Collaborative Large-scale Integrating Project

Open Platform for EvolutioNary Certification Of Safety-critical Systems

List of proposed requirements for Avionics domain
Annex D1.1.b to deliverable D1.1

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Contributors

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Document History

Version	Date	Remarks
V0.1	2012-03-05	First emission
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V0.3	2012-03-09	Update
V0.4	2012-03-20	Ready for PB Approval
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NB: The following examples of proposed requirements for avionics field focus essentially on European Union (EU) Civil Aviation regulatory environment and on Avionics equipment installed on-board aircraft.

1 SAFETY POLICY

The proposed avionics requirements, which constitute "Certification Policy", including "Safety Policy" according to the reference standards are detailed below. These include also requirements as they relate to "Certification and Safety Organisation".
Rationale: Certification policy within the Avionics field is essentially derived from legal duties and must incorporate regulatory requirements that are binding on the Products, Processes and Organisations. Though Safety is one of the major objectives in Certification, multiple other aspects must be addressed. Refer to D1.1 section 4 for details.

<TAV> 0003: <Type certification>	
Alias	Type certification
Status	Proposed
App. Domain	Avionics
Type	Safety Policy
Priority	High
Description	Type Certificate (TC). In order to be granted a TC, based on the Type Design, an Aeronautical Product shall be assessed to meet its applicable airworthiness requirements. "Type Design" Refer to section 4 Safety Product ad D.1.1 definitions
Derived from	

<TAV> 0001: <Certification>	
Alias	Certification
Status	Proposed
App. Domain	Avionics
Type	Safety Policy
Priority	High
Description	Certification shall be understood as the formal recognition and Legal statement (written certificate), by the state authority, that an aeronautical product complies with the applicable regulations. "Aeronautical product" means an aircraft, engine or propeller.
Derived from	

<TAV> 0002: <Airworthiness>	
Alias	Airworthiness
Status	Proposed
App. Domain	Avionics
Type	Safety Policy
Priority	High
Description	- Individual Airworthiness: To obtain a Certificate Of Airworthiness (COA) an individual Aeronautical Product conformity shall be determined conform to its Type Design, and in condition for safe flight operation. - Continued Airworthiness: In-service Aeronautical products shall be monitored to maintain their airworthiness in compliance with regulations, and to correct any defect that might affect safety.
Derived from	

<TAV> 0004: <Certification requirements>	
Alias	Certification requirements
Status	Proposed
App. Domain	Avionics
Type	Safety Policy
Priority	High
Description	Certification requirements derive from legal duties and associated rules & regulations. Hence the mandatory Certification process shall be conducted. The main EASA Certification Specifications and Implementing Rules used for avionics are:
Derived from	EASA standards

Airworthiness Regulation	Aircraft weight category	Aircraft type/Procedure
EASA CS-23 / FAR 23	>/= 5700 kg (12,500 lb)	Small Aeroplanes – Fixed wing
EASA CS-25 / FAR 25	> 5700 kg (12,500 lb)	Large Aeroplanes – Fixed wing
EASA CS-27 / FAR 27	>/= 3200 kg (7,000 lb)	Small Rotorcraft – Rotary wing
EASA CS-29 / FAR 29	> 3200 kg (7,000 lb)	Large Rotorcraft – Rotary wing
EASA Part 21 / FAR 21	All	Certification procedures for Aircraft and related parts

<TAV> 0013: <Acceptance>	
Alias	Acceptance
Status	Proposed
App. Domain	Avionics
Type	Safety Processes
Priority	High
Description	Acceptance shall be understood as the acknowledgement by the certification authority, that the module, application, or system complies with its defined requirements. Acceptance is recognition by the certification authority (typically in the form of a letter or stamped data sheet) signifying that the submission of data, justification, or claim of equivalence satisfies applicable guidance or requirements. The goal of acceptance is to achieve credit for future use in a certification project.
Derived from	

<TAV> 0014: <Incremental acceptance>	
Alias	Incremental acceptance
Status	Proposed
App. Domain	Avionics
Type	Safety Processes
Priority	High
Description	Incremental acceptance shall be understood as the process for obtaining credit toward approval and certification by accepting or finding that an Integrated Modular Avionics (IMA) module, application, and/or off-aircraft IMA system complies with specific requirements. This incremental acceptance is divided into tasks. Credit granted for individual tasks contributes to the overall certification goal. Incremental acceptance provides the ability to integrate and accept new applications and/or modules, in an IMA system, and maintain existing applications and/or modules without the need for re-acceptance.
Derived from	

<TAV> 0012: <Approval>	
Alias	Approval
Status	Proposed
App. Domain	Avionics
Type	Safety Processes
Priority	High
Description	Approval shall be understood as the act or instance of giving formal or official acknowledgement of compliance with regulations. In the context of Integrated Modular Avionics (IMA), there are typically two forms of approval: - approval of submitted life cycle data by the certification authority (usually demonstrated by issuance of a stamped letter of approval), - installation approval by the issuance of an aircraft or engine type certificate and a subsequent individual airworthiness certificate.
Derived from	

<TAV> 0005: <Design organisation approval>	
Alias	Design organisation approval
Status	Proposed
App. Domain	Avionics
Type	Safety Policy
Priority	High
Description	Aeronautical Product manufacturers shall demonstrate their capability to design Product for which they request a TC. To this end, they shall obtain EASA Design Organisation Approval (DOA). Aeronautical Product manufacturers holding a EASA DOA are delegated some privileges (e.g.: approval of minor changes). Some equipment manufacturers shall obtain the A-DOA (Alternate DOA), which is now mandatory to design ETSO/TSO units.
Derived from	EASA Part-21

<TAV> 0006: <Production organisation approval>	
Alias	Production organisation approval
Status	Proposed
App. Domain	Avionics
Type	Safety Policy
Priority	High
Description	Equipment manufacturers shall be recognized to be able to manufacture units of equipment and be able to determine airworthiness prior to releasing those units for installation on aircraft. To this end, they shall obtain an EASA Production Organisation Approval (POA)
Derived from	EASA Part 21 G POA

<TAV> 0007: <Maintenance organisation approval>	
Alias	Maintenance organisation approval
Status	Proposed
App. Domain	Avionics
Type	Safety Policy
Priority	High
Description	Equipment manufacturers Repair Stations shall be recognized to be able to maintain and/or repair the units of equipment and ensure they conform to the original manufacture prior to release those units to service. To this end, they shall obtain an EASA Maintenance Organisation Approval (MOA).
Derived from	EASA Part 145 MOA

Note: The organization for certification may differ from a country to the other. For example the US FAA system is using designated personnel such as the Designated Engineering Representatives (DERs), while the EU EASA system is based on approval of organizations for design, production, maintenance.

2 SAFETY PROCESSES

The proposed avionics requirements, which constitute "Certification processes", including "Safety Processes" according to the reference standards are detailed below. These include also requirements as they relate to "Development Assurance".
Rationale: Certification process within the Avionics field is closely linked to the concept of Development Assurance including Safety Assurance as one of the major aspects of Certification. Certification means both the target objective (e.g. a written certificate), and most importantly the route leading to that target (e.g. the certification process).

<TAV> 0009: <Certification basis>	
Alias	Certification basis
Status	Proposed
App. Domain	Avionics
Type	Safety Processes
Priority	High
Description	All applicable certification requirements shall be defined on the basis of Authorities' expectations (e.g.: EASA Certification Review Items (CRIs) or FAA Issue Papers (IPs). Those CRis and IPs address each and every issue from design to testing.
Derived from	

<TAV> 0008: <Certification process>	
Alias	Certification process
Status	Proposed
App. Domain	Avionics
Type	Safety Processes
Priority	High
Description	The objective of the Certification Process shall be to demonstrate that a product meets its functional and safety requirements. The certification process shall extend from Proof of Concept through project development, including design from requirements to actual software and hardware and verification via analyses and testing, to in-service operations, including continued airworthiness (maintenance). Aircraft aspects shall be under control of the aircraft manufacturer, as the applicant, then holder of the aircraft Type Certificate (TC). The certification process, at aircraft level shall include first the establishment of a Certification Basis as the starting point of such a process, Then, Means of Compliance (MOC) shall be deployed with the aim to show compliance with regulatory requirements with an extensive coverage, Finally compliance reports and records shall be associated with MOCs and produced then submitted to Airworthiness Authorities for agreement.
Derived from	

<table>
<tr><th colspan="2"><TAV> 0010: <Means of compliance></th></tr>
<tr><td>Alias</td><td>Means of compliance</td></tr>
<tr><td>Status</td><td>Proposed</td></tr>
<tr><td>App. Domain</td><td>Avionics</td></tr>
<tr><td>Type</td><td>Safety Processes</td></tr>
<tr><td>Priority</td><td>High</td></tr>
<tr><td>Description</td><td>Means of Compliance (MOCs) shall be the various types of methods used first at Aeronautical Product level then at any level to show compliance with regulatory requirements along with the development process. The MOCs ashall be independent from the DAL but variable in terms of providing extensive assurance (e.g. testing is generally more convincing but sometimes lacks some representativity).

List of MOCs:
<table>
<tr><th>Means of Compliance</th><th>Description</th></tr>
<tr><td>MOC # 0: Noted (N)</td><td>Declarations of Performance or verifiable statements</td></tr>
<tr><td>MOC # 1: Review (R)</td><td>Design reviews and descriptive data and drawing</td></tr>
<tr><td>MOC # 2: Analysis (A)</td><td>Miscellaneous engineering and technical analyses</td></tr>
<tr><td>MOC # 3: Failure Analysis (FA)</td><td>SSA (based on FTA, FMEA or other methods)</td></tr>
<tr><td>MOC # 4: Functional Tests (FT)</td><td>Testing performed on representative test rigs</td></tr>
<tr><td>MOC # 5: Ground Tests (GT)</td><td>Testing using aircraft test rig & aircraft on ground</td></tr>
<tr><td>MOC # 6: Tests in-Flight (TF)</td><td>Testing using aircraft during roll-out and in-flight</td></tr>
<tr><td>MOC # 7: Inspections (I)</td><td>Examinations by Authorities representative or their delegates</td></tr>
<tr><td>MOC # 8: Flight Simulations (FS)</td><td>Evaluations on representative Flight simulators</td></tr>
<tr><td>MOC # 9: Data (D)</td><td>Qualification (equipment, System S/W & H/W)</td></tr>
</table>
</td></tr>
<tr><td>Derived from</td><td></td></tr>
</table>

<table>
<tr><th colspan="2"><TAV> 0011: <Industry standards></th></tr>
<tr><td>Alias</td><td>Industry standards</td></tr>
<tr><td>Status</td><td>Proposed</td></tr>
<tr><td>App. Domain</td><td>Avionics</td></tr>
<tr><td>Type</td><td>Safety Processes</td></tr>
<tr><td>Priority</td><td>High</td></tr>
<tr><td>Description</td><td>Aeronautical product manufacturers shall use industry standards adapted to the reglatory material and consistent with other advisory material. These Industry Standards are recognized by Authorities as to provide adequate guidance in terms of Interpretative Material or Acceptable Means of Compliance (AMC) with applicable regulations.

List of Industry Standards, which provide guidance on certification process :
<table>
<tr><th>Domain</th><th>Standard</th></tr>
<tr><td>Safety</td><td>SAE ARP 4761 -- EUROCAE ED-135</td></tr>
<tr><td>System</td><td>SAE ARP 4754A - EUROCAE ED-79A</td></tr>
<tr><td>Integrated Modular Avionics</td><td>RTCA DO-297 - EUROCAE ED-124</td></tr>
<tr><td>Software</td><td>RTCA DO-178C - EUROCAE ED-12C</td></tr>
<tr><td>Hardware</td><td>RTCA DO-254 -- EUROCAE ED-80</td></tr>
<tr><td>Environmental</td><td>RTCA DO-160G - EUROCAE ED-14G</td></tr>
</table>
</td></tr>
<tr><td>Derived from</td><td></td></tr>
</table>

Note: There are also many other standards available to provide more product-oriented guidance, including for example minimum operating performance standards that have have determined as acceptable to meet both performance and safety objectives for a particular product or appliance. The requirements below are concentrating on the Industry Standards that are providing process-oriented guidance.

<table>
<tr><th colspan="2"><TAV> 0031: <Industry standards></th></tr>
<tr><td>Alias</td><td>Industry standards</td></tr>
<tr><td>Status</td><td>Proposed</td></tr>
<tr><td>App. Domain</td><td>Avionics</td></tr>
<tr><td>Type</td><td>Safety Processes</td></tr>
<tr><td>Priority</td><td>High</td></tr>
<tr><td>Description</td><td>The System Development Assurance process shall comply with the guidelines of:
<table>
<tr><th>Domain</th><th>Standard</th></tr>
<tr><td>System</td><td>SAE ARP 4754A - EUROCAE ED-79A</td></tr>
<tr><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Derived from</td><td></td></tr>
</table>

<TAV> 0032: <Industry standards>	
Alias	Industry standards
Status	Proposed
App. Domain	Avionics
Type	Safety Processes
Priority	High
Description	The Safety Assurance process shall comply with the guidelines of: **Domain** | **Standard** Safety | SAE ARP 4761 -- EUROCAE ED-135
Derived from	

<TAV> 0033: <Industry standards>	
Alias	Industry standards
Status	Proposed
App. Domain	Avionics
Type	Safety Processes
Priority	High
Description	The IMA Development Assurance process shall comply with the guidelines of: **Domain** | **Standard** Integrated Modular Avionics | RTCA DO-297 – EUROCAE ED-124
Derived from	

<TAV> 0034: <Industry standards>	
Alias	Industry standards
Status	Proposed
App. Domain	Avionics
Type	Safety Processes
Priority	High
Description	The Software Development Assurance process shall comply with the guidelines of: **Domain** | **Standard** Software | RTCA DO-178C - EUROCAE ED-12C
Derived from	

<TAV> 0035: <Industry standards>	
Alias	Industry standards
Status	Proposed
App. Domain	Avionics
Type	Safety Processes
Priority	High
Description	The Hardware Development Assurance process shall comply with the guidelines of: **Domain** | **Standard** Hardware | RTCA DO-254 – EUROCAE ED-80
Derived from	

<TAV> 0036: <Industry standards>	
Alias	Industry standards
Status	Proposed
App. Domain	Avionics
Type	Safety Processes
Priority	High
Description	The Environmental Conditiond Assurance process shall comply with the guidelines of: **Domain** / **Standard** Environmental / RTCA DO-160G - EUROCAE ED-14G
Derived from	

<TAV> 0015: <Development assurance>	
Alias	Development assurance
Status	Proposed
App. Domain	Avionics
Type	Safety Processes
Priority	High
Description	Development assurance shall comprise all of those planned and systematic actions used to substantiate, at an adequate level of confidence, that development errors have been identified and corrected such that the system satisfies the applicable Certification Basis.
Derived from	

<TAV> 0016: <Development assurance level>	
Alias	Development assurance level
Status	Proposed
App. Domain	Avionics
Type	Safety Processes
Priority	High
Description	Systems and items shall be assigned “Development Assurance Levels (DAL)” based on Failure Condition classifications associated with aircraft-level functions implemented in the systems and items. The rigor and discipline needed in performing the related processes for Systems, Hardware and Software shall then be tailored in relationship to the assigned Development Assurance Level.
Derived from	

<table>
<tr><th colspan="2"><TAV> 0017: <System development assurance levels></th></tr>
<tr><td>Alias</td><td>System development assurance level</td></tr>
<tr><td>Status</td><td>Proposed</td></tr>
<tr><td>App. Domain</td><td>Avionics</td></tr>
<tr><td>Type</td><td>Safety Processes</td></tr>
<tr><td>Priority</td><td>High</td></tr>
<tr><td>Description</td><td>The system DAL shall be assigned based on the most severe Failure Condition classification associated with the applicable aircraft-level function(s):
<table>
<tr><th>Failure Condition (FC) Classification</th><th>Development Assurance Level (DAL)</th></tr>
<tr><td>Catastrophic</td><td>A</td></tr>
<tr><td>Hazardous / Severe Major</td><td>B</td></tr>
<tr><td>Major</td><td>C</td></tr>
<tr><td>Minor</td><td>D</td></tr>
<tr><td>No safety effect</td><td>E</td></tr>
</table>
</td></tr>
<tr><td>Derived from</td><td></td></tr>
</table>

<TAV> 0018: <Item development assurance level>	
Alias	Item development assurance level
Status	Proposed
App. Domain	Avionics
Type	Safety Processes
Priority	High
Description	The Item DAL shall be allocated on the basis of the overall system architecture through allocation of risk determined using the PSSA (Preliminary System Safety Assessment per SAE ARP-4761). For items that support multiple aircraft functions, the applicable safety requirement shall be based on the most severe of the effects resulting from failure or malfunction of any supported aircraft function or any combination of supported functions. - If the PSSA shows that the system architecture provides containment for the effects of design errors (i.e. aircraft-level effects of such errors are sufficiently benign), development assurance activities shall be conducted at a reduced level of rigor for the system items within the architectural containment boundary. - If a system has multiple categories of Failure Conditions associated with its different functions, architectural means shall be used to limit the interaction between items. This may allow the separate items to be developed at different assurance levels. - System architectural features, such as redundancy, monitoring or partitioning, shall be used to eliminate or contain the degree to which an item contributes to a specific failure condition, allowing simplification or reduction of the necessary assurance activity. - Assurance that the item level assignments and their independence are acceptable shall be validated at the higher level and verified by the SSA (System Safety Assessment, refer to ARP4761). SAE ARP-4754 give insight into the correspondence between development assurance level and the recommended activities contained within the supporting processes.
Derived from	

<TAV> 0019: <Design levels>	
Alias	Design levels
Status	Proposed
App. Domain	Avionics
Type	Safety Processes
Priority	High
Description	The DAL shall determine the necessary software and hardware design levels of DO-178B and DO-254. - Software level: The software levels and processes for compliance, as defined in EUROCAE ED-12B/RTCA DO-178B, shall be related to the failure condition classifications of the ARP4754 DAL. - Hardware level: When deterministic techniques cannot be used or are insufficient to demonstrate the safety of hardware design then the EUROCAE ED-80/RTCA DO-254 shall applies per allocated DAL.
Derived from	

<TAV> 0020: <Process assurance>	
Alias	Process assurance
Status	Proposed
App. Domain	Avionics
Type	Safety Processes
Priority	High
Description	Along with the development and certification process, the Process Assurance shall be a transverse activity implemented tshall ensure that the development assurance activities are maintained and followed. The objectives of the process assurance activities shall be: a. To ensure the necessary plans are developed, and then maintained for all aspects of aircraft, system and item development. b. To ensure development activities and processes are conducted in accordance with those plans. c. To establish evidence that the activities and processes adhere to the plans.
Derived from	

<TAV> 0025: <Functional hazard assessment>	
Alias	Functional hazard assessment
Status	Proposed
App. Domain	Avionics
Type	Safety Product
Priority	High
Description	Functional Hazard Assessment (FHA) shall consist in identifying and classifying the Failure Condition(s) associated with the aircraft functions and combinations of aircraft functions. These Failure Conditions classifications shall establish the safety objectives. The output of the FHA shall be used as the starting point for conducting the PSSA. - Postulate Hazards Based on the Failures of Functions; The FHA is independent of the H/W and S/W implementations, - Derive Overall Effect of Hazard on System/Aircraft and People – Classify Failure Conditions effects, - Assess Severity of Failure Condition – Assign Classification. FHA provides the Fault Tree Analysis (FTA) Top Events.
Derived from	

<TAV> 0026: <Preliminary system safety assessment>	
Alias	Preliminary system safety assessment
Status	Proposed
App. Domain	Avionics
Type	Safety Product
Priority	High
Description	Preliminary System Safety Assessment (PSSA) shall be a system evaluation of the proposed architecture(s) and implementation(s) based on the Function Hazard Assessment (FHA) Failure Conditions classifications and shall determine safety requirements of the system. The PSSA shall establish the safety requirements of the system and shall determine that the proposed system architecture can reasonably be expected to meet the safety objectives identified by the FHA (i.e. how failures can cause the functional hazards of the FHA). The PSSA shall be an iterative analysis associated with the design definition and imbedded within the overall development. PSSA shall provide a systematic means of evaluating safety early in the design process and to reduce surprises at the end of the development program. The PSSA shall take the form of a Fault Tree Analysis (FTA) (Dependence Diagram (DD) or Markov Analysis (MA)) and shall also include common cause analysis (CCA) (see below). System-level safety requirements and DAL s shall be allocated to items hardware and software.
Derived from	

<TAV> 0027: <System safety assessment>	
Alias	System safety assessment
Status	Proposed
App. Domain	Avionics
Type	Safety Product
Priority	High
Description	System Safety Assessment (SSA) shall be a systematic, comprehensive evaluation of the implemented system conducted to show that the qualitative and quantitative safety requirements as defined in the FHA and PSSA have been met. It shall evaluate the implemented system to show that safety objectives from the FHA and derived safety requirements from the PSSA are met. The SSA shall be based on the PSSA FTA (DD or MA may also be used) and shall use the quantitative values obtained from the FMEA/FMES. The SSA shall verify that all significant effects identified in the FMES are compatible with FTA primary events. The SSA shall also include applicable Common Cause Analysis (CCA) results. Additional activities known as Common Causes Analyses (CCA) of safety in aircraft avionics shall include: - Common Mode Analysis (CMA) to address potential common modes of failures across systems, - Zonal Safety Analysis (ZSA) to cover specific aspects of systems installation and location on aircraft, - Particular Risks Analysis (PRA) to cater for very specific aspects (rotor burst, bird strikes, fire, etc.). Note: Those three types of analysis above can be partially performed at an avionic system level or may involve part or all of an avionic systems but they can only be resumed and completed as an integral part of the [Preliminary] Aircraft Safety Assessment (PASA/ASA).
Derived from	

3 SAFETY PLANNING

The proposed avionics requirements which constitute “Certification Planning, including “Safety Planning” according to the reference standards are detailed below. These include also requirements as they are related to the “Certification and Safety Data Package”.
Rationale: Certification planning of activities within the Avionics field is essential to ensure adequate control and monitoring of activities that are formally mandated to produce documented evidence in meeting the assigned objectives. Documented evidence means Certification Data Package produced as evidence of compliance with the Certification requirements.

<TAV> 0041: <Certification plan>	
Alias	Certification Plan
Status	Proposed
App. Domain	Avionics
Type	Safety Planning
Priority	High
Description	Certification Plans shall be established at the adequate levels (System, Safety, Hardware, Software, and Environmental), to describe the proposed methods of showing compliance with Certification Basis.. Refer to Industry Standards for the details on each Certification Plan.
Derived from	

<TAV> 0042: <Development plan>	
Alias	development Plan
Status	Proposed
App. Domain	Avionics
Type	Safety Planning
Priority	High
Description	Development Plans shall be established at the adequate levels (System, Safety, Hardware, Software, and Environmental), to describe the proposed processes planned for use. Refer to Industry Standards for the details on each Development Plan.
Derived from	

<TAV> 0043: <Validation & Verification plan>	
Alias	Validation & Verification Plan
Status	Proposed
App. Domain	Avionics
Type	Safety Planning
Priority	High
Description	Validation and Verification Plans shall be established at the adequate levels (System, Safety, Hardware, Software), to describe the proposed specific methods used for validation of requirements and verification versus requirements. Refer to Industry Standards for the details on each Validation & Verification Plan.
Derived from	

<TAV> 0044: <Configuration Management plan>	
Alias	Configuration Management plan
Status	Proposed
App. Domain	Avionics
Type	Safety Planning
Priority	High
Description	A Configuration management Plan shall be established to describe the means and specific methods used at various levels (System, Safety, Hardware, Software), to identify items, establish baselines, problem reporting and change control, archive and retrieval
Derived from	

<TAV> 0023: <Process assurance plan>	
Alias	Process assurance plan
Status	Proposed
App. Domain	Avionics
Type	Safety Planning
Priority	High
Description	A Process Assurance Plan shall be established to describe the means to assure that the practices and procedures to be applied during development at various levels (System, Safety, Hardware, Software). Particular emphasis is placed on the certification-related activities. Process Assurance activities are generally part of the conventional Quality Assurance activities, together with the Product Assurance activities, and are conducted with the required independence.
Derived from	

<table>
<tr><th colspan="2"><TAV> 0021: <Level of involvement></th></tr>
<tr><td>Alias</td><td>Level of involvement</td></tr>
<tr><td>Status</td><td>Proposed</td></tr>
<tr><td>App. Domain</td><td>Avionics</td></tr>
<tr><td>Type</td><td>Safety Planning</td></tr>
<tr><td>Priority</td><td>High</td></tr>
<tr><td>Description</td><td>Depending on the criticality, complexity and novelty of the hardware or software item, and based on other considerations, the Certification Authorities shall define their Level of Involvement (LOI) from “NONE” to “HIGH”.
This LOI will then determine both the review effort and data submittal requirements that shall be fulfilled.
<table>
<tr><th>LOI</th><th>Reviews</th></tr>
<tr><td>HIGH</td><td>At least 2 on-site reviews (e.g. Design Review, Verification review)
+ desktop reviews (e.g. Planning Review, Final Certification Review)
+ additional technical meetings (e.g. novelty)
+ Review of applicant Review Reports</td></tr>
<tr><td>MEDIUM</td><td>At least 1 on-site review (e.g. combined Design and Verification Reviews)
+ desktop reviews (e.g. Planning Review and Final Certification Review)
+ additional technical meetings
+ Review of applicant Review Reports</td></tr>
<tr><td>LOW</td><td>Desktop reviews
+ Review of applicant Review Reports</td></tr>
<tr><td>NONE</td><td>Review of applicant Review Reports. Note that EASA may increase its involvement if they decide so</td></tr>
</table>
</td></tr>
<tr><td>Derived from</td><td></td></tr>
</table>

<table>
<tr><th colspan="2"><TAV> 0022: <Stages of involvement></th></tr>
<tr><td>Alias</td><td>Stages of involvement</td></tr>
<tr><td>Status</td><td>Proposed</td></tr>
<tr><td>App. Domain</td><td>Avionics</td></tr>
<tr><td>Type</td><td>Safety Planning</td></tr>
<tr><td>Priority</td><td>High</td></tr>
<tr><td>Description</td><td>The development approval process leading to certification shall be controlled and monitored via formal reviews conducted along with the process at key milestones known as the Stages Of Involvement (SOI) with Authorities. SOI Reviews [Audits] shall be planned, prepared and conducted to meet the certification process requirements and Authorities expectations
<table>
<tr><th>SOI</th><th>Description</th></tr>
<tr><td>SOI #1</td><td>Planning Review is conducted when the initial planning process is completed, to determine whether the applicant’s plans and standards satisfy the objectives of the standards, both hardware and software.</td></tr>
<tr><td>SOI #2</td><td>Development Review is conducted when the design process and resulting data are sufficiently complete and mature to ensure that enough evidence exists to show effective implementation of the plans and application of the standards.</td></tr>
<tr><td>SOI #3</td><td>Verification Review is conducted when the verification process and resulting data are sufficiently complete and mature to ensure that representative data exists to show effective implementation of the plans and application of the standards.</td></tr>
<tr><td>SOI #4</td><td>Final [Certification] Review is conducted when all the development activities are completed for the final configuration identified and considered applicable and valid for the intended to be certified equipment, system, hardware and software.</td></tr>
</table>
</td></tr>
<tr><td>Derived from</td><td></td></tr>
</table>

4 SAFETY PRODUCT

The proposed avionics requirements which constitute “Certification and Safety Product” according to the reference standards are detailed below.
Rationale: The term “Certification” is normally used in relationship with the so-called Type Certification of Aeronautical Products such as aircraft, engines or propellers. However it is also commonly used by extension to their parts & appliances, i.e. equipment or systems, software and hardware for which it designates the approval of the related design by Authorities.

<TAV> 0024: <Type design>	
Alias	Type design
Status	Proposed
App. Domain	Avionics
Type	Safety Product
Priority	High
Description	The Type Design shall consist of: 1. Drawings and specifications that define the “as designed” configuration of the product; 2. Information on materials and processes and on methods of manufacture and assembly; 3. Airworthiness limitations in the instructions for continued airworthiness section; and 4. Other data necessary to allow determination of airworthiness (noise & emissions, fuel venting).
Derived from	
<TAV> 0051: <Configuration Index>	
Alias	Configuration Index
Status	Proposed
App. Domain	Avionics
Type	Safety Planning
Priority	High
Description	Configuration Indexes shall be established at the adequate levels (System, Hardware, Software), to identify the physical items that together constitute a System Refer to Industry Standards for the details on each Configuration Index.
Derived from	

<TAV> 0052: <Accomplishement Summary>	
Alias	Accomplishement Summary
Status	Proposed
App. Domain	Avionics
Type	Safety Planning
Priority	High
Description	Accomplishment Summaries shall be established at the adequate levels (System, Hardware, Software), to provide the outlines f the results of the certification activities established in the corresponding plan. Refer to Industry Standards for the details on each Validation & Verification Plan.
Derived from	

<table>
<tr><th colspan="2"><TAV> 0028: <Certification data package></th></tr>
<tr><td>Alias</td><td>Certification data package</td></tr>
<tr><td>Status</td><td>Proposed</td></tr>
<tr><td>App. Domain</td><td>Avionics</td></tr>
<tr><td>Type</td><td>Safety Product</td></tr>
<tr><td>Priority</td><td>High</td></tr>
<tr><td>Description</td><td>The data packages formally mandated via applicable certification requirements shall be those established by Industry Standards. In addition few documents shall be formally submitted, while the others produced and made available depending on the document, the Level Of Involvement (LOI), or DAL.
<table>
<tr><th>LOI</th><th>PSAC, TQP
PHAC, TQP</th><th>SAS
HAS</th><th>SCI (VDD)
HCI (CID)</th><th>Other SW/HW plans</th></tr>
<tr><td>HIGH</td><td>For agreement</td><td>For agreement</td><td>For information</td><td>For information</td></tr>
<tr><td>MEDIUM</td><td>For agreement</td><td>For agreement</td><td>For information</td><td>For information</td></tr>
<tr><td>LOW</td><td>For information</td><td>On request</td><td>On request</td><td>On request</td></tr>
<tr><td>NONE</td><td>On request</td><td>On request</td><td>On request</td><td>On request</td></tr>
</table>
</td></tr>
<tr><td>Derived from</td><td></td></tr>
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