

Implementation of the ECCAIRS electronic data transfer file (E5X) in EASA's Top Reporting Organisations

1 INTRODUCTION

Regulation (EU) No 376/2014 mandates organisations to report in an ADREP taxonomy and ECCAIRS software compatible format. The Data Flow Working Group of the Network of Analysts has developed, together with the JRC, a standard interface to comply with this requirement specially designed for organisations reporting with a significant volume of occurrences and/or targeting organisations with extended IT technical capabilities, Top Reporting Organisations (TRO) hereafter. This method of Data File Exchange is a standard interface and is the so called "E5X" file type.

Note that this IT-technical centric interface is one of the three software compatible methods that will be made available to report in order to comply with Regulation 376/2014. The other two methods, Online Web Reporting and Offline Document Reporting, will be documented and described in later notes, when those methods are made available.

Furthermore, the usage of one method, does not exclude the use of any of the other methods. TROs or other stakeholder can use any combination of the three methods to report in order to be compliant with Regulation 376/2014, or to decide discussing any alternative one providing the same level of compliance.

This paper aims at providing the details to EASA TROs on how the Data File Exchange (E5X file) method needs to be implemented in local systems. The note is accompanied by:

1. A White Paper describing the format and explaining how to create the E5X package, and
2. The Reduced Interface Taxonomy (RIT) Schema providing the XSD structure to build a compliant and valid E5X file.

2 E5X FILE

E5X file is the zip of occurrence(s) data stored in XML(s) file(s) and any other file(s) attached to those occurrences. The content of XML file complies with the ECCAIRS XSD schema, which is built out of the ECCAIRS aviation taxonomy. The file can be opened in an ECCAIRS environment without any previous conversion. E5X files can be created from IT environments without requiring an ECCAIRS installation.

This file type is only used for transferring information from reporting organisations not using - ECCAIRS to an ECCAIRS environment, normally in the Competent Authority in the MS or in the Agency. E5X file cannot be (and is not intended to be) generated from an ECCAIRS environment.

The White Paper attached contains the technical description of the E5X file and the technical instructions to generate it.

3 REDUCED INTERFACE TAXONOMY (RIT)

The data in an E5X file is based on the so called Reduced Interface Taxonomy (RIT). RIT is a subset of the ECCAIRS aviation taxonomy defined by the Network of Analysts (NoA). It contains the necessary attributes and values to, firstly, enable compliance with the regulatory requirements (e.g., use of ADREP taxonomy, reporting of mandatory data fields, etc.) and secondly, to convey additional information which may be relevant for enhancing safety analysis and trend monitoring.

In order to facilitate the implementation of the E5X format in TROs, the NoA has agreed with the ECCAIRS Steering Committee to freeze the structure of the ECCAIRS taxonomy contained in the RIT for the next 3 years (till 2018). Changes in the structure of the RIT will be considered a major update and it will only be done every 3 year. Within this 3-year interval, the RIT could evolve but always ensuring backwards compatibility and only by having incremental changes in attributes or values of attributes (minor update). The RIT could be then updated, together with the ECCAIRS XSD package, every 6 months. Integration of the new XSD will be optional for organisations, but not for MS if any of their organisations has decided to go for the minor update. Implementation of major 3-year updates will be, in principle, required for all organisations using the E5X file for reporting.

4 TIPS FOR TRO

While implementing the reporting in E5X file as the reporting mean for TROs, TROs should consider certain aspects.

4.1 Integration strategy

The integration of the ECCAIRS XSD could be done in two ways by the TROs:

1. Mapping out the TRO internal database taxonomy against ECCAIRS XSD to create the E5X file,
2. Integrating the ECCAIRS XSD as the taxonomy of the local database,
3. A free combination of 1 and 2.

The strategy to implement the ECCAIRS XSD is left to each TRO; E5X files should not be affected by the strategy chosen.

4.2 Trim of RIT

The RIT is a subset of the ECCAIRS taxonomy. However, it is still a large taxonomy with more than 150 attributes and more than 120 value lists. In this document the Agency defines the list of attributes to be implemented by TROs out of the RIT, what these attributes should contain and the rules of use of the taxonomy. The subset includes the mandatory attributes listed in the Annex I of the R376/2014 (except those specific fields related to Air Navigation Services and Aerodromes), but also additional ones necessary for the processing of the information. These additional fields were already contained in the previous technical specifications for TROs (IORS XSD v4). The selection of attributes may differ depending on the type of TRO and on the domain or area where the TRO develops its operations or provides its services. In practical terms, the subset of the RIT aims at achieving a balance between the transfer of the data captured by the TRO being possibly used at

National or European level to enhance safety analysis and trend monitoring, and the feasible implementation in each TRO. The subset here referred is detailed at the end of this document.

4.3 Inclusion of attachments in E5X

E5X files allow attaching files to the occurrences contained in the file. However, this feature should be carefully implemented as it is not possible to limit the size of the attachments in the current setup. Transmission and processing of big size files will penalise the overall performance of the system. The Agency proposes limiting the size of the files attached to an E5X to less than 10Mbytes in total. This limit can be reviewed by enabling a wide-band file transfer channel (e.g., EASA File-box, FTPS).

4.4 Naming convention for E5X files

TROs may decide on any naming convention suiting better their systems. However, TROs are invited to consider the naming convention agreed in the IORS XSD v4, where the name of the E5X file complies with the following:

RRRRRRRRRRRR-IIIIII-YYYYMMDD.E5X

Where:

Field	# ¹	Type ²	Designation
RRRRRRRRRRR R	12-	A	Reporting Organisation Name coded on a maximum of 12 alphanumeric characters. This code has to remain unchanged for all XML files deliveries.
IIIIII	6	N	File Identification number ("000001", "000002", ...), continuously incremental.
YYYY	4	N	Year of the file creation (with the century).
MM	2	N	Month (of the year) of the file creation. That is "01" for January, "02" for February, ..., "12" for December.
DD	2	N	Day (of the month) of the file creation. That is "01" for the 1st day of the month, "02" for the 2nd day of the month, ..., "28" or "29" or "30" or "31" for the last day of the month.
.E5X	3	L	File extension, ".E5X"

4.5 Technical support to TROs

The documentation package has been developed to ease the implementation of the electronic data transfer file for TROs.

In the preparation and implementation of the electronic transfer file solution, there are two aspects to be distinguished:

1. the technical support for the TRO to build a compliant E5X file (IT wise), and

¹ #: length of identification element.

² Type: L for letter, N for numerical, A for alphanumeric.

2. the agreement with EASA on the content of the E5X file (aviation wise) to make it compliant with requirements in Regulation 376/2014.

On the first aspect, the documentation (E5X white paper) and associated technical specifications (XSD files) target people with good knowledge of IT, normally seating in the IT departments of the TRO and it should be sufficient to achieve its successful implementation. However, the JRC may provide additional technical advice to the TROs.

The second aspect is covered by this paper. TROs will find here below the acceptable means to implement the E5X solution.

5 USE OF TAXONOMY

In order to ensure a minimum quality of the data transferred from the TRO system to EASA, as required by Regulation 376/2014, it is necessary to define not only the attributes to be sent, but also the minimum content of those attributes and some basic rules to follow while filling them in.

5.1 General rules

The following rules are general rules in the use of the RIT taxonomy. In certain cases, these rules are overridden as described in the table of paragraph Annex I.

1. Each attribute in the RIT and each value in the value list contain their definition and own rules of use. Definitions and rules are included in the documentation items in the XSD scheme. TRO should use attributes and provide their values consistently with those definitions.
2. Should the information of any attribute be unknown or not relevant for the occurrence, the attribute should be empty (not transmitted, as empty tags are not allowed in the XML) or with the value "Unknown".
3. In a value list with more than one level, always the lowest level in the tree should be envisaged. However, failing to find an appropriate value in that lowest level, immediate upper level should be checked. This escalation should be iterated until the most adequate value, though more generic, is found.
4. Some attributes may contain more than one value, hence the most complete information should be provided.
5. Some attributes allow code value and free text. In this case, free text should be used to complete the coded value where the coded value is not entirely describing the intended information.
6. The free text fields should not contain personal information, like persons' names, email address, phone numbers, etc.

5.2 Detailed use of taxonomy for EASA TROs

For the subset of RIT attributes defined by EASA for EASA TROs, the table in Annex I contains further information to facilitate their implementation in TRO systems. The table identifies:

- Entity Identification Number (Entity ID) as defined in the XSD scheme
- Entity Name as defined in the XSD scheme

- Attribute identification number (Attr. ID) as defined in the XSD scheme
- Short description of the attribute as defined in the XSD scheme
- Remarks for implementation, where additional guidelines are given specific for that attribute
- Reference to IORS XSD v4, identifying a “peer” attribute in the previous IORS XSD v4
- Qualifier, defining the status of the attribute
 - o Mandatory: Attributes listed in Annex I of R376/2014 and applicable to EASA TROs (Annex I paragraphs 1, 2.1 and 2.4). TRO shall be able to provide all mandatory attributes listed.
 - o Recommended: Attributes currently listed in the IORS XSD v4 and/or that provide information that could be useful for report processing and safety analysis. It is expected that TROs would provide all Recommended attributes that they already provide currently when applying the IORS XSD v4. TRO systems may enable the transfer of the rest of the Recommended attributes, especially if they are currently recorded in TRO databases.
- Value List, reference to the applicable value list in the XSD (not applicable for all attributes)
- Detailed description, as defined in XSD scheme.

6 IMPLEMENTATION OF E5X FILES IN TRO

The implementation of the E5X file transfer solution will be found compliant with R376/2014 with R748/2012, when the TRO is able to generate an E5X file that is able to contain:

- all the fields tagged as “mandatory” in the table below, and
- contains those “recommended” fields which are currently provided to EASA in the implementation of the IORS XSD v4. New TROs, those TRO not reporting now with the IORS XSD v4, shall agree with EASA the subset of “recommended” data fields to be reported.

TRO should provide the relevant information in those fields when known.

ANNEX I: SIMPLIFIED RIT TABLE FOR THE IMPLEMENTATION IN EASA TRO

Entity ID	Entity name	Attribute ID	Short Description	Remarks for implementation	Reference to IORS XSD v4	Mandatory (Annex I) Recommended	Value List
4	Aircraft	21	Manufacturer/model	Aircraft type in Make/Model/Series/sub-series/(free text). Refer to value list. The list reflect "manufacturers". Expect modifications in the final value list to accommodate the reference to the current TCH. The most detailed value is expected.	Aircraft	Mandatory	VL1182_12_0_1_4
4	Aircraft	32	Aircraft category	Refer to value list (constant for most TCH)		Mandatory	VL1179_5_0_1_4
4	Aircraft	33	Total cycles a/c	Total accumulated cycles of the aircraft since new	AC_CSN	Recommended	
4	Aircraft	54	Call sign	Call sign		Mandatory	
4	Aircraft	121	Flight phase	Flight phase when the most relevant event occurred. Refer to value list.		Mandatory	VL121_5_0_1_1
4	Aircraft	167	Last departure point	Refer to value list, complete with free text if not listed. Free text entry is also acceptable	Departure	Mandatory	VL1085_12_0_1_2
4	Aircraft	175	Maximum t/o mass	MTOW of the specific aircraft involved in the occurrence		Recommended	
4	Aircraft	209	Number of engines	Number of engines (constant value for each aircraft types)		Recommended	
4	Aircraft	214	Operation type	Refer to value list. Expect changes in the value list for the final XSD (intended to be aligned to EU regulations).		Mandatory	VL1178_5_0_1_3
4	Aircraft	215	Operator	It should identify the state of the operator and the name of the operator (e.g., "Spain - Iberia, L.a.e., S.A." or "Spain" and "Iberia S.A." as free text, if operator is not listed) . Refer to value list. Expect continuous updates in the last level of values in this value list as result of regular taxonomy maintenance. Free text entry is also acceptable.	Operator	Mandatory	VL1016_12_0_1_2
4	Aircraft	228	Planned destination	Refer to value list, complete with free text if not listed. Free text entry is also acceptable	Destination	Mandatory	VL1085_12_0_1_2
4	Aircraft	232	Propulsion type	Refer to value list (constant for each aircraft type)		Mandatory	VL232_5_0_1_1
4	Aircraft	244	Aircraft registration	Aircraft registration	Registration	Mandatory	
4	Aircraft	254	Serial Number	Aircraft serial number	AC_SN	Mandatory	
4	Aircraft	281	State of registry	State of registration of the aircraft involved. Refer to value list.		Mandatory	VL1024_5_0_1_2
4	Aircraft	291	Aircraft total time	Total accumulated time of the aircraft since new	AC_TSN	Recommended	
4	Aircraft	313	Wake turb. category	Refer to value list value list. Direct relation with Maximum t/o mass (attribute 175).		Recommended	VL313_5_0_1_1
4	Aircraft	319	Mass group	Mass group of the aircraft type or aircraft to which the occurrence related to. Refer to value list. Direct relation with Maximum t/o mass (attribute 175).		Mandatory	VL319_5_0_1_1
4	Aircraft	327	Year built	Year built of the aircraft involved in the occurrence		Recommended	
4	Aircraft	1083	Rotorcraft Mass Group	Rotorcraft specific Mass Group. Value list.		Recommended	VL1174_5_0_1_1
13	Engine	387	Manufacturer/model	Engine Make/Model/(free text). Refer to value list. Expect modifications in the final value list to accommodate the reference to the current TCH. The most detailed value is expected. Free text should be used to describe product not yet listed.	Engine	Recommended	L1007_12_0_1_2

Entity ID	Entity name	Attribute ID	Short Description	Remarks for implementation	Reference to IORS XSD v4	Mandatory (Annex I) Recommended	Value List
13	Engine	881	Engine Serial Number	Engine serial number	Eng_SN	Recommended	
13	Engine	883	Time since new	Time since new of the engine	Eng_TSN	Recommended	
13	Engine	885	Cycles since new	Accumulated cycles since new of the engine	Eng_CSN	Recommended	
13	Engine	945	Hazard. eng effect	Hazardous engine events as per CS-E. Refer to value list.	Eng_Event	Recommended	VL1143_5_0_1_1
14	Events	390	Event Type	Description of the occurrence in events. Provide at least one event (the most relevant one) coded to level 3 (i.e., ATA chapter/sub-chapter). Refer to value list. Example: "Equipment - 2500 Cabin Equipment/ Furnishing - 2520 Passenger Compartment Equipment ". In case the values at level 3 are not meaningful, take the value at the immediate upper level. If it is still not meaningful, take the next upper level.		Mandatory	VL1009_5_0_1_5
14	Events	391	Phase	Description of when the event occurred. It should be associated to the event(s) attribute 390		Recommended	VL1088_5_0_1_4
24	Occurrence	452	File number	File number is not necessary as the internal reference number for the organisation shall be always provided (attribute 438 reporting identification). This attribute is optional for reporting organisations but it should be the same than the Attr 438 and it should be always filled in conjunction with 453 (either both filled in or both blank).	Internal_Ref_No	Recommended	
24	Occurrence	453	Responsible entity	This attribute is optional for reporting organisation. If implemented, use the following value by default: "International Organisations - EASA". It should be always filled in in conjunction with Attribute 452 (either both filled in or both blank). Refere to value list.	Org_Country	Recommended	VL1181_5_0_1_3
24	Occurrence	430	Occurrence category	Multivalued, more than one occurrence categories are allowed. Refer to value list.		Mandatory	VL430_5_0_1_1
24	Occurrence	431	Occurrence class	Refer to value list. There should be consistency between class assigned and the values of "Injury level" and "Highest damage", as per definitions in R996/2014	Occurr_Class	Mandatory	VL1015_5_0_1_2
24	Occurrence	432	Highest Damage	Refer to value list.		Mandatory	VL432_5_0_1_1
24	Occurrence	433	Local date	When (date) the occurrence happened or when (date) the finding was made	Date_of_Finding	Recommended	
24	Occurrence	440	Location name	Geographical location of the occurrence in free text	Location	Mandatory	
24	Occurrence	451	Injury level	Refer to value list.		Mandatory	VL451_5_0_1_1
24	Occurrence	454	State/area of occ	Geographical location of the occurrence. Refer to value list. State of occurrence is expected, though free text entry is also acceptable		Mandatory	VL1090_12_0_1_3
24	Occurrence	114	Total number fatalities	Number of the total fatalities on board		Mandatory	
24	Occurrence	460	Total fatalities ground	Number of the total fatalities on ground		Mandatory	
24	Occurrence	462	Total on board a/c	Number of total injured on board		Mandatory	
24	Occurrence	463	Total injuries-ground	Number of total injured on ground		Mandatory	
24	Occurrence	187	Total minor injuries	Number of minor injured on board		Mandatory	
24	Occurrence	469	Total minor injuries-ground	Number of minor injured on ground		Mandatory	
24	Occurrence	262	Total serious injuries	Number of total seriously injured on board		Mandatory	
24	Occurrence	472	Total serious injuries-ground	Number of total seriously injured on ground		Mandatory	
24	Occurrence	477	UTC date	When (date) the occurrence happened or when (date) the finding was made		Mandatory	
24	Occurrence	601	Headline	Brief disidentified description of the occurrence (no personal data, no data related to the aircraft as registration, S/N, flight number, etc.)	Title_or_Summary	Mandatory	

Entity ID	Entity name	Attribute ID	Short Description	Remarks for implementation	Reference to IORS XSD v4	Mandatory (Annex I) Recommended	Value List
24	Occurrence	1072	Detection Phase	When the finding was made. Refer to value list. Detection phase may be different from flight phase, as the issue may be discovered after the flight or during a different flight phase from when it occurred.	Detect_Phase	Recommended	VL1168_12_0_1_1
24	Occurrence	606	Weather relevant	Refer to value list.		Mandatory	VL606_5_0_1_1
24	Occurrence	1088	Related Aviation Sector	The aviation sectors affected by the occurrence. Code, multiple values		Recommended	VL1176_5_0_1_1
26	Part Information	485	Part name	Part name of the component relevant in the occurrence	Comp_Name	Recommended	
26	Part Information	486	Part number	Part number of the component relevant in the occurrence	Comp_PN	Recommended	
26	Part Information	657	Serial number	Serial number of the component relevant in the occurrence	Comp_SN	Recommended	
26	Part Information	658	Manufacturer	Manufacturer of the component relevant in the occurrence. Refer to value list. Use "Other - (free text)" when value is not listed	Comp_Manuf	Recommended	VL1046_12_0_1_1
26	Part Information	659	ATA chapter number	ATA chapter for the part relevant in the occurrence (no engine or propeller issue). Refer to value list. Subchapter ATA is expected.	ATA	Recommended	VL1006_12_11000000_1_4
26	Part Information	660	Time since new	Accumulated time since new of the part relevant in the occurrence	Comp_TSN	Recommended	
26	Part Information	661	Time since overhaul	Accumulated time since last overhaul of the part relevant in the occurrence	Comp_TSO	Recommended	
26	Part Information	663	Cycles since new	Accumulated cycles since new of the part relevant in the occurrence	Comp_CSN	Recommended	
26	Part Information	664	Cycles since overhaul	Accumulated cycles since overhaul of the part relevant in the occurrence	Comp_CSO	Recommended	
26	Part Information	666	Date of manufacturing	Date of manufacturing of the part relevant in the occurrence	Comp_Date_Manuf	Recommended	
29	Propeller	492	Make of propeller	Make of the propeller. Refer to value list. Use "Other" "(Free text)" when necessary value is not listed	Propel_Manuf	Recommended	VL1019_12_0_1_1
29	Propeller	493	Propeller model	Propeller model as free text.	Propel_Model	Recommended	
29	Propeller	893	Prop serial	Propeller serial number	Propel_SN	Recommended	
29	Propeller	895	Prop position	Position of the propeller. Values from 1 to 10	Propel_AC_Pos	Recommended	
29	Propeller	899	Time since new	Accumulated time since new of the propeller	Propel_TSN	Recommended	
29	Propeller	900	Time since overhaul	Accumulated time since last overhaul of the propeller	Propel_TSO	Recommended	
29	Propeller	902	Cycles since new	Accumulated cycles since new of the propeller	Propel_CSN	Recommended	
29	Propeller	903	Cycles since overh	Accumulated cycles since overhaul of the propeller	Propel_CSO	Recommended	
29	Propeller	946	Hazardous prop effects	Hazardous propeller events as per CS-Prop. Refer to value list.		Recommended	VL1144_5_0_1_1
53	Reporting history	438	Report identification	File number should be the internal reference number for the organisation. This value should be equal to the value in attribute 452 reporting identification	Internal_Ref_No	Recommended	
53	Reporting history	447	Reporting Entity	Identification of the State of the organisation, type of organisation and approval reference number and name of organisation. Refere to value list. Data should be provided be provided following the structure of the example: "Andorra - Other - Design organisation" "EASA.21J.0035 // AERO DOA S.A." where the second text in quotes is free text. Free text should be fixed by each reporting organisation.	Org_Name + Appr_Ref	Recommended	VL1181_12_0_1_3
53	Reporting history	495	Reporting form type	Refer to value list. Proposed fixed value "EASA - Form 44"		Recommended	VL1021_12_0_1_3
53	Reporting history	800	Report status	Status of the report in the report in the reporting organisation at the time of the reporting to the authority	Report_Org_Statu s	Mandatory	VL1117_5_0_1_1
53	Reporting history	801	Reporting date	Date when the report was sent to the authority.	Report_Date	Recommended	
53	Reporting history	802	Report	Reference to the attachment(s) contained in the E5X file		Recommended	

Entity ID	Entity name	Attribute ID	Short Description	Remarks for implementation	Reference to IORS XSD v4	Mandatory (Annex I) Recommended	Value List
53	Reporting history	1064	Parties Informed	Multivalue. Field to declare the reporting to other establishments as per applicable reporting obligations. Refer to value list. Use free text field to identify the name of the organisation. Feel to be filled in only when applicable.		Recommended	VL1167_12_0_1_1
53	Reporting history	1065	Risk Classification	Free text field to record the risk value resulting of the safety risk assessment on the occurrence. It is free text field to cope with any methodology used (GREEN, AMBER, 1A, HIGH,...).	Report_Org_Classif	Mandatory	
53	Reporting history	1066	Risk Methodology	Free text field to record the risk assessment methodology used to assess the occurrence		Recommended	
53	Reporting history	1067	Description Investigation	Free text field to record the description of the analysis/investigation of the occurrence	Investigation	Recommended	
53	Reporting history	1068	Risk Assessment	Free text field to record the results of the safety risk assessment on the occurrence	Risk_Assess	Recommended	
53	Reporting history	1069	Corrective Actions	Free text field to record the corrective actions	Correct_Act	Recommended	
53	Reporting history	1070	Conclusions	Free text field to record the conclusions of the analysis/investigation of the occurrence	Conclusion	Recommended	
53	Reporting history	1071	Tracking Sheet Number	Free text field to record the reference number of the common safety issue. In DAH, this refers to the Airworthiness Review Sheet, Action Sheet, Continuous Airworthiness Review Item, or similar process handling the unsafe condition common to more than one occurrence	TRS_Ref	Recommended	
53	Reporting history	1084	Report Version	Free text field to provide de versioning of the different reports. It can contain any necessary sequence generated from TRO systems. Version of the report provided by the individual or organisation to facilitate the management of follow up reporting post analysis	Issue	Recommended	
53	Reporting history	1085	Other Report Information	Free text field containing any other information needed to be providing from the reporter or reporting organisation that cannot otherwise be provided in any other field or for which no other field is available	TRO_1	Recommended	
53	Reporting history	1086	Report Subject to Export Control	YES/NO field. Field to declare if the report free text fields contain information subject to international export controls.		Recommended	VL1175_5_0_1_1
53	Reporting history	1092	Reporters Description of the Event	It contains the description of the occurrence provided by the TRO. Free text field linked to the report entity.	Narrative	Mandatory	
53	Reporting history	1091	Language of the Reporters Description of the Event	Language use to provide the description of the Reporters (attr 1092)		Mandatory	VL1097_5_0_1_1