EASA
European Union Aviation Safety Agency

EASA eRules

Easy Access Rules in machine-readable format (XML)

Your safety is our mission.

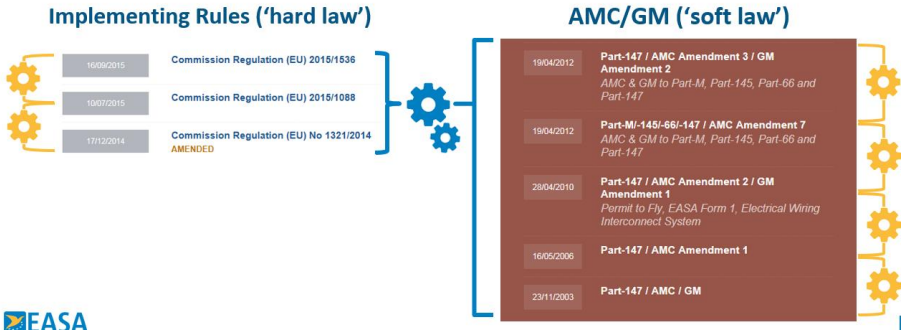
An Agency of the European Union

Agenda

TIME	SUBJECT	SPEAKER
10:00 – 10:05	Welcome and presentation of the presenters	Anna Ngu
10:05 – 10:10	Overview of the eRules project	Anna Ngu
10:10 – 10:20	Data structure in eRules	Anna Ngu/ Steffen Frederiksen
10:20 – 10:50	The choice of the XML format & how it can be used	Steffen Frederiksen
10:50 – 11.20	Answering questions received prior to the event	Steffen Frederiksen
11:20 – 12:00	Answering ad-hoc questions about the XML format	Steffen Frederiksen

Trigger for eRules

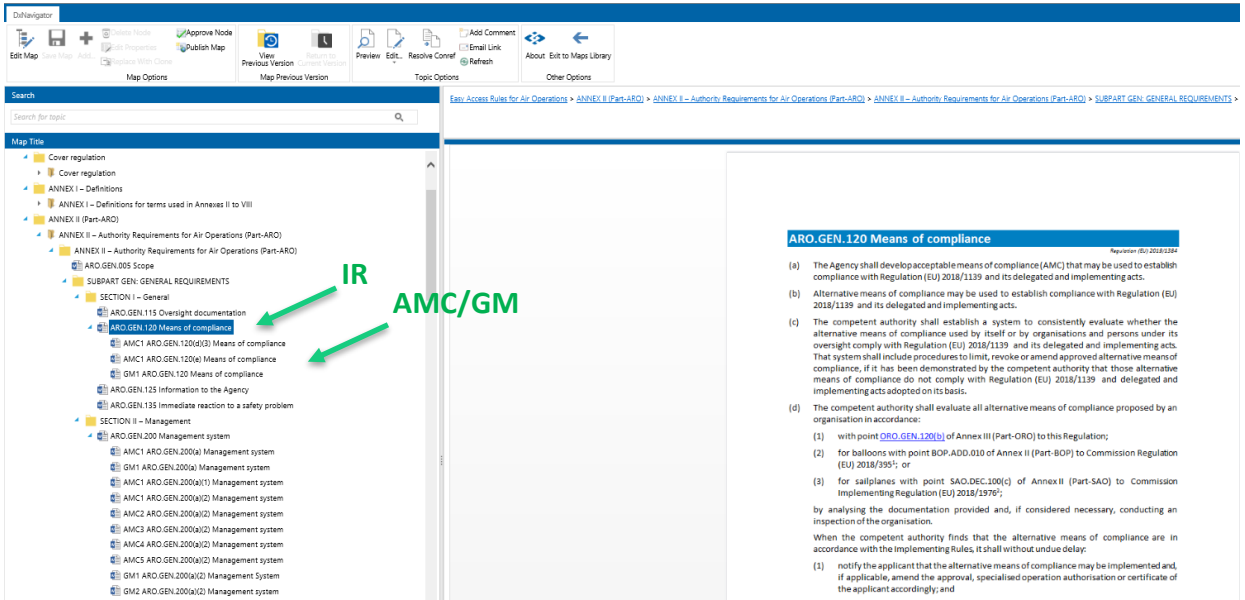
- Lack of single source of rules
- Complexity of European aviation regulatory system
- Inefficiency in internal and external processes



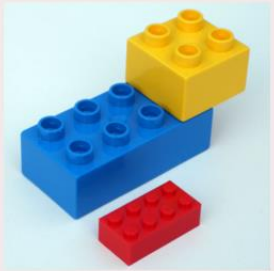
What is eRules?

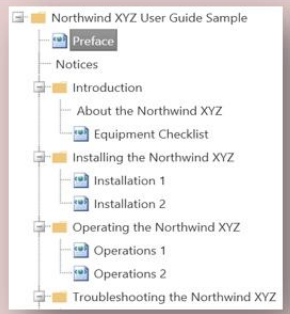
- Platform for managing aviation rules based on a Component Content Management System (**CCMS**)
- Easy Access Rules are published from eRules

eRules =
structured data



Units of information – Lego analogy

eRules	LEGO
Topic modules	Bricks
Topic Concept Reference Task Topic (minimal): 1. Title 2. Metadata 3. Content (text) 4. Only one content type	
DITA map	Model/building set



Content is divided into topics

Topics are assembled into maps

Division of the content into ‘topics’

- *A “TOPIC” is the smallest unit of information that makes sense to the reader, in standalone mode.*

26.105 Emergency exit access

Regulation (EU) 2015/640

Operators of large aeroplanes used in commercial air transport shall provide means to facilitate the rapid and easy movement of each passenger from their seat to any of the emergency exits in case of an emergency evacuation.

CS 26.105 Emergency exit access

ED Decision 2020/023/R (applicable from 26.2.2021)

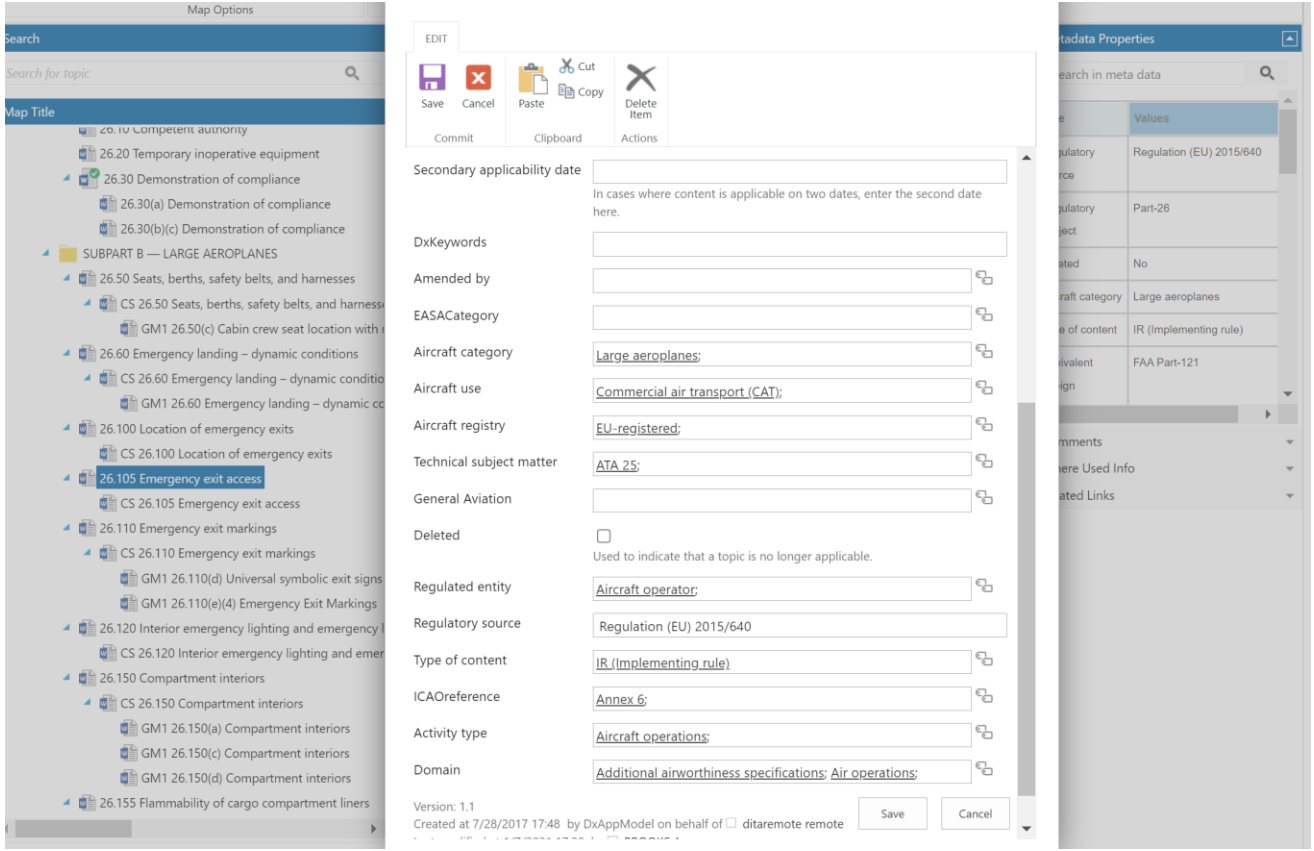
Compliance with point 26.105 of Part-26 is demonstrated by complying with CS 25.813(d) to (f) or equivalent, or with the following:

(a) Reserved.

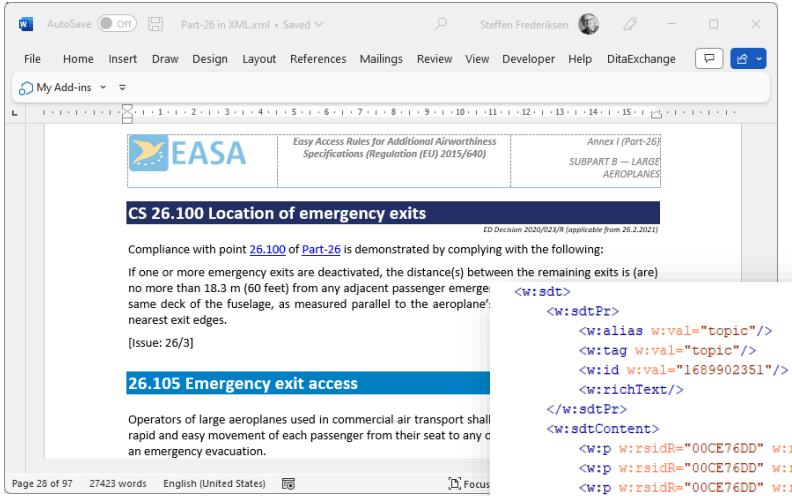
(b) If it is necessary to pass through a passageway between passenger compartments to reach any required emergency exit from any seat in the passenger cabin, the passageway is unobstructed. However, curtains may be used if they allow free entry through the passageway.

(c) No door is installed in any partition between passenger compartments.

Set of metadata attached to every topic



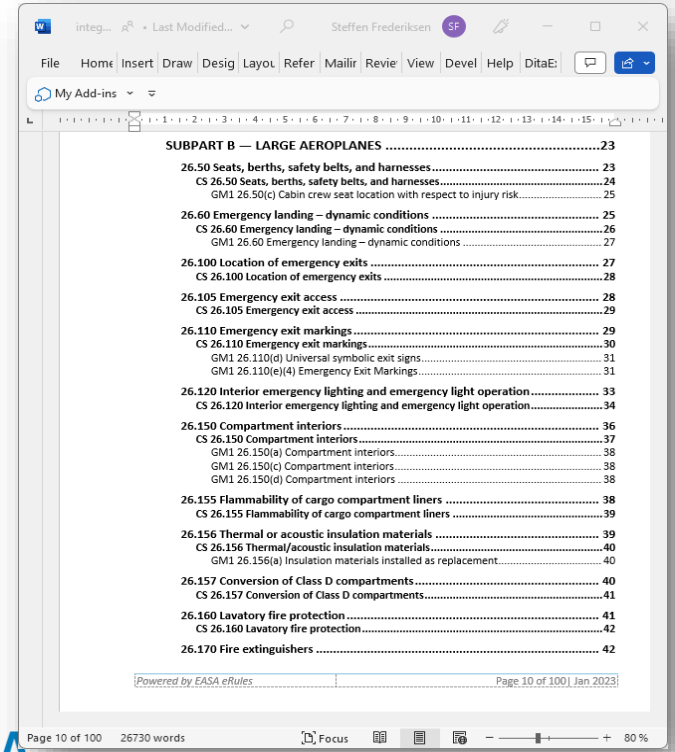
Topic in XML




```
<w:sdt>
    <w:sdtPr>
        <w:alias w:val="topic"/>
        <w:tag w:val="topic"/>
        <w:id w:val="1689902351"/>
        <w:richText/>
    </w:sdtPr>
    <w:sdtContent>
        <w:p w:rsidR="00CE76DD" w:rsidP="00CE76DD" w14:paraId="6C70CFE8"
        <w:p w:rsidR="00CE76DD" w:rsidRPr="00CE76DD" w:rsidP="00CE76DD"
        <w:p w:rsidR="00CE76DD" w:rsidRPr="00CE76DD" w:rsidP="00BD410A"
        <w:p w:rsidR="00BE755A" w:rsidP="00BD410A" w14:textId="150581AE">
            <w:pPr>
            <w:r w:rsidRPr="00CE76DD">
                <w:t xml:space="preserve">If one or more emergency exits are deactivated, the distance(s) between the
                    remaining exits is (are) no more than 18.3 m (60 feet) from any adjacent passenger emergency exit
                    on the same side of the same deck of the fuselage, as measured parallel to the aeroplane's
                    longitudinal axis between the nearest exit edges.</w:t>
            </w:r>
        </w:p>
        <w:p w:rsidR="000279B1" w:rsidRPr="00CE76DD" w:rsidP="000B4A1E"
    </w:sdtContent>
</w:sdt>
```

Map in XML

Word/PDF TOC



SUBPART B — LARGE AEROPLANES 23

26.50 Seats, berths, safety belts, and harnesses 23
CS 26.50 Seats, berths, safety belts, and harnesses 24
GM1 26.50(c) Cabin crew seat location with respect to injury risk 25

26.60 Emergency landing – dynamic conditions 25
CS 26.60 Emergency landing – dynamic conditions 26
GM1 26.60 Emergency landing – dynamic conditions 27

26.100 Location of emergency exits 27
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26.105 Emergency exit access 28
CS 26.105 Emergency exit access 29

26.110 Emergency exit markings 29
CS 26.110 Emergency exit markings 30
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CS 26.120 Interior emergency lighting and emergency light operation 34

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CS 26.156 Thermal/acoustic insulation materials 40
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CS 26.160 Lavatory fire protection 42

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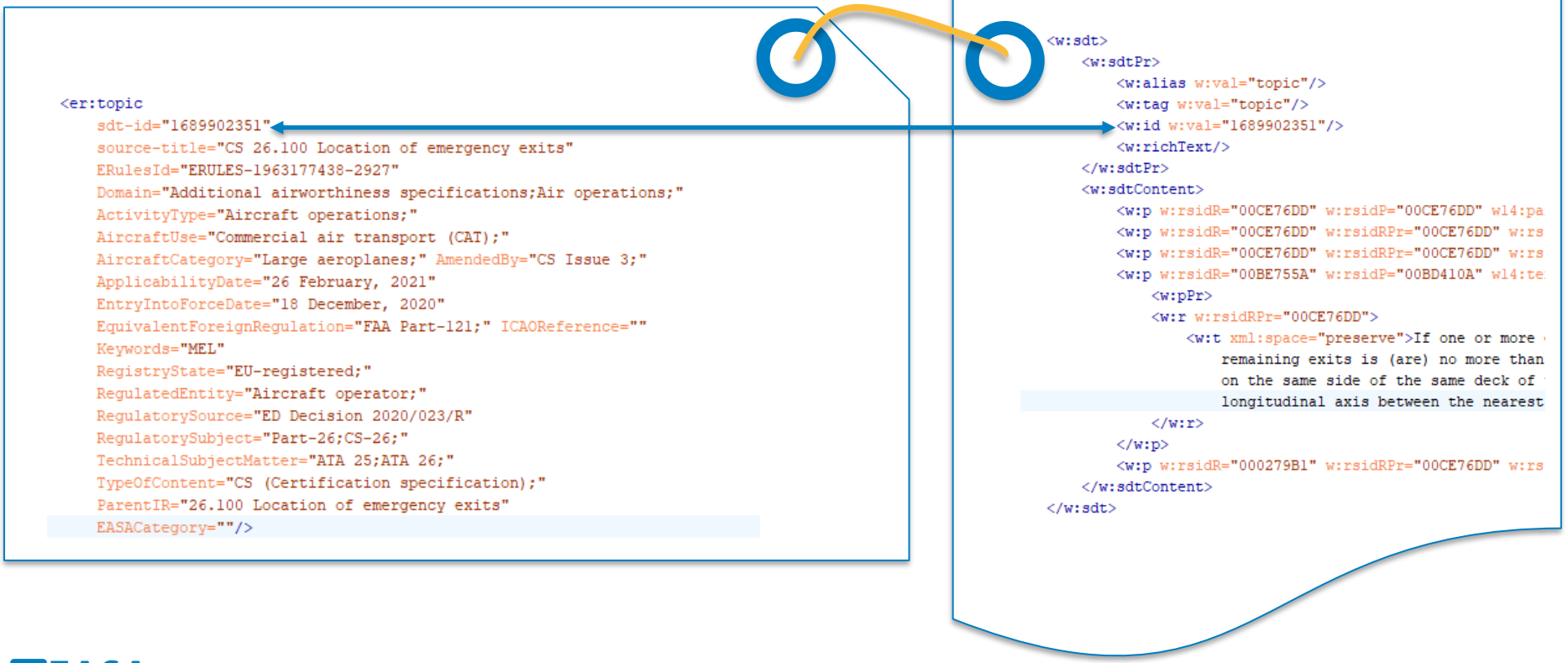
Export XML (and map) structure

```
<er:heading sdt-id="736686409" title="SUBPART B — LARGE AEROPLANES"/>
<er:toc>
    <er:topic sdt-id="593794994" source-title="26.50 Seats, berths, safety belts, and
    <er:toc>
        <er:topic sdt-id="-736622335" source-title="CS 26.50 Seats, berths, safety bel
        <er:toc>
            <er:topic sdt-id="879449670" source-title="GM1 26.50(c) Cabin crew seat l
        </er:toc>
    </er:toc>
    <er:topic sdt-id="1186377145" source-title="26.60 Emergency landing – dynamic cond
    <er:toc>
        <er:topic sdt-id="-1748360523" source-title="CS 26.60 Emergency landing – dyna
        <er:toc>
            <er:topic sdt-id="95076102" source-title="GM1 26.60 Emergency landing – dy
        </er:toc>
    </er:toc>
    <er:topic sdt-id="-1966231053" source-title="26.100 Location of emergency exits"
    <er:toc>
        <er:topic sdt-id="1689902351" source-title="CS 26.100 Location of emergency e
    </er:toc>
    <er:topic sdt-id="-455773973" source-title="26.105 Emergency exit access"
    <er:toc>
        <er:topic sdt-id="949973199" source-title="CS 26.105 Emergency exit access"

    </er:toc>
    <er:topic sdt-id="-486372749" source-title="26.110 Emergency exit markings"
    <er:toc>
        <er:topic sdt-id="-1048356124" source-title="CS 26.110 Emergency exit markings
        <er:toc>
            <er:topic sdt-id="-165599634" source-title="GM1 26.110(d) Universal symbol
```

Metadata in XML



Easy Access Rules – available in 3 formats

PDF format – from 2017

- Consolidated, structured content
- Ca. 140 consolidated books published on the website

Online publication – from 2020

- Adjustment to mobile views (tablets, phones)
- Online filters to provide a view tailored to users' needs

XML format

- Machine-readable format – for integration with stakeholders' applications

Easy Access Rules – available in 3 formats

Regulations

Navigate through the regulation structure by area of implementation.
Access detailed information for each individual regulation group by clicking on the title in the first column of the overview below.

Download the Regulation Structure in PDF

Basic Regulation	**Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency** • Easy Access Rules: Basic Regulation (Regulation (EU) 2018/1139)
Initial Airworthiness	**Commission Regulation (EU) No 748/2012 of 3 August 2012 - Airworthiness and Environmental Certification** • Easy Access Rules: Airworthiness and Environmental Certification (Regulation (EU) No 748/2012)

Publications

- Easy Access Rules for Airworthiness and Environmental Certification (Regulation (EU) No 748/2012) (Online format)
- Easy Access Rules for Airworthiness and Environmental Certification (Regulation (EU) No 748/2012) (PDF)
- Easy Access Rules for Airworthiness and Environmental Certification (Regulation (EU) No 748/2012) (XML)
  View technical XML documentation

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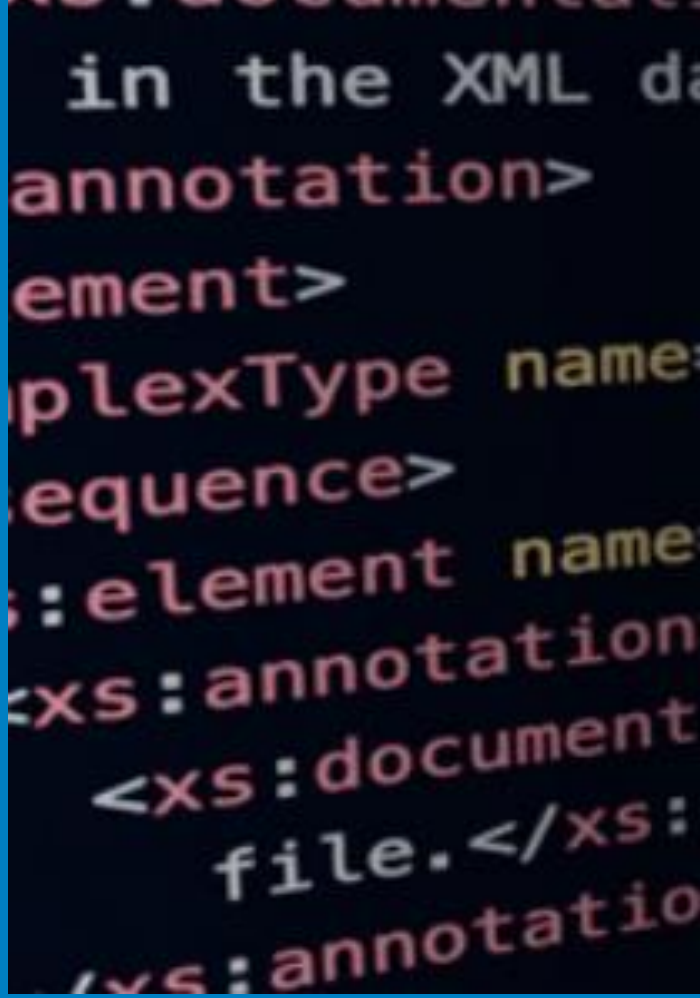
The choice of the XML format and how it can be used



Why XML or why not …?

Why XML and Why Office Open XML (ECMA-376, ISO/IEC 29500)?

- Requirements for the EASA eRules export format:
  - Support as many different stakeholder use cases as possible, from the simplest to the most complex
  - High fidelity – no loss of information – no loss of the modular structure
  - Support for content validation
  - Self-contained, one file – encapsulating graphics objects, formulas, even 3rd party formats (e.g. Math, Chemical)
  - Editable, human-readable and machine-readable
  - International standard
  - Fully documented
  - Rich set of editors, tools, and interfaces (APIs) must be available

eRules XSLT transformation example

→ XML to JSON example:

```
<json>
{"topic"  :{
        "metadata" :{
                "source-title"  :{"val" : "CS 26.100 Location of emergency exits", },
                "ERulesId" :{"val" : "ERULES-1963177438-2927", },
                "Domain" :{"val" : "Additional airworthiness specifications;Air operations;", },
                "ActivityType" :{"val" : "Aircraft operations;", },
                "AircraftUse" :{"val" : "Commercial air transport (CAT);", },
                "alias" :{"val" : "topic", },
                "id"    :{"val" : "1689902351", }
                 },
        "content" :{
                "t" :"  If one or more emergency exits are deactivated, the distance(s) between the
                        remaining exits is (are) no more than 18.3 m (60 feet) from any adjacent passenger emergency exit
                        on the same side of the same deck of the fuselage, as measured parallel to the aeroplane's
                        longitudinal axis between the nearest exit edges." }
         }
}
</json>
```

Editors and other tools

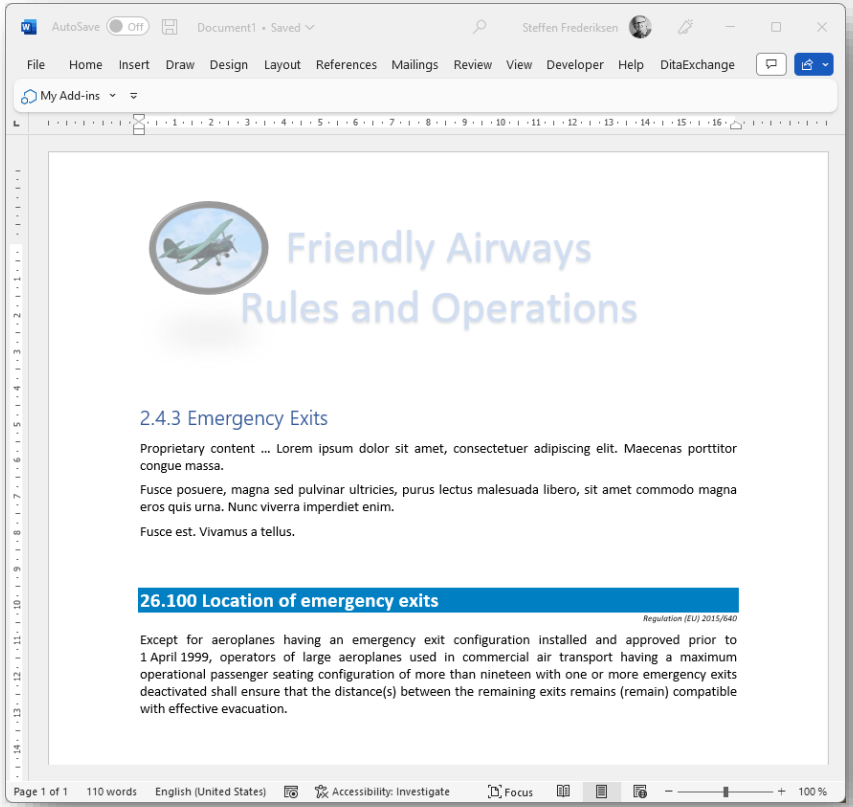
- Editors
  - Any XML or text editor/coding tool that can handle large files (1-10MB)
  - Microsoft Word (as a viewer and quick validator of the format)

- Other tools and standards:
  - XML DOM, XSLT, XSD Schema, and XPath
  - Open XML SDK

How it can be used?

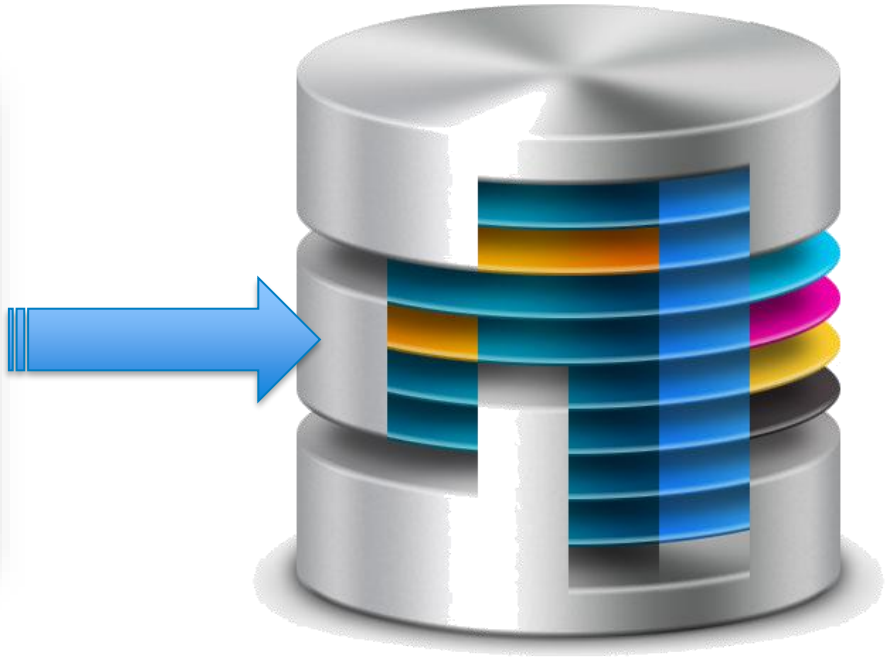
- From simple to complex use cases
  - Simply add your proprietary content and formatting, and print
  - Transform as needed and import into existing applications
    - Import into existing regulatory application
    - Import into knowledge portals
    - Import into existing CCMS
    - Import into existing database
    - Automated impact analysis on rule changes (by linking and using ERulesId)

Authoring Proprietary Standard Operating Procedures (SOPs)



Import to a database application

```
SQL-RECORD[Guid("2E2B9C47-B7E2-4D37-97C9-998E3489F8C6")]
source-title="CS 26.100 Location of emergency exits"
ERulesId="ERULES-1963177438-2927"
Domain="Additional airworthiness specifications;Air operations;"
ActivityType="Aircraft operations;"
AircraftUse="Commercial air transport (CAT);"
AircraftCategory="Large aeroplanes;" AmendedBy="CS Issue 3;"
ApplicabilityDate="26 February, 2021"
EntryIntoForceDate="18 December, 2020"
EquivalentForeignRegulation="FAA Part-121;" ICAOReference=""
Keywords="MEL" RegistryState="EU-registered;"
RegulatedEntity="Aircraft operator;"
RegulatorySource="ED Decision 2020/023/R"
RegulatorySubject="Part-26;CS-26;"
TechnicalSubjectMatter="ATA 25;ATA 26;"
TypeOfContent="CS (Certification specification);"
ParentIR="26.100 Location of emergency exits" EASACategory=""
ContentBLOB="1689902351"
```



Integrate into existing CCMS application

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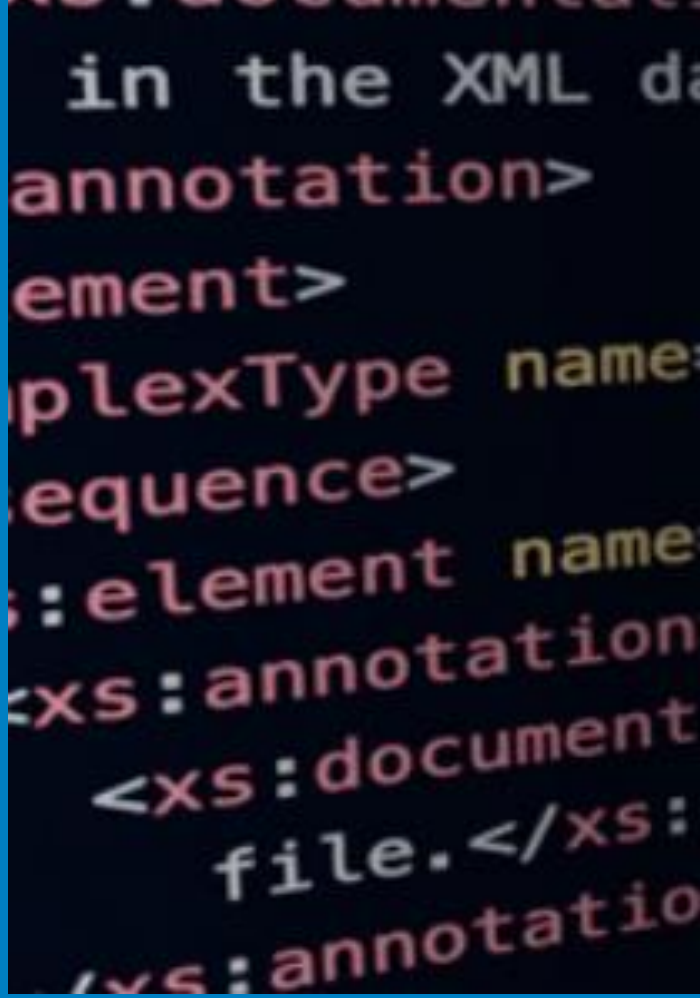
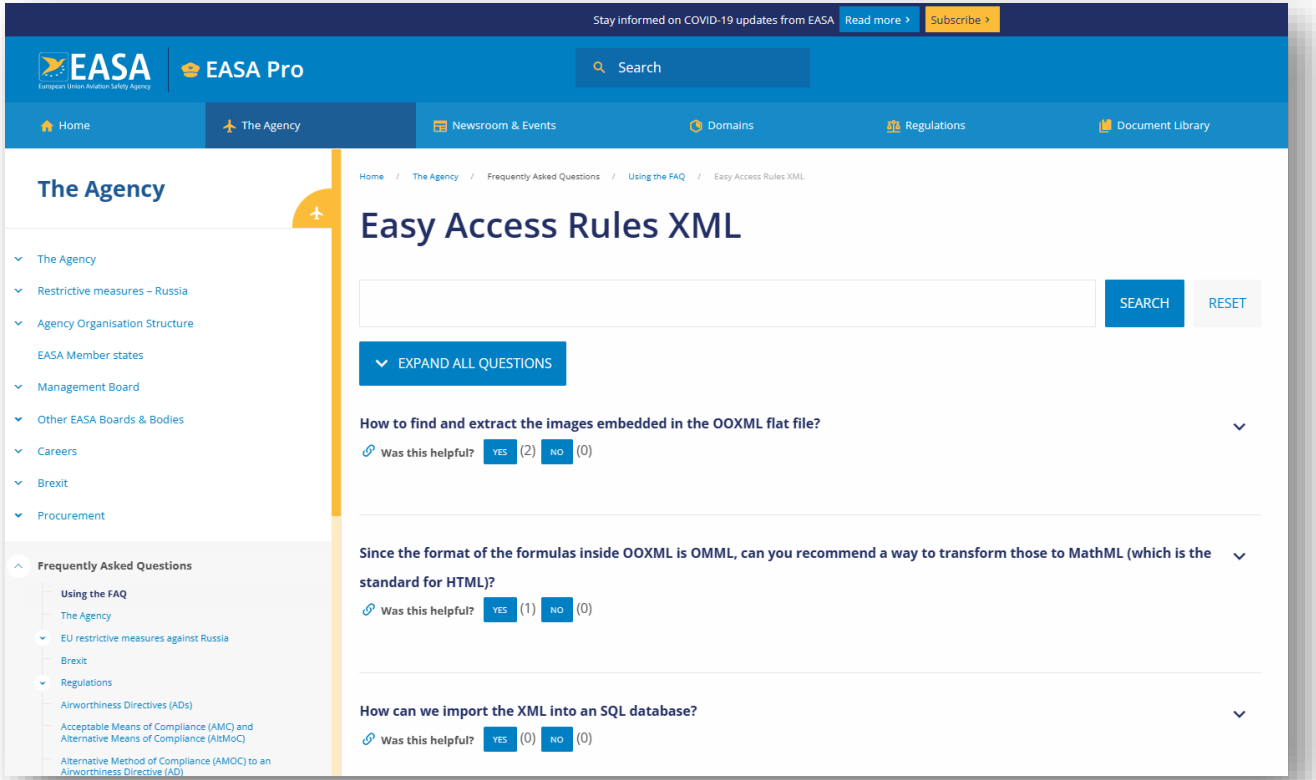
Previous questions - and answers



Frequently Asked Questions – https://www.easa.europa.eu/en/the-agency/faqs/easy-access-rules-xml



How to identify changes?

When an amended version of a rule is published in the XML format, is there a way to determine what are the changes compared to a previous version?

There are several ways to make a comparison. One is to simply - programmatically - compare the two XML files and extract the changes. In addition to that or as an alternative to this method, you can use the attribute topic-metadata/@RegulatorySource. When a topic which appears in one version of a publication is modified in a subsequent version, the value of its attribute topic-metadata/@RegulatorySource changes.

For example: The topic with the identifier ERulesId="ERULES-1963177438-2548" was present in one version of a rule with the value of the attribute topic-metadata/@RegulatorySource ="ED Decision 2014/012/R" If the topic's content is modified in the next version of the rule, then the attribute topic-metadata/@RegulatorySource will receive a new value corresponding to the decision that approved the change, for example topic-metadata/@RegulatorySource ="ED Decision 2018/009/R"

Was this helpful? YES (1) NO (0)

How to identify changes?

When an amended version of a rule is published in the XML format, is there a way to determine what are the changes compared to a previous version?

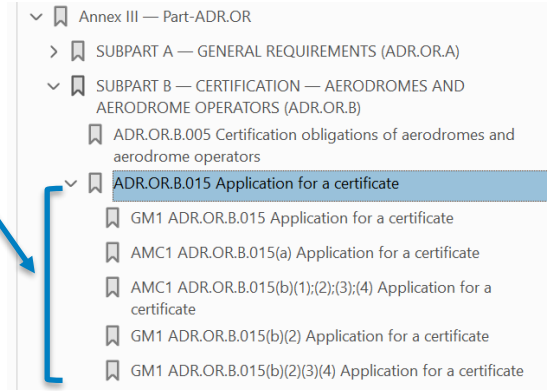
There are several ways t… …d extract the changes. In addition to t… …atorySource. When a topic which appe… …ribute topic-metadata/@RegulatoryS…

For example: The topic w… …le with the value of the attribute to… …fied in the next version of the rule, then … …o the decision that approved the chang…

Was this helpful? YES

```
<er:topic
    sdt-id="1689902351"
    source-title="CS 26.100 Location of emergency exits"
    ERulesId="ERULES-1963177438-2927"
    Domain="Additional airworthiness specifications;Air operations;"
    ActivityType="Aircraft operations;"
    AircraftUse="Commercial air transport (CAT);"
    AircraftCategory="Large aeroplanes;" AmendedBy="CS Issue 3;"
    ApplicabilityDate="26 February, 2021"
    EntryIntoForceDate="18 December, 2020"
    EquivalentForeignRegulation="FAA Part-121;" ICAOReference=""
    Keywords="MEL"
    RegistryState="EU-registered;"
    RegulatedEntity="Aircraft operator;"
    RegulatorySource="ED Decision 2020/023/R"
    RegulatorySubject="Part-26;CS-26;"
    TechnicalSubjectMatter="ATA 25;ATA 26;"
    TypeOfContent="CS (Certification specification);"
    ParentIR="26.100 Location of emergency exits"
    EASACategory=""/>
```

AMC/GM related to IR – how do I identify the relationship in the XML file?



In PDF

5.2.19 Attribute topic-metadata / @ParentIR

Description	Identification of the 'parent-child' relatio in a nested structure. Typically, the IR/CS 'child' topics. That relationship, however, This attribute holds the title of the 'paren example, for each AMC/GM in a conso following condition is met: • the topic has a direct topic pare the table of contents (ToC) hierar

```
<er:topic sdt-id="-173277623"
    source-title="ADR.OR.B.015 Application for a certificate"
    ERulesId="ERULES-1963177438-2088" Domain="Aerodromes;"
    ActivityType="Certification;" AircraftUse="" AircraftCategory=""
    AmendedBy=""
    ApplicabilityDate="6 March, 2014 [point ADR.OR.B.015(b)(2)(ii) until 26 January 2022]"
    EntryIntoForceDate="6 March, 2014" EquivalentForeignRegulation=""
    ICAOReference="Annex 14;"
    Keywords="Initial certification; application form; CB proposal; ELOS proposal; certification d
    certification request; aerodrome design; proposed design; proposed facilities; certification f
    RegistryState="" RegulatedEntity="Aerodrome operator;"
    RegulatorySource="Implementing Regulation (EU) 2020/469"
    RegulatorySubject="Part-ADR.OR;" TechnicalSubjectMatter=""
    TypeOfContent="IR (Implementing rule);" ParentIR="" EASACategory=""/>
<er:toc>
    <er:topic sdt-id="1407406001"
        source-title="GM1 ADR.OR.B.015 Application for a certificate"
        ERulesId="ERULES-1963177438-2633" Domain="Aerodromes;"
        ActivityType="Certification;" AircraftUse="" AircraftCategory=""
        AmendedBy="" ApplicabilityDate="6 March, 2014"
        EntryIntoForceDate="6 March, 2014" EquivalentForeignRegulation=""
        ICAOReference="Annex 14;"
        Keywords="Expression of interest; preliminary meeting; pre-application"
        RegistryState="" RegulatedEntity="Aerodrome operator;"
        RegulatorySource="ED Decision 2014/012/R"
        RegulatorySubject="Part-ADR.OR;" TechnicalSubjectMatter=""
        TypeOfContent="GM to IR (Guidance material to implementing rule);"
        ParentIR="ADR.OR.B.015 Application for a certificate"
        EASACategory=""/>
    <er:topic sdt-id="142678844"
        source-title="AMC1 ADR.OR.B.015(a) Application for a certificate"
        ERulesId="ERULES-1963177438-2624" Domain="Aerodromes;"
        ActivityType="Certification;" AircraftUse="" AircraftCategory=""
        AmendedBy="" ApplicabilityDate="6 March, 2014"
        EntryIntoForceDate="6 March, 2014" EquivalentForeignRegulation=""
        ICAOReference="Annex 14;" Keywords="Application form"
        RegistryState="" RegulatedEntity="Aerodrome operator;"
        RegulatorySource="ED Decision 2014/012/R"
        RegulatorySubject="Part-ADR.OR;" TechnicalSubjectMatter=""
        TypeOfContent="AMC to IR (Acceptable means of compliance to implementing rule);"
        ParentIR="ADR.OR.B.015 Application for a certificate"
        EASACategory=""/>
    <er:topic sdt-id="187123260"
        source-title="AMC1 ADR.OR.B.015(b)(1);(2);(3);(4) Application for a certificate"
        ERulesId="ERULES-1963177438-2625" Domain="Aerodromes;"
        ActivityType="Certification;" AircraftUse="" AircraftCategory=""
```

Questions?

EASA

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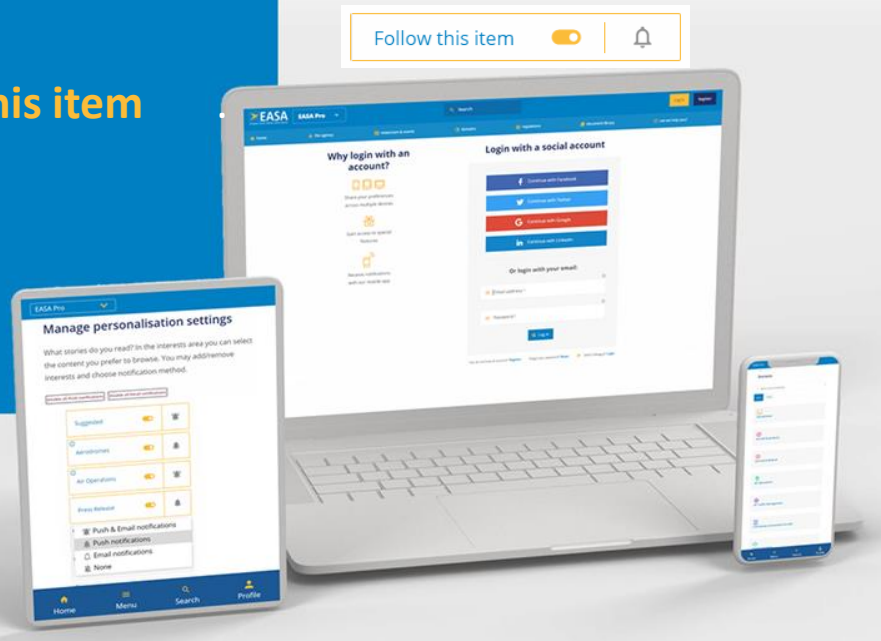
   & Go to Get notified section, click **Follow this item**
3. Decide how to stay informed
   - → Your stream on the EASA Homepage
   - → Email
   - → Push notification



Go to the event
https://www.easa.europa.eu/en/newsroom-and-events/events/easy-access-rules-machine-readable-format-xml-how-use-it