

Dynamic Content and the EFB

Kaan Erdal

InfoTrust Group Inc.

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Agenda

- Introduction to the challenge and the opportunity
- Details on the Solution
- Conclusion
- Questions

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The Big Picture

- International air transportation industry serves from basic survival to higher order social needs of the world population
- For best service possible at every point, organizations within the industry need to achieve operational efficiency and reliability within and among themselves
- Standards-based dynamic and targeted information distribution in any domain is essential for operational efficiency and reliability of aircrafts
- Aircraft operation information in Flight Bags touch different organizations across the industry, and now calls for a paradigm shift moving away from paper to serve all interests better

EFB's and Digital Manuals

- Portable Electronic Devices (PEDs) have been approved to replace paper flight bag products consisting of
 - Aircraft flight manuals
 - Performance information
 - Checklists
 - Aeronautical charts, including approach plates and airport diagrams
- Thus the term Electronic Flight Bag or EFB
- This presentation we'll discuss the transition of paper to digital flight manuals also known as documents/content/data within EFB such as
 - FCOM, AOM, MEL, Check lists etc

The Paper Document Challenge

- The current dominant paradigm of paper based documentation in the Flight Bags supporting aircraft operation is no longer viable
 - This is not cost effective for anybody
 - Turn times with less staff is stretching the limits of the paper paradigm
 - Newer generation aircraft are more sophisticated with on board servers, new flight deck and avionics standards requiring dynamic content update
 - Today, digital technologies and standards are up to the task to replace paper and do much more

The OEM Perspective

- OEMs are recognizing the cost and impact of producing targeted, high-quality documentation and the affect on the airlines
- Need to deliver even more safety, compliance and aircraft configuration data especially with the new generation of more sophisticated aircraft
- Old way of delivering paper targeted content for these needs is no longer cost effective, or versatile for required integrations

The Operator's Perspective

- Operators are acutely experiencing the cost and efficiency of managing and providing targeted distribution of operational and safety data via paper
- Need for excellence in operations and speed of business, along with the primal concern of safety and consequently compliance has reached an all time high
- Old way of circulating paper or digitized paper within flight operations at the airlines is no longer cost effective nor serves additional purposes of information

The Strategy for the Opportunity

- What is needed is a comprehensive and dynamic digital content strategy
 - Preventing information overload by delivering the right information to the right user at the right time
 - Providing quality, accurate, and reliable operational data essential in the achievement of operational excellence and compliance
 - Achieving more value "more with less" for all parties involved

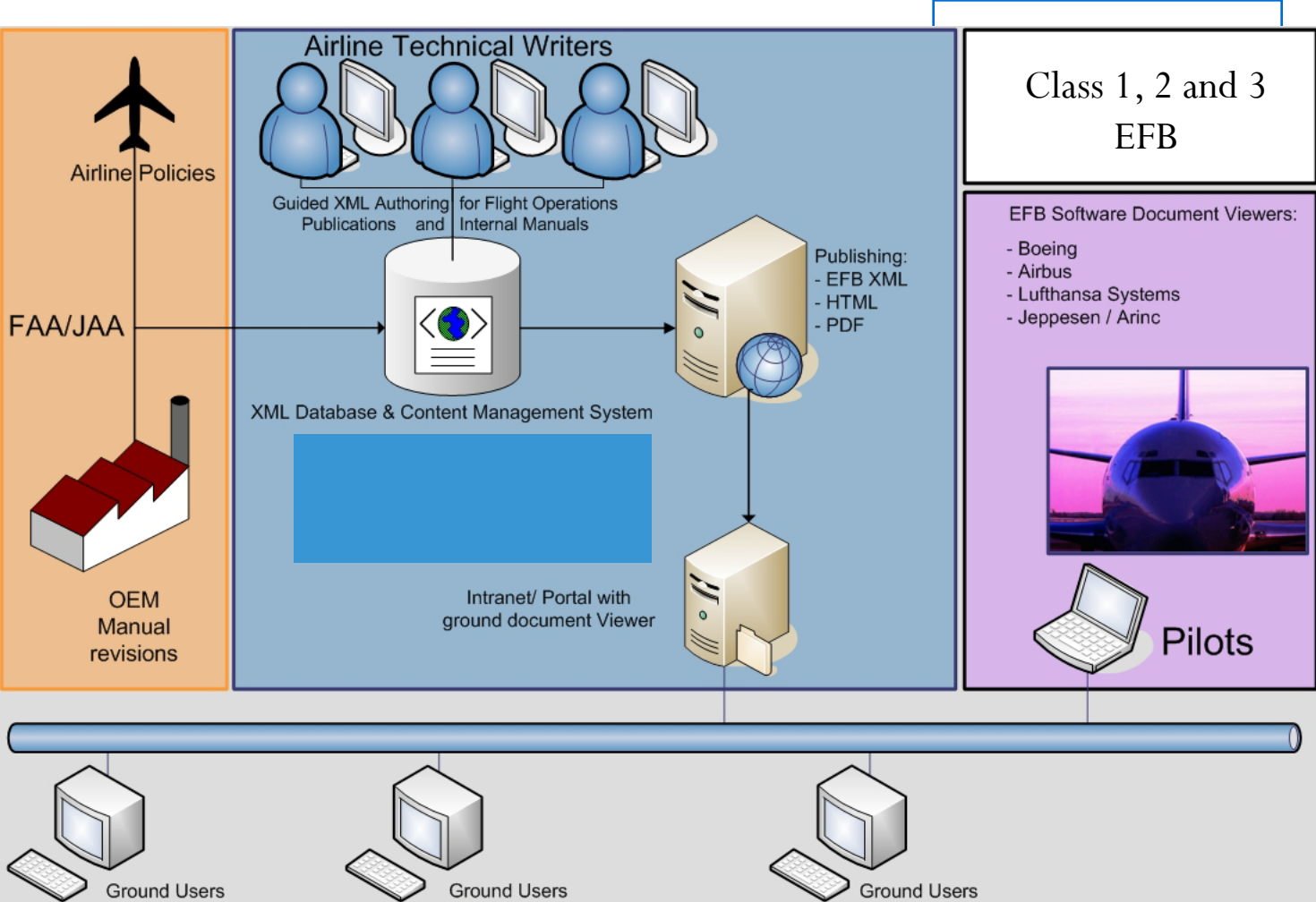
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The Solution Description

- An XML information management system that must
 - Improve Quality and consistency of technical documentation, policies, procedures and other published content
 - Reuse content and reduce the time and cost of content creation, and maintenance
 - Provide an intuitive environment that technical and non-technical authors can use to rapidly create valid XML, sheltering them from the complexity of XML tagging and syntax
 - Provides proper checks and verifications that need to be in the business process
 - Provide for publishing and distribution mechanisms for business users and developers alike to seamlessly access latest data from anywhere, on the ground and on the cockpit via various devices and tools

The Solution Depiction



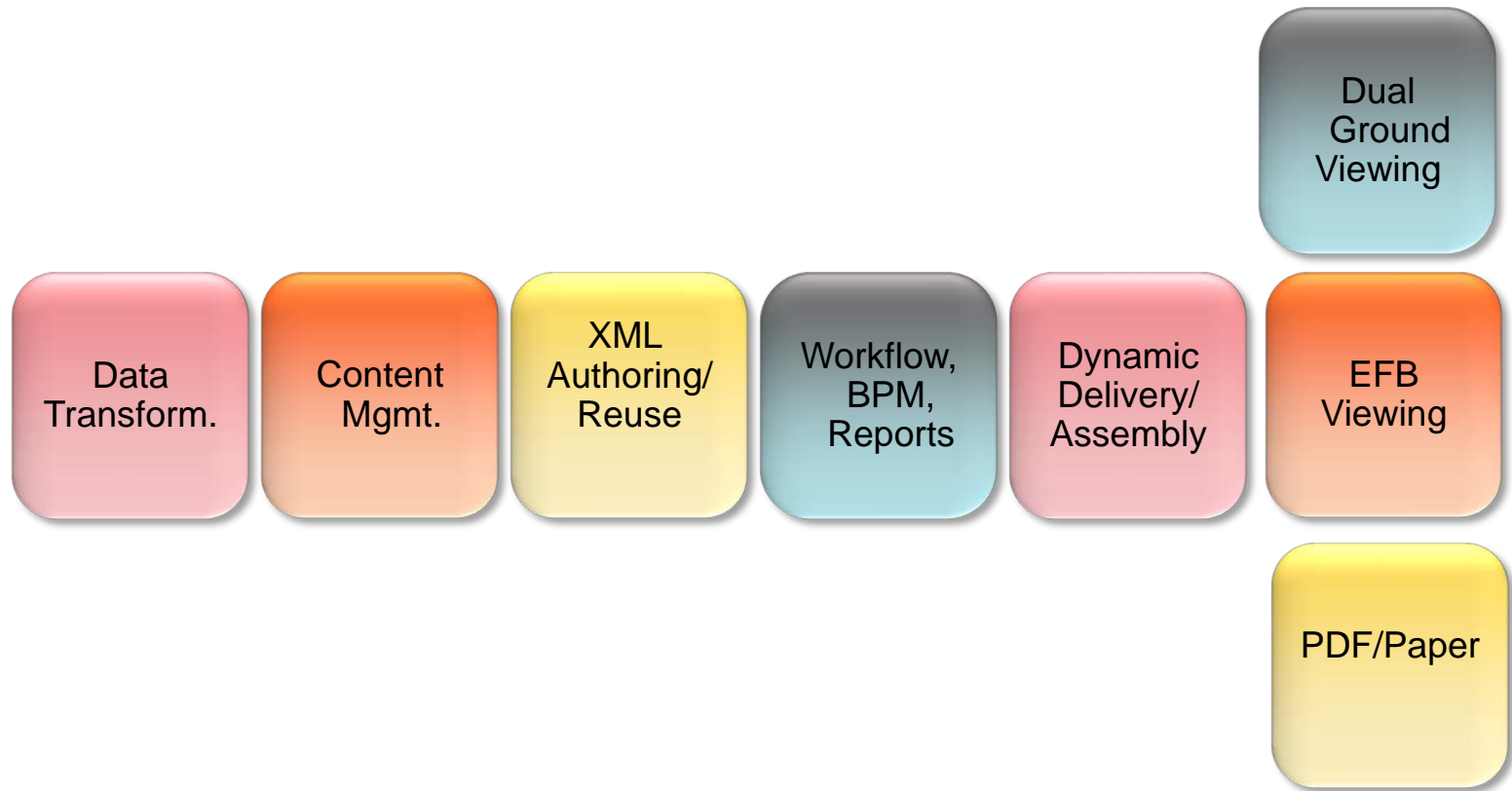
The Solution and The EFB

- Focus has been on the box: hardware-centric
- There has been lack of focus on the backbone of the EFB's digital document support
- Proposed dynamic and structured content management strategy and solution provides both the missing backbone as well as the delivery to end users

The Solution Enablers

- Today we have many necessary enablers to achieve this required paradigm shift within the industry
 - Data representation standards –XML
 - Evolving industry standards –Spec 2300
 - Modal OEM initiatives –B787, A350
 - Modal Operator initiatives –EFB programs in airlines
 - Third party vendor competencies –number of vendors offering EFB solutions

Key Solution Modules



Content Management

- The system facilitates and enforces
 - Efficient revision management
 - Metadata tracking for content
 - Controlled check in, check out and access to content
 - Supports structured and unstructured content formats
 - Allows for parallel authoring and development
 - Process to control content for published content

XML: Foundation of the Solution

- Foundation of a dynamic information management and delivery is XML
- XML is an information tagging language suitable to capturing the inherent structure that exists in technical data and expressing it with a high degree of consistency
 - Is used as technical information/content/data exchange format among humans and among devices as well as between humans and devices
 - This dual use is at the root of its maximum utility

Benefits of XML to Content Creators

- Promote consistency in data by enforcing validations against industry standard (or proprietary) grammars (DTD/Schemas)
- Promotes and facilitates reuse by allowing self contained content units to be assembled where needed
- Generalized authoring tools extended to become specific data oriented authoring tools that can guide and assist others in content creation by
 - access to reference contents for hand picking
 - multiple ways of reuse of content
 - specific data lookups
 - rules verifications (such as BREX)
 - form authoring where needed
- Parallel authoring

Benefits of XML to Content Consumers

- Allows single sourced data to be repurposed and published in to different presentation styles by different consumers through style sheets
- Promotes and facilitates incremental updates to provide consumers up-to-date info
- Enables intelligent, in context search capabilities presenting the correct results virtually instantaneously
- The data gets blended with other data coming from other systems and creates myriads of other operational data as well as statistics

XML Based Exchange Standards

- Standards are needed to define and exchange grammar for XML for the data/content the standard aims at regulating
- Spec 2300 for FCOM was released last year to address this lack of standard through the efforts all interested parties
- MEL standardization is also on its way
- While no OEMs yet delivered the data in Spec 2300, Boeing and Airbus' latest FCOM structure definitions are close to this format and OEMs are looking hard in to adopting the standard
- The proposed system should leverage Spec 2300 as FCOM standard and transform data as needed from and to other current OEM XML schemas

Transformations

- XML to XML transformations are practically a matter of dialect normalization and typically transformed data will yield full utilization of system functions
- Legacy data can still be transformed but will require more work and certain system features such as automated OEM revision management could be available with reduced functionality
- Once data comes in a standard schema, such as Spec 2300 or comes in a data oriented XML data that can be easily transformed to a standard schema, full benefits of XML management and distribution will realized

Spec 2300

- Based on XML and XML Schema
- Provides a concise set of information standards and guidelines for:
 - Management
 - Configuration
 - Interchange of flight operations technical data.
- Focused on:
 - data-centric approach
 - addressing the airplane operator's current and planned future operational / business requirements of this data.
- Facilitate reuse of content for different audiences, e.g., Crew Use During Flight, In-House Training, Engineering, Computer-Based Training (CBT)
- Owned and facilitated by ATA eBiz

Spec 2300 Scope

- Systems Description Data
 - System, subsystem, components, controls, indicators, annunciators
- Metadata
 - Phase of flight, standard numbering system (SNS)
- Limitations
- Procedures (Normal and Abnormal)
- Performance
- Metadata
 - Applicability (effectivity)
 - Externalize Revision Data

Targeted Publishing

- All the system benefits is achieved by standardizing content and enabling a standardized form of distribution and communication to a variety of audience
- Most difficult aspect of this is the targeted addressing of wide and highly specialize audience ranging from
 - Pilots in initial, recurrent, and upgrade training
 - Pilots in aircraft operation in normal and abnormal conditions
 - Mechanics performing line maintenance
 - Regulatory authorities attempting to control and regulate both content and intent

Single-source XML Publishing

```

<item atacode="22-11-01">
  <title>Autopilot Flight Directors Computers (AFDC)</title>
  <dispcnd
    category="B"
    nbrins="0"
    nbrreq="0"
    maintenance="1"
    operations="1"
    flightdispatch="1"
    landing.category="I-III"
    rnav.mp="1"
    rvsm.ops="1">
    <para><ops_exception>Except for ER operations,
    </ops_exception> may be inoperative provided:
    </para>
    ...
  </dispcnd>
</item>
  
```

[Go Up One Level](#)

22-11-01-1

Interval	Installed	Required	Procedure	Remarks
C	3	2	(M)(O)	NOTIFICATION TO DISPATCH REQUIRED CATEGORY I/II/III

Conditions / Limitations

(M)(O) One may be inoperative provided: [test]

- Associated AFDC circuit breaker is opened and collared.
- Associated AFDC backdrive actuator circuit breaker is opened and collared, and
- Approach minimums do not require use of the associated autopilot.

XML published to multiple outputs

- Web viewer (HTML)
- PDF for printing or external distribution
- EFB viewer for cockpit viewing (XML, HTML)

version: 2.10a

Close

Library

Search

Rev List

Day Night

Zoom

Full Scrn

Hide

777 Minimum Equipment List
Chapter: Auto Flight
Section: Section 22-11

Section 22-DG

Section 22-11

Section 22-31

SECTION 11 - SECTION 22-11

Item: 22 - 11 - 01

Autopilot Flight Director Computers (AFDC)

1.

Cat.	No.Inst.	No.Req.	(M)	(O)	(FD)
C	3	2	(M)	(O)	(FD)

(M)(O) One may be inoperative provided:

- Associated AFDC circuit breaker is opened and collared,
- Associated AFDC backdrive actuator circuit breaker is opened and collared, and
- User Notes : Take note of this item**
Approach minimums do not require use of the associated autopilot.

2.

Cat.	No.Inst.	No.Req.	(M)	(O)	(FD)
C	3	1	(M)	(O)	(FD)

(M)(O) Except for ER operations beyond 180 minutes and polar operations, the center and one other AFDC may be inoperative provided:

- Associated AFDC circuit breakers are opened and collared,

Back

Fwd

Pgup

Pgdn

Prev Sect

Next Sect

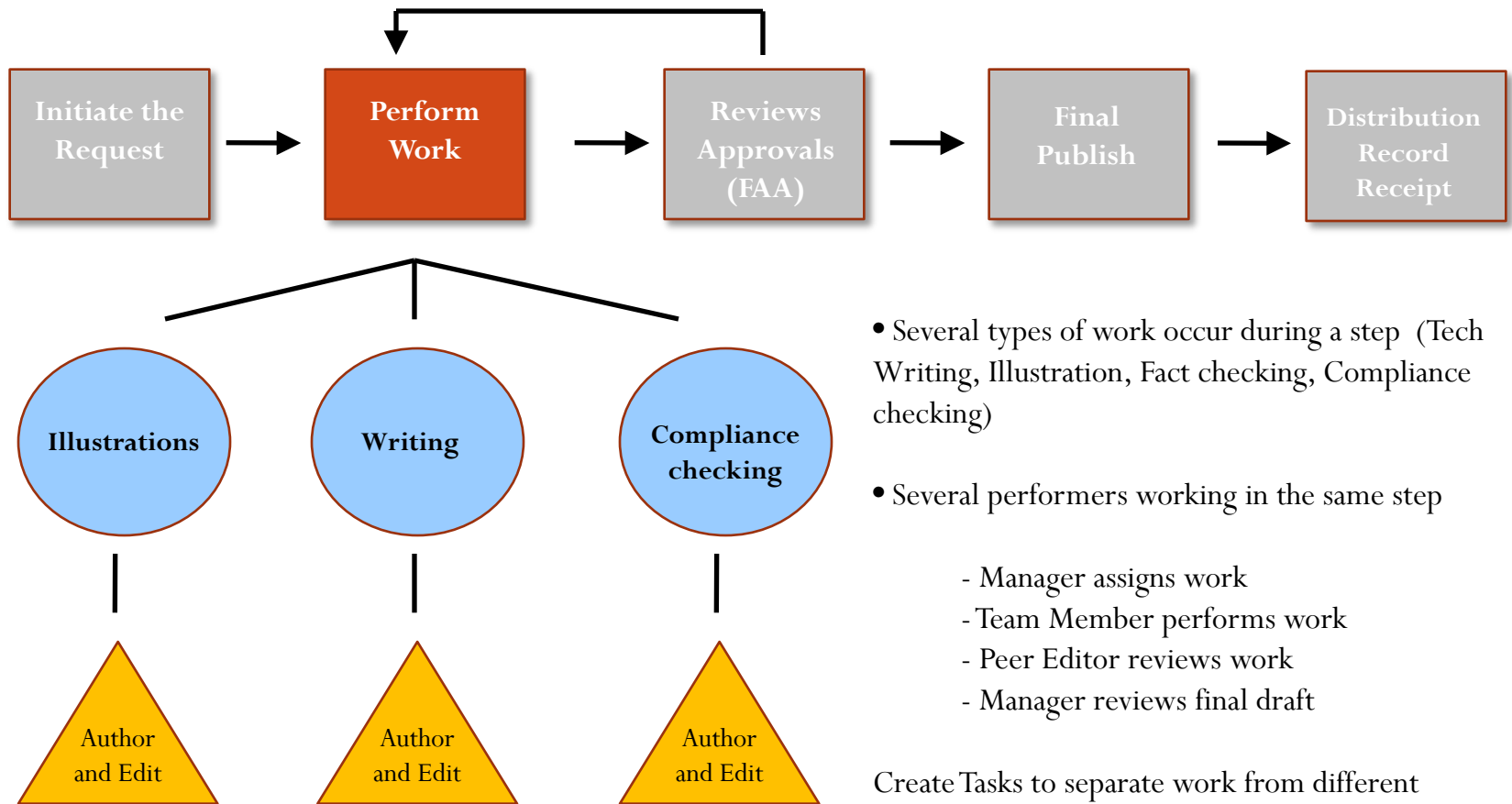
Bkmrks

Notes

Business Process Management

- The system facilitates and enforces compliance by
 - Making sure every change is preauthorized
 - Change incorporation content creation that goes through specific review and approval processes via automated routers
 - Automated notifications that are posted along the way to stakeholders
 - Enforcing that all revisions and discussions during the process of change are captured and archived
 - Comprehensive status reports that are easily configurable
 - Trend and statistics analysis setup that identify bottlenecks and other issues in the process

BPM Depicted



- Several types of work occur during a step (Tech Writing, Illustration, Fact checking, Compliance checking)

- Several performers working in the same step

- Manager assigns work
- Team Member performs work
- Peer Editor reviews work
- Manager reviews final draft

Create Tasks to separate work from different performers

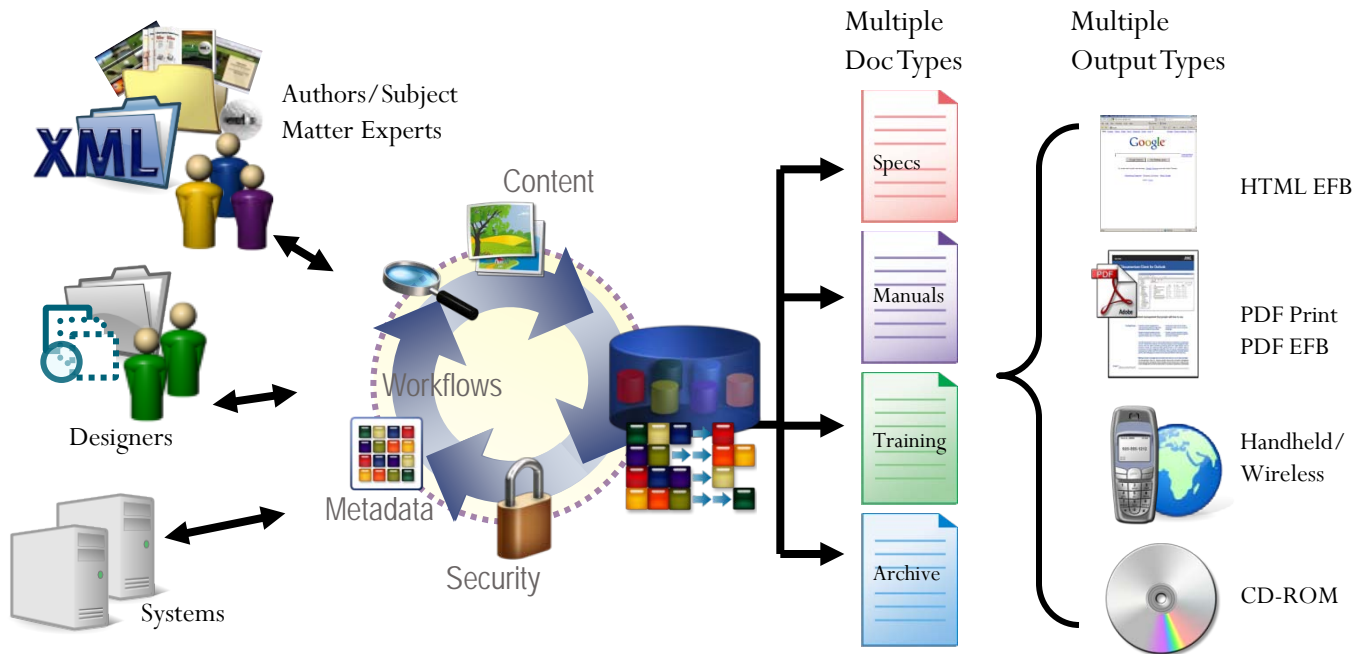
Viewer Functionality

- The system will provide such functionality
 - EFB Class 1, 2 or 3, and online delivery of large XML content
 - Also allows for viewing of PDF files
 - Intuitive, flexible and in context search, data navigation with hyperlinking, and TOC
 - Personalization to control how data is presented to a particular pilot, along with personal notes & bookmarks
 - Filtering based on text, phase of flight, and effectivity
 - In-line viewing of graphics, with zoom, rotate & pan

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System Summary



End-to-End Content Lifecycle Management



Conclusion

- EFB's are a crucial part of a comprehensive operational transition
- Dynamic digital content management and distribution represents one of the “low hanging fruits” for cost containment and improved operational command and control in the EFB process and will provide the required cost savings and efficiencies for both OEMS and the operators
- Structured dynamic content will also foster increased organizing power in the cockpit in the form of integration between software and devices resulting in additional streamlined information available users on board

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- Contact info
 - Kaan Erdal
 - 714 348 8886
 - kerdal@infotrustgroup.com