New Methods to Manage Digital Information

Alex Skrabal, Manager eOperations, SWISS shares the story of SWISS's journey to a new digital and more useful documentation system

THE ORIGINAL PROJECT brief of the SWISS PEGMA library project summed up the situation perfectly, "eKnowledge is the center of the flight operation relevant knowledge and links all related information. This information shall be accessible through a single entry point (offline / online)."

In this article, I'd like to share with readers what SWISS International Airlines (SWISS) is doing in our current documentation project; how digital manuals are treated and what are the plans for the future of those manuals. All airlines face the problem that users of documentation and manuals are often offline and hard to reach as well as being scattered across the world in places where connectivity is still an issue. Added to this, as we often hear, the millennials are coming; a new generation for whom the modern ways, apps and the like, are taken for granted. In addition to that, airlines like SWISS are introducing new models to their fleets that, in turn, are introducing new and additional documents to the system. That is the scale of the challenge with documentation.

FROM DOCUMENTS TO INFORMATION UNITS (TOPICS)

People don't need documents to run a business safely and efficiently — they need knowledge that is correct, complete and up to date. In a critical situation, you cannot act on documents — you have to act on knowledge about the situation and available actions. Classical documents are not the best means to build up knowledge and to keep it up to date. Topic-oriented approaches to information creation and delivery are much better suited for the current challenges faced by airlines. In topic-oriented approaches, classical documents are just one way of delivering information. The relevant information unit, however, is not the document anymore. The topic ideally includes a self-contained piece of information which can be created, managed, revised, and published independently. It can be used and referenced in all kinds of assemblies, including classical manuals, e.g. an OM-A, but also a specific information collection like a winter guide.

WHERE WE ARE COMING FROM

Historically only a small number of manuals was required to run an airline. The manuals were updated occasionally, and due to the paper-based process of removing sheets with old information and inserting sheets with new information there was a good chance a pilot has seen all relevant new information — documents turned into knowledge. One side effect of the tedious process of replacing leaves in a document was the revision and enhancement of knowledge — at least as long as updating the manual was not delegated to some back-office service. In the next step, paper was replaced by PDF documents which were pushed to offline devices like iPads. The manual process was removed, the number of documents grew. PDFs are easy to create and distribute but from the end user perspective they are less than ideal: every bit of information can be buried in a PDF document. Retrieval of relevant information becomes increasingly difficult with the growing number of documents. Full-text search — even across all PDF documents — does not provide precise access to the information needed.

AN EXAMPLE

Information about Safety Landing is spread over several manuals or parts of manuals: The OM-A contains general information, alternative routes and general procedures, the OM-C adds company specific information, the Route Manual lists country specific communication rules, the Charts section contains airport specific information, e.g. fire and rescue facilities, runway lengths etc. It should be possible — either for the technical editors or for end users to create a structured private or a public information collection that references bits of existing manuals and enhances that collection with additional information.

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Various groups work on different aspects of the same processes and instructions. The net result is that we almost certainly end up with information being duplicated by different authors in different manuals, being delivered at different times, in different formats, consumed in different viewers (figure 1). In the worst case, one user will receive the information in one tool whereas it won't yet have arrived in another tool, creating an inconsistency. This scenario is not satisfactory for our end users who need their information to be consistent, concise, up to date and easy to use.

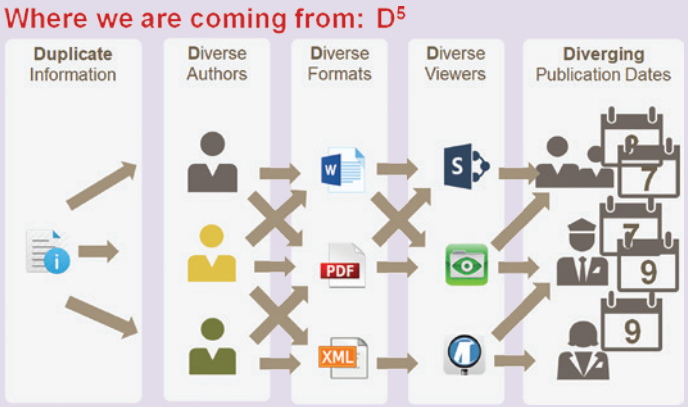

Figure 1

Today, the number of documents and the amount of information has multiplied — keeping track of new and changed information has become a challenge for the end users or 'consumers' of the information. As an airline, we must continue to meet regulatory and legal requirements but, what is even more important, we should support cockpit and cabin crews to do their job better than ever and we can only do this with a clear focus on their needs:

- Deliver new information when it is available;
- Avoid redundant information;
- Provide an easy to use check list of updated or new information;
- Facilitate finding the right information in a specific situation;
- Support learning and checking;
- Allow the end users individually to aggregate information in different ways;
- Allow users to comment on information;
- Provide feedback channels, e.g. for change requests, error corrections;
- Share useful individual information collections.

WHERE WE WANT TO GO

We want to change this process in such a way that information is created and managed only once. We will break up documents into largely self-contained pieces of information. These original topics may be referenced and annotated in different manuals but they cannot be changed, copied, transformed to a different format, managed independently of their source, or published at different times (figure 2).

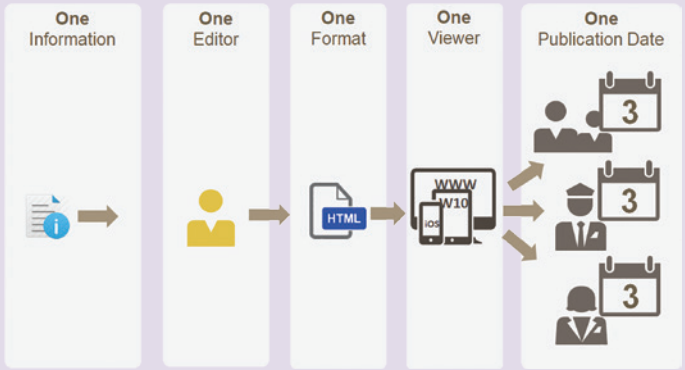

Figure 2

In order to achieve this goal we have defined the following steps in our information process:

Content Creation — Original content is created in one format only: XML. All information will be managed centrally. This helps to avoid duplication of content. For each topic we will know in which context it was created and in which contexts it is referenced. This will avoid loose information, that is information which is not used in any context or document. Finally, each piece of content will carry additional information about its effectivity, priority, intended audience and content owner/creator.

Content Enrichment — Original content can be used in different documents or collections. Original content may never be changed, but it can be enriched by comments, additional information, etc. It can be embedded in specific manuals (e.g. a winter manual). Enrichment is always carried out in a different 'layer' to avoid modification of the original content. Textual enrichments are created in XML, and they are linked to the original content. The end user can clearly distinguish between original content, enrichment of original content, and additional content.

Content Review and Approval — Each new piece of original content and each new document, consisting of proprietary content, referenced content, and enrichments, must be reviewed and approved internally,

and, in many cases, externally by the relevant authorities. The review and approval process must be interactive, transparent, and traceable. It is almost impossible to fulfill these requirements with a PDF or paper-based process. An electronic, ideally web-based, process which imposes a strict workflow should be established instead.

Content delivery, 'consumption' and interaction — Any new or changed piece of content will only be delivered once. Documents or manuals referencing this piece of content will be updated automatically. Consequently there will not be different versions of the same content in different manuals.

'Consumers' will always find a consistent information set. They can add their own remarks and comments, provide feedback, even create and share their own summaries or assemblies of information. eQuestionnaires allow them to review content and test their knowledge.

THE INFORMATION LOOP

We capture this process in the Information Loop. It consists of two interacting process circles which feed each other:

- Content and Information Creation Process;
- Knowledge Process.

eKnowldege connects the two circles: end users interact with the information provided by the Content Creation Process, they build their own information collections, they share these collections, they comment on and enhance bits of information and they send feedback which shapes the future content. We engage the subject matter experts, mainly cockpit and cabin crew, to actively work with the information we provide, 'consume' it, learn it, test it, provide feedback and re-organize it into new assemblies. This helps to actively build and keep up to date the knowledge required for running an airline efficiently; in addition we tap into their knowledge and use it to improve the content we provide.

Figure 3

WHERE WE STAND

In November 2016, the first release of our new system went live. We had a special need to replace two legacy systems which could not be maintained in the future. The legacy PDF-based system was replaced by our new XML-based system. In order to allow a stepped migration to the new concepts described above, we started by managing and publishing the original PDF documents from the new system. The original PDF documents will then be replaced step by step by native XML content which can then be broken up into modules as planned.

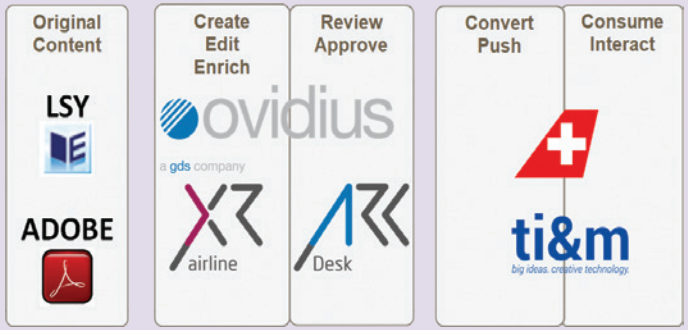

Figure 4

Currently we have the following functionality:

- Manage PDFs in the XML CMS (with additional metadata to facilitate searching and updating);
- Convert PDF to HTML for display in the Library Viewer — this solves a number of issues, most importantly that we don't need an embedded PDF viewer on any of the target platforms;
- Full-text search over all content;
- Cross-platform viewer from one source code base;
- First set of topic-oriented content in XML: eQuestionnaire for e-Learning;
- Demigration of the old document management systems browser, i.e. moving data to the new system.

"This project introduces step by step a complete new paradigm into our process of information creation, management, and consumption. We are moving away from a document-based process to a topic-based process."

THE LIBRARY VIEWER (WINDOWS, iPAD, ANDROID, WEB)

The next release will bring the following features:

- Aircraft manufacturer's Operations Manuals in XML;
- Revision Inbox: Handling of revised content / modules including change reason (read/unread/archived);
- Personal Highlights: revision proof markings;
- MyBooks: User can assemble his own books from content in the Library Viewer (structured favorites based on content modules);
- SharedBooks: User can share his books with other users.

CHALLENGES AND BENEFITS

CHALLENGES

This project introduces step by step a complete new paradigm into our process of information creation, management, and consumption. We are moving away from a document-based process to a topic-based process. We put a strong emphasis on the needs of the end-user or 'information consumer', and we still fulfill all regulatory requirements.

This creates several challenges for the entire company:

- Moving to a completely XML-based information management process creates an obstacle for casual system users who are used to the flexibility of word processors for content creation. There are two strategies to deal with this: we try to make editing XML more accessible by providing only simple structures to casual users and an editing environment that has a word processor look and feel. In addition, we have experienced editors who enhance and structure the information obtained from our contributors.
- Moving away from books to information units requires a completely different way of thinking and writing. Editors will cover topics like aircraft safety instead of specific manuals. They do not know all the contexts in which their information units may be used in the future. Consequently, they need to create them in such a way that they do not rely on a specific context. Fundamentally changing a paradigm always requires an initial effort because we must leave our established way of thinking and working.
- Document ownership is being replaced by content ownership giving editors the flexibility to create assemblies. A higher level of flexibility on the content level leads to a reduction of control on the document level: this change of power over information lead to intense discussions — as paradigm changes always do.

"...our IT department is profiting from the simplified system landscape and the use of modern technologies. Data security, access control, well defined interfaces and state of the art technologies allow a safe operation"

BENEFITS

On the other hand, the benefits are starting to show. After introducing the new system, the overall process of content delivery has become much smoother and more robust. End users have started to concentrate on content instead of documents. We have one single back-end system that replaces several legacy systems, and manages all types of objects (PDFs, XML modules, graphics, and any other file format) centrally. Our library concept is generalized both in the back-end system, and in the front-end system which allows easy synchronization between the systems and reliably pushes to the end user devices. We facilitate eLearning and eTesting, therefore reducing in-class time for our crews. The interaction design is the same for all information types, and personal settings are synced across the platforms. Finally, we provide a modern information and knowledge management application to young users who grew up with tablets and apps.

With the upcoming revision handling features, the users see their personal status at a glance: a simple traffic light indicator signals if they have read and acknowledged the latest content revision. Users get one look and feel across all access methods; be it the browser in the Crew Hotel, the PC at home or the tablet device at work. But also our IT department is profiting from the simplified system landscape and the use of modern technologies. Data security, access control, well defined interfaces and state of the art technologies allow a safe operation. ■

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Alexander Skrabal graduated BA at the 'University of Applied Sciences' (ZHAW) in Zurich and has worked for over 12 years in the aviation industry. He is employed by SWISS International Air Lines as project manager in eOperations and is currently responsible for projects in Flight Operations pilots and cabin crew with a focus on the documentation supply chain.

SWISS INTERNATIONAL AIR LINES

Swiss International Air Lines (SWISS) is the national airline of Switzerland. From Zurich and Geneva the SWISS fleet serves a total of 102 destinations worldwide in 46 countries. With a fleet of 93 aircraft SWISS transports over 16 million passengers annually. The cargo division SWISS WorldCargo offers a comprehensive airport-to-airport service, for high-quality goods and care-intensive freight, to 130 destinations in over 80 countries. As Switzerland's national airline, SWISS stands for traditional values and is committed to the highest product- and service quality.

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