Magister Ludi
AVIATION

AIRPORT PROCEDURE TRACKING SYSTEM

Contents

1 Project description

1.1 Rationale

This project proposes to address issues related to procedure construction, maintenance, management and execution in European Airports.

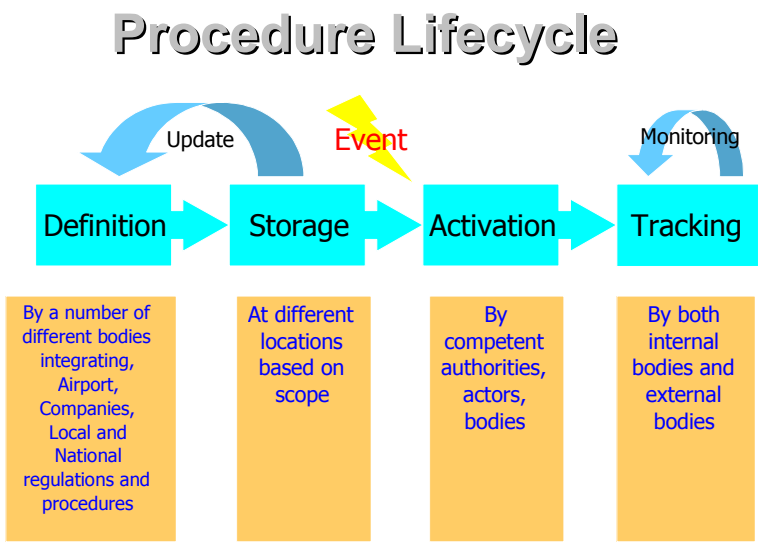
Procedures within the context of airport daily operation, anomaly management and emergency management to some extent exist and airport entities are familiar with their significance (especially for the case of emergency management). However, even though procedures provide a reliable framework for problem management, they are wholly based on paper which makes them difficult to use in practice.

Another aspect involves the creation and evolution of procedures; this tends to be a long labour intensive iterative process leading to their definition only for emergency situations, whereas they could validly be defined for daily operations.

Unfortunately experience has shown, with testimony from recent airport disasters, further problems due to a paper based procedure approach which makes their executive coordination difficult: such as inefficiencies in execution, difficult traceability, poor reliability of message exchange mechanisms and problems where message delivery is not guaranteed. Actors involved in activating and tracking emergency procedures are often unfamiliar with the systems in place and are quickly overwhelmed by events.

It is therefore clear that information flow including different forms and mechanisms for message exchange, is crucial during the application of a procedure. The consequence of this is the difficult trade off between maximizing information flow and providing an overload of information leading to a saturation of the messaging systems or operator. E.g. each actor involved in the procedure must receive reliably and in a timely fashion all and only pertinent information.

It is clear from these general problems that an integrated software and hardware system with a strong supporting methodology is required. In fact, a strong argument for the use of IT can be found when considering the general procedure life cycle summarized in the following diagram:



Therefore we propose an Integrated Project that aims to develop a set of IT instruments (software and hardware) designed and built with a strong emphasis on human factors related issues, for procedure tracking in airports. This will facilitate the use of procedures, and it will encourage their use at any level in the airport: from daily management to anomaly management up to emergency management.

1.2 Project objectives

The ultimate objective of the Integrated Project is the development of a software system for airport procedures tracking with strong commercial potential.

The project will:

- Link with other bodies such as BAA for involvement and understanding of procedures definition
- Link with EASA, JAA and EUROCONTROL to provide regulatory involvement in project development, and to ensure synergistic coordination with existing and future European air safety initiatives such as JSSI and the European Runway Safety Initiative.
- Work in partnership with specific airport(s), and the cooperation of industry (ACI & ERA), in the definition of procedures and the trial of prototype software and hardware
- Adopt and exploit existing standard technologies and apply them to the aeronautics domain
- Search/use/exploit existing standards for procedure definition, representation
- Search/use/exploit best practice from other industries.

The system will implement four main facilities:

- Procedures definition and storage
- Procedures tracking
- Message exchange
- Post-incident process analysis to facilitate improvements to procedures.

The system must also meet the following requirements

- Security (only accredited users can access the system)
- Survivability (the system must be able to survive and intelligently work around significant disruption to leadership, communication, and power networks)
- It must support different end user devices (PC/Laptop/Palmtop/FAX/Phone/GSM).
- It must be flexible and mobile (to ensure that the system remains fully capable at all times, e.g. when major construction programmes are in progress, and to allow for the system to be extended or deployed to alternate locations for special contingencies/events)
- It must support for different end user devices (PC/Laptop/Palmtop/FAX/Phone/GSM)
- Capability of compliance with local/national/international data protection laws.
- Compatibility with legacy/proprietary systems
- It must be an open system supporting both networked and other information transmission media.
- It must integrate different software components and information repositories to specifically support paper based procedures
- It must be realised to facilitates training & emergency simulation

Such a system is highly focused on communication issues on two main sides: technical side and human factor side. Technical aspects cover subjects such as definition of flow, information exchange, and Media/Channels definition, whereas human factor aspects must guarantee that the system

- Provides an ordered sequence of tasks but avoids too rigid procedures.
- Improves the dissemination of information but implements a dedicated filtering of messages.
- Provides for effective training and simulation.

1.3 Project Phases

The development of the airport procedure tracking system will step through a number of activities

1. Analysis
    - User Requirements Specification including Case Studies and Information Flow Analysis
2. State of the Art Study
    - Existing Systems and software

      Emergency Management, Work Flow Management, Commercial Systems, Airlines proprietary systems
    - Existing standards

      BAA Procedures, SMS by CAA, FAA etc
    - Mature Industrial IT Technologies
3. Development of the system
4. Test and Deployment in an airport environment
5. Certification/Endorsement

2 Need & Relevance

Lack of coordination, inappropriate or slow response, can severely hamper an airport's ability to manage an emergency effectively, potentially leading to loss of life or increased and unnecessary disruption to operations. An airport procedure tracking system (APTS) enables key decision makers to make accurate informed assessments and coordinated timely decisions. The ability to manage even minor occurrences safely and quickly ensures that an airport and the associated air traffic system can maintain the highest capacity at all times with significant savings to operators. Managing the resources involved in an emergency situation more effectively reduces the level of risk to other elements of the air transport system while the emergency situation is being resolved.

3 Scale of ambition & critical mass

Growth of air transport industry is inhibited within Europe by limited airport capacity in the central regions and at hub airports. Simple, innovative, and cost effective IT solutions which enable the capacity of the air transport system to be extended and maintained more reliably will enable faster growth with a consequent boost to industry. Effective management of airport procedures will help to reduce delays at peak times and improve public perception of the air transport system.

APTS has potential applications in other sectors of the European public transport system (such as railway and dock management), public event management (sporting events, festivals etc.).

The project aims to gather a suitable number of European participants that cover a number of aspects related to the complexity of the problem being tackled. Main topics for which experience is needed are:

- IT: distributed messaging systems, workflow and knowledge management, networking
- Human factors: paper based to IT based system transition, user interface design
- Emergency planning and crisis management
- Aviation safety management and knowledge of appropriate European and national regulations
- Airport operations and emergency response

4 Integration

Following the phases sketched in section 1.3 above, APTS must be developed through the following main activity workpaths:

- Definition of the participants/Project launch - briefings and meetings with regulatory bodies, industry, university and research centers to seek support/partners
- Identification of the airport site(s) that will act as testbed for the project
- Establishing user requirements - closely linked to state of the art study
- Definition of all the activities needed to deploy the system in the testbed airport site
- Definitions of the tests to be performed on the system, having it running daily.
- Development of the APTS and deployment at the airport.
- Run/test the system for a specified period
- Evaluation of the test results and dissemination of the results
- Definition of a potential activities for the commercial exploitation of the system

Work paths will be conducted in parallel as much as possible.

A strong effort will be needed in participant coordination as well as in developing synergies with air safety initiatives and with regulatory authorities to exploit the project results to their maximum extent.