THE EVOLUTION OF WORLDWIDE AIR TRAFFIC MANAGEMENT

A technological perspective

October 2014



CONTENT

AIR TRAFFIC MANAGEMENT FRAMEWORK & NEEDS FOR IMPROVEMENT

NEW AIR TRAFFIC MANAGEMENT CONCEPTS & TECHNOLOGIES

INDRA SOLUTIONS



CURRENT WORLDWIDE AIR TRAFFIC MANAGEMENT PROCEDURES AND TECHNOLOGIES ARE NOT ALIGNED WITH THE FUTURE NEEDS



Traffic growth can only be accommodated through a paradigm shift in Air Traffic Management



1977 1992

ENHANCING THE CURRENT SYSTEM WILL LEAD TO A GLOBAL, SEAMLESS AND PERFORMANCE-BASED AIR TRAFFIC MANAGEMENT





Consistent architecture

Performance based operations



Adoption of new common standards, procedures and technologies Continuous monitoring of performance and collaborative decision making



Capacity & Safety

Advanced use of technology to decrease controller workload and increase safety Increased efficiency



Cost and time savings for aircraft operators and air travellers

The Involvement of all concerned stakeholders is key for success 🦛



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A NEW PARADIGM FOR ADVANCED AIR TRAFFIC MANAGEMENT HAS BEEN EMBRACED BY MAJOR INTERNATIONAL ORGANIZATIONS...





International Civil Aviation Organization (ICAO) has initiated a Global ATM Operational Concept implemented through the "Aviation System Block Upgrades" (ASBU), becoming the basis for future ATM concept all over the world

INTERNATIONAL INITIATIVES



Working together and collaborating for the delivery of a seamless, performance-based global Air Traffic Management



...BASED ON A NUMBER OF KEY OPERATIONAL IMPROVEMENTS ENABLED BY NEW TECHNICAL SOLUTIONS





FREE ROUTING AND FLEXIBLE AIRSPACE MANAGEMENT ARE THE CORNERSTONES OF HIGHLY EFFICIENT OPERATIONS...





- Static Flight Plans
- Air-Ground voice communication
- National local approach to ATC



- Unconstrained 4D trajectories
- Dynamic updates of flight info
- Digital air-ground data-link
- Seamless gate-to-gate operations

The facilitation of user-preferred 4D trajectories will provide operational benefits for both Air Navigation Service Providers and airspace users



...ENABLED BY THE SHARING OF DATA FROM ALL STAKEHOLDERS THROUGH SYSTEMS INTEROPERABILITY...



- Custom communication protocols
- Self-contained information systems
- Locally designed interfaces
- Individual exchange of information
- High cost and maintenance



Moving to a System-Wide Information Management (SWIM) architecture is key to ensure that all stakeholders work with the same picture



...TO MOVE FROM TACTICAL RE-ACTIVE AIR TRAFFIC CONTROL TO STRATEGIC PRO-ACTIVE AIR TRAFFIC MANAGEMENT





This implies major changes in the current Air Traffic Control system architecture



ATM FRAMEWORK & NEEDS FOR IMPROVEMENT **NEW ATM CONCEPTS &** TECHNOLOGIES **INDRA SOLUTIONS**



INDRA IS A MAJOR TECHNOLOGY MULTINATIONAL IN EUROPE AND LATAM WITH WORLDWIDE PRESENCE







INDRA SUPPLIES THE MOST ADVANCED TECHNOLOGY ENSURING FULL INTEROPERABILITY AND SEAMLESS OPERATION





A THIRD OF THE WORLD AIR TRAFFIC IS HANDLED BY INDRA ATM SYSTEMS, THANKS TO INNOVATION AND TECHNOLOGICAL EXCELLENCE





ITEC-IFDP IS THE INDRA SOLUTION ALLOWING A COST EFFECTIVE PROVISION OF CAPACITY



Initial Flight Plan

Allows creation, modification, coordination and cancellation of FP and related messages or manual inputs

Trajectory

Performs route extraction, procedures assignment, 4D profile calculation, time estimation and sector sequence

Flexible

Checks all flight plans regarding the availability of Conditional Routes, providing result and also request messages.

Sectorisation

Provides maximum flexibility through multi layered airspace definition. Supports shared, but separate use of civil/military

airspace









Flight Data Distribution

Flight Data is distributed to all controllers (civil and military), mentioning the sectors that the flight will cross.

Flight Path Monitoring

Monitors all tracks to determine lateral, vertical and time deviations, providing necessary alerts and updates to flight profiles

Coordination & Transfer

Ensures coordination between internal or external sectors and between civil and military sector teams

Safety Nets

Facilitates strip-less operational concept and early detection of potential conflicts to reduce executive intervention





The Indra iFDP is designed to provide the most advanced functionalities through an interoperable and scalable platform



THE ITEC CONTROLLER WORKING POSITION PROVIDES AN ADVANCED CONFIGURABLE INTERFACE TO THE AIR TRAFFIC CONTROLLER



The Indra iCWP is designed to provide Air Traffic Controllers with very advanced tools to improve safety and reduce workload



ITEC INTEROPERABILITY IS ENSURED BY ITS COMPATIBILITY WITH THE SWIM INFRASTRUCTURE





- The new IOP Application ensures iTEC's compatibility with SWIM
- IOP Application can be a new functionality of an existing FDP or a new component
- iTEC is able to use both ATC
 specific but also generic SWIM
 capabilities
- SWIM allows sharing structured information among different systems

SWIM supports the exchange of data and services across the whole European Air Traffic Management system

ITEC IS THE MOST ADVANCED ATM SYSTEM IN THE WORLD THANKS TO ALLIANCE OF STRONG AIR NAVIGATION SERVICE PROVIDERS





ITEC is the alliance of ANSPs including UK, Germany, The Netherlands and Spain, and Indra as technology partner

ITEC is key to ANSPs in designing and delivering future harmonised procedures and putting in place the technology to support SES directives

The iTEC Alliance is open to other ANSPs

iTEC alliance allows exploiting ANSPs synergies for the development of an ATM system, in order to share costs, face lower risks and reduce delays



ITEC IS THE OPTIMUM SOLUTION TO FULFIL ANSPS NEEDS, MAXIMISING EFFICIENCY



19

03 Indra solutions

iTEC PROVIDES TANGIBLE BENEFITS TO ANSPS



Operational

- En-route / TMA OPS harmonisation
- Silent coordination
- Advanced ATCO support
- Flexible airspace management
- Full alignment with new international concepts (SESAR, NextGen)
- Controller acceptance (others use it)

Technological

- iTEC-iFDP development aligned with the European ATM Master Plan
- CWP, Safety Nets, simulators, ...
- Other ATS components (AMAN, ...)
- SESAR Validation Platform (IBP)
- Lifecycle management
- SWIM compatible

Benefits of common iTEC approach

- Common iTEC position at main fora:
 - 🗸 SESAR
 - 🗸 🗸
- Full alignment with SESAR Deployment strategy
- International cooperation and coordinated procurements

- Network benefits to customers
- ANSPs savings from shared costs during:
 - Development phase : design, coding, testing, validation
 - Training and transition
 - Maintenance

Economic

Strategic

OUR VISION OF AIR TAFFIC MANAGEMENT BEYOND 2020



Preparing today to respond to long-term challenges is essential to guarantee delivering best-in-class solutions when they are needed!





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