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Automation and the Air Navigation System

Gonzalo Alonso Pacheco
Head of Commercial Division and International Business Development, ENAIRE
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AUTOMATION AND AIR NAVIGATION SYSTEM
1. ORGANIZATIONAL CHART: Public Business entity under Ministry of Public Works
1. WHO WE ARE: BUSINESS GROUP

**ENAIRE GROUP**

**ENAIRE** is the main Air Navigation Service Provider in Spain.
2. ENAIRES Figures 2016

ENAIRE employees: 3,692

2016 Annual Turnover: 923M€

1.9 million flights

Evolución de vuelos 2012-2016

-6.6% -2.4% 3.9% 2.9% 7.9%
ENAIRE serves en-route and approach services in three flight information regions in the Spanish Airspace.
3. ENAIRE ATC Services

- 5 ACCs: Madrid, Barcelona, Sevilla, Palma de Mallorca, and Canarias
- 2 TACC: Valencia and Santiago de Compostela
- 22 Towers
- CNS Provider in all Spanish Airspace including the Aena Airport network
- Spanish AIS Provider
4. ENAIRE AIR NAVIGATION SYSTEM

Air Navigation System covers COMs, NAV, SURV and Automation

244 TMA and En-Route nav aids
54 Surveillance systems for TMA, En-Route and aerodrome surface
130 Communication Centres
100 REDAN nodes for voice and data
127 ATCO Working Positions for APP and Tower
139 ATCO Working Positions for En-Route
5. ENAIRE FLIGHT PLAN 2020

- FP 2020 is the ENAIRE is 2017-20 Strategy Plan which envisages a 300 M€ infrastructure, training and innovation investment Plan in the period.

- FP 2020 covers both System Modernization and Innovation

- FP 2020 is in turn part of higher structured Transport Ministry Plan
5 ENAIRE FLIGHT PLAN 2020

ENAIRE MAJOR PROJECTS IN AUTOMATION

5.1 COMMUNICATIONS

• ATM IP Communication Data Network System (REDAN)
  To increase capacity and efficiency by integration of operational data and voice.

• Complemented by NewPENS

REDAN IS THE TRUE BACKBONE AND ENABLER OF THE AUTOMATION STRATEGY
where all remaining systems rest on for data interchange

• DATALINK
  Pilot Controller Datalink service to improve service capacity and efficiency in operations.

• February 2018: Regulation 310/2015 amending Regulation No 29/2009 on data link services for the SES

• In March 2016 ENAIRE started transition to complete Phase I.

CEF 2016 DLS Project (model D: multifrequency dual squitter) + multilink
5 ENAIRE FLIGHT PLAN 2020

ENAIRE MAJOR PROJECTS IN AUTOMATION

5.2 NAVIGATION

• GNSS RNP APCH for airports

• TMA (RNAV1 – P RNAV)
  To optimise airspace in high density TMA

The implementation of PBN NAV will help to optimise in and out flows improving efficiency


• 2017-2020 Palma ACC sectors, P_RNAV TMA Barcelona, P-RNAV TMA Madrid.
5 ENAIRE FLIGHT PLAN 2020

ENAIRE MAJOR PROJECTS IN AUTOMATION

5.3 SURVEILLANCE

RADAR PROJECTS

• **Mode S SSR:**
  Replacement of radar network for Mode S technology by 2021

• **ADS-B**
  On experimental phase

  • 2016-2017: Implementation of 3 test stations for certification
  • 2018 onwards: ADS B network deployment complementing Mode-S SSR network.
SACTA: ATC Automated System

- SACTA is the ENAIRE’s En-route and Tower Air Traffic Control automated system manufactured by INDRA.
- It does genuinely integrate the Spanish En-route, APP and Tower ATC Control systems ensuring a coherent and synchronised data management in all flight phases and transfers among dependences.

Features:

- Automated communication among Spanish and Collateral Centres by using international data interchange standards.
- It reduces manual intervention detecting and alerting on conflicts on an automated way.
- It permits airspace flexible and dynamic configurations.

During the period 2016–2024 new iTEC functionalities will be deployed in successive SACTA versions until fully iTEC SACTA 4.2.
5 ENAIRE FLIGHT PLAN 2020

ENAIRE MAJOR PROJECTS IN AUTOMATION

5.5 ATC AUTOMATED SYSTEM

iTEC (interoperability Through European Collaboration)

• iTEC is a collaboration Project among DFS, ENAIRE and NATS as founding members and the later access of LVNL, PANSA, Oro Navigacija and AVINOR and industry partner INDRA.

• iTEC goal is to develop an advanced air traffic management system for dense and complex airspace meeting SESAR requirements gaining in productivity

• iTEC caters for eFDP, middleware iMAS and moves into a new common CWP allowing for modularity

• iTEC looks for joint specification and commissioning of common Advanced ATC Automated System components so as to reduce procurement and maintenance costs throughout its lifecycle sharing same concept of operation and exploitation.

• iTEC provides for evolution.
5 ENAIRE FLIGHT PLAN 2020

ENAIRE MAJOR PROJECTS IN AUTOMATION

5.5 ATC AUTOMATED SYSTEM

iTEC (interoperability Through European Collaboration)

• iTEC eFDP to cater for ATCO tools as assisted situational awareness enabling free route operations, enhanced surveillance and dynamic configuration by reducing controller workload and increasing individual flight efficiency and capacity

• iTEC is SESAR compliant and will implement 4D Trajectory to implement trajectory based operations which brings in better predictability and allow for user-preferred routing

• iTEC ensures global Interoperability, supporting worldwide convergence with SWIM capabilities

• iTEC eFDP is currently in operation in NATS Prestwick Centre Upper Airspace and DFS Kalsruhe ACC and in next 5 years deployment will continue in others ACC in Spain, Germany, United Kingdom, Dutchland, Poland, Norway and Lithuania.
4 ENAIRE FLIGHT PLAN 2020

ENAIRE MAJOR PROJECTS IN AUTOMATION

5.5 ATC AUTOMATED SYSTEM

iTEC (interoperability Through European Collaboration)

iTEC V1:
4D Trajectory Based Operations
- AF1. Extended AMAN
- AF2. A-CDM
- AF2. A-SMGCS
- AF2. Airport Safety Nets
- AF3. Dynamic Sect. and Advanced FUA
- AF3. FRA and DCT
- AF3. MTCD and CMON
- AF3. Civil/Military coordination
- AF5. FMTP, AMHS, METAR/GRIB2
- AF6. AGDL (FANSA & ATN)

iTEC V2.1 & V2.5:
Full support to Upper and Lower Airspace. Provision of advanced separation management tools for Planning and Tactical Control
- AF1. Enhanced TMA using RNP
- AF2. Integrated AMAN/DMAN
- AF2. TBS
- AF3. Tactical Trajectory and Risk Modules
- AF3. LARA Itf
- AF3. Dynamic FRA
- AF3. Contingency sectors
- AF4. Complexity Manager
- AF5. Flight service FIXM
- AF6. ADS-C tracks

iTEC V3:
- AF3. NOP Itf
- AF4. Collaborative NOP
- AF4. ADS-C EPP trajectory
- AF5. SWIM full (FIDX, AIXM, WXXM)
- AF6. I4D
- AF6. IOP (ATC-ATC and ATC-NM)
5 ENAIRE FLIGHT PLAN 2020

ENAIRE MAJOR PROJECTS IN AUTOMATION

5.6 ATC AUTOMATED SYSTEM

OTHER Complementary PROJECTS

- Aeronautical Environmental Data System (ICARO)
  Icaro is the environment database for the SACTA System and the aeronautical user facilitating the upload of flight Plans and bulletins download previous to the flight. It is also the support tool for A-CDM implementation

- EU ADQ IR compliant.

- New functionality on internet flight plan submission for users since 2015

- NMOC B2B SWIM

ICARO is the SWIM Facilitator

- IP Voice Communication System (COMETA VoIP)
  The new VoIP Communication System to enhanced capacity and efficiency

- 2016-2021: progressive implementation in ACCs and Towers
6 CONCLUSIONS

- ACKNOWLEDGED NEED OF A SIGNIFICANT BUT ESSENTIAL INVESTMENT

- COMMON PROCUREMENT TO REDUCE COSTS BUT SYSTEM MODULARITY CAPABILITIES

- DIMENSIONED TO THE NEEDS AND AIR NAV SYSTEM CAPABILITIES

- RELIABLE AND EXPERIENCED INDUSTRIAL PARTNER ABLE TO DEVELOP AND INTEGRATE OPERATIONAL CONCEPT REQUIRED FUNCTIONALITIES TO HIGHEST STANDARDS
Thanks for your attention