

S-GEN: SURVEILLANCE SYSTEMS

OBJECTIVES.

This course provides an overview of all existing surveillance systems covering Primary Surveillance Radar (PSR), Secondary Surveillance Radar (SSR, MSSR), Surface Primary Radar (SMR), Mode-S radar, ADS and multilateration systems.

It also covers the Surveillance Data Distribution from detection to plot output.

WHO SHOULD ATTEND.

This course will be directed to:

- **Engineering, Technical and/or Maintenance** professionals of an Air Navigation Service provider (ANSP) that are involved in the design, installation and/or operation of surveillance systems and their evolution.
- **CNS/ATM sector companies staff** requiring knowledge of surveillance systems providing services in Air Navigation as well as their evolution defined in ICAO, Eurocontrol, EUROCAE, ETSI, EASA,... So, industry would be able to analyse the evolution of current ADS systems having a more global view in order to be able to generate better Offers bidding to Call For Tenders launched by ANSPs.

KEY BENEFITS OF ATTENDING.

You will:

- **Learn** current status of the art about surveillance.
- **Understand** the principles managing the evolution of surveillance systems.
- **Know** the technical and operational specifications of surveillance systems.
- **Practise** the implementation of operational procedures based on surveillance systems.
- **Win** experience and know-how to generate better Offers to ANSPs CFTs.

HIGHLIGHTS

Technical and operational course based on a wide experience deploying surveillance systems and services in Air Navigation.

Practical explanations based on current operational implementations.

Practical exercises to settle down theoretical concepts.

Ideal course for students with little, middle or high background on surveillance systems due to the customization performed by the Trainer.

Recommendable course for designers, implementers, developers and professionals within the aeronautical CNS/ATM sector.

COURSE PRE-REQUISITES.

Basic knowledge about CNS/ATM systems.

TABLE OF CONTENTS.

- 1) Introduction to Surveillance.
- 2) Radar basics + PSR.
- 3) Primary radar systems.
 - Antenna
 - Transmitter Receiver
 - Signal Processing
 - Plot Extraction and Processing
 - Typical ATC Primary Radar
- 4) Secondary radar systems. Technical principles.
 - SSR Basics
 - Standards and Operational Requirements
 - Interrogations and Replies
 - SSR System Limitations
- 5) Secondary radar systems. Principles of Operation.
 - SSR Operational Characteristics
 - Sliding Window SSR
 - Monopulse SSR Principle
 - SSR Signal Processing & Plot Extraction
 - A Typical Radar
 - Mode S and (M)SSR Manufacturers
 - SSR Performance Requirements
- 6) Mode S Technical principles.
 - Mode S SSR
 - Standardisation
 - All-Call and Acquisition Processing
 - Mode S Formats and Protocols
 - Mode S IC Allocation
 - Elementary and Enhanced Surveillance
 - Mode S & ACAS Programme, EMS and ARTAS
- 7) Mode S Operational Aspects.
 - Introduction and Overview

- Flight Planning
 - Display of Mode S information
 - Correlation Processes
 - ACID Programme
 - SES Regulatory Framework
- 8) Surveillance in Military - Impact of Windturbines.
- 9) Avionics.
- Global View
 - Certification
 - A few Acronyms and Definitions
 - Avionics for Surveillance
- 10) Introduction to Automatic Dependent Surveillance-Broadcast (ADS-B)
- Definition of ADS
 - ADS-B OUT, ADS-B IN
 - ADS-B Technologies
 - ADS-B Applications
 - Mandate Situation
- 11) ADS-Contract.
- ADS-C Introduction
 - ADS-C Application
 - ADS-C Implementation
- 12) Multilateration.
- 13) Integration of Surveillance Information.
- 14) Surveillance Data distribution.
- ASTERIX
 - ASTERIX demo
 - SDD Networks
- 15) Surveillance Data processing.
- ARTAS
 - SASS-C
- 16) Airport Surveillance.
- System Description
 - Performance
 - Commercial products
- 17) Implementation.