

# Identification, Friend or Foe (IFF)

## Secondary Surveillance Radar (SSR) Beacon Identification Systems

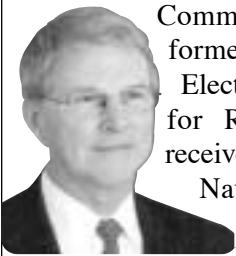
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### Summary

This fast moving three-day course is designed for managers, engineers and technicians who need an understanding of the basics of IFF/SSR radar beacon technology and systems. The principles of the various IFF/SSR systems are presented. The system design tradeoffs are discussed in the context of the different target identification and air traffic control mission requirements. This course will provide the ability to understand and communicate with IFF/SSR engineers and project personnel.

### Instructor



**Dr. Patrick W. Johnson** is a former Navy Commander and founder and former President of American Electronics. He is now Sr. VP for R&D at ZAI, Inc. He received a BS from the U.S. Naval Academy, an MSEE from the Naval Postgraduate School in Monterey, California, and his PhD from Queens University in Kingston, Ontario, Canada. While in the Navy, he was the OPNAV sponsor for shipboard radar and target identification systems. At Amelex, he was the Principal Investigator for a continuing series of radar and IFF/ID programs and projects for the Army, Navy, Air Force, FAA, NASA and DARPA.

### Course Outline

1. **Introduction to Radar Beacon Identification Systems.** Overview of background and course objectives. History of radar beacon systems.
2. **Principles of Operation.** Basics of IFF/SSR system. Antenna characteristics, interrogation and reply signals. Monopulse principles. Typical equipment specifications and standards.
3. **Ground Antenna Systems.** Horizontal and vertical characteristics. Backlobes. T/R switch, rotating joint, cable components. Radar colocation.
4. **Interrogators.** Mode Generator. Transmitters and receivers. Monopulse receivers.
5. **Sliding Window Plot Extraction.** Reply decoder. Defruiting. Target detection.
6. **Monopulse Plot Extraction.** Reply processing. Surveillance processing. False target processing. SSR/PSR combination.
7. **Transponders.** Airborne antenna patterns. Specifications and conformance to specifications.
8. **Multipath and Interference.**
9. **System Design.** Radar range equation. Power budgets. Reply and detection probabilities. Transmitter PRF. Bearing accuracy. Antenna height. SSR/PSR Cross coupling.
10. **Performance Measurement and Monitoring.** Measurement and monitoring of IFF/SSR systems. Model of SSR environment.
11. **Mode S. Reasons for Development.** Interrogation and reply formats. Parity and address. Interrogation and reply types. Data link applications.

### What You Will Learn

- Basic math and physics underlying IFF/SSR technology and systems.
- The fundamental concepts of the various IFF/SSR radar beacon systems.
- The working language of the IFF/SSR community.
- The major trade-offs in radar beacon system performance.