

Course Description: Automated High Frequency Radio

A century-old wireless technology is experiencing a resurgence of interest from warfighters worldwide. Fourth-generation (4G) wideband high-frequency (HF) radios are now emerging to satisfy military needs for an alternative to satellites for mission-critical beyond line-of-sight communications.

In the 100+ years since Marconi demonstrated trans-Atlantic communications, HF radio has matured from a quirky, temperamental medium requiring highly trained operators to a reliable, low-cost, automated technology with global reach. This course was developed to satisfy the need of government and industry worldwide to understand and apply 2G and 3G HF systems, and the exciting new 4G wideband (WBHF) technology for sending video and high-speed data over HF radio.

OBJECTIVE

The objective of this course is to help military officers, government personnel, and industry managers understand the opportunities and challenges presented by HF radio communications, and the ability of the new generations of HF radio technology to overcome the difficulties and provide reliable, economical, long-range communications.

WHO SHOULD ATTEND

This course is particularly suited for:

- US and Allied communications engineers and planners, who will learn how to apply modern high frequency radio technology
- US and Allied acquisition professionals who must make decisions about HF radio systems
- Industry salespersons who want to understand the emerging generations of HF radio technology

COURSE OUTLINE

1. HF: Applications and Challenges

- Why HF?
- HF Antennas and Propagation
- The HF Channel
- HF System Engineering

2. HF Automation

- Automatic Link Establishment (ALE)
- 2G ALE: MIL-STD-188-141
- Linking Protection
- HF Data Modems: MIL-STD-188-110 and STANAG 4539
- Wideband HF for data rates up to 240 kbps: STANAG 5069
- Reliable HF data link: STANAG 5066
- The HF House: NATO and Allied Standards

3. HF Networking

- HF LANs and WANs
- Channel Access and Routing Protocols
- Optimized HF Networking

4. 3G HF Automation: STANAG 4538

- 3G ALE
- 3G ARQ
- 3G Multicasting

5. HF in the Internet

6. 4G HF Automation

- 4G ALE (WALE)
- Staring ALE

Course Coordinator and Lecturer

Dr. Eric E. Johnson has been a key contributor to HF radio automation for over three decades, both in the US and in the NATO Beyond-Line-of-Sight Communications Capability Team. He chairs both the NATO CaT and the Government/industry Technical Advisory Committee that guides the development of US Military Standards. He is the author or editor of four of the current generation of US and NATO standards for HF protocols and modems: MIL-STD-188-141D, STANAG 4538, MIL- STD-188-110D, and STANAG 4539. Dr. Johnson is the lead author of *Advanced High-Frequency Radio Communications* and *Third-Generation and Wideband HF Radio Communications*. He is Professor Emeritus of Electrical and Computer Engineering at New Mexico State University.