Course Description: Automated High Frequency Radio

In the 100 years since Marconi demonstrated trans-Atlantic communications, high-frequency (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 wideband (WBHF) technology for video 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, 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-188-110B and STANAG 4539
- Wide band HF for data rates up to 120 kbps
- 2G ARQ: 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: MIL-STD-188-141B and 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 three decades, both in the US and in the NATO Beyond-Line-of-Sight Communications working group. He chairs both the NATO working group 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-188-141C, STANAG 4538, MIL- STD-188-110C, and STANAGÊ 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.