

Electronic Countermeasures — Theory and Design

The goal of this course is to educate the participants in the the field of Electronic Countermeasures (ECM) and Electronic Attacks (EA). This includes the complete countermeasures development cycle from analysing threat systems, to developing jammer techniques, and finally confirming their effectiveness.

Intended Audience

The intended audience of this course are EW professionals with an introductory course in EW who are looking to expand their knowledge of the field to electronic countermeasures. A professional level of education in radar and communications systems is recommended.

Module 1 — Principles of Electronic Attacks

This module starts with understanding the weapon systems that will be attacked, and how the desired effects can be achieved in them. This is followed by a review of radar concepts, followed by a discussion of jammer-to-signal ratio and its relation to ECM.

Module 2 — Attacking Search and Tracking Radars

This module focuses on the understanding the various forms of electronic attacks and how they create effects in the threat systems. Deceptive techniques covering range, velocity, and angle will be explored, along with noise jamming. These techniques will then be applied to both search and tracking radar systems.

Module 3 — ECM Design and Effectiveness

Using the knowledge gathered so far this module explores its application in developing countermeasures against specific threats. This includes analysing ELINT, understanding ECM effects against different types of radar threats, and modelling their effectiveness. The spectrum of ECM systems will also be explored from chaff to digital radio frequency memory jammers on multiple platforms including towed and active decoys.

Module 4 — Attacking Communications and Infrared Systems

This module covers the application of EA techniques and platforms to communications and IR systems. The IR lessons start with a discussion of seekers followed by their ECM and the methods to achieve those effects. This includes the spectrum of IR ECM, from flares to Directed IR Countermeasures (DIRCM).