

Web-Based Video Radar Systems Courses to be Offered by IEEE New Hampshire Section and IEEE Aerospace and Electronics Systems Society

By Dr. Robert O'Donnell, Lecturer, and Tom Perkins, *HFE* Senior Technical Editor

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Introduction

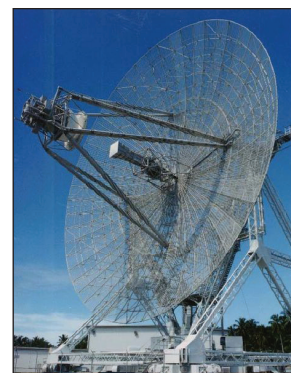
One of the most prominent technologies in the past 70 years has been radio detection and ranging (radar). It has helped win wars, guide land vehicles, ships and aircraft, and explore space. This technology led to numerous spin-off commercial technologies such as traffic law enforcement, microwave ovens, Homeland Security, and non-invasive medical technology.

A recently developed set of Radar Systems lectures consisting of video, audio, screen-captured PowerPoint slides and separate PDF slides have been developed by Dr. Robert O'Donnell, IEEE Fellow. Currently students are e-mailing questions and having them answered in video recitations. Problem solutions are being developed. Testing, final exam and homework problems will be developed using Blackboard and Moodle. It represents the state-of-the-art in distance-learning capability.

Radar Systems Engineering II (1st Year Graduate Course)

This Radar Systems Engineering Course has been created as a first course in Radar Systems for graduate students or professionals new to radar. In the 17 lectures (approximately 26 hours in duration) there are over 1,150 slides. In slightly over a year the course has

had over 240,000 hits from 175 countries and over 2.4 terabytes of course material has been downloaded. Example Homework Problems may be performed. The course author is in the process of adding the ability to take the course for university credit or a Certificate of Completion mode based upon successful performance on homework and tests which will be administered via the web.



ALTAIR Range Instrumentation Radar at Kwajalein, Marshall Islands. Photo courtesy US Army.

Outline of Course Material

The subject matter listed below is covered in considerable depth.

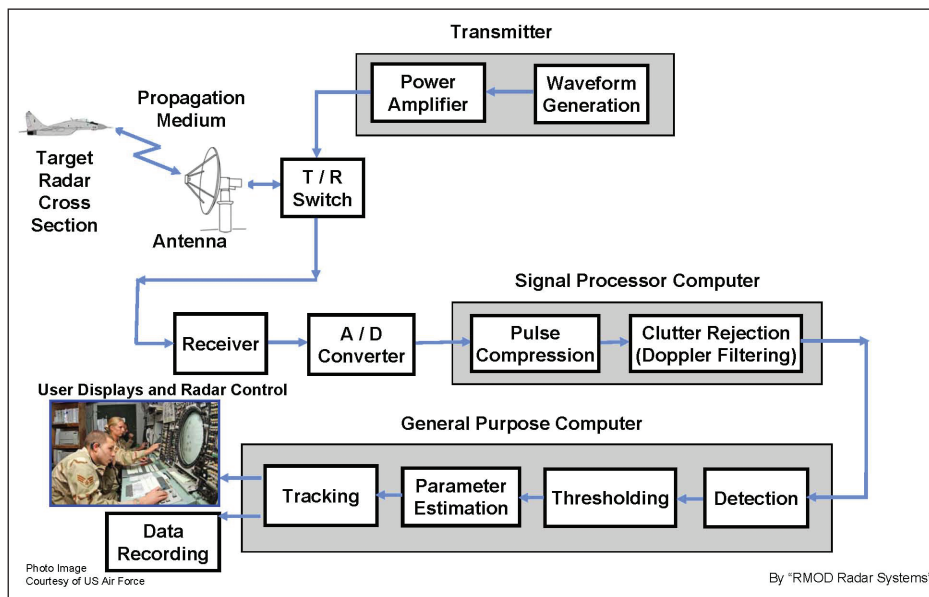
1. Introduction
2. Review E & M
3. Review of DSP
4. Radar Equation
5. Propagation
6. Detection
7. Radar Cross Section
8. Antennas I

9. Antennas II
10. Radar Clutter
11. Waveforms & Pulse Compression
12. Clutter Rejection I
13. Clutter Rejection II
14. Airborne Radar
15. Parameter Estimation
16. Tracking
17. Transmitters/Receivers

The course in its present form may be taken free of charge at <http://aess.cs.unh.edu/radar%20se.html> or at <http://ece.wpi.edu/radar-course/>.

Introduction to Radar Systems

This is an introductory course for those students or professionals peripherally involved in radar technology, e.g., lawyers dealing with radar patent issues, community college students, or technical support persons working with radars systems, either in their development, manufacture or operations. Its present form, the set of 10 video lectures (about 11+



hours in duration, approximately 600 viewgraphs), is taken from a three-day course developed at MIT Lincoln Laboratory, before the lecturer retired (In this form it is available free on the MIT Lincoln Laboratory web site below).

Though developed to provide an understanding of radar systems concepts and technologies to military officers and DoD civilians involved in radar systems development, acquisition, and related fields, it is also quite useful to those with less formal math and science backgrounds. This set of lectures is designed to instill a basic working knowledge of radar systems. Video recitation sessions, practice homework problems, as well as Q & A sessions are planned to be added to this course. This course would be very useful for community college students enrolled in an Engineering Associate Degree program. Take the free course, Introduction to Radar Systems Engineering at: <http://www.ll.mit.edu/workshops/education/videocourses/intro radar/index.html>

Summary

Dr. O'Donnell with his vast experience has devoted countless hours to development of these courses over the past five years. These lectures offer a well-organized, comprehensive education in radar technology that students and current practitioners at various levels can take advantage of now and also later as their experience matures.

About the Authors

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