AEROSPACE
SHORT COURSES

Aircraft Avionics Test and Evaluation Fundamentals (AERO0630)

Instructor: Mark Swaney

Course Description

This course provides an overview of basic avionics systems flight test to include the understanding of test planning and risk management, as well as the necessity and complexity of flight test instrumentation and data collection. Students will understand the challenges of testing integrated systems, as well as understanding the importance of time, space and position information (TSPI), sources of TSPI and its use for data acquisition, reduction and analysis. They will review causes and methods of testing software and for identifying electromagnetic interference. Students will also receive a basic understanding of aerospace data bus architectures, communications and radio navigation systems, Global Navigation Satellite Systems, RADAR systems and electro-optical and infrared systems to help understand required flight test techniques. Students will also gain understanding in the challenges of human-machine interfaces which require crew station and workload evaluations as part of the aircraft and systems certification process.

Course Highlights

- Fundamentals and basics of communications, navigation, radar, and electro-optics systems for development of flight test programs
- Understanding resources required for ground and flight test of modern avionics systems
- Choices and considerations in the development of test planning documents and schedules
- Understanding the importance of crew station layout and workload assessments in the accomplishment of mission tasks for flight test
- Designing a flight test program applicable to standalone systems as well as considerations for integrated avionics systems

Who Should Attend?

Flight test engineers and managers, instrumentation engineers and project/program managers new the area of aircraft avionics flight test. The course also offers an opportunity for those who have been out of flight test to refresh their knowledge. It is also applicable to aerospace industry electronics and avionics suppliers and manufacturers of unmanned air systems interested in how their products will be flight tested to meet specifications and user

requirements. It is applicable to military and civilian organizations alike and has no prerequisites. Attendees should have a basic knowledge of college mathematics.

Learning Objectives
- The need for avionics flight test, system vs. subsystem test, and the challenges of integrated systems
- Safety requirements and risk management throughout the test program
- The need for TSPI, sources of TSPI and the use of TSPI for data acquisition, reduction and analysis
- RF interference and basic methods of testing for Electromagnetic Interference and Compatibility.
- Software test and configuration management principles
- Avionics data bus architectures
- Human factors considerations of avionics controls and displays, as well as associated workload testing concepts
- Basic flight test principles of common avionics systems for communications, navigation, RADAR and electro-optics

Course Outline
Day 1
- Welcome
- Flight Test Risk Management
- Flight Testing Integrated Systems
- Time, Space, Position Information (TSPI)

Day 2
- Databus Systems
- Data Acquisition, Reduction, and Analysis
- Electromagnetic Interference and Compatibility
- Communications Systems Flight Test

Day 3
- Radio Aids to Navigation Flight Test
- Global Navigation Satellite Systems
- Software Development and Flight Test
- Considerations for Complex and/or Highly Integrated Aircraft Systems

Day 4
- Human Factor Principles and Certification
- Crew Station Evaluations
- Workload Evaluation

Day 5

- RADAR – Radio Detection and Ranging Flight Test
- Electro-optical and Infrared Systems Flight Test
- Avionics Test Program Example
- Exam

Classroom hours / CEUs
35.00 classroom hours
3.5 CEUs

Certificate Track
This course is not part of a certificate track.

Course Fees
Early registration course fee: $2,595 if you register and pay by the early registration deadline (45 days out).

Regular registration course fee: $2,795 if you register and pay after the early registration deadline.

U.S. Federal Employee Discount
This course is available to U.S. federal employees at 10% off the registration fee. To receive the federal employee discount, you must enter the code **FGVT116** during the checkout process. Please note that you must validate your eligibility to receive this discount by entering your U.S. government email address (ending in .gov or .mil) when creating your online registration profile. This discount is available for both the early registration and regular registration fees.

Instructor Bio
Mark Swaney is a commercial pilot, test pilot, flight instructor and educator who has spent many years of his career either involved with flight test of military and commercial aviation systems or teaching aircraft and avionics systems flight test. Mark studied aerospace engineering at the University of Cincinnati and co-op'd in experimental flight test at Gates Learjet Corporation. After completion of commercial pilot training, Mark participated in modification and certification flight test of new and modified Learjet systems. Upon graduation, he volunteered for the US Navy and was designated a Naval Flight Officer. Mark served as a Radar Intercept Officer flying the F-14 Tomcat in operational fighter squadrons. He completed the US Naval Test Pilot School as a Test Naval Flight Officer and served in numerous flight test roles involving tactical avionics systems, weapons systems, advanced flight controls, structures, and engines. He was project officer for the upgrade to the Super Tomcat, was the lead flight test officer for the AN/APG-71 radar system and project RIO for the Infrared Search and Track System. Mark was designated an Aerospace Engineering Duty Officer and a Weapon System Acquisition Manager. His later assignments were Commanding Officer, Naval Air Pacific Repair Activity; Operations Officer, Program Executive Officer for Tactical Aircraft Programs; Commander, Naval Test Wing Pacific; and Vice Commander, Naval Air Warfare Center Weapons

Division. He retired from the Navy with 30 years of service and then applied his expertise to educating students about avionics flight test at National Test Pilot School.

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Your company can realize substantial savings by bringing an aerospace short course to your workplace. On-site delivery is ideal for organizations that need to train 10 or more employees on a specific topic. For more information on on-site course delivery, or to request a cost proposal, please contact us at 913-897-8782, or email us at ProfessionalPrograms@ku.edu.

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