Flight Testing Unmanned Aircraft Systems—Unique Challenges
Instructor: George Cusimano

Description
Unmanned Aircraft Systems (UAS) are comprised of an unmanned vehicle (UAV), a manned control element(s), and various data and control links. Although unmanned, the vehicle is still an aircraft and must be tested with the same rigor and precision as manned systems. However, being “unmanned”, and being part of an integrated system, UAVs demand unique flight test approaches that present corresponding challenges. If these challenges go unmet, the UAS Development Test and Evaluation (DT&E) program often experiences unacceptable cost and schedule overruns, which in turn could lead to program termination. This course introduces the primary challenges associated with flight-testing remotely piloted and command-directed (a.k.a. autonomous) vehicles; with primary emphasis on Tactical, MALE and HALE class systems. The course also recommends solutions to these challenges that are meant to either mitigate or eliminate potential problems before they become unmanageable.

Highlights
- Review of the purpose of the flight test and evaluation process as it applies to UAS testing.
- Review of both typical user and certifying airworthiness requirements.
- Review of current regulations for conducting UAV flight operations within both the National Airspace System and on national test ranges.
- Review of the system concept and why knowledge of typical UAS architectures is necessary to assure a successful flight test program.
- Examine the level and complexity of UAS software testing and the need for systems-level flight test.
- The basis for UAV designs, with emphasis on those features that create development and test challenges.
- Review of the most problematic areas of UAV ground and flight test.
- Review of the risk-management process and how it applies to UAV testing.
- Introduction of a new methodology designed to help mitigate UAV flight test problems.
- Discussion of the application of human factors principles to UAS command and control design and test.
- Discussion of the unique aspects of UAV first flight(s).
- UAV lessons learned.
- Review the top 20 flight test challenges presented in the course.

Who should attend?
The course is designed for practicing flight test engineers, test pilots, test managers, aircraft engineers, aircraft designers and educators who already possess a fundamental understanding of flight test principles and practices. The course content is appropriate for civilian, military and academic researchers.

“The UAV flight test short course was a well-constructed and very well presented course. George Cusimano’s wealth of experience in flight test, and in particular, UAS flight test was the most valuable element.”

—Dr. Clare Chatterjea, San Diego attendee