



# *Aircraft System Identification in the Frequency Domain*

## *Methods and Practical Applications*

**A Short Course by Dr. Gene Morelli**

**Date: March 26, 2019 (held in conjunction with Meeting #123  
of the Aerospace Control and Guidance Systems Committee)**

*Course fee includes CD with course notes, breakfast, and lunch*

### *Course Description*

This course teaches the theory and practice of using frequency-domain methods to build mathematical models for aircraft based on flight data. The results are useful for flight simulation development, aircraft stability and control flight testing, comparisons with results from computational fluid dynamics and wind tunnel tests, flight envelope expansion, control system design and refinement, flying qualities assessment, and more. The course includes relevant theory and background for various methods, but focuses mainly on practical applications and solutions. The main objective of the course is to provide an understanding and working knowledge of practical approaches for aircraft modeling in the frequency domain, along with a discussion of the situations where these methods work well, and when alternative methods are required. Real-world applications and software demonstrations are included, to show examples of the results that can be achieved, and to highlight practical uses.

### *Who Should Attend*

The course will be useful to flight test engineers, simulation engineers, control system designers, aircraft designers, applied aerodynamicists, flying qualities engineers, engineering managers, project leaders, and anyone who needs to identify high fidelity mathematical models based on measured data from an experiment, or understand how it can be done.

### *Topics*

Background and Introduction  
Transforming Data into the Frequency Domain  
Spectral Estimation and Empirical Frequency Responses  
Flight Test Input Design  
Dynamic Modeling in the Frequency Domain  
Real-Time Methods  
Software Tools and Practical Applications