

From Simulation to Flight Test - application oriented flight research

Guest Seminar



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This talk discusses the utilization of Model Based Design (MBD) approaches in Flight Control System (FCS) development and its harmonization with state-of-the-art standards, best practices and regulatory requirements, so as to support the growing market of Unmanned Aerial Systems (UAS) in surveillance, entertainment and cargo transport applications. Expected longer flight endurance and higher load carrying capabilities require a time-constrained holistic design and development process that relies on the conversion of traditionally piloted aircraft to Unmanned Aerial Vehicles (UAVs) utilizing proven and accessible airframes.

To define the future UAV's 6 DoF dynamic model, a carefully orchestrated parameter estimation campaign, supported by computational fluid dynamics calculations, shall be performed using the targeted aircraft platform. A precise model and properly selected controlled plant structure are the essentials for designing a well performing and robust FCS. With the aircraft dynamic model available, one can now take advantage of a full motion aircraft simulator to intuitively tune a controller within a rapid prototyping environment. The developed control laws, implemented onto target avionics/digital platform using low-level code generation process, can finally be exposed to their operating environment onboard the real aircraft and their performance evaluated based on the achieved flight test results closing the full design loop - from SIMULATION to FLIGHT.