Unmanned Air Systems: A Tool in the Design and Experimental Evaluation of Novel Aircraft Configurations

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Abstract: Unmanned Aircraft Systems (UAS) have existed for decades, with the primary market drivers being military requirements. While the value of the UAS as a military asset is well known, civilian use of UAS has seen a dramatic increase in activity in recent years. This talk will present some of the research and development in the area of "Unmanned Air Systems: Design, Build, Test and Fly" at the Center for Aerospace Research at the University of Victoria in partnership with OEMs such as Boeing (USA), Embraer (Brazil), and nationally with Meggitt Training Systems and Bombardier Aerospace. The research program aims to improve the performance of complex aerospace engineering systems through advances in mathematical and computational models, and experimental methods that incorporate multidisciplinary analysis, design optimization and subscale UAV model flight-testing for the synthesis of optimal and novel aircraft designs. The design and development of physical flight test platforms provide a low-cost opportunity to evaluate flight worthiness of new and unconventional aircraft configurations. The presentation will outline some of the experimental UAV flight test programs for aero-elastic evaluation of joined-wing and high-aspect ratio aircraft configurations in collaboration with OEMs. The UAV based flight test programs enable designers to retrieve quantifiable data and to provide a qualitative assessment of the aircraft handling qualities. It provides new perspectives that may lead to identification of design issues early in the development process thus avoiding expensive re-designs at the detailed design phase of the full-scale transport aircraft.

Biosketch: Afzal Suleman, Canada Research Chair (Tier1) and Professor, University of Victoria (2000-Present). BSc (Honours) and MSc in Aeronautical Engineering from Imperial College, U. London, UK. PhD in Space Dynamics (1992) from the University of British Columbia. International Space University, Advanced Space Studies Program, Japan, 1992. National Academy of Sciences/National Research Council Fellow, US Air Force Research Labs (1992-1994). Assistant Professor, Technical University of Lisbon (1995-2000). National Delegate, United Nations Committee on Peaceful Uses of Outer Space (UN-COPUOS) and NATO Research and Technology Organization Applied Vehicle Technology (AVT-RTO). Associate Fellow of the American Institute of Aeronautics and Astronautics, Member of the Canadian Armed Forces Defence Advisory Board. Member of the Canadian Government Space Advisory Board. Fellow Royal Aeronautical Society. Fellow Canadian Academy of Engineers. Fellow of the Royal Academy of Sciences of Lisbon. Associate Fellow AIAA. Associate VP Research (2009-2010), and Associate Dean Research (2005-2009) at University of Victoria. International leader in the fields of Aeronautics and Astronautics, and Director of UVic's Centre for Aerospace Research. Research and development in the area of Unmanned Air Systems, Aircraft Structures, Aeroelasticity, Aircraft Design and Advanced Composites.