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From Blank Slate to Flight Ready New Small Research UAVs in Twenty Weeks - Undergraduate Airplane Design at the University of Washington

The capstone airplane design course at the University of Washington, two academic quarters long, has evolved in recent years to cover the airplane design experience from market and needs studies through conceptual design, preliminary design, and detail design, and up to the construction, ground testing, and flight testing of complex research-type small UAVs. Significant engineering resources are devoted to this effort including substantial CAD, CFD-based aerodynamics, NASTRAN-based structural analysis, as well as performance, and stability and control simulations. Wind tunnel tests of commercial quality models at the University of Washington's Kirsten wind tunnel are carried out, plus structural static and modal tests, airframe / propulsion system integration tests, together with systems and system integration testing. An emphasis is placed on test / simulation correlation assessment and the development in students of the appreciation of alternative numerical / analytic modeling methods, their strengths and limitations, advantages and disadvantages. The course emphasizes team work, communication skills, leadership, initiative, and innovation. It runs with tight budget and schedule constraints which the students must meet. Each year a new design challenge is pursued leading to new and unique research UAVs. The program leverages the University's own wind tunnel labs, local flight test locations, and the availability of experienced mentors. Significant support from the Boeing Company and from Aeronautical Testing Service, Inc. (Arlington, Washington), allows the students access to, and interaction with, world class experts in the various areas airplane design has to cover.

Author Name:

Eli Livne

Chester P. Nelson

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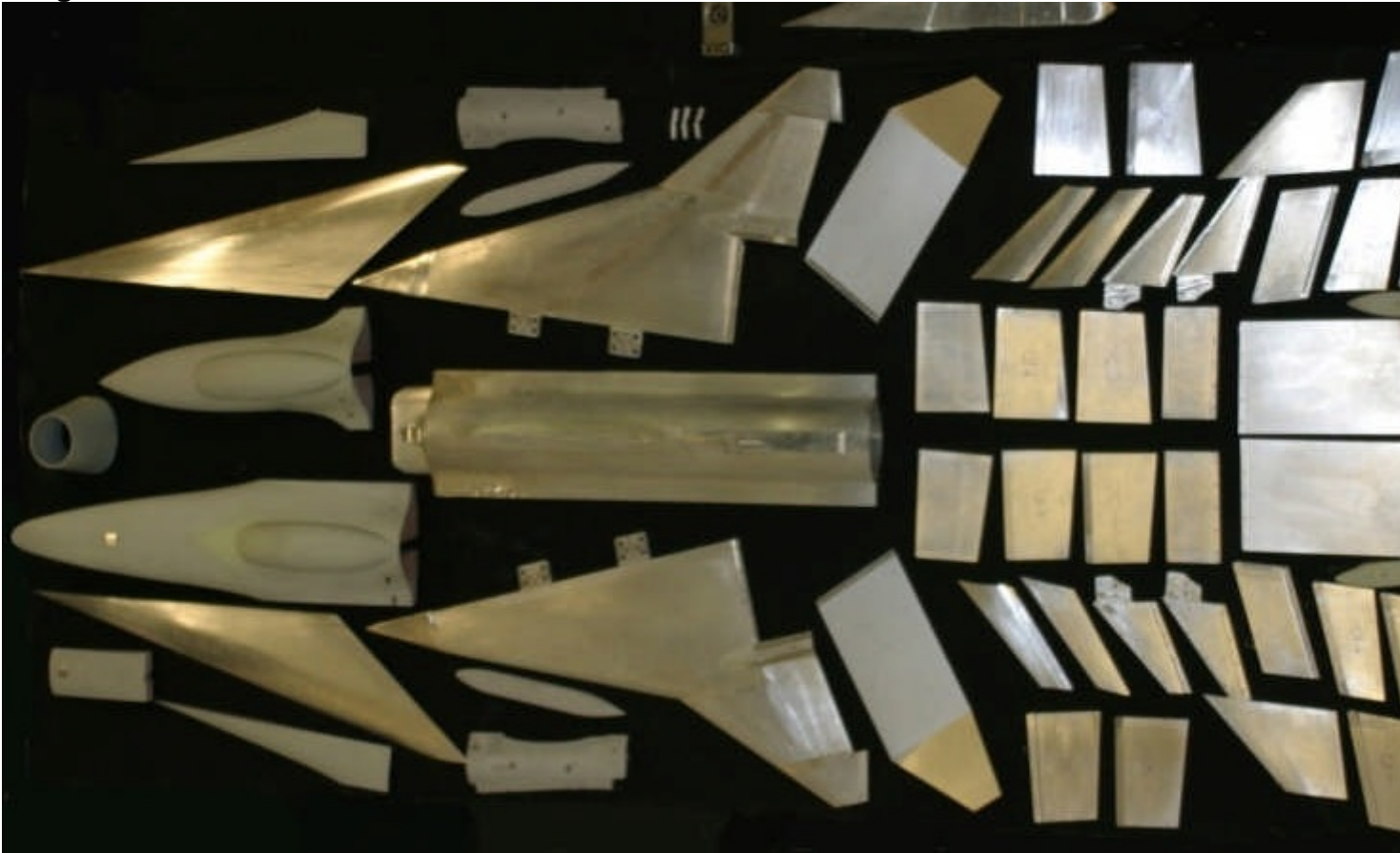
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