

Stress, fatigue, and damage-tolerance analysis of airframe structure, and full-aircraft finite element models correlated to full-scale test.

Ace Analytics is the independent practice of John Taylor, an aerospace structural engineer with 15+ years on metallic and composite aircraft structure, including twelve years developing, validating, and applying a 12-million-DOF full-aircraft finite element model used for USAF T-38 fleet-management decisions.

Core competencies

- ▲ **Stress analysis** — strength, buckling, crippling, and joint failure of metallic and composite structure by classical hand methods and direct FEA; linear and nonlinear, including contact.
- ▲ **Fatigue and damage tolerance** — ASIP-style analysis for sustainment fleets: critical-location stress extraction, spectra, and the data packages that support them.
- ▲ **Full-aircraft finite element models** — large, parts-separated NASTRAN models with discretely modeled fasteners, producing loads and stresses for fleet decisions.
- ▲ **Model validation and verification** — correlation to full-scale fuselage and wing tests with statistician-supported treatment of deflection, gauge error, and residuals; resolving incomplete or conflicting test data.
- ▲ **Nonlinear and multiphysics** — local nonlinear and contact submodels of major joints, carried into the global model as case-based connection stiffnesses; coupled thermal, structural, CFD, and modal analysis.
- ▲ **Composite structure** — material and process selection, laminate design, radome and rotor-blade structure, parametric CAD, and ASME Y14 drawing packages.
- ▲ **Program support** — MRB and repair analysis, subcontractor technical lead, Critical Safety Item programs, proposal co-authoring.

Differentiators

- Analysis that has been held to test: twelve years correlating a fleet-scale model to full-scale structural test, not just building one.
- Hand calculation and FEA from the same engineer, so results are checked both ways before they leave.
- Methods and results presented directly to USAF customers and the ASIP community.
- Single point of contact: the engineer who signs the report did the work.

Tools: Patran/NASTRAN, Femap, ANSYS · NX, CATIA V5, SolidWorks · Python, MATLAB, Mathcad, C++

Credentials: MS Mechanical Engineering (structural mechanics), University of Utah · BS Mechanical Engineering, BYU · U.S. citizen; DoD Secret clearance held 2008–2022, eligible for reinstatement

Past performance

T-38 Talon full-aircraft FEM, Northrop Grumman (2010–2022)

Developed and applied a ~12M-DOF parts-separated NASTRAN model with ~80k discretely modeled fasteners; led V&V against full-scale fuselage and wing tests. Presented to USAF customers and at ASIP 2017 and HOLSIP 2018.

A-10 Critical Safety Item program, Northrop Grumman

Led the CSI program across internal and subcontractor teams; site analysis problem-solver for MRB, procurement, and repair; co-authored proposals from \$1M to \$34M.

47-ft composite radomes, Infinite Technologies (2008–2010)

Led multi-site development and production of 100+ radar domes from clean-sheet materials and process selection through CATIA V5 models and drawing packages. Co-inventor, US Patent 9,562,555.

DARPA Heliplane rotor hub and mast, Groen Brothers Aviation (2007–2008)

Design trades, stress, and fatigue analysis; coupled thermal, structural, CFD, and modal analysis of the rotor head and IM7/BMI composite blade.

Company data

Legal name	Ace Analytics LLC
Structure	Single-member LLC, Utah; small business
NAICS	541330 Engineering services 541715 R&D, physical and engineering sciences
UEI / CAGE	SAM.gov registration in progress
Engagement	Direct or subcontract; T&M or fixed-price; remote or on-site
Export control	U.S. person; twelve years under DoD data-handling and export rules
Insurance	Professional and general liability; certificates on request
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