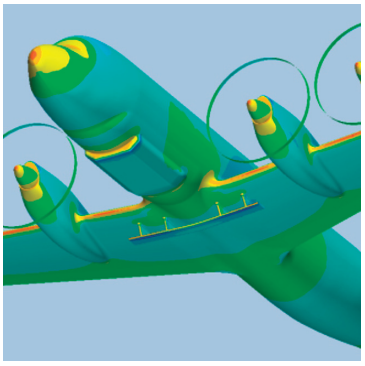
Aerospace Engineering

CONSULTING SERVICES



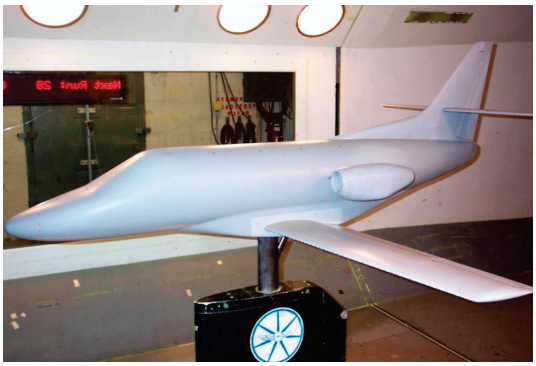
DARcorporation

Design • Analysis • Research

Design, Analysis and Research Corporation (DARcorporation) is a world class aeronautical engineering and prototype development company that boasts a team of highly skilled aeronautical engineers, software developers, project managers and prototype production personnel. Our primary objective is to help you design and build safe and predictable aircraft.

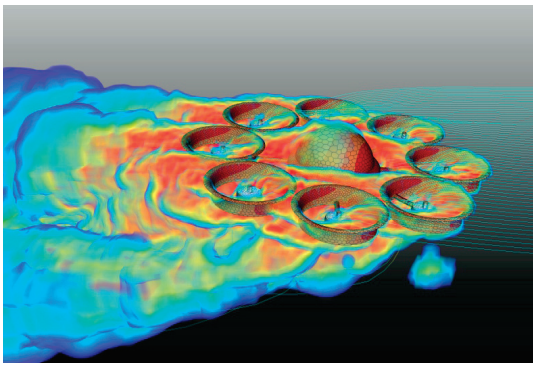
Aerospace Engineering CONSULTING SERVICES

Our expertise includes aircraft configuration design and analysis, aerodynamic and structural design and analysis, prototyping, wind tunnel and water tunnel project management, flight testing and ground testing.



Safire Jet Wind Tunnel Test

Glasair Merlin LSA



Octocopter UAV CFD

DARcorporation engineers work with customers to solve their most critical problems and combine extensive engineering experience with computerized simulation tools to provide the services our customers want. Through the following five disciplines, DARcorporation provides professional services for the design and analysis of aircraft and aircraft systems.

Aircraft Configuration Design and Analysis

We begin every project with a careful review of objectives and existing data and then offer an assessment that includes a cost projection and timeline. Our engineers use conceptual sketches and specifications to produce a complete design or review an existing design. We will analyze your design and provide you a documented projection of performance and cost. Services include:

- Conceptual and Preliminary Design
- Stability and Control Analysis
- Detailed Aircraft Performance Analysis
- Aircraft Modification Analysis
- Detailed Geometry Design

Aerodynamic Design and Analysis

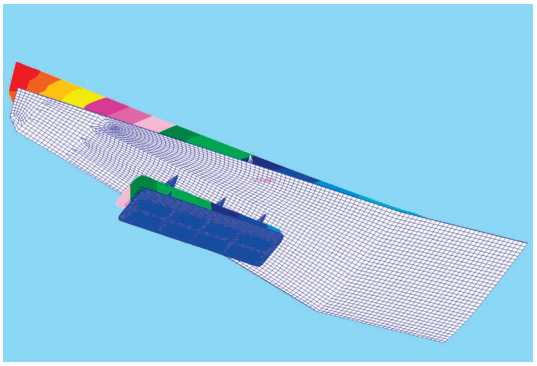
DARcorporation engineers can perform detailed aerodynamic analysis on any flight vehicle using our experience in combination with several aerodynamic software tools including STAR-CCM+ and FlightStream®. These tools are used to simulate the air flow around the aircraft and evaluate how the fluid interacts with the aircraft surfaces for any type of aircraft configuration. Our aerodynamic expertise is not limited to aircraft. Our tools allow us to analyze any body that has air flowing around it. Services include:

- Quasi-Vortex Lattice Code
- Full Navier-Stokes CFD
- Aerodynamic Analysis
- Lift, Drag and Moment Analysis
- Airfoil Design and Analysis
- Wind Tunnel Testing and Data Analysis

Aerospace Engineering CONSULTING SERVICES

BT-67 Preflight with Radar Fairing

Cessna Citation Excel Spray Rig Assembly



BT-67 Wing and Radar Fairing Deflection

Wind Tunnel Test: Business Jet at UWAL

Structural Design and Analysis

Our engineers use Finite Element Analysis (FEA) methods and software to analyze aircraft structures for strength, stiffness, dynamic modes, fatigue, flutter, crash/impact tolerance, etc. Results such as stresses, deformations, buckling factors, natural frequencies, flutter speeds, impact forces, etc. are compared against possible failure modes to ensure structural integrity. The structural analysis yields material selections, material thicknesses and composite layup schedules and produces an optimized structural configuration. Services include:

- Loads Analysis
- Structural Analysis
- Fatigue and Crack Growth
- Aeroelasticity (Flutter & Divergence)
- Bird Strike and Crashworthiness
- Structural Testing and Ground Vibration Tests

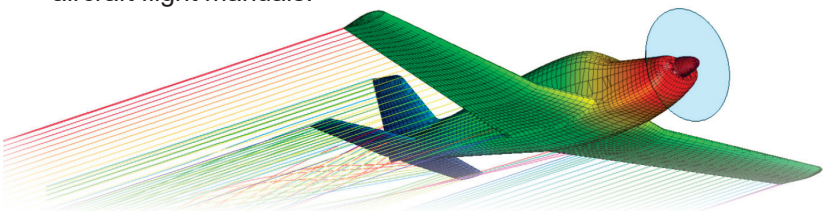
Prototyping and Manufacturing

DARcorporation can generate manufacturing drawings and build a designed structure for structural, aerodynamic and performance testing. We have experience using composite, metal and 3D printed plastic materials. DARcorporation engineers have worked with many unconventional prototypes including experimental airplanes, flying cars and UAVs. In addition to designing your vehicle, we will stay in close involvement with every step of its fabrication and assembly, thereby assuring that “what we designed is what you fly”. Services include:

- Manufacturing Drawings
- Prototype Assembly
- Manufacturing Engineering Support

Flight Testing

DARcorporation has over 25 years of flight testing experience. Besides evaluating flight test results and data, our engineers are capable of flight test planning including ground/flight test planning and preparation, organizing flight test cards, defining test procedures, addressing safety issues via risk management and instrumentation/configuration definition. After analyzing, processing and formatting the test data, our engineers can provide technical reports that document the results and findings. DARcorporation engineers also use this data to create aircraft flight manuals.



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Sample Projects

- Aeroelasticity analysis of the fuselage and wing Ultra-Wide Band antenna installations on The University of Kansas/CReSIS/Basler BT-67 (Turboprop DC-3).
- Glasair LSA Merlin stability and control and aerodynamic analysis and created the aircraft's trim diagrams.
- CReSIS/NASA DC-8 Antenna assembly manufacturing support.
- CReSIS/NASA C-130 antenna installation research.
- The University of Kansas Wind Tunnel modifications.
- Preliminary design and low-speed wind tunnel test of USAF Fifth Generation Target Drone.
- Loads analysis for the Snow S-22.
- Water tunnel tests on a modified KC-135R for AEL Industries (now BAE Systems).
- Design of a scaled Supermarine Spitfire.
- Impact of nose modification on a KingAir B200.
- Air Tractor stability and control analysis.
- KingAir 350 Loads Analysis for weather equipment installation on the wing.
- Structural and aeroelastic analysis of a spray rig assembly mounted on a Cessna Citation Excel vertical tail for Cessna Aircraft Company.
- Fire effects on fuselage locker structures for a business jet modification for Raisbeck Engineering.
- Multiple studies on the design and analysis of the Oliver VTOL Hexplane related to weight, performance, RDT&E (Research, Development, Test and Evaluation) cost and ground effects.
- Performance analysis and technical flight manual writing/updating of military transport aircraft.
- Firewall forward design of an ATP turboprop powered Vans RV-6A for Rivers Aeronautical.
- Samson Motorworks Switchblade preliminary design analysis.
- Design verification, aerodynamic, stability and control support for a small business jet for Safire Aircraft.
- Preliminary design of a supersonic business jet for OrthoAir.
- Loads and structural analysis of a communication satellite radome assembly on the Boeing 737-700 airframe.
- Design review for the Nexaer LS1.
- Stability and control derivatives for the Beech Bonanza for MDM Systems, Inc. a simulator company.
- Preliminary design and analysis on the Kelly Space and Technology Second Generation Reusable Launch Vehicle under the NASA NRA8-27 contract.

About Us

DARcorporation is an aeronautical engineering firm, located in Lawrence, Kansas, that has been offering aeronautical engineering consulting services, software and books since 1991. DARcorporation works closely with several FAA Designated Engineering Representatives (DER's) whose specialties include Mechanical Equipment Major Alteration/Major Repair, Structural Major Alteration/Major Repair, Mechanical Systems and Equipment, Structures, Flammability, etc.

Experience in the design, detailed analysis and building of prototypes gives DARcorporation a unique advantage over other companies, since we can go from initial design all the way through full size prototype manufacturing and flight testing. We will work with you to design and optimize your aircraft for performance, manufacturability and cost. Let us know how we can support your projects.

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