

DARcorporation

Design • Analysis • Research

July 2024

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Consulting Services



DARcorporation has years of experience in design, analysis and manufacturing of aircraft modifications for various applications, such as radomes, antennas, external cargo pods or re-engineing. Our extensive experience in aircraft design, aerodynamic analysis, structural analysis and prototyping ensures any modifications are analyzed for impacts on the aircraft aerodynamics, structures, performance and handling qualities.

Starting with a careful review of objectives and existing data, DARcorporation will offer an assessment of the consulting project including a cost and timeline projection. Your specifications will aid our engineers in designing your modification. Or, if you need a review of an existing modification, we will analyze your modified aircraft and provide detailed documentation covering the effects of the modification on the aircraft aerodynamics, performance and stability and control and make suggestions if the modification degrades aircraft performance. Our engineers have the capability to model and simulate aircraft external installations (e.g., radomes and stores) in various flow regimes including subsonic and transonic flow where both steady and unsteady flow characteristics are studied to calculate surface loads and the fluctuation of loads. The frequency and magnitude of the flow fluctuation are predicted in Computational Fluid Dynamics (CFD) to help with structural analysis to guide potential material strength and fatigue analyses, thus providing higher confidence in the external installation integration to the aircraft.

DARcorporation can also provide manufacturing engineering support and oversee quality control when necessary.

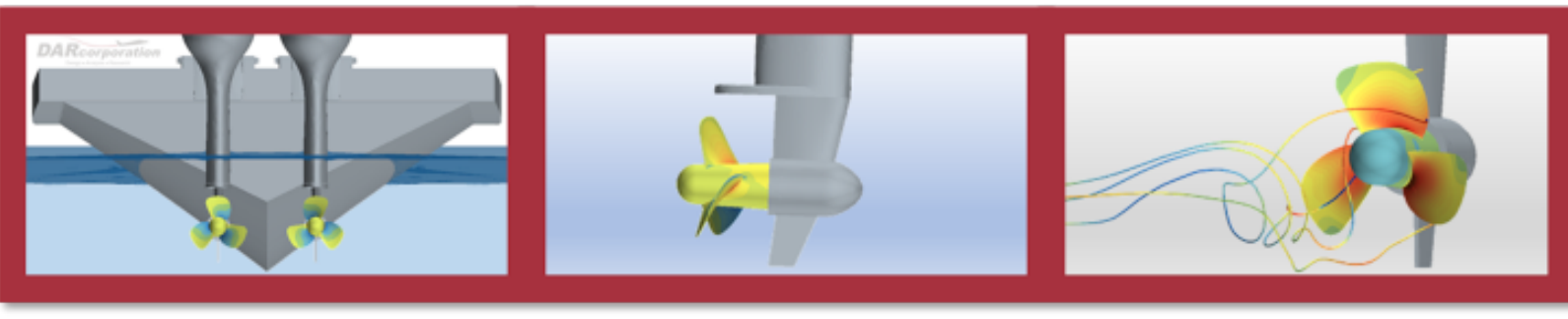
Aircraft modification projects that DARcorporation has participated in include:

- AEL Industries KC-135R Modified Refueling System
- Basler BT-67 Ultra-WideBand Ice Radar
- Beechcraft C-12J Fuselage Radome
- Beechcraft King Air B200 Nose Mounted Radome
- Boeing 737-700 Satellite Communications Radome
- Boeing C-17 Radome Panel
- Boeing KC-135 Fuselage Antenna
- Cessna Citation XLS+ Icing Tanker Spray Boom
- Lear 60 Business Jet External Fuselage Locker
- Lockheed C-130 Hatch and Shoulder Panel Radomes
- NASA DC-8 MCoRDS Radar Integration
- NASA P-3 MCoRDS Radar Integration
- NOAA P-3 EcoSAR Radar Integration

[Additional Information](#)

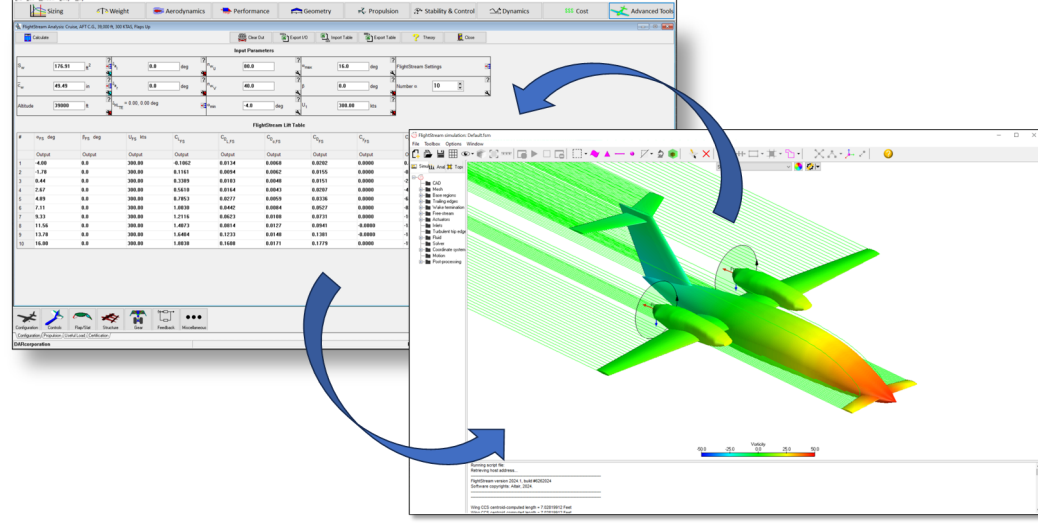
Marine Propeller Design & Analysis

DARcorporation engineers have vast experience in designing, analyzing and testing propellers for marine propulsion systems. Our hydrodynamics experience includes working with a wide range of fluid types and dealing with issues such as cavitation. We offer engineering consulting services for marine propeller design and analysis as well as bench testing of existing propellers and prototype designs to provide detailed information on thrust, torque, rpm and efficiency. DARcorporation has CFD experts proficient in the use of Siemens STAR-CCM+ software that is capable of analyzing the flow characteristics of existing or new propeller designs for improved propeller efficiency/performance and hull interaction. Utilizing a quick and powerful analytical method, DARcorporation has developed a tool to rapidly predict the performance of propellers, which allows us to quickly perform trade studies between different geometry parameters including blade count and optimal blade chord/pitch/twist when designing a propeller from scratch.



[Additional Information](#)

Advanced Aircraft Analysis (AAA) 5.2 New Integration with FlightStream®



Advanced Aircraft Analysis (AAA) Version 5.2 (Summer 2024 Release) will feature increased integration with FlightStream®!

AAA is a preliminary aircraft design software developed by DARcorporation and installed in over 60 countries. FlightStream® is a vorticity-based aerodynamic flow solver developed by Research in Flight. DARcorporation is a long-time reseller of FlightStream® and offers technical support and services to software users.

AAA Version 5.1 currently includes a tool to export the aircraft geometry from AAA to a mesh file that will import directly into FlightStream®. AAA 5.2 users will be able to run a FlightStream® simulation from within AAA. They will be able to change mesh parameters and control other simulation settings in the AAA user interface. AAA will then automatically prepare the mesh file, prepare a script file, open FlightStream®, run the simulation and read in the resulting force and moment coefficients, which will be displayed in AAA. Users can choose to only use AAA or save the simulation file for advanced results visualization in FlightStream®.

The new functionality in AAA 5.2 will offer users a new way to analyze their aircraft designs. They can choose between the immediate results from proven AAA methods, or choose the slightly slower but higher fidelity results typically offered by a panel code such as FlightStream®.

Current users of AAA 5.1 will automatically upgrade to AAA 5.2, when it is released, under their maintenance program or subscription license purchase/renewal.

AAA Example Files



20 aircraft example files for AAA 5.1 are **now** available on our website:

- Single & Twin Engine
- Business Jets
- Commercial Transports
- Distributed Electric Propulsion (DEP) Aircraft
- Experimental Aircraft
- Flying Wings
- Kit Aircraft
- Unmanned Aerial Vehicles (UAVs)
- Vertical Take-Off and Landing (VTOL) Aircraft
- And More...

[Download AAA Example Files](#)

DARcorporation Events in 2024!



EAA AirVenture Oshkosh

July 22 - July 28, 2024

Oshkosh will display: EAA Fly-In Convention Grounds **Hanger C, Booth #3072C** (same as last year)

We will be displaying unmanned aircraft and propellers designed and manufactured by DARcorporation and demonstrating the Advanced Aircraft Analysis (AAA) and FlightStream® software.



2024 AIAA AVIATION Forum and Exposition

July 29 - August 2, 2024

Las Vegas, Nevada: [Caesars Forum](#)

Dr. Willem Anemaat will present two Papers:

AIAA-2024-4428 "Conceptual Design of RUFUS, an Uncrewed Ducted Fan VTOL Aircraft"
August 1 (3:50 pm) Alliance Ballroom 304



AIAA-2024-4652 "UAV Propeller Acoustic Design, Analysis and Testing"
August 2 (1:20 pm) Academy Ballroom 416



Engineering Support

We understand the current engineering job market is tight and finding engineering talent can be difficult. DARcorporation engineers can temporarily fill open jobs until a permanent solution can be found or the job is finished.

DARcorporation engineers are experienced in:

- Aircraft Conceptual and Preliminary Design
- Computational Fluid Dynamics
- Structural Analysis and Structural Dynamics
- Propulsion System Design
- Propeller (Aircraft or Marine), Rotor and Ducted Fan Design
- 3D CAD
- Propulsion System Testing (Performance and Acoustics)
- Flight Testing
- Flight Manuals

[Contact DARcorporation](#)



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