

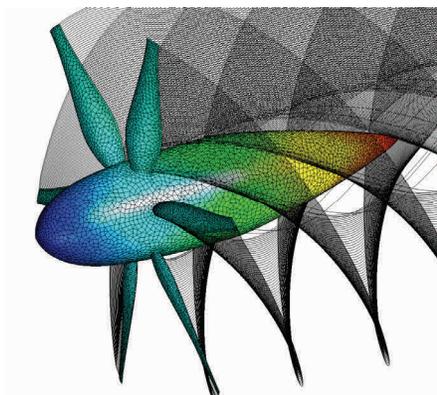


Propeller Design

Design, Prototyping and Testing

Overview

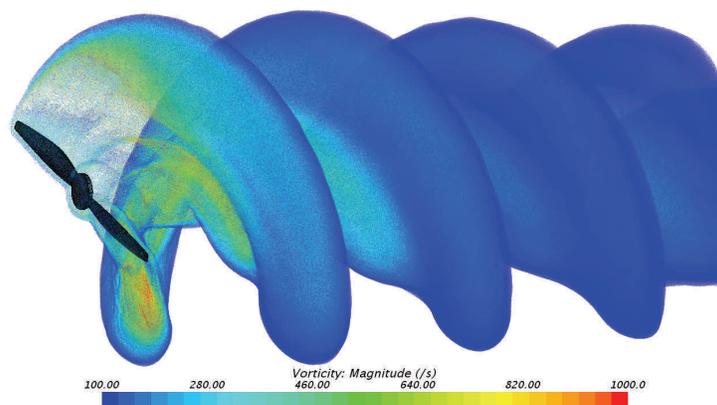
Design, Analysis and Research Corporation (DARcorporation) engineers are capable of performing detailed aerodynamic design and analysis on any aircraft or drone propeller. Flow characteristics around the propeller can be accurately analyzed and the optimal propeller layout can be determined to ensure superior aircraft performance. The pressure distribution obtained from the aerodynamic analysis is also used in subsequent structural design and analysis for optimal strength and weight of the propeller blades. We can quickly construct propeller prototypes and perform performance testing as well, so DARcorporation is a one-stop shop for your propeller design needs.



Aerodynamic Design and Analysis

Based on Blade Element Momentum (BEM) theory, DARcorporation has developed and customized in-house software for initial aerodynamic design of the propeller blades. Also using high-fidelity CFD with rotation simulation, the full power-thrust curve

design include recommendations on the number of blades, airfoil selection, chord and pitch distribution, rotor diameter, rpm, etc.



Structural Design and Analysis

DARcorporation utilizes physics-based high-fidelity Siemens NX Nastran and Autodesk Nastran to analyze the propeller and rotor structures. DARcorporation engineers can perform structural analyses on strength, vibration, fatigue and optimization. Unwanted vibrations are identified and designed out of the system. The propeller is designed in such a way that the natural frequencies of the blades are different from the operating rpm.





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Acoustic Analysis and Testing

DARcorporation has the capability to analyze propeller noise. The simulation tools we use can predict the sound pressure levels at various propeller working conditions. With our on-site acoustic chamber and testing instruments, we can measure and compare the acoustic/noise signature of different propellers. These measurements enable us to design/select the quietest propeller possible. The latest 3D printing technology allows us to rapidly prototype and test our designs and quickly converge on the optimal choice for our client.



Drones/UAVs

DARcorporation has recognized the potential for significant improvement in the area of propeller performance and efficiency. Optimizing propeller blades by performing a detailed aerodynamic analysis will ensure that the drone flies longer, further and more efficiently. Our extensive expertise in aerodynamics and structures can provide any drone with a substantial improvement in propeller performance, noise reduction and overall quality.



The DARcorporation Advantage

Experience in the design, detailed analysis and building of prototypes gives DARcorporation a unique advantage, since we can go from initial design all the way through full-size manufacturing. Our unique skills and tools make us the best choice for any custom propeller development. Using our in-house methods we have been able to design propellers that can be 20% more efficient than typical off-the-shelf drone propellers. Our designs are validated using our robust testing system for measuring thrust and rpm, which ensures a significant increase in overall performance.

