

# DARcorporation

Design • Analysis • Research

April 2022

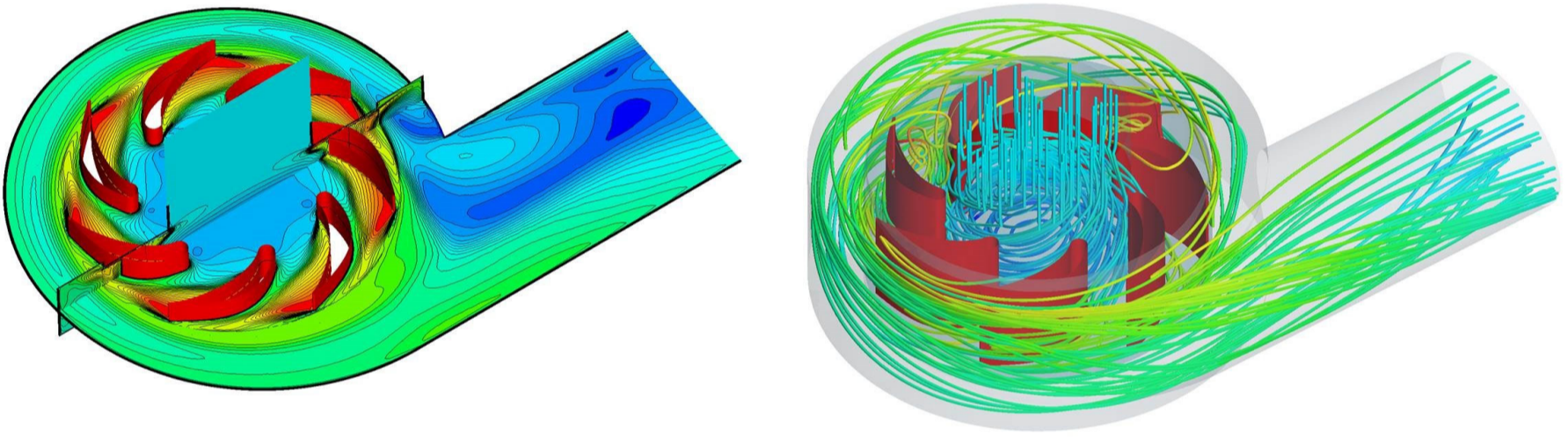
## Surrogate Flight Testing



Neither the cold temperatures nor the snow of January through March can keep the intrepid DARcorporation flight test engineers away from the test field. Testing and development of the Surrogate aircraft continues unimpeded by the challenges thrown at the team by Mother Nature. The Surrogate aircraft is a heavily modified COTS aircraft designed as a testbed for a VTOL/STOL aircraft that can transition between vertical and horizontal flight without using tilt wings or tilt rotors. Recent tests include the demonstration of transition from horizontal flight to vertical flight and vertical landing. ([YouTube Video](#))

## Pump Design and Analysis

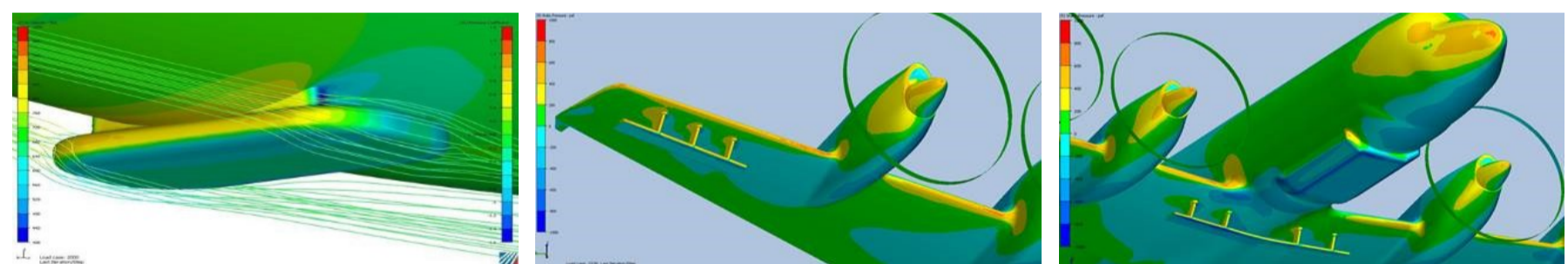
DARcorporation offers [engineering consulting services](#) for centrifugal and axial [pump design and analysis](#). Bench testing of existing pumps and prototype designs provides detailed information on head pressure, flow rate, rpm and efficiency. DARcorporation has CFD experts proficient in the use of Siemens STAR-CCM+ software that are capable of analyzing the flow characteristics of existing or new pump designs. Utilizing a quick and powerful analytical method, DARcorporation has developed a tool to predict the performance of a centrifugal pump. This allows us to quickly perform trade studies between different geometry parameters when designing a pump impeller from scratch. [Contact DARcorporation](#)



## External Modifications to Aircraft



DARcorporation engineers have the capability to model, simulate and analyze [aircraft external modifications](#) (e.g., antenna, radome and weather equipment) on aircraft. Utilizing computational fluid dynamics (CFD) simulations at subsonic and/or transonic speeds in both steady and unsteady conditions, detailed surface pressure distributions and loads are calculated for use in finite element analysis (FEA) structural analysis and sizing. Through CFD analysis and FEA, critical flight conditions are identified and recommendations for structural improvement are made. CFD simulation also helps to determine the presence of adverse effects on aircraft stability and control due to the external modification. External modification to aircraft could cause unsteady flow fluctuations too, which can be detected using velocity profile, streamlines and vorticity plots. [Contact DARcorporation](#)



## We're ready for a road trip, join us!



### [VFS 78th Annual Forum & Technology Display](#)

May 10 - 12 Fort Worth, TX  
Booth #1003

Paper to be presented:

- Modeling and Optimization of Propulsion Systems for eVTOL Aircraft  
Session: Aircraft Design II, May 11, 2022 from 11:45 AM - 12:15 PM



### [AIAA Aviation Forum](#)

June 27 - July 1: Chicago, IL  
Booth #113

Papers to be presented:

- Design, Build and Flight Testing of the MAVRIK with Distributed Electric Propulsion  
Session: ACD-01, Complete Aircraft Design I, June 27, 2022 from 9:30 AM to 11:10 AM
- Preliminary Design of the Multi-Purpose Aerial Vehicle (M-PAV)  
Session: ITAR-04, ITAR - USAF Transformational S&T II, June 28, 2022 from 2:00 PM to 3:40 PM
- Design, Build and Flight Test of the Multi-Purpose Aerial Vehicle SubScale Demonstrator (M-PAV SSD)  
Session: ITAR-04, ITAR - USAF Transformational S&T II, June 28, 2022 from 2:00 PM to 3:40 PM



### [EAA AirVenture Oshkosh](#)

July 25 - 31: Oshkosh, WI  
Hangar C (Booth #3072C)

