

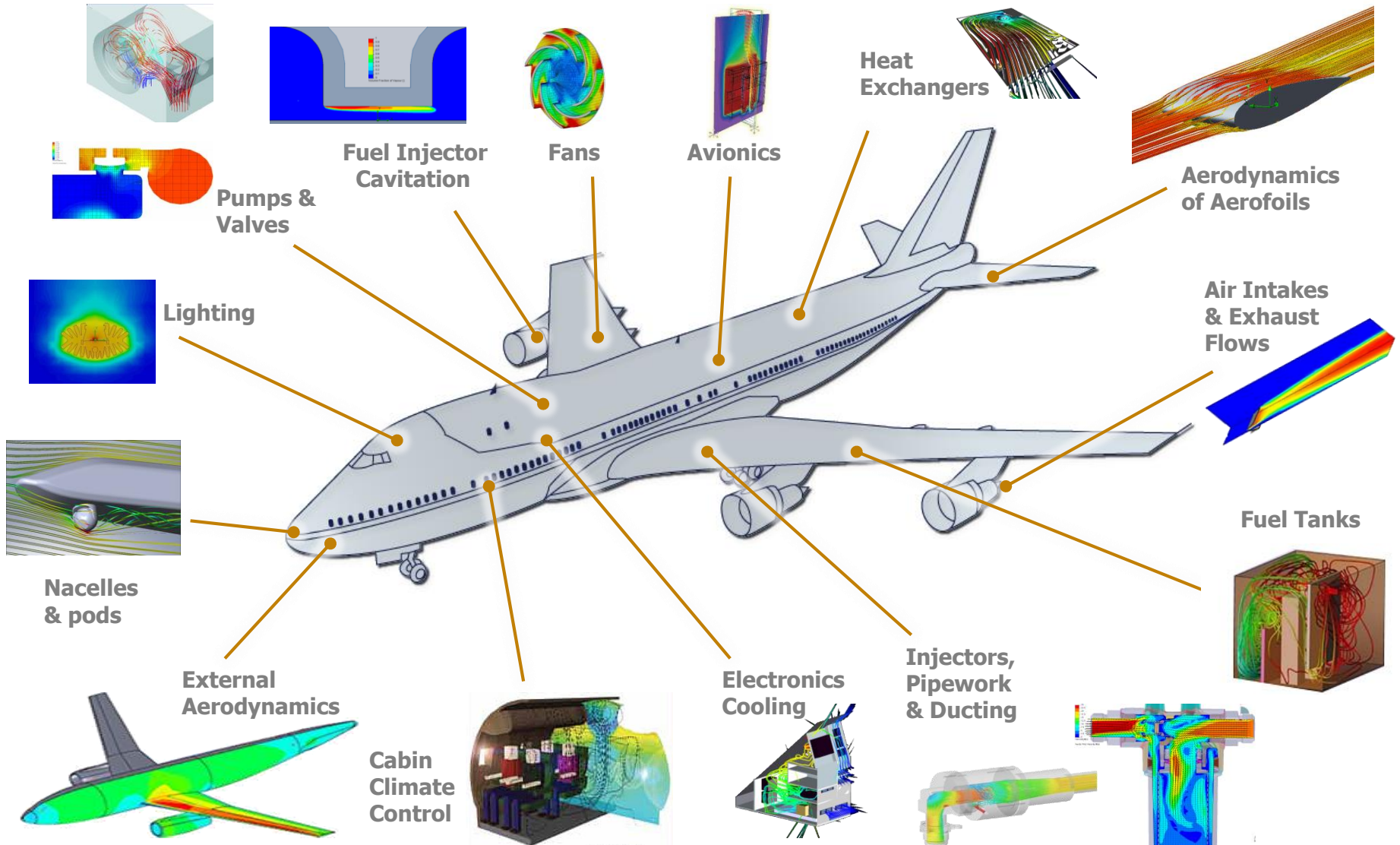
FloEFD Customer Success Stories: Aerospace & Defense



Mechanical Analysis Division

11th November 2016

Mentor Graphics CFD applications in the Aerospace & Defense Industry



FloEFD Solves Flow & Structural Design of a Servo/Antenna Radar System Upgrade

- C&C of Rome Italy is a small mechanical and aeronautical engineering services company who on behalf of CNR ISAC (National Centre for Research) performed flow studies on a servo/antenna, part of a meteorological radar system that needed modernization.

Challenges: Ensure redesign meets a wide range of operating conditions

Solution: FloEFD for PTC Pro/E

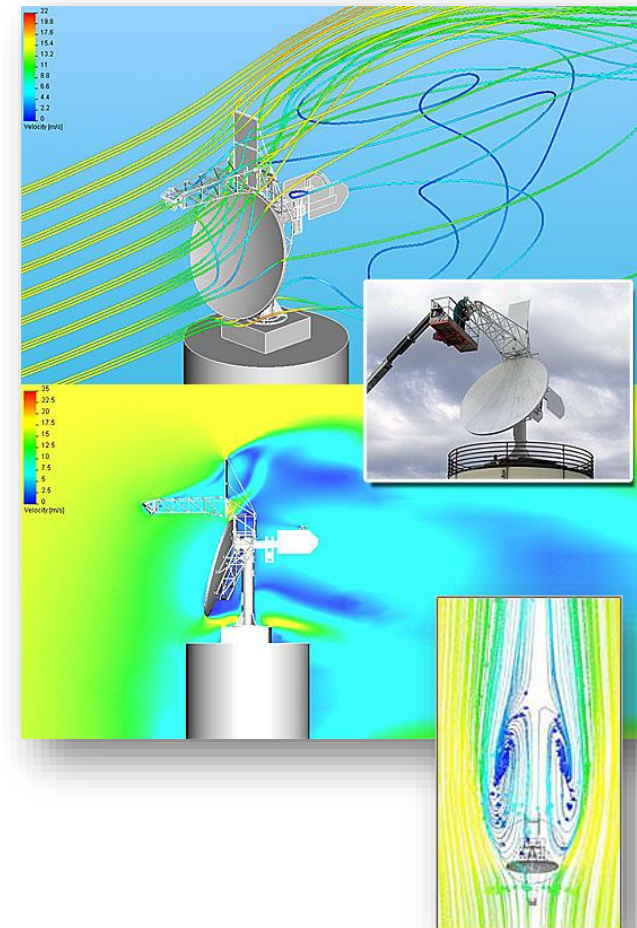
Benefits:

- Ease of use of the software and ability to manage extremely complex geometries
- Antenna analyzed for many configurations, with wind velocities averaging 60 km/h from different directions.

"FloEFDPro, thanks to its tight integration with PTC Pro/Engineer, allowed us to evaluate the effects of possible counterbalancing solutions of the elevation axis loads in order to increase the stability and the accuracy of the system when subject to wind gusts."

Manager, CnC, Rome

Aerospace & Defense



FloEFD pays back 10 fold for Sturman Industries in Space Valve design



- Sturman invented these digitally controlled, magnetically-latching precision valves 30 years ago for the Apollo Space Program.

Challenge: Simulate fluid flow and refine its high-speed, energy efficient, HVC II valve designs fast

Solution: FloEFD

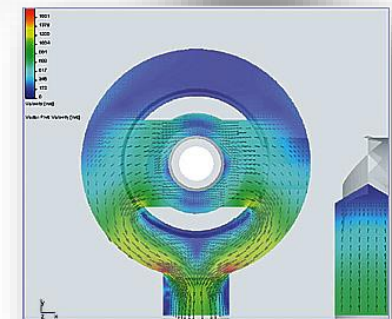
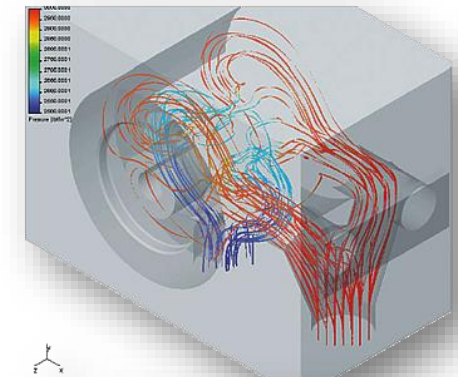
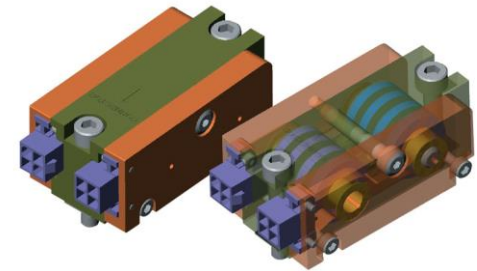
Benefits:

- Picked up by designers immediately rather than traditional CFD
- Several hundred hours of design time invested in the HVC II productline
- FloEFD mission critical to design process now

"FloEFD probably drove 80 percent of the HVC II design because we had to maximize flow by minimizing radial and axial forces. It has paid off big time but we're too busy to even develop any exact metrics. With some software programs, though, you just know that you are benefiting and I would say that FloEFD has definitely paid for itself ten times over."

Steve Massey, Mechanical Engineer, Sturman Industries

Aerospace & Defense



FloEFD CAD-embedded CFD Helps Azonix Reduce Number of Thermal Prototypes from 12 to 1

- Azonix is a division of Crane Co. a leading provider of highly engineered computers and displays designed for extremely harsh environments. **Aerospace & Defense**

Challenge: Their new Terra computer is totally sealed and must dissipate approximately 60 W of power inside the case without exceeding a 90°C surface temperature limit.

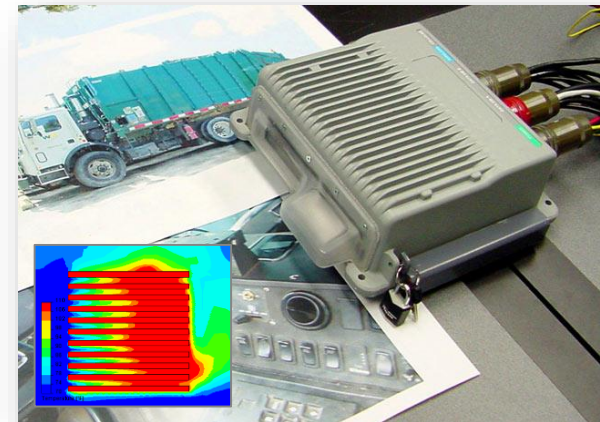
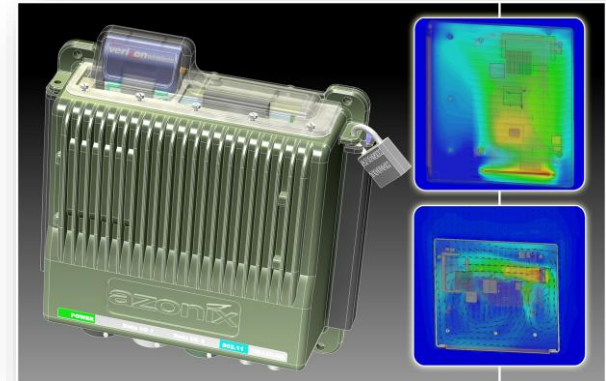
Solution: FloEFD

Benefits:

- Got design right the first time,
- Thermal prototypes reduced from 12 previously to 1 this time,
- CFD predictions to within 5% of experimental measurements.

"FloEFD computational fluid dynamics (CFD) software enables design engineers without a fluid analysis background to perform thermal simulation. The result is that we got the design right the first time, only had to make one prototype, and avoided expensive design changes that typically occur in the late stages of the development process"

James Young, Design Engineer, Azonix Corporation



Thales uses CFD to Ensure Performance of Electronics Hardware at Extreme Temperatures

- Thales Group is a leading international electronics **Aerospace & Defense** and systems group, serving mission critical defense, aerospace and security markets worldwide, with a comprehensive services offering.

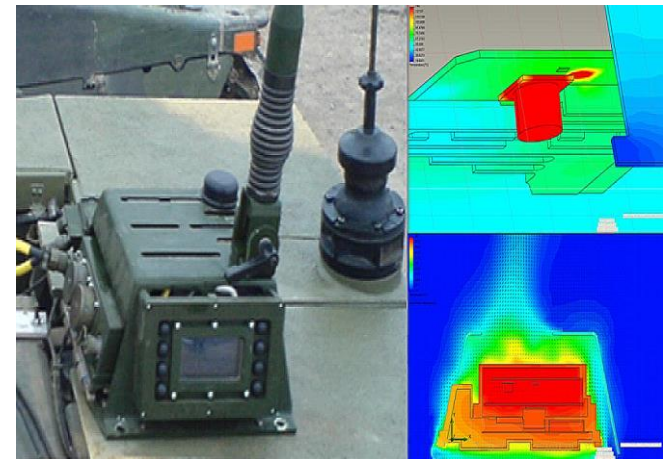
Challenge: Ensure performance of Thales Battlefield Identification (BTID) Transponder Demonstrator hardware in extreme high temperature environments.

Solution: FloEFD for PTC Pro/E

Benefits: - Ease of use, speed and accuracy of FloEFD was established,
- Fault-free operation of BTID equipment was subsequently validated in trials in the Mojave Desert, USA.

"FloEFD^{Pro}'s ease of use, speed and accuracy led to its selection over and above the candidates benchmarked. In addition to the technology, I think it is also important to mention the support services, which in the eight years I have been using the software has always been excellent -- both in terms of speed and quality of response."

Mark Pashley, Principal Mechanical Engineer, Thales Air System Division



Shaw Aero* Reduce Valve Prototype Development Time from 3 Months to 1Day



- Shaw Aero Devices designs, develops and manufactures a wide range of products in the areas of fuel, oil and water/waste systems and components.

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Challenge: Develop a new solenoid valve for an unmanned aerial vehicle cost effectively

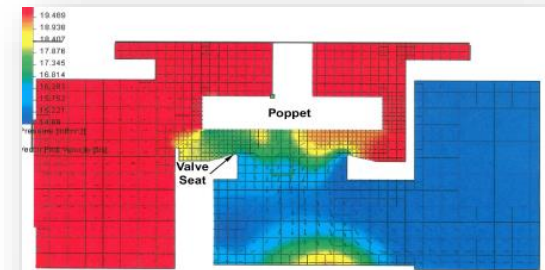
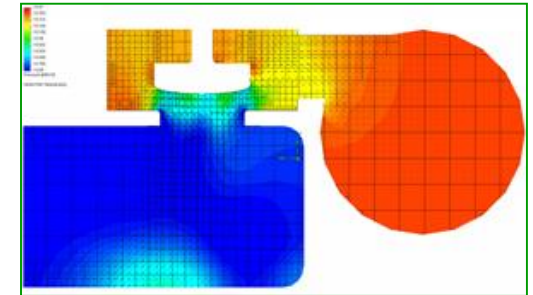
Solution: Use FloEFD and AutoCAD to optimize pressure drop across a custom solenoid valve to meet a precise customer requirement

Benefits:

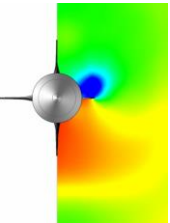
- Met their customer's precise pressure drop requirements
- Reduced development time from 3 months to 1 day
- Reduced engineering costs by replacing physical prototypes

"CFD simulation dramatically reduced the time needed to meet our customer's demanding specifications. "Without CFD, we would have had to go through a minimum of three prototypes, more likely several more. With CFD we moved from the beginning of the project to the development of an acceptable software prototype in only one day".

Robert Preble, Project Engineer, Shaw Aero



(*) Shaw is now part of Parker Aerospace



Missile & Rocket Technologies Proven using FloEFD

- [Bayern-Chemie Protac](#) develops and produces drive systems & components for solid-propellant rockets & uses CFD to optimize intake components for flying objects with ram jet rocket drives calculating thrust vectors of angled nozzles or ascertaining the aerodynamic coefficients of flying objects.

Challenges: Better understand rocket & missile behavior

Solution: FloEFD in various CAD packages

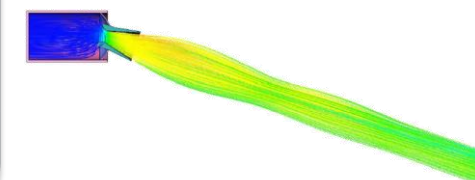
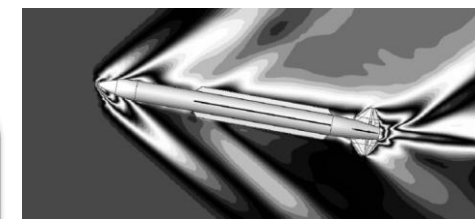
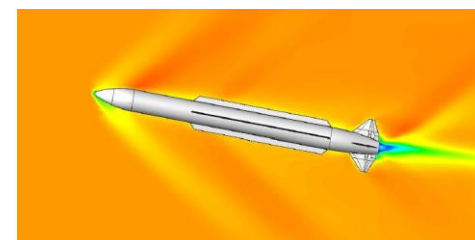
Benefits:

- Created an air intake for a ramjet propulsion system
- Simulated thrust misalignment for canted nozzle
- Determined aerodynamic coefficients for missiles
- Fast and deep understanding of rocket behavior

"We do research on a phenomena basis. The principle character of a flow area is more important than exact numbers. The calculated phenomena (behavior) offers feedback on design settings and is used to evaluate a design approach. In the beginning we work with a minimum of precision in order to get a maximum of calculated variants. If we come closer to a promising design we increase the precision of the calculation. This gives us a fast yet precise output in the shortest time possible."

Ralf Stierle, R&D Engineer, Bayern-Chemie Protac

Aerospace & Defense



Puralator save 2 months in Design of Cyclonic Particle Separator for Jet Engines

Aerospace & Defense

- [Purolator-Facet](#) is a US based leading developer of filter related components for various industries.

Challenge: Redesign a cyclonic inertial separator for a Pratt & Whitney military jet engine.

Solution: FloEFD virtual testing

- Benefits:**
- CFD analysis allowed for testing of 27 design variants without a prototype
 - Project completed in 6 months, saving 2 months, and resulted in a patent-pending new Separator design
 - Traditional CFD tool had failed to do the study
 - \$1,000's saved.

"We saved 2 full months of development work and delivered the project to the customer on time. As far as helping us modify the relationship between pressure drop and filtration efficiency, we used FloEFD to break some of the established paradigms of cyclonic inertial separator design."

David Rachels, Director of Engineering, Purolator-Facet

