

SOLAR SHIP INC.

COMMERCIALIZING THE FIRST SOLAR-POWERED
HYBRID AIRSHIP WITH SOLIDWORKS SOLUTIONS



SOLIDWORKS design, analysis, fluid flow simulation, and product data management solutions helped Solar Ship develop the first solar-powered hybrid airship to obtain governmental regulatory approvals and fly with an actual pilot.

Challenge:

Accelerate development of the first piloted hybrid airplane/airship that meets governmental safety requirements for commercial use to transport people and freight to remote locations.

Solution:

Implement SOLIDWORKS Standard, SOLIDWORKS Professional, and SOLIDWORKS Premium design software; SOLIDWORKS Simulation, SOLIDWORKS Simulation Premium, and SOLIDWORKS Flow Simulation analysis software; SOLIDWORKS Enterprise PDM product data management software; SOLIDWORKS Sustainability environmental impact assessment software; and SOLIDWORKS Composer technical communication software solutions.

Results:

- Accelerated development process
- Reduced number of prototypes required
- Fostered collaboration among global partners
- Piloted first hybrid airship to obtain regulatory approval

It's a blimp. It's a plane. No, it's a solarship. The solarship hybrid airship, which combines the characteristics of airplanes and dirigibles into a solar-powered flying machine, is the first aircraft of its kind to obtain governmental regulatory approvals and fly with an actual pilot.

Developed by Toronto-based Solar Ship Inc., the solarship is a true hybrid aircraft, gaining lift from both buoyant gas and aerodynamics. Its wing-ship design provides a large surface area for power-generating solar cells, allows for short takeoffs and landings, and enables long, self-sufficient flight. The solarship can carry people and freight without the need for fossil fuels, roads, or runways, which makes it perfect for travel and shipping to and from remote areas.

The current prototype will be commercialized as the *Caracal*, a solarship for delivering medical supplies and for Intelligence, Surveillance, and Reconnaissance (ISR) markets. Two larger models—the *Chui*, which is designed for midsized cargo markets, and the large-sized *Nanuq*, which will be built as a multiton cargo freighter—will follow.

According to CEO Jay Godsall, transforming the solarship from a cool idea into a commercially viable means of transport requires an efficient, reliable development platform. "Many of our engineers found us because of the passion they have for this product," Godsall recalls. "When the time came to collaborate with global partners, we asked, 'What's a common design format that people like?' The resounding reply from our young-gun engineers was SOLIDWORKS. We are organizing the collective intelligence of many contributors to develop the solarship, and SOLIDWORKS has proven to be the right platform for fostering collaboration."

Solar Ship chose SOLIDWORKS® solutions because they are easy to use, robust, and provide design, simulation, visualization, communication, and product data management (PDM) capabilities in an integrated environment. The company implemented SOLIDWORKS Standard, SOLIDWORKS Professional, and SOLIDWORKS Premium design; SOLIDWORKS Simulation, SOLIDWORKS Simulation Premium, and SOLIDWORKS Flow Simulation analysis; SOLIDWORKS Enterprise PDM (EPDM); SOLIDWORKS Sustainability environmental impact assessment; and SOLIDWORKS Composer™ technical communication software solutions.

ENSURING SAFE OPERATION

Using SOLIDWORKS, Solar Ship has accelerated development while adhering to a staunch focus on safety. With SOLIDWORKS Simulation for structural analysis and SOLIDWORKS Flow Simulation for computational fluid dynamics (CFD) analysis, Solar Ship engineers have investigated previously unexplored aeronautical concepts using computer simulations, enabling them to quickly develop innovations to satisfy the unique requirements of this type of aircraft.

"Because we're dealing with many first principles, we chose to employ larger safety factors than ordinarily would be the case," explains Industrial Designer Andrew Leinonen. "Safety is our primary concern, so we really take advantage of the SOLIDWORKS Simulation FEA [finite element analysis] tool to better understand performance and accelerate development safely."

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— Andrew Leinonen, Industrial Designer

"We pay close attention to regulatory approvals, so we constantly ask ourselves, 'Is it safe? Is it in the public's interest?'" Godsall says. "SOLIDWORKS Simulation has played a major role in allowing us to prove that the aircraft will have the flight safety and performance characteristics required to secure these approvals."

SIMULATIONS SAVE TIME, CUT COSTS, REDUCE PROTOTYPES

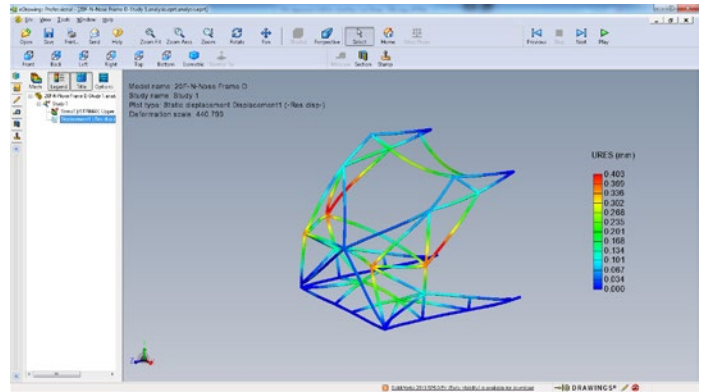
SOLIDWORKS simulation tools also help Solar Ship save time, cut costs, and minimize prototyping. "Simulations enable us to understand how to interface a large, rigid aluminum fuselage with a light, inflatable wing, so that the solar ship is strong enough to withstand flight and landing loads while still remaining light on its feet," Leinonen notes. "SOLIDWORKS structural, buckling, deformation, and CFD analysis tools have taken the guesswork out of the process.

"Simulations eliminate destructive testing, saving time and money," Leinonen adds. "The fact that we need fewer prototypes goes without saying."

RETURN ON EMOTION INVESTED

While saving time and money is vital to the company's success, Godsall says there's another important benefit to utilizing the integrated SOLIDWORKS design, simulation, visualization, communication, sustainability, and PDM system: a high rate of return on emotion.

"When you're engaged in a high-risk proposition about which the development team is passionate, a setback can cause more damage than lost time and money," Godsall says. "It can drag down a team's passion, energy, and enthusiasm. With SOLIDWORKS solutions, we have the tools we need to make mistakes in a virtual environment, which is not only less emotionally devastating to our team's spirit but also builds the confidence that we need to take risks, try new approaches, and discover breakthroughs. SOLIDWORKS is helping us build an aircraft that can go where no one else can."



SOLIDWORKS Simulation capabilities are enabling Solar Ship to resolve one of its biggest technical challenges: understanding how to interface a large, rigid aluminum fuselage with a light, inflatable wing.

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