FLOFLEET S.R.L.

SPEEDING UP DEVELOPMENT OF AN INNOVATIVE, FLOATING HELIUM AIRSHIP WITH 3DEXPERIENCE WORKS SOLUTIONS

Case Study

FloFleet leveraged **3D**EXPERIENCE Works modeling, design, data management, simulation, collaboration, and communication solutions to develop its innovative, solar-powered, floating helium airship, which overcomes the limitations of traditional drones by extending range, flight autonomy, and load capacity, making the ship better suited for applications such as longer-term infrastructure surveillance, disaster assessments, search and rescue, events streaming, agriculture, and cartography.

Challenge:

Quickly develop a drone-like, solar-powered, helium floating airship with extended flight autonomy of at least a week of flight, zero emissions, and the ability to carry payloads of up to 8 kg (17.5 pounds).

Solution:

Implement modeling, design, data management, simulation, collaboration, and communication solutions from the **3D**EXPERIENCE Works portfolio, which operate on the cloud-based **3D**EXPERIENCE platform—including 3D Creator, 3D Sculptor, **3D**EXPERIENCE SOLIDWORKS Premium, **3D**EXPERIENCE SOLIDWORKS Simulation Designer, Collaborative Designer for SOLIDWORKS, Collaborative Industry Innovator, Project Planner, **3D**EXPERIENCE Works Learner, Social Business Analyst, and 3DSwymer roles—as part of the **3D**EXPERIENCE Works for Startups Program.

Results:

- Accelerated airship development
- Reduced development costs
- Eliminated repetitive prototyping cycles
- Enhanced collaboration

FloFleet S.r.l. is an Italian startup company that is developing a floating helium airship that overcomes the limitations of traditional drones. While drones have revolutionized many applications, such as aerial monitoring, photography, and surveillance, they are often limited in range, flight autonomy, and load capacity, making them incapable of completing tasks that require long, lengthy flights of more than 200 km or carrying heavier payloads. Using helicopters as an alternative for these purposes is extremely expensive and relies on emissions-producing fossil fuels. FloFleet is developing a solar-powered, floating helium airship that can remain in flight for a week and carry payloads of up to 8 kg (17.5 pounds) with zero emissions. Applications for this innovative airship include longer-term infrastructure surveillance, disaster assessments, search and rescue, events streaming, agriculture, and cartography.

"One of the first problems we faced was related to the volume of the airship, a fundamental variable for making it fly. It's necessary to achieve balance between the volume and surfaces for aerodynamics, taking into account the presence of upper surfaces where the solar panels are installed, and the availability of an adequate volume for helium that is capable of ensuring the correct aerostatic thrust. The 3DEXPERIENCE Works modeling and simulation tools helped us solve this challenge by evaluating the best-performing geometries."

— Andrea Buson , Chief Technology Officer

According to CEO Andrea Cecchi, the idea for the FloFleet airship grew out of the need to replace traditional aircraft with a more sustainable solution. "Among the primary and most current objectives, there is the need to reduce CO_2 emissions deriving from the use of aircraft that are generally used for these longer flight activities, such as helicopters or planes," Cecchi explains. "For this reason, we have created an airship capable of both responding to needs, such as the monitoring of energy infrastructures and the overflight of specific areas, and intervening in scenarios in which natural disasters have occurred and there is a need to search for missing persons or develop an estimate of damages."

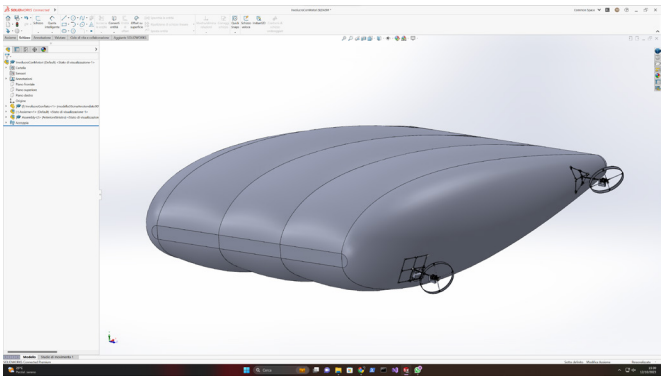
Although the underlying principle for the airship is not new—helium-filled blimps are used worldwide—its size, power source, and capabilities are innovative. The FloFleet airship is filled with helium and capable of floating and traveling in the atmosphere due to four electric motors that are powered by solar panels placed on the top of the aircraft. Photo cameras, thermal imaging cameras, and other sensors can be installed in the lower part of the airship, together with the vehicle control devices. FloFleet completed its proof-of-concept prototype in late 2022 and delivered its first commercial version in 2024.

When FloFleet was founded in mid-2022, the design and engineering team included former students at Politecnico di Milano, where they learned how to use SOLIDWORKS® design software. Having SOLIDWORKS experience, FloFleet decided to implement modeling, design, data management, simulation, collaboration, and communication solutions from the **3D**EXPERIENCE® Works portfolio, which operate on the cloud-based **3D**EXPERIENCE platform—including 3DCreator, 3DSculptor, **3D**EXPERIENCE SOLIDWORKS Premium, **3D**EXPERIENCE SOLIDWORKS Simulation Designer, Collaborative Designer for SOLIDWORKS, Collaborative Industry Innovator, Project Planner, **3D**EXPERIENCE Works Learner, Social Business Analyst, and 3DSwymer roles—as part of the **3D**EXPERIENCE Works for Startups Program.

SIMULATION ELIMINATES REPETITIVE PROTOTYPING CYCLES

The FloFleet design team faced a significant engineering challenge in designing the airship: achieving the correct balance between load capacity, autonomy, and weight. The team leveraged the **3D**EXPERIENCE SOLIDWORKS Simulation Designer role to solve this challenge without the need for repetitive prototyping cycles. "As a startup we do not have large economic resources available to invest, and we have found in the software simulation offered by the **3D**EXPERIENCE Works for Startup Program, distributed by SolidWorld GROUP, an excellent solution for modeling the airship and carrying out tests and evaluations in a virtual environment," Cecchi stresses. "This not only allowed us to reduce costs, but also speeded up the subsequent development phases."

An important aspect in the airship development was defining the volumes and surfaces of the aircraft. "One of the first problems we faced was related to the volume of the airship, a fundamental variable for making it fly," notes CTO Andrea Buson. "It's necessary to achieve balance between the volume and surfaces for aerodynamics, taking into account the presence of upper surfaces where the solar panels are installed, and the availability of an adequate volume for helium that is capable of ensuring the correct aerostatic thrust. The **3D**EXPERIENCE Works modeling and simulation tools helped us solve this challenge by evaluating the best-performing geometries."



Using **3D**EXPERIENCE Works solutions, FloFleet was able to accelerate development and reduce development costs through enhanced collaboration. It also tapped simulation tools to solve a significant engineering challenge designing the airship: achieving the correct balance between load capacity, autonomy, and weight.

ACCURATE MODELS, TRANSPARENT DATA MANAGEMENT

With accurate models—validated with precise simulation tools—and a transparent data management solution in the cloud, the FloFleet design team was able to make quick decisions and leverage the design model for other functions. "We modeled every part of the airship, including the engines, supports, and sensors, after which we assigned each the relevant material and mechanical characteristics to evaluate their behavior," Cecchi recalls.

"We also used the same model created with **3D**EXPERIENCE Works to test autonomous driving algorithms in an extremely precise manner," Cecchi continues. "In other words, once built, the model proves to be truly multifunctional. Every minute spent in the initial phases pays off abundantly later, as it allows us to obtain more precise results in the simulations, arrive at the desired result more quickly

and with less cost, and with all of the data managed and maintained in the cloud."

ENHANCED COLLABORATION SPURS DEVELOPMENT

Even though the members of the FloFleet team attended university together and were familiar with collaborating as a team, **3D**EXPERIENCE Works solutions have enhanced collaboration among team members and spurred development because they enable the team to collaborate even when not physically together. "We continue to use **3D**EXPERIENCE Works solutions at FloFleet, both because it is a complete software and a very powerful suite, of which we will probably also use other applications in the future, and because it has proven to be very flexible," Buson points out.

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"In fact, the license is not associated with the single computer but with the user, therefore with a simple login on the portal, it can be downloaded on multiple machines," Buson adds. "For example, now I have one installation on the PC in the office and one on the laptop at home. Depending on where I am or how I prefer to work, I am able to access the files in the cloud and modify them, and also collaborate with other team members from either location."

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