

GENERAL AERONAUTICS

Case Study



Photo © General Aeronautics

Challenge

General Aeronautics in India designs and develops unmanned aerial systems that help tackle some of society's biggest environmental challenges. In its quest to become a global leader, the company needed a technology platform that could connect its design and engineering teams, consolidate its data and give it the agility it needs to develop innovative aircraft faster.

Solution

General Aeronautics implemented 3DEXPERIENCE on cloud with the *Reinvent the Sky* industry solution experience to deliver scalable access to digital design and simulation applications in a single, secure, standards-based environment. By bringing together its disparate tools, teams and processes into a single

stream, the company can gain a complete view of its product lifecycles, optimize the form and function of its next-generation drones and avoid costly late-stage issues.

Benefits

By connecting the dots across its organization via a cloud-based platform, General Aeronautics is driving collaborative innovation and gaining the agility it needs to develop new aircraft concepts faster and adapt quickly to customer demands. A fast deployment, robust design capabilities and access to the latest technology empowers the company to explore new applications for its drone technology and help tackle society's most pressing issues.



“The 3DEXPERIENCE platform has been key to the development of both fixed-wing hybrid and multicopter UAV systems with advanced capabilities.”

- Dr. Kota Harinarayana, Founder Chairman,
General Aeronautics

DRONES TACKLE SUSTAINABILITY

Electric aircraft technology is emerging as a critical force against some of the biggest environmental and humanitarian challenges our society faces today. Typically cheaper and more expendable than aircraft carrying crew, unmanned aerial vehicles (UAVs), commonly known as drones, enable faster remote access to a particular area without compromising human safety.

India-based unmanned aerial systems (UAS) developer General Aeronautics is applying its cutting-edge technology to help tackle some of its home country's most pressing issues. Every year, farmers in the northern Indian state of Rajasthan are plagued by large insect swarms that threaten to destroy crops and cause major agricultural damage. Traditionally, they use sprayers mounted on tractors and fire tenders to spread insecticide across the affected areas, now General Aeronautics drones are providing additional support. The company's remotely piloted aircraft systems are being used across the state, spraying insecticide at height and in places where regular ground vehicles cannot reach. A typical drone flight can spray a 2.5-acre area in just 15 minutes.

More recently, when the coronavirus pandemic broke out, the company developed drones for large-scale sanitization and monitoring of Covid-19 hotspots across India. By July 2020, General Aeronautics' drones had covered more than 40 sites in Bangalore and Bhubaneswar city, spraying disinfectant over residential areas, markets, roads and hospitals. Bangalore police also took advantage of the aircraft for surveillance and to make public addresses over speakers in an effort to share critical information and keep residents safe.

“Our drones have been in the frontline fight against Covid-19 across the country,” said Abhishek Burman, CEO of General Aeronautics. “The lessons we learnt from the project will benefit us in our future product strategy supporting applications like transportation of packages including medical supplies, organs for transplantation and precision agriculture.”

General Aeronautics develops all of its cutting-edge technology at speed using the 3DEXPERIENCE® platform from Dassault Systèmes. The company deployed the cloud-based platform to reduce the development time of its aircraft and apply its technology to a wider range of civilian, humanitarian and military projects.

“The 3DEXPERIENCE platform offers cloud-based, scalable access to digital design and simulation applications in a single, secure, standards-based environment, with quick and easy deployment,” said Chinnarajan P, lead engineer at General Aeronautics. “We appreciate the way Dassault Systèmes' technical consultants explained the benefits of the 3DEXPERIENCE cloud capabilities and demonstrated with real examples and relevant success stories from the market. As a startup, we needed to be agile and felt that this platform can really help us make an impact on the ideation process.”

CLOUD NATIVE

Like many startups, General Aeronautics is unburdened by legacy technology infrastructures and has been quick to embrace the latest cloud technologies to launch new products and business models faster than its competitors.

“We are a cloud-native company and we are one of the first 3DEXPERIENCE cloud installations in India,” said Devanandham Henry, head of systems engineering at General Aeronautics. “It was an easy decision because the leadership that formed the company, all of us had many years of experience in the aerospace and defense sector using standalone, on premise installations and we were very much aware of their limits in terms of scalability and flexibility. We all recognized the power of a cloud installation.”

Deploying the 3DEXPERIENCE platform on cloud delivered some immediate benefits to General Aeronautics.

“We are a small startup company so we need not worry about infrastructure, setting up the hardware and maintaining it,” Henry said. “All we needed was good computer systems and a reliable internet connection.”



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- Abhishek Burman, CEO,
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Because the implementation was so fast and straightforward, it freed General Aeronautics up to focus on making best use of the new software and exploring its capabilities.

“Within a couple of hours, the application was up and running,” said Anil Kumar, technologist at General Aeronautics. “We saved significant time avoiding IT challenges, resource management, down time and resolving initial teething issues. The team was productive on the same day.”

AGILE AND INNOVATIVE

One of the biggest reasons General Aeronautics decided to partner with Dassault Systèmes was to embrace a culture of agility and innovation in its organization.

"We need to be agile," Burman said. "We are looking at various kinds of applications for drones that will make an impact in society and help humankind. For example, we are looking at agricultural applications. This is a new space for us, and we are interacting with farmers and other agricultural agencies to understand how drones can help them. It's a very new thing for farmers too, so we are constantly dealing with new and changing requirements throughout the lifecycle."

In an industry where speed to market is critical, General Aeronautics needs to be able to bring together all its disciplines and accelerate product development.

"The detail, planning and management involved in taking a product from concept to market is overwhelming," said Srikanth Srinivasan, head of sales and marketing at General Aeronautics. "A standardized design and product development approach on the **3DEXPERIENCE** platform has reduced design iterations, allowed us to converge faster and significantly speed up time to market."

Now, with all product design and manufacturing processes running through **3DEXPERIENCE** on cloud, the company is working more efficiently and cohesively.

"In a typical model that is used in systems engineering, you start with an operational need, you develop your requirements and go through your design, development and building of the drone, and then the system is ready to verify and validate," Burman said. "There are so many people involved in this whole loop and it can be challenging getting them all to communicate with each other. The bigger challenge is to get their tools to talk to each other and that's where the **3DEXPERIENCE** comes in, bringing together not only the native apps within the **3DEXPERIENCE** but also the other tools we use in house. Now, we can seamlessly collaborate and make fast decisions. We've reduced our design cycle time by 30%."

WORKING TO THE SAME GOALS

Backed by the **3DEXPERIENCE** platform, General Aeronautics can ensure digital continuity, deliver on key performance indicators and bring new ideas and designs to market quickly.

"As an organization, productivity and efficiency gains to secure a competitive edge in an increasingly global market is one of the primary criteria for us," said Ramaseshan Satagopan, COO at General Aeronautics. "The **3DEXPERIENCE** platform saves us from having repeated discussions on the same topics with multiple iterations. It gives us a single version of the truth, accessible by everyone, everywhere, at any time."

Today, all disciplines are clear on their objectives and able to quickly reconfigure aircraft for different customer use cases.

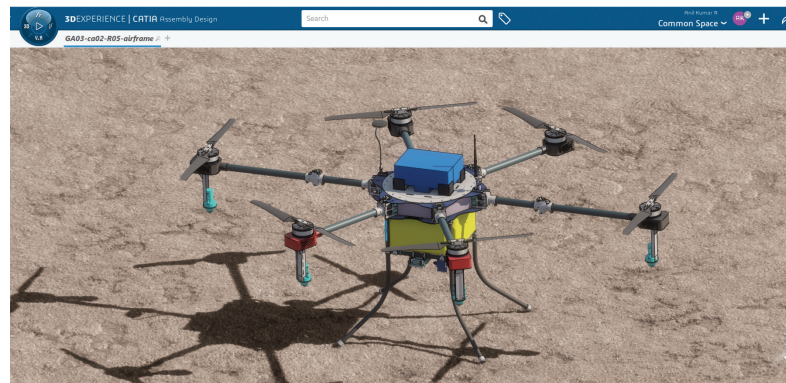
"We can come out with several variants of UAVs for different market applications keeping the base concept the same, thanks to the robust design capabilities of the application with easy-to-use options for replacing and modifying the tree structure of the assembly," Chinnarajan said. "The sub-component modularity is extremely useful for reconfiguring a product for different roles. Key requirements can be explained to our customers visually and we can stick to critical parameters required for the assembly/application of the product."

More about the solution:

The Reinvent The Sky Industry Solution Experience supports startups, small and medium enterprises (SMEs) and original equipment manufacturers (OEMs) to develop disruptive solutions: from small, light aircraft to electric VTOL, as well as space launchers and satellite propulsion. Companies seeking new ways to integrate technology into product development can leverage the solution on the cloud to accelerate the product lifecycle from concept to certification and gain critical first to market advantage.

Benefits:

- Shorten time from concept to prototype
- Ensure digital continuity from concept to flight
- Enhance collaboration between functional teams
- Full traceability for certification



Top image: 3D model of the latest drone in the **3DEXPERIENCE** platform

Bottom image: Drone-based spraying against pests

Focus on General Aeronautics

General Aeronautics was founded in 2016 and is a startup with a vision to be a global leader in the design and development of efficient, reliable and cost-effective aerospace vehicles. The company develops unmanned aerospace systems for various societal and industrial applications in agriculture, military, emergency medicine and surveillance.

For more information: www.generalaeronautics.com

ADVANCING UAV CAPABILITIES

General Aeronautics is exploring the use of Model Based Systems Engineering (MBSE) and Multi-Disciplinary Optimization (MDO) capabilities in the **3DEXPERIENCE** platform to virtually develop and simulate its drones. This means it can analyze and virtually test new designs and iterations to avoid unnecessary and expensive physical prototype costs, share cross-domain models and parameters in a single environment and avoid many of the integration issues that can impact the cost and schedule of each project.

One of the first aircraft products to be developed on the platform was the GA-1, a mini UAS capable of vertical take-off. With its efficient forward flight and high endurance, this aircraft is built to be truly versatile and is reconfigurable for payloads from high-resolution surveillance equipment to packages for delivery to urban or remote locations.

"The **3DEXPERIENCE** platform has been key to the development of both fixed-wing hybrid and multicopter UAV systems with advanced capabilities," said Dr. Kota Harinarayana, founder chairman at General Aeronautics. "We are excited to collaborate with Dassault Systèmes to implement a comprehensive design and development process comprising design, engineering, integration, manufacturing as well as digital twin for mirroring physical and digital representatives of UAV systems.

Our **3DEXPERIENCE**® platform powers our brand applications, serving 11 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the **3DEXPERIENCE** Company, is a catalyst for human progress. We provide business and people with collaborative virtual environments to imagine sustainable innovations. By creating 'virtual experience twins' of the real world with our **3DEXPERIENCE** platform and applications, our customers push the boundaries of innovation, learning and production.

Dassault Systèmes' 20,000 employees are bringing value to more than 270,000 customers of all sizes, in all industries, in more than 140 countries. For more information, visit www.3ds.com.



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