



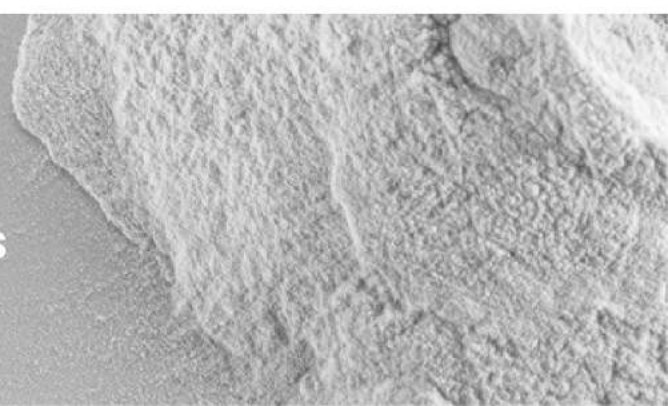
CASE STUDY

3D PRINTED DRONE TAKES FLIGHT WITH CUSTOMIZED POLYMER MATERIALS

Cost-Effective 3D Printing Solves Age Old Problems



Find the Right Material for
Your Additive Manufacturing Needs





OVERVIEW

CHALLENGE

Take The Drone Bird Company's application, previously handmade with fiberglass and epoxy, and replicate its capabilities by adding 3D printed components. With customized polymer materials, the strength of the drone can be tested to withstand the product requirements.

SOLUTION

Leverage EOS' Selective Laser Sintering (SLS) technology to 3D print the drone body and various cover-flaps with the help of ALM's PA 640-GSL lightweight carbon material. The drone is able to be used in tandem with traditionally manufactured parts.

RESULTS

Faster delivery time, lower production costs, and versatility in shape, design, wall thickness, and development.



SHORT PROFILE

The Drone Bird Company is a forward-thinking Dutch technology company leading the world in the development of bird-shaped drones. We specialize in the development of fixed-wing and flapping-wing systems, and our drones are both available for purchase or as a service provided by our specially trained, highly skilled pilots. We solve pest bird problems in a non-lethal way with our flapping-wing falcon. The unique feature of this drone is its ability to chase birds away in the direction of choice out of harm's way, without habituation. While the falcon drone bird has been in use commercially for the past several years, the latest addition to our flock has been in development: the AVES Series Larus.

CONTACT

The Drone Bird Company

Institutenweg 25a
7521 PH Enschede
The Netherlands

**WE LOVE TECHNOLOGY. WE LOVE BIRDS.
WE COMBINED THEM IN ONE SOLUTION.**

The Bird Drone Company



Is it a Bird or a Drone?

Yes.

The Drone Bird, a product of **The Drone Bird Company**, is a drone that looks, moves, and operates like a bird when in flight. Although originally created to support University of Twente student Nico Nijenhuis' master thesis topic, the application quickly took flight in more ways than one after seeing the success of the prototype.



The goal of the prototype was to see how closely a robotic drone could mimic the movements of a bird in flight. How true to nature – without stabilizers and with a natural wing beat – could a drone be in achieving the natural look of a bird? The Drone Bird was developed with these goals in mind, and quickly came to life as a “real” flapping falcon. The drone was so true to nature that it deterred other birds - allowing the prototype to become more than just an experiment, but a potential product.

Target Industries of the Drone Bird Product

The main target audience for the Drone Bird quickly became the aviation industry. Why? Bird strikes and interference are reported to cause up to \$500 million dollars each year in damages and are as common as 15,400 strikes per year (2021), according to the **Federal Aviation Association (FAA)**. The FAA attributes this high cost and number of strikes to the expanding wildlife populations, increase in number of aircraft movements, and trend toward faster and quieter aircrafts. With the Drone Bird able to deter wildlife from airfields, airlines can reduce their aircraft damage costs significantly. The Drone Bird has also seen success in the agricultural business, where drones can be used to assess livestock, deter predators, and check irrigation systems remotely.

Drone Industry Insights noted that the total drone investment value in the US has nearly tripled (2021: \$7 billion) from the previous year (2020: \$2.4 Billion). Not only does this show that more industries, like aviation and agriculture are expanding their combat tactics, but that they are also seeking new developments.



The 3D Printing Solution

Throughout the drone's initial building and production, it became clear that the application's build process, made entirely by hand with fiberglass and epoxy, was driving down profitability. This is where 3D printing came into play - a solution to reducing production time, cost, and material waste. **Parts on Demand**, a 3D printing service provider specialized in supplying 3D printed manufacturing solutions to organizations beginning with industrial 3D printing, collaborated with **Advanced Laser Materials (ALM)** to bring expertise in research and development of Thermoplastic Rapid Prototyping (RP) and AM materials to the Drone Bird production.

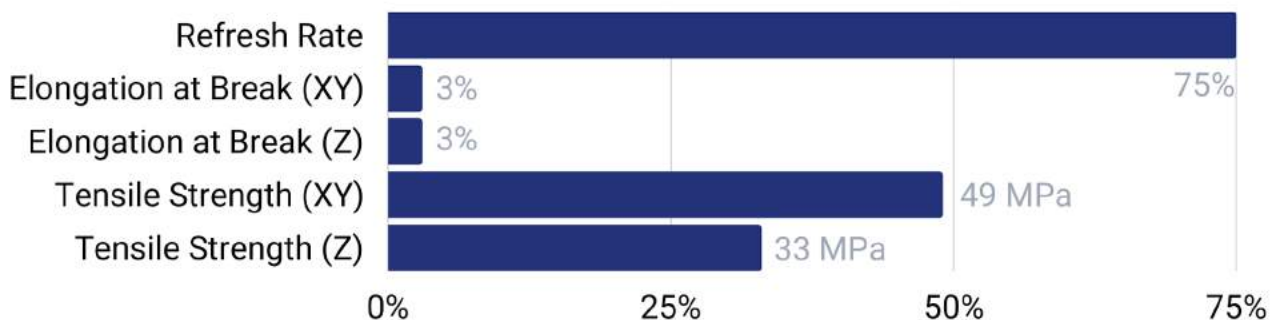
Parts on Demand identified the key attributes needed, like lightweighting, from a polymer material while maintaining strength and durability. Another benefit brought to the table for The Drone Bird Company was the ability to accelerate the prototype phase and more accurately produce through the use of SLS 3D printing. If each iteration of the prototype was made by hand, it would have consumed their production time and ability to go to market.

ALM PA 640-GSL, in combination with the **EOS P 396** 3D printer was ideal for several reasons. The PA 640-GSL is PA 12-based, carbon fiber and glass sphere filled providing:



- High stiffness and strength
- High thermal stability
- Buoyancy (floats on water)
- Excellent surface finish and detail
- 10% less material per average build

PA-640 GSL Material Technical Data:



The Drone Bird Results

With the collaboration of partners like Parts On Demand, The Drone Bird Company's team of talented engineers, ALM's advanced polymer material expertise, and the EOS P 396 SLS printer, the Drone Bird now has improved design, testing, and production aspects. With the body and various cover flaps being 3D printed, the Drone Bird can meet faster delivery times at lower costs. The integration of 3D printing into their production allows The Bird Drone Company to consider different AM materials based on new challenges or different ideations of the application, while having design freedom in shape, material attributes, and wall thickness. It also allows for more rapid prototyping and the future evolution of the Drone Bird.

What is Next for the Drone Bird?

The Drone Bird Company has begun leveraging the rapid prototyping of industrial 3D printing to begin production of their second drone bird product, the fixed wing Bird of Prey. Inspired by the peregrine falcon because of their known predatory behavior from the **National Wildlife Association** ([variety of species consumption—450 North American species and up to 2,000 worldwide](#)), the Bird of Prey flies with a fixed wing, similar in movement to a glider plane. The Bird of Prey is inaudible at as low as 50 meters above the ground, with a 72 km/h speed and 40-minute flight time.

The Bird of Prey drone has seen success not only as an airport avian deterrent, but in the oil industry as well by keeping birds from purging in tailing ponds and installations. The Bird of Prey drone has also successfully protected blueberry crop fields from starlings, a common pest bird for the agricultural sector, by decreasing the amount of crops lost from 50% to less than 5%. The Bird of Prey drone is available with or without surveillance attachments. Footage of both Drone Bird products is available on The Drone Bird Company YouTube, [@ClearFlightSolutions](#).



MATERIALS



AN EOS COMPANY

Advanced Laser Materials (ALM) specializes in material research, development and consultation for industrial 3D printing and additive manufacturing. Founded in 2004, ALM remains focused on providing customers with application-specific, quality-tested materials and engineering support to meet the most complex product specifications and production requirements. ALM offers the largest selection of laser sintering solutions with onsite capabilities to produce standard and specialized materials in varying quantities. Based in Temple, Texas, ALM is a wholly owned subsidiary of EOS.

SYSTEMS



EOS provides responsible manufacturing solutions via industrial 3D printing technology to manufacturers around the world. Connecting high quality production efficiency with its pioneering innovation and sustainable practices, the independent company formed in 1989 will shape the future of manufacturing. Powered by its platform-driven digital value network of machines and a holistic portfolio of services, materials and processes, EOS is deeply committed to fulfilling its customers' needs and acting responsibly for our planet.

PARTNERS



Parts on Demand

Parts On Demand is one of Europe's pioneers in the field of serial production by means of 3D printing. With our roots in product development, production and innovation, we are at your side to make your products smarter and more efficient. Every day we produce parts and help our customers with optimizing production and products. 3D printing offers design opportunities we never believed possible. And, let's be honest. If you haven't informed yourself you probably still don't believe them to be possible. That is why we, as experts, offer you our services.

Learn more about how **ALM materials** can help your next product **take flight** today



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