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TOP TIPS FOR DRONE MANUFACTURING WITH 3D PRINTING



Discover how three Drone Industry experts use 3D printing to innovate, adapt, and grow their businesses.





THE GROWING DRONE INDUSTRY

Drone companies are now producing quadcopters, hexacopters and quite everything from foam, to high-grade materials to create professional gear.

Drones can be used for the most technical applications and are real engineering devices. Drone growth has been quite impressive these past years and it is not about to stop here.

From agriculture, construction and mining, and insurance, to media and telecommunications, drones are now everywhere. If the drone market is getting stronger and evolving quickly, drone manufacturing is still full of challenges and innovative solutions have to be found. Additive manufacturing is offering advanced technologies and materials to optimize both processes and drones themselves.

\$43.1 B

The size of the Drone market by 2024 (up from \$14.1 billion in 2018)

20.5%

Annual growth estimated by Drone Industry Insights regarding the global market for drone technologies.

DRONES EVERYWHERE

What are the industries and applications using drones?

- **Agriculture:** It is possible to use drones for livestock monitoring, irrigation management, and fertilization.
- **Environment:** Drones can monitor endangered species and map the changes in ecosystems around the world.
- **Emergency and disaster management:** Drones can go to remote areas to deliver medical services or locate victims
- **Security:** With intelligent surveillance capabilities, drones can be used for law enforcement and protection.
- **Geographic mapping:** Drones can acquire high-resolution data and download imagery from inaccessible locations.
- **Construction:** Drones gather real-time data for better progress tracking.
- **Filmmaking:** Drones provide affordable access to stunning aerial photography for journalism and filmmaking



DRONES & 3D PRINTING

How has 3D printing changed the drone manufacturing world?

Innovation

Thanks to new design opportunities you will benefit from more freedom. Design for additive manufacturing is a way to rethink and optimize your drones.

Adaptation

Create on-demand parts, perfectly adapted to the specific needs of your projects. You will get the possibility to iterate and adapt your parts as necessary or opt for mass-customization to make unique drones adapted to each customer's requirements.

Growth

Additive manufacturing will help you grow by rethinking your business strategy and improving your manufacturing process from prototyping to production.





MEET THE EXPERTS

Who better to share insights on the uses of 3D printing in the drone industry than actual users? Meet the experts who share their experiences, lessons and best tips.



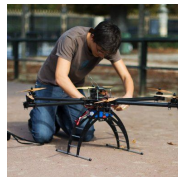
Thomas Posluszny

Product Design Engineer



AERACCESS is a technology solutions provider that designs, builds and produces drones providing surveillance and inspection applications for the security/ defense environment and the industrial sector.

Thomas has been working in the drone industry **for 2 years**.



Nicolas Chaslot

Robotics Prototyping Engineer



UAVIA designs drone prototypes used primarily for R&D in the drone field to advance and develop new technologies.

Nicolas has **11 years of experience** in the design, manufacture, and operation of drones.



Damien Chatard

Business Development



Skydrone Robotics offers its standard, modular and multi-mission drones dedicated to the observation and science, protection and security, and transport and health sectors.

Damien has **more than 10 years of experience** in drone manufacturing.

DESIGNING THE DRONES OF THE FUTURE



3D printing allows us to reduce the number of parts of our drones by optimizing them with more elaborate shapes than molded parts. This allows us to optimize the overall mass of the drones.



Weight is one of the biggest challenges of drone manufacturing and thankfully, a number of possibilities are offered by design for additive manufacturing. Optimize the weight of drone parts with integrated assembly to reduce the number of parts. You can integrate accessories, clips, or supports, directly into the structure of your drone, reducing assembly time and the number of components such as screws and metal fasteners. The weight of the drone is improved as well as its performance, but these design opportunities will also benefit your manufacturing process: By reducing the number of components, you will also shorten your assembly process.



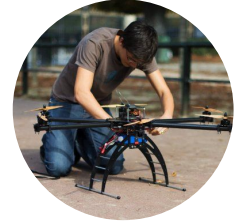
WHAT DESIGN POSSIBILITIES DOES 3D PRINTING ALLOW YOU TO EXPLORE?

When conceiving drones, we are always trying to make the drones light and reliable.

Several new possibilities are available to us with 3D printing. For instance, we can create more complex shapes that would not be possible otherwise, such as hollowed-out parts or complex shapes linked to specific elements' topological sizing.


Additive manufacturing changes the way drones are made by creating innovative structures. 3D printing is the perfect solution to create complex parts, impossible to manufacture with traditional techniques such as injection molding or CNC machining. While creating designs for 3D printing, you don't have to worry about the constraints of traditional manufacturing techniques anymore: this leaves more space for innovation.

The shape of your drone can perfectly be adapted to the needs and requirements of your projects. Design for additive manufacturing allows to take into account all the specificities of your project. Optimization and simulation methods such as topological optimization can also be used to improve the drone's form, strength, and weight.



Nicolas Chaslot
Robotics Prototyping
Engineer - UAVIA

How are you using 3D Printing?



Not having to design a mold also saves us precious time and gives us the possibility of more customization according to each customer's demands.



With 3D Printing, we usually produce different component supports and the outer shells of our drones, or even their structure for small-sized drones.

Make the most of additive manufacturing to create accessories, mounts or any other modifications to your project. The shape of your drone can be customized to fit the functional features and the exact components you need. Indeed, with 3D printing, it is possible to create on-demand parts, adapted to the specificities of your own drones, or meet the exact requirements of your customers. Mass customization is one of the biggest advantages of additive manufacturing, your modifications can easily be implemented on your 3D models.

Making adjustments and customizations while respecting both your budget and deadlines is impossible with traditional manufacturing techniques. 3D printing is offering a high-level of functional integration, combined with customization opportunities. This manufacturing technique will help you increase customers' satisfaction by delivering resistant, on-demand, good-looking drones.

Which materials are best adapted to 3D Printing drones?

Nylon PA12 is still widely used due to its reliability and durability, but, new high performances materials are now allowing to produce lightweight and perfectly rigid, resistant drones. Carbon-fiber-reinforced materials such as Ultrasint® PA11 CF offer advanced mechanical properties, with interesting strength-to-weight ratio, ideal to manufacture both resistant and lightweight drone parts.



As for the materials, it depends on what you want to do. For rigid parts, **in a prototyping phase, PLA can do the trick** very well because it prints quickly and is inexpensive. **For a final version, we can go for composite materials** (filled plastics, for example) or only materials with the best properties (ABS, Nylon, PETG). We can **also use flexible materials** to add seals or make parts deformable, like TPU, which has significant advantages.

Nicolas Chaslot



We tend to reach out to PA12 with Multi-Jet Fusion technology by HP. This material offers good resistance and waterproofness.

Thomas Posluszny

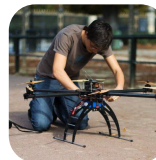


At which stages of your production do you use 3D Printing?

Implementing additive manufacturing in your business strategy and using its full potential will help your business grow. 3D printing offers many benefits from the early prototyping stages to series production of your drone. By simulating, testing and iterating with additive manufacturing you will speed up your product development and improve the performance of your drones.

We use 3D printing at all levels, whether prototyping or small series (we do not do "production" strictly speaking). To best develop new projects, I think that we must above all not hesitate to launch out and try new things. Iterate, crash, and start over.

We use 3D printing very early in our manufacturing process. We save time in prototyping and make our production more reliable.

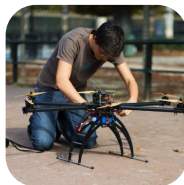


Nicolas Chaslot
UAVIA



Damien Chatard
Business Development

How does 3D printing improve your development process?



The most significant advantage is undoubtedly the execution speed. You can go in a few hours from an idea to a design to a real part and validate a design or modification that would otherwise take more time.

Nicolas Chaslot
Robotics Prototyping Engineer

Time is obviously a big constraint while developing a project requiring so many components and advanced features. With 3D printing lead times and a faster iteration process allow for a significant improvement for the overall project development time. Iterations and testing can be executed in quick succession whether developing a project from scratch or testing new modifications to an existing drone.

ANY LAST TIPS?

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3D printing gives a lot of flexibility in developing and optimizing drone parts by simplifying the manufacturing processes as much as possible. The quality of 3D printing being relatively good nowadays, it can be considered for small series and no longer only in the prototyping phase.

Thomas Posluszny

AERACCESS



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To implement 3D printing in your manufacturing processes, we must forget what we know about traditional manufacturing methods. You have to think about 3D printing to design 3D printed parts and make the most of the possibilities of this type of manufacturing. Think about the options from the start.

Nicolas Chaslot

UAVIA



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Here at Skydrone, we recommend the use of Additive Manufacturing. We've trusted 3D printing for a while now because it allows us to unleash our creativity by giving us many more options to design, conceive, and create our drone parts. It also enables us to test our creation at a low cost.

Damien Chatard

SKYDRONE



ABOUT SCULPTEO

Digital manufacturing leader since 2009, Sculpteo works with innovative companies to integrate 3D printing in their manufacturing processes. Sculpteo offers on-demand 3D printing with experienced digital manufacturing specialists and professional technologies.

To learn more about integrating 3D printing for your drone projects, **Speak to our experts at: hello@sculpteo.com**



MAKE YOUR BUSINESS THRIVE WITH 3D PRINTING

Access our
MasterClass resources
and develop your AM strategy



**Think additive & Gain
an adaptive advantage
for your business.**

Access to a one-stop-shop of resources to discover your Additive Advantage and develop a strategy that will **put game-changing technology into your hands**.

Use it to unlock the full potential of 3D printing, and:

- **Create room for innovation,**
- **Scale your production,**
- **Make adaptability one of your greatest strengths.**

We've compiled our best ebooks, playbooks, guides, and customers' stories, made for professionals who want new additive manufacturing opportunities ...all in one place.



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