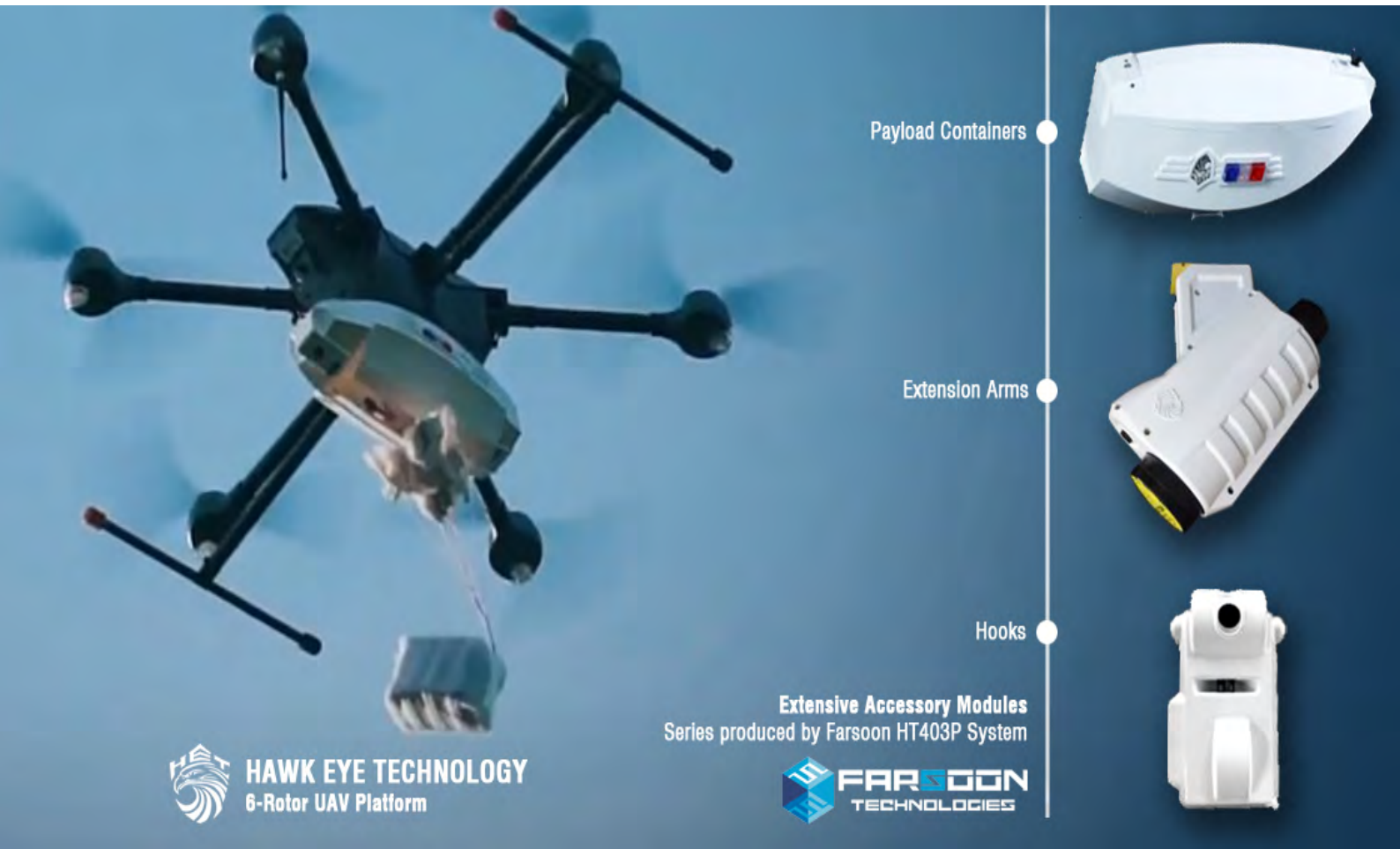




EMERGENCY UAV HELP FIGHTING COVID19 POWERED BY FARSOON LASER SINTERING TECHNOLOGY



HAWK EYE TECHNOLOGY
6-Rotor UAV Platform

Extensive Accessory Modules
Series produced by Farsoon HT403P System

FARSOON
TECHNOLOGIES

Payload Containers



Extension Arms



Hooks



Figure 1: Hawk Eye Technology 6- rotor UAV platform. Farsoon 3D printed accessory mounts for medial supplies delivery: extension arms, hooks, payload containers. Image Courtesy: Hawk Eye Technology

↓ Project Overview

- | | |
|---------------------|--|
| CHALLENGES | <ul style="list-style-type: none"> Slow design iterations High prototyping cost due to structural complexity Functional requirements |
| SOLUTION | <ul style="list-style-type: none"> Optimized design and manufacturing enabled by Farsoon plastic LPBF 403P platform and High-performance Farsoon material |
| KEY BENEFITS | <ul style="list-style-type: none"> Reducing prototyping cost by 90% 70% shorter Iteration process for new modules Faster small-batch series production Reduce cost of physical inventory |

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TECHNOLOGIES

Advancing Development & Series Production on UAV Functional Modules - Through Farsoon Additive Manufacturing.

↓ Customer Profile

Hawk Eye Technology was established in 2014. Committed to provide professional and customized UAV system and solutions to the Civil emergency, Hawk Eye Technology have develop a comprehensive UAV system, as long as an increasing number of accessory functional mounts. to meet the requirements of 23 emergency services for required applications.

An **Unmanned Aerial Vehicle (UAV)**, or drone, is an aircraft piloted by remote control or onboard computers. Aside from the increasing popularity of UAV's in the consumer market, there are many other customized UAV technologies and systems developed to fit specialized applications. **Hawk Eye Electronic Technology Co., Ltd** is a leading manufacturer of customized civil emergency UAV systems in China. During the Covid-19 outbreak in China, Hawk Eye UAVs performed multiple tasks for medical first-aid and rescue operation related to fighting the spread of the pandemic. With the unparalleled challenge of public safety, manpower shortage and large areas of emergency, Hawk Eye UAVs were able to perform faster, safer, and more efficient operations than manned ground transportation.

↓ Background

Hawk Eye's innovative high carrying capacity, multi-task, 6-rotor UAV platform, is capable of equipping **multiple**

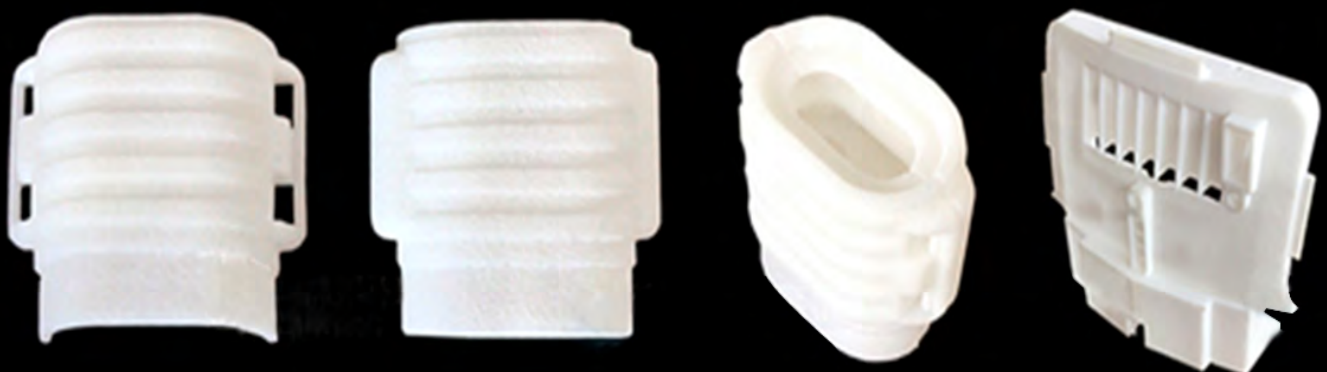
functional components for delivering a wide range of needed medical supplies. It is designed to perform remote high-speed delivery via a communication system from a ground-based control unit. Thanks to its large internal battery, the Hawk Eye 6-rotor drone is able to conduct aerial operation for as long as 1 hour, with a carrying capacity of up to 13 kilograms. According to the shape and load of the medical supplies, **specialized accessory mounts** can be used, including **extension arms, hooks or payload containers** (figure 1), all of which are additively developed and produced on **Farsoon 403P** plastic laser sintering systems.

Founded in 2014, Hawk Eye Technology is a market leader in emergency UAV solution including UAV aircraft platform, extensive functional modules, ground-control stations, and communication systems. Committed to technological innovation and customized applications, Hawk Eye Technology has been faced with huge challenges when it comes to new UAV product development and functional units prototyping.

↓ UAV Functional Units Rapid Prototyping

With the expanding application demands of UAVs, slow design iterations resulting from using traditional manufacturing process is a major bottleneck. *"The development cycle of new UAV accessories and modules usually takes 3 design iterations, which will take up to 9 months in total,"* said Hu Chenghao, General Manager of Hawk Eye Technology, *"The complex structures have to be produced in multiple smaller parts for further assembly and post-processing. Also, we have*

Figure 2 - Farsoon series production of UAV electrical housing and battery housing. Image Courtesy: Farsoon Technologies



to customize special tools and molds, which will increase the cost by more than 5,000 USD.”

These UAV components will then be functionally tested in extreme aerial operation conditions including impact and collisions. The complexity of manufacturing process resulted in many joint lines on finished part, which often result in low part accuracy as well as damages due to low mechanical strength and durability.

All these factors led to Hawk Eye Technology to come to the decision of adapting additive manufacturing with Farsoon’s HT403P laser sintering system in 2017. Additive manufacturing offers unparalleled freedom for functional part design and optimization for reduced weight while retaining structural strength. The prototyping production process is also simplified by additively fabricating in a single piece with excellent size precision and structure integrity. With the open parameters found in Farsoon systems, engineers were able to further fine-tune the build process in order to achieve the required performance for the application. This helps to achieve a significantly **faster design-prototype-verification cycle of only 3 months, a 70% shorter iteration** compared to traditional manufacturing. Plastic laser sintering also eliminates the demand for mold and tooling regardless of the level of part complexity, which helps to **reduce the prototyping cost by up to 90%**. With the help of Farsoon’s additive technology, **over 100 UAV modules and add-ons as well as three entirely new UAV platforms have been developed** using 3D printing.

↓ Series Production & Digital Inventory

Besides the increasing demand for additive manufacturing during the product development phase, Hawk Eye Technology is also in seeking to apply additive technologies in series production that can help reduce the cost of manufacturing and inventory compared to

traditional manufacturing.

“It takes us at least one month to make the production molds necessary to produce a UAV add-on, including at least two version of the mold design. If the testing produced part fails, the design of the mold will need to be further modified – it can take up to 10 days longer for only a 10% modification to the design,” said General manager Hu. *“With so high investment required for production tools and molds and a quickly growing product line, it doesn’t offer an economic solution when you only use it for small batch fabrication and spare parts.”*

At Hawk Eye Technology parts with complex structures or those which requires frequent design modifications or updates were first chosen to test out the new manufacturing process. With a large build volume of 400 x 400 x 450 mm and fast production speeds, Farsoon HT403P systems offered maximum yield and cost-efficiency for part production. The simplified production process also accelerates the cycle for product quality verification required before market introduction. Fabricated with high performance Farsoon FS3300PA material, the functional parts featured **improved mechanical strength and excellent impact resistance** under extreme conditions (temperature, humidity and chemical corrosion).

“Farsoon laser sintering has become an important part of our production line and supply chain system,” explains Mr. Zhao, head of manufacturing department at Hawk Eye Technology, *“Most of the UAV’s housings is produced on Farsoon 403 systems, and functional parts such as connectors, supports, adapters and electric fuse boxes. Additive technology also helps us to establish our digital inventory to reduce the cost of spare parts, and reduce the lead time for new production inquiry, These benefits become powerful production tools especially during the time of Covid-19 pandemic where supply chains were disrupted, we were able to produce extra orders of accessory mounts for emergency UAVs.”*

Figure 3 - Farsoon series production of UAV camera module housing assembly. Image Courtesy: Farsoon Technologies



↓ Farsoon's Plastic Laser PBF Systems

▼ HT1001P

▼ 403P Series

▼ FLIGHT 403P Series

▼ FLIGHT 252P Series

▼ 252P Series

▼ eForm



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