

World Civil Unmanned Aerial Systems

MARKET PROFILE & FORECAST 2023/2024



TEAL GROUP
CORPORATION



World Civil Unmanned Aerial Systems

Market Profile & Forecast

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Executive Overview

The Civil UAS Market Outlook

Summary

Uncrewed aerial systems have become increasingly common sights in skies around the world as more industries find uses for them, governments reshape regulations, and companies deliver increasingly advanced technologies and services. Civil government and commercial drone markets continue growing, moving from nascence to adolescence, as UAS prove their worth in numerous fields. For the moment, though, sales growth appears to be moving from new customers to replacement for previous systems. At the same time, exogenous issues, like COVID-19 and the Ukraine war, are providing unexpected challenges to the UAS market.

On the plus side, China is reshaping the agricultural market with the

rapid spread of subsidized UAS technology for spraying and imaging, while using regulation to keep foreign competitors out. Traditional aerospace and defense firms are competing to develop new solar-powered systems to provide low-cost internet as programs exploring integrating delivery drones into airspace gradually move from test to initial operation. And governments increasingly move to UAS solutions for challenging problems like border control and even aerial firefighting.

Just the United States has 863,728 drones registered, 352,222 (41%) for commercial use and 506,635 (59%) recreational. 331,573 remote pilots certified as of August 2023. Yet it is important to remember that these drones have been registered in the period since Part 107 went into effect in

August 2016. Since the effective commercial life of prosumer drones is about a year and a half on average, many of those are no longer in the fleet, so the registration statistics can include multiple replacements for the same operator and task.

The Market

The market for civil UAS will continue to be one of the most dynamic aerospace growth sectors through the beginning of the next decade, emerging from a \$8.2 billion market (value of air vehicles) in 2023 to climb to \$19.5 billion by 2032. That represents a 10.1% compound annual growth rate (CAGR) in constant dollars. Over the next 10 years the market will total \$149.8 billion. However, we forecast peak expansion for most sectors around 2028, as

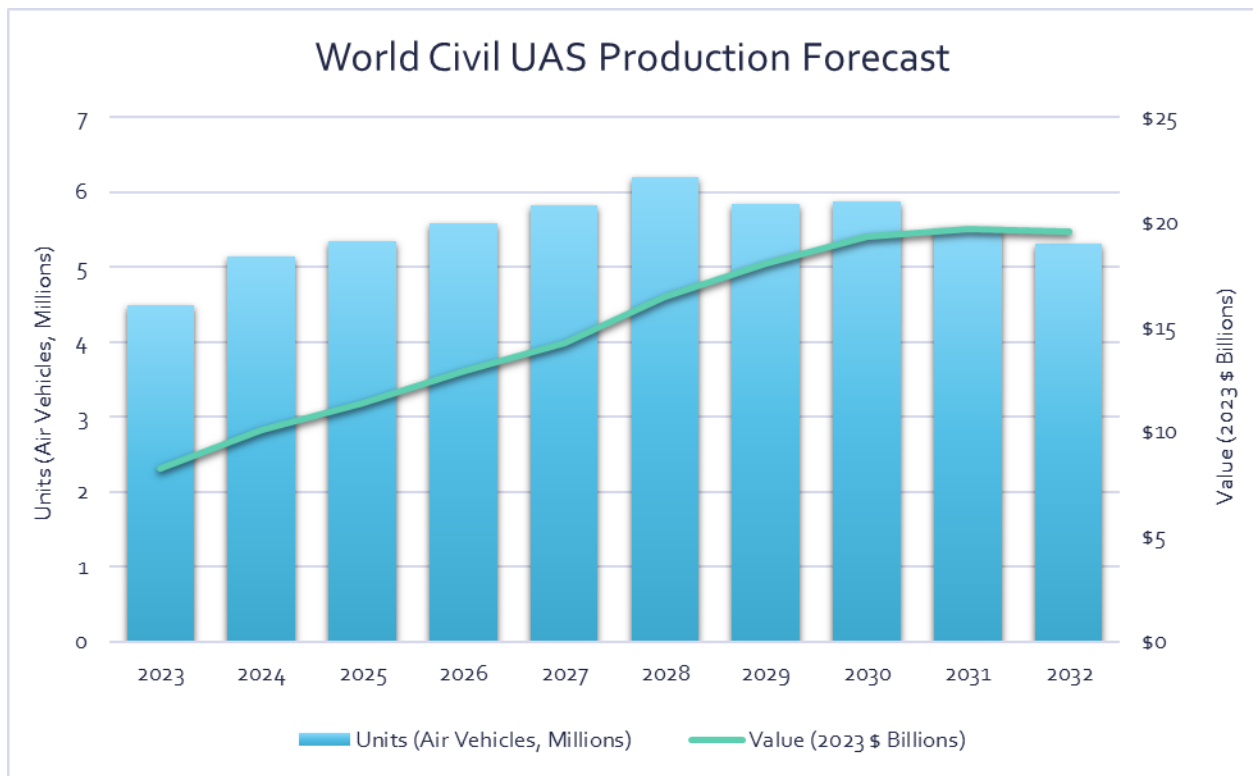


Figure 1

companies come to understand the requirements for UAS, the technology matures, and regulation stabilizes. Many types will move more into a replacement cycle thereafter. The exception is in the United States, where regulatory changes expected toward the end of the forecast period unleash pent-up demand, especially for larger systems, in several sectors.

Although the consumer systems and commercial systems segments began the forecast period in our 2020 study relatively close in annual production value of air vehicles at 42% and 55%, respectively, the latter segment will exhibit the fastest growth in the market. By the end of our 10-year forecast, commercial systems will command 87% of the overall civil UAS market, while consumer systems will slip to 11% of air vehicle production value.

Government

After years of delays, civil governments in the United States and Europe are getting serious about deploying UAS. Civil government drone spending promises to continue benefiting from concerns about border and maritime security in the United States and Europe. In addition, public safety use for law enforcement and fire control is growing, with new companies considering and/or entering the field, and existing firms offering UAS tailored to these sectors' specific requirements. Furthermore, the regulatory restrictions that have inhibited growth of the commercial US sector are less onerous and easier to be waived for public safety uses.

The European Maritime Safety Agency and, to a lesser extent, the US Coast Guard are purchasing UAS services and planning is underway for broader deployment of systems. The US Customs and Border Protection Agency has introduced a pilot

program in small UAS to complement its longtime use of MALE systems.

The US federal government stands to be a market maker for "Blue UAS,"¹ systems certified as secure and suitable replacements for Chinese-made drones that are being eliminated from federal agency fleets. The Department of Defense has certified 28 systems to carry this designation as of December 2022. Industry has followed, with the Association for Uncrewed Vehicle Systems International (AUVSI), the leading UAS trade association, unveiling a "Green UAS" certification for commercial systems meeting standards of corporate cyber hygiene, product and device security, and supply chain risk management.²

Commercial

Commercial markets are developing at very different rates around the world. In countries that have moved quickly to adopt regulations, UAS are already in widespread use. In others, companies are currently doing proof of concept work to create foundations to deploy drones, while waiting for regulatory regimes to enable that deployment. They are working to prove cost savings and make sure data flowing from UAS can be integrated into the businesses' workflow.

UAS use by *construction, insurance and energy* promises to continue growing quickly. Large enterprises are deploying or expanding fleets of systems.

Agriculture, which is currently the largest market thanks to the value of unmanned spraying systems, will grow more slowly due to the currently depressed profitability of the sector and the diffuse nature of decision-making; it may slow most in those countries that are leading deployment, while being poised for explosive growth in markets like the

United States that have not yet adopted such systems on a wide basis.

Delivery promises to be a very large market but will develop first in narrow niches such as delivery to remote areas such as islands or ships, followed by rural areas, or delivery of high-value, time-sensitive products such as medical supplies. It is unlikely that delivery UAS will be in operation to residential doors in very many areas before the end of the forecast period.

Initial development of the commercial market has been based on inexpensive prosumer and mini-UAVs and was much more price sensitive than the government market. Even local law enforcement agencies will be buying mainly prosumer and inexpensive mini systems rather than much costlier larger UAVs. However, the unit value of UAVs in both markets is increasing as demand supports the development of systems tailored to specific missions rather than adapting existing units off the shelf.

While the quantities of UAVs purchased to serve the commercial market promise to be substantial, their unit value is a small fraction of that of the costly, sophisticated systems that dominate the military market such as Global Hawk and Predator, or even of the higher-end spraying systems and long endurance communications relay UAS.

Consumer

The battle for the consumer drone manufacturing market is over, with China's DJI Innovations dominating the market and former principal competitors like Parrot leaving the field. While consumer UAS will continue to sell, the most explosive growth is behind it. It is a mature market that has lost some of its novelty, and fewer technological innovations will attract buyers. Still, the market will

¹ Formerly "Blue sUAS."

² A Green UAS-certified system does not automatically qualify for

Blue UAS, but DoD is open to considering such transitions on a case-by-case basis.

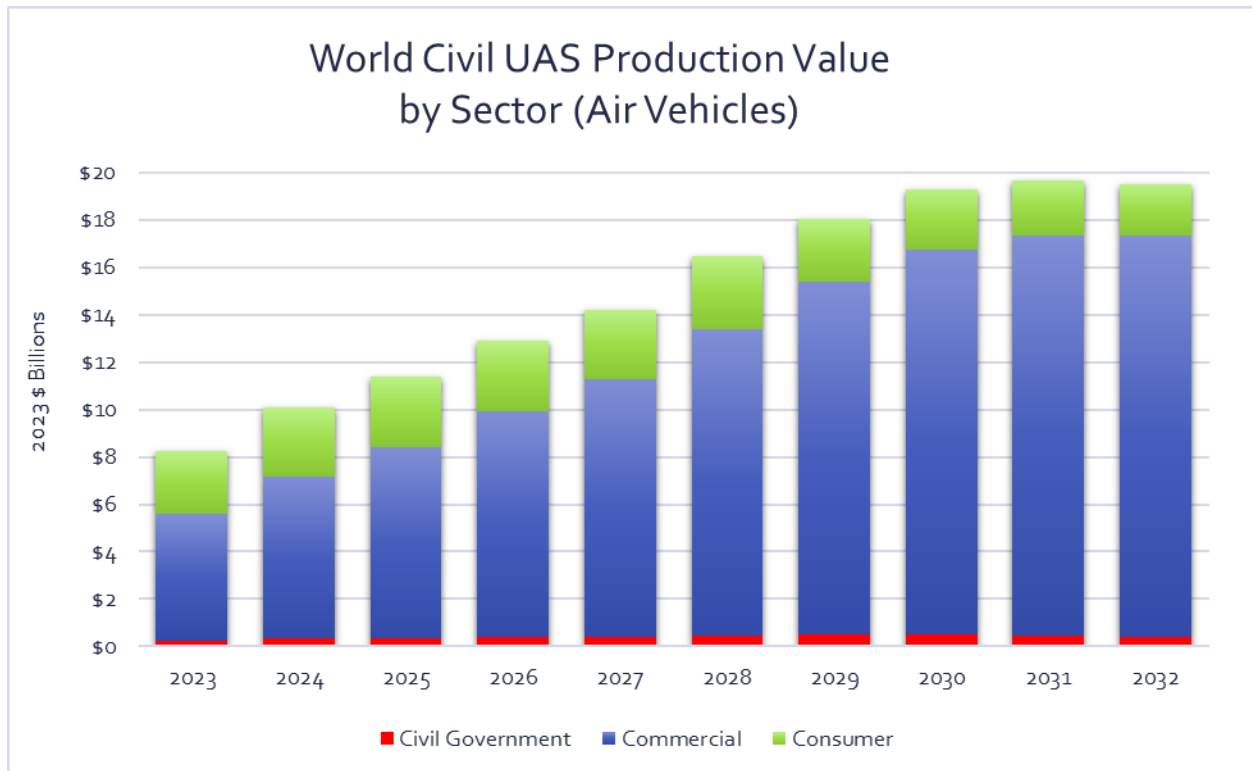


Figure 2

continue to expand for several more years thanks to new technological developments, a wider range of product offerings, and comparatively low barriers to entry compared to more sophisticated UAS. There is considerable crossover between consumer and low-end commercial UAS markets, as consumer drones are used for simple commercial tasks such as real estate. Consumer drone manufacturers are also moving up the value chain to create more capable, complex systems able to take on more demanding commercial work. Consumer systems can be expected to reach the saturation point in the United States and Europe by 2024-2025.

Even DJI has tacitly acknowledged the consumer market has become mature, as evidenced by its move into higher level, more sophisticated systems.

On the other hand, the markets in commercial drone manufacturing, services and analysis are still up for grabs. This middle market, ranging from prosumer units to lower-end MALE systems, stands to enjoy the most significant growth in our forecast period, particularly as regulations evolve to permit their use in more countries and roles. US, European, and Asian companies are battling worldwide for positions in systems and services to address this market. While this attracts numerous new entrants, particularly to niche markets, the drive for scale has begun as mergers and acquisitions nationally and across borders accelerate.

As the worldwide industry develops, national and regional advantages are emerging.

The *United States* is the clear leader in analytics and developing

service offerings. Tremendous interest by technology leaders such as Intel Corp., Amazon, Google, Sony, Verizon, Mitsubishi, General Electric, Microsoft, Apple, and Samsung adds to the speed of development by providing financing and an infusion of new technology and talent. Major technology firms such as Intel, Microsoft and Qualcomm are working to apply their technologies to making drones effective work tools.³

In many cases, US companies' analytical advantage in fields like infrastructure inspection or soil surveys has made them platform-agnostic. They can work with Chinese UAS as easily as American-made drones, and although numbers of mid-tier US startups like Harris Aerial are emerging to bring capability to niche markets, it's not yet clear that the United States can or will be able to claim an advantage in hardware production.

³ On the other hand, Meta, the parent company of Facebook, stood

down its connectivity drone efforts in late 2022.