

World Civil Unmanned Aerial Systems

2021/2022 MARKET PROFILE & FORECAST



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Market Profile & Forecast

2021/22 Edition

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Executive Overview

The Civil UAS Market Outlook

Summary

The civil government and commercial drone markets continue rapid growth as unmanned aerial systems (UAS) prove their worth in numerous fields.

The United States and Europe are forging ahead with costly new deployments of UAS to protect their

boundaries. Drones have been registered and 253,271 remote pilots certified as of late November 2021. (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

growth rate (CAGR) in constant dollars. Over the next 10 years the market will total \$121 billion.

Although the consumer systems and commercial systems segments began our forecast period in our study last year (2020 base year) relatively close in annual production

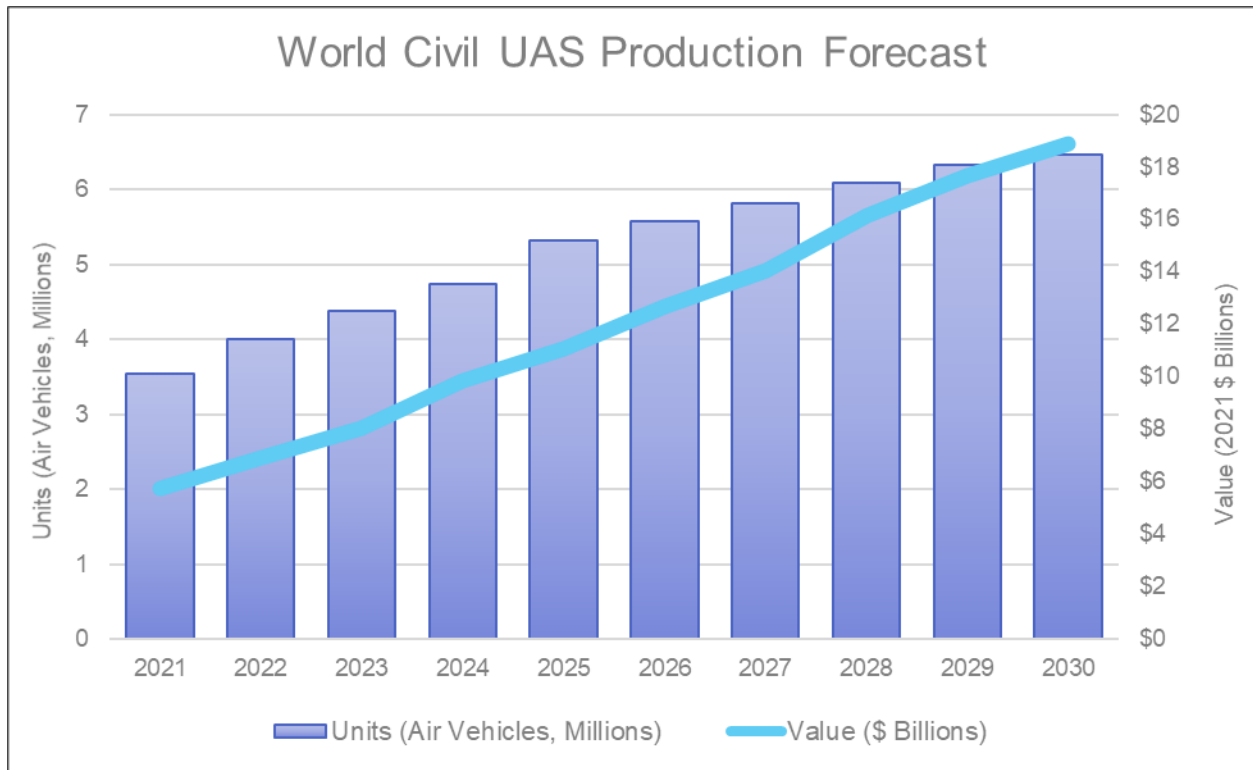


Figure 1

borders. China is reshaping the agricultural market with the rapid spread of subsidized UAS technology for spraying and imaging. Traditional aerospace and defense firms are competing to develop new solar-powered systems to provide low-cost internet. Test programs around the world explore integrating delivery drones into airspace.

Numbers plainly show this development. In the United States, 867,590 commercial and recreational

drone registrations are made every year, about a year and a half on average, many of those are no longer in the fleet, so the registrations can include multiple replacements for the same operator and task.)

In terms of aerospace, the market for civil UAS promises to be one of the most dynamic growth sectors for the next decade, emerging from a \$5.8 billion market (value of air vehicles) in 2021 to more than triple to \$18.9 billion by 2030. That represents a 14.1% compound annual

growth rate (CAGR) in constant dollars. Over the next 10 years the market will total \$121 billion. Although the consumer systems and commercial systems segments began our forecast period in our study last year (2020 base year) relatively close in annual production

value of air vehicles at 42% and 55%, respectively, the later segment will exhibit the fastest growth in the market. By the end of our 10-year forecast, commercial systems will command 85% of the overall civil UAS market, while the consumer systems will slip to 12% of the air vehicle production value.

drone spending promises to continue benefiting from concerns about border and maritime security in the United States and Europe. Peace-keeping operations for United Nations and other countries will further boost sales. In addition, public safety use for law enforcement and fire control is growing. And the regulatory restrictions that inhibit growth of the commercial US sector are less onerous and easier to be waived for government use.

The US Coast Guard and the European Maritime Safety Agency are now 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.

The US federal government stands to be a market maker for “Blue SUAS,” UAS certified as secure and suitable replacements for Chinese-made drones that are being eliminated from federal agency fleets. The Department of Defense has certified at least five systems to carry this designation as of late 2021.

Commercial markets are developing at very different rates around the world. Many companies are currently doing proof of concept work to create the foundations for widespread deployment of 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 businesses’ workflow.

UAS use by construction, insurance and energy promises to grow quickly in coming years. Large enterprises will deploy 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 very remote areas such as islands or ships, or delivery of high-value, time-sensitive products such as medical supplies. It is unlikely that delivery US will be in operation two residential doors in very many areas before the end of the forecast period.

Initial development of the commercial market is so far based on inexpensive prosumer and mini-UAVs and will be 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.

While the unit numbers of these UAVs purchased to serve the commercial market promise to be substantial, their value will be 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.

While consumer UAS will continue to grow, the most explosive growth is behind it. It is a much more mature market that has lost some of its novelty and technological innovations that will attract buyers are becoming fewer. Still, the market will 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. Moreover, there promises to be considerable crossover between consumer and commercial UAS markets as consumer drones are used for low-end 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.

The battle for the consumer drone manufacturing market is over, with China’s DJI Innovations dominating the market. 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 the development of service offerings. Tremendous interest by technology leaders such as Intel Corp., Amazon, Facebook, Google, Sony, Verizon, Mitsubishi, General Electric Co., Microsoft, Apple, and Samsung is adding 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.

An infusion of venture capital is creating an industry of startups in both manufacturing and the services that will be critical to development of the commercial market. Two-thirds of the venture capital money worldwide is going into the US drone industry.

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

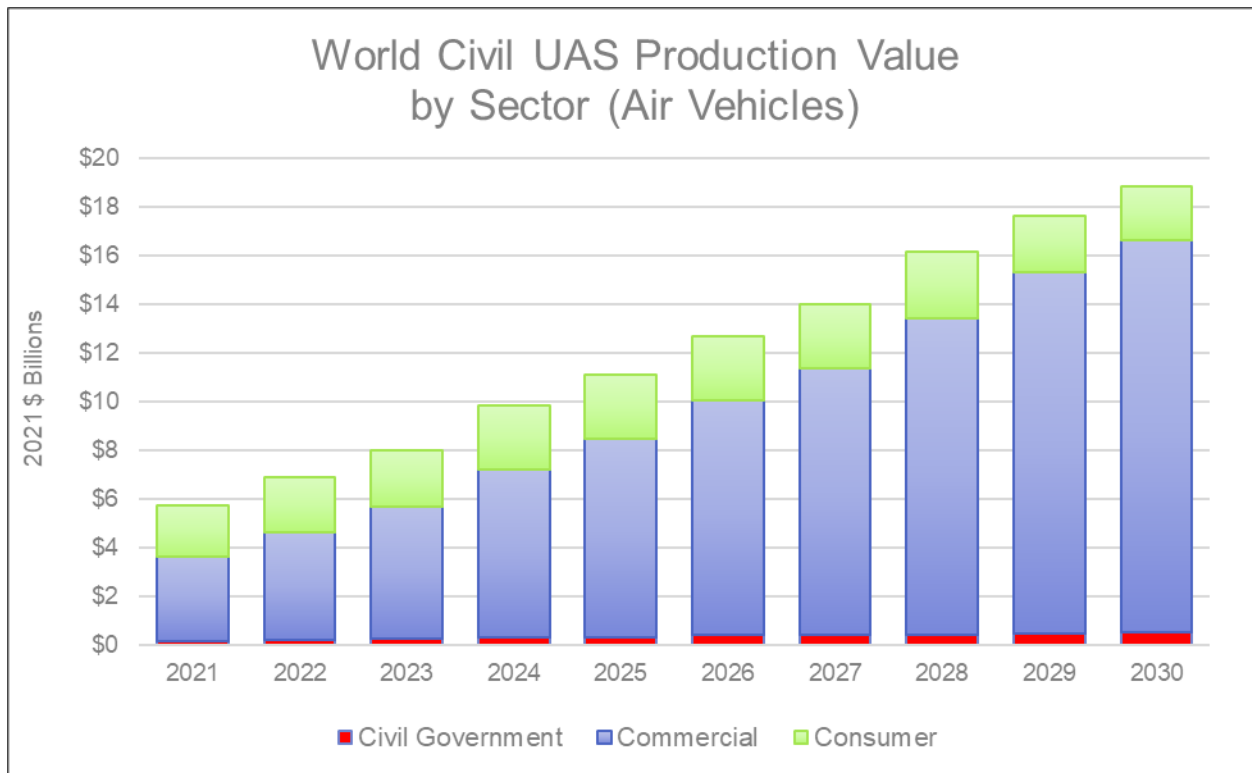


Figure 2

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.

China's clear advantage is in manufacturing. The nation is seeking to expand from dominance in consumer UAS manufacturing to leadership in commercial UAS. Government and industry are working together to build their country's market presence in agricultural and delivery drones, two of the largest potential sectors in the future. Yet other Chinese companies are working to move into drone production for specialized inspection areas such as powerlines and wind turbines. This upward evolution will move some significant Chinese companies from markets they currently dominate into ones where other companies have established leading positions.

Despite vocal support from the Japanese government, Japan is falling behind China. Japan emerged as an early leader in civil UAS development thanks to an unmanned agricultural spraying industry that dates back three decades. Japan's most promising potential areas to play a role in the worldwide UAS industry come in agricultural spraying, smart construction work, and services. In each of those cases, Japan's lack of manpower is driving national adoption of unmanned systems.

Europe has already ceded its early lead in drone market development to the United States and China. Europe is working to avoid being left behind by enacting standardized airspace rules that will create a single market. The European Aviation Safety Agency (EASA) led the harmonization of European national regulations by establishing rules for small UAS across the European Union and issued its guidelines for verifying UAS designs in April 2021.

European UAS firms are falling behind in this flurry of activity. They lack the strong venture capital funding enjoyed by US firms and the large, unified domestic drone market of China. As a result, some European drone firms have either moved their headquarters or significant operations to the United States. The new EASA rules should help remedy this situation.

The worldwide drone market's evolution is clear from venture capital trends. Increasingly venture capital funding is shifting from hardware to software and services that will make existing drones more useful. Funding is being used to develop the business tools that are needed to quickly allow industry to develop scale, such as national networks of service providers and improved analytics to make UAS easier to use and more proscriptive. VC funds are also going to the companies that will lay the foundations for access to airspace such as detect and avoid technology and unmanned traffic management.