

World Civil Unmanned Aerial Systems

MARKET PROFILE & FORECAST 2022/2023



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Market Profile & Forecast

2022/23 Edition

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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. Increasingly, 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.

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 865,505 commercial (37%) and recreational (63%) drones registered and 280,418 remote pilots certified as of late May 2022. 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 registrations can include multiple replacements for the same operator and task.

The Market

The market for civil UAS promises to be one of the most dynamic aerospace growth sectors for the next decade, emerging from a \$7.2 billion market (value of air vehicles) in 2022 to more than triple to \$19.8 billion by 2031. That represents a 10.1% compound annual growth rate (CAGR) in constant dollars. Over the next 10 years the market will total \$139 billion. However, we forecast peak expansion for most sectors around 2029, as companies come to understand the requirements for UAS, the technology matures, and regulation stabilizes. Many types will move

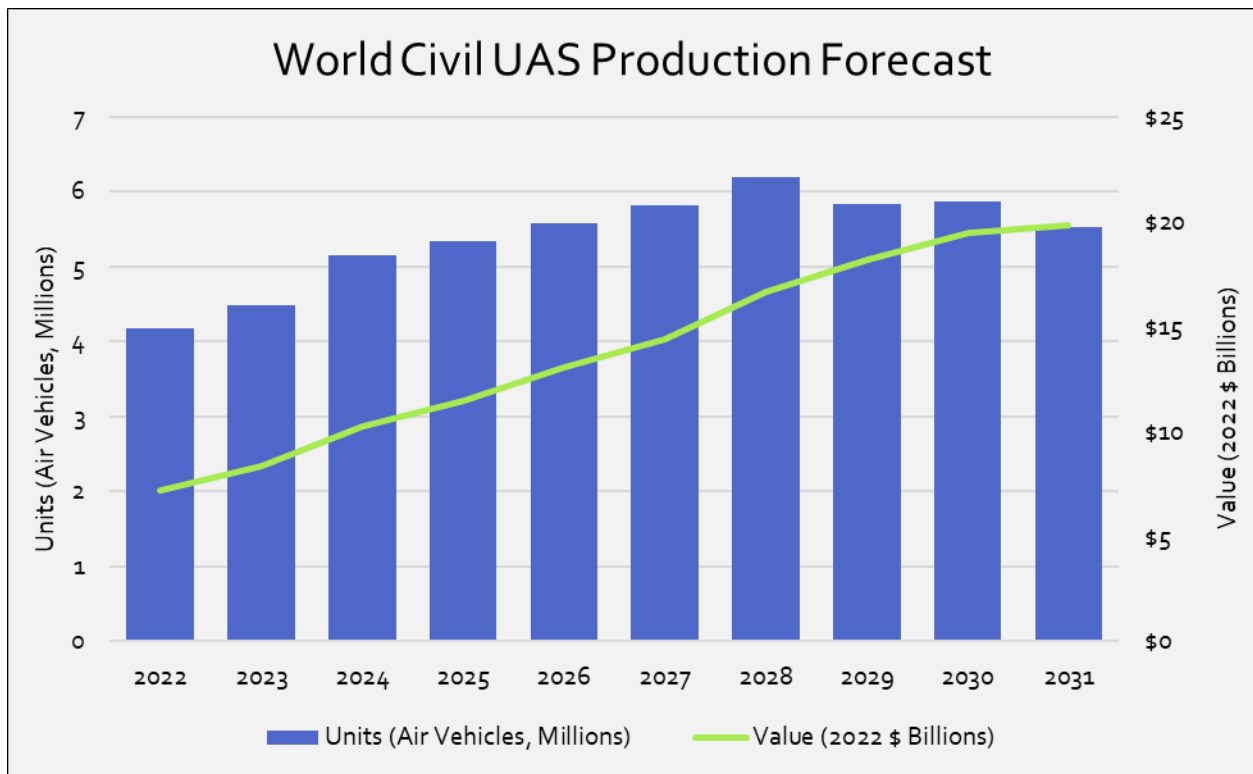


Figure 1

more into a replacement cycle thereafter. The exception is in the United States, where regulatory changes expected toward the end of the forecast period drive higher 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 86% of the overall civil UAS market, while consumer systems will slip to 12% of air vehicle production value.

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. Peacekeeping 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 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 11 systems to carry this designation as of mid-2022.

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 are deploying 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.

The battle for the consumer drone manufacturing market is over, with China’s DJI Innovations dominating the market and principal competitors

like Parrot leaving the field. 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 fewer technological innovations will attract buyers. 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. Leading manufacturer DJI’s data showed their UAS performed 9,632,454 flights in the United States in 2019 with an average flight time of 7.1 minutes. That flight time suggests a preponderance of recreational usage, but considerable crossover between consumer and commercial UAS markets is likely, 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 2024-2025.

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.

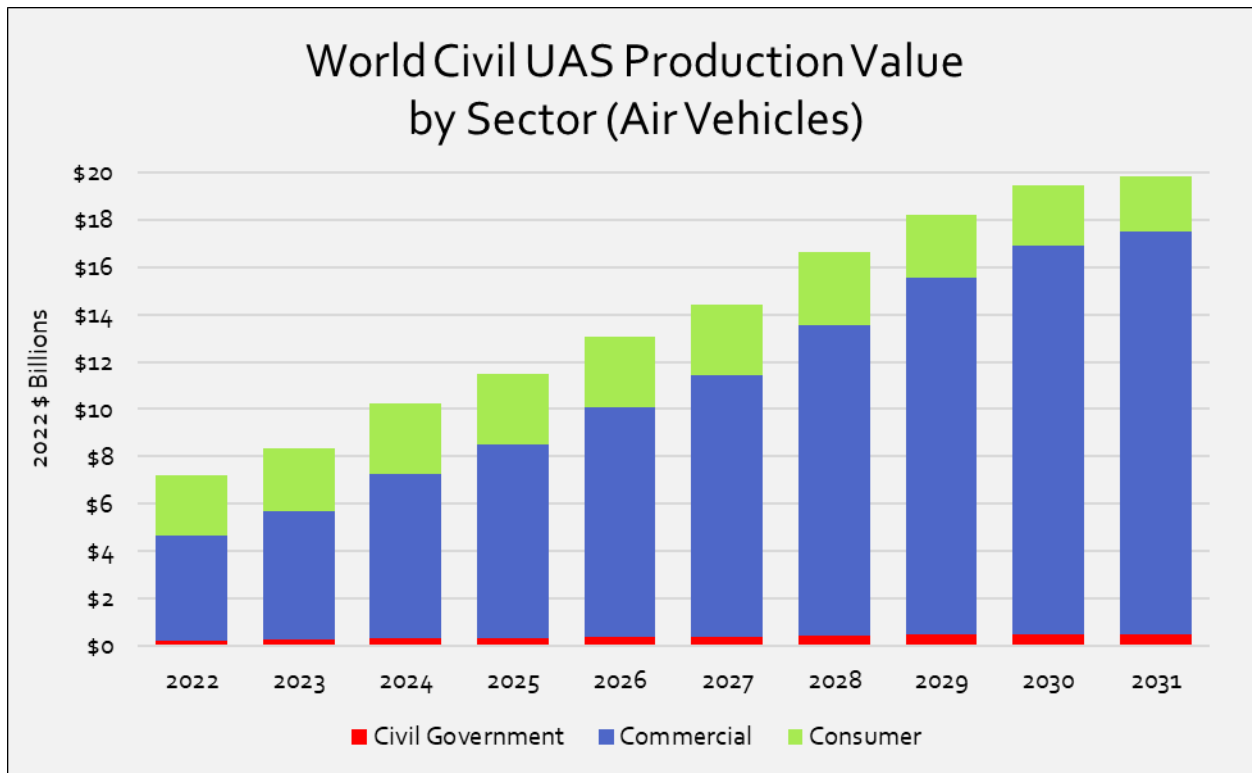


Figure 2

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, 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.

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.

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 is moving some significant Chinese companies from markets they currently dominate into ones where other companies have established leading positions.

It is also creating some antibodies. Perhaps most notably, in February 2022 a group of US legislators introduced the “Countering CCP Drones Act,” which would put DJI on a list of companies “deemed to pose an un-

acceptable risk to the national security of the United States or the security and safety of United States persons.” Prospects for the legislation are uncertain. In February 2022, the government of India banned the import of drones (while allowing the importation of drone components and unassembled units) to defend its domestic market.

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 relative lack of manpower is driving national adoption of unmanned systems.

European UAS firms have fallen behind in this flurry of activity. Lacking the strong venture capital funding enjoyed by US firms and the large,

International Civil Government Markets

Any discussion of the use of civil drones in Europe must now begin with Ukraine. There, both Ukrainian and Russian militaries are using commercially available UAS for reconnaissance and, in some cases, direct action. Furthermore, groups of Ukrainian citizens are using their own hobby drones in support of these operations, bolstering the military. Other civilians are crowdfunding consumer UAVs for military use in both Ukraine and Russia. This has led some drone manufacturers to cease selling their systems in those countries.

With the flow of draft eligible Russian citizens out of the country leading to new border issues in Europe, demand for UAS is only increasing. A discussion of UAV use for border control follows.

European Union Agencies & Programs

Growing Momentum in the Use of UAS to Control European Borders

Faced with problems controlling its borders, the European Union is moving on plans to introduce UAS to help control land and particularly maritime frontiers.

Border and Coast Guard. Contract awards have been made for UAS services and demonstrations are underway of systems that would provide greater capabilities.

operations under several service contracts for MALE, VTOL and tactical UAS. FRONTEX contracted for long-endurance demonstrations in 2018.

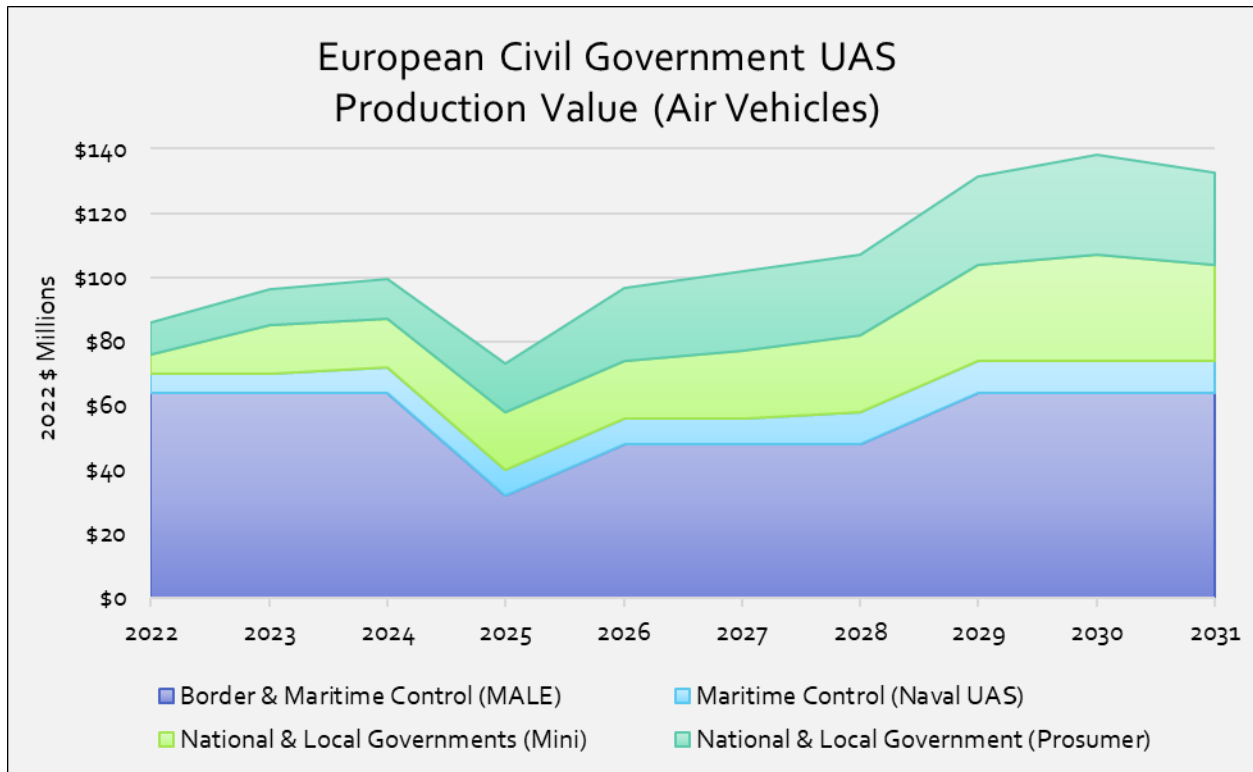


Figure 15

Budgets are soaring, and European agencies are getting the authority to contract on their own for UAS and eventually build up their own fleets. Plans are advancing for development of a 10,000-man European

European agencies are in the process of developing the expertise needed to make future drone programs successful. The European Maritime Safety Agency has begun

The building blocks are being put in place for a rapidly growing deployment of UAS by European agencies and individual European nations in the future.