Federal Aviation Administration

FAA AEROSPACE FORECAST

Fiscal Years 2016-2036

TC16-0002

Unmanned Aircraft Systems

An Unmanned Aircraft System (UAS) is the unmanned aircraft (UA) and its associated elements (including communication links and the components that control the unmanned aircraft) that are required for the safe and efficient operation of the unmanned aircraft in the national airspace system (NAS). The forecast will be driven by a combination of an improved regulatory environment and underlying demand. In 2015, unprecedented milestones were achieved for UAS. The FAA is continuing to enable this new thriving industry to flourish while maintaining safety.

Education, Outreach, and Research

The FAA is partnering with several industry associations for the "Know Before You Fly" educational campaign. This outreach promotes the safe and responsible use of unmanned aircraft as they become integrated into the NAS. The FAA also developed and made available an app, B4UFLY which provides UAS operators with pertinent airspace requirements and restrictions before operating.

Six FAA-selected UAS test site operators are providing information on system safety, data gathering, aircraft certification, command and control link issues, control station layout and certification, ground and airborne sense and avoid, and environmental impacts. In addition, a team led by Mississippi State University has been identified as the FAA's Center of Excellence for Unmanned Aircraft Systems (COE UAS). The COE will focus on research, education, and training in areas critical to safe and successful integration of UAS into the nation's airspace.

Exemptions and Authorizations

Section 333 of the FAA Modernization and Reform Act of 2012 grants the Secretary of Transportation the authority to determine whether an airworthiness certification is required for certain UAS to operate safely in the NAS. This determination is based on the size, weight, speed, and operational capabilities of the aircraft. Using the FAA's exemption process, a safety evaluation is conducted, and appropriate conditions and limitations for the operation are imposed through each exemption granted. As of March 16, 2016, over 4,000 exemptions have been granted for commercial UAS operations in the United States under the Section 333 authority. This demonstrates considerable potential demand for UAS operations, in low-risk, controlled environments. In addition, commercial UAS operations must be conducted in accordance with a Certificate of Authorization or Waiver (COA) issued by the FAA Air Traffic Organization. The COA describes the specific operating areas approved for UAS operations and associated mitigations that help to ensure the safety of the NAS.

Model Aircraft and Hobbyist Forecast

In order to operate in the NAS, the FAA must ensure that aircraft operators are not only aware of the system in which they are operating, but that the agency also has a means to identify owners. One means to accomplish this is through aircraft registration and marking. On December 14, 2015, the FAA issued a rule requiring all UAS weighing more than 0.55 pounds (250 grams) and less than 55 pounds to be registered using a new on-line system (UAS weighing more than 55 pounds must be reg-

istered using the existing Aircraft Registration Process). This registration rule will aid in investigations and allow the FAA to gather data about UAS use. As of mid-March, 2016 there have been over 408,000 registrations.

As shown in the following table, a sales forecast was developed for the small UAS registration rule, which included very small units below the registration size cutoff of 250 grams. For this interim final rule, in 2016, we forecast 1.9 million potential annual sales and that number could increase to 4.3 million units sold annually by 2020. As shown in the first row of the table below, this would represent the upper bound of the potential number of small UAS operated as model or hobby aircraft.

Sales Forecast Summary
Million sUAS Units

	2016	2017	2018	2019	2020
Hobbyist (model aircraft)	1.9	2.3	2.9	3.5	4.3
Commercial (non-model aircraft)	0.6	2.5	2.6	2.6	2.7
	2.5	4.8	5.5	6.1	7.0

Note: Numbers may not add due to rounding

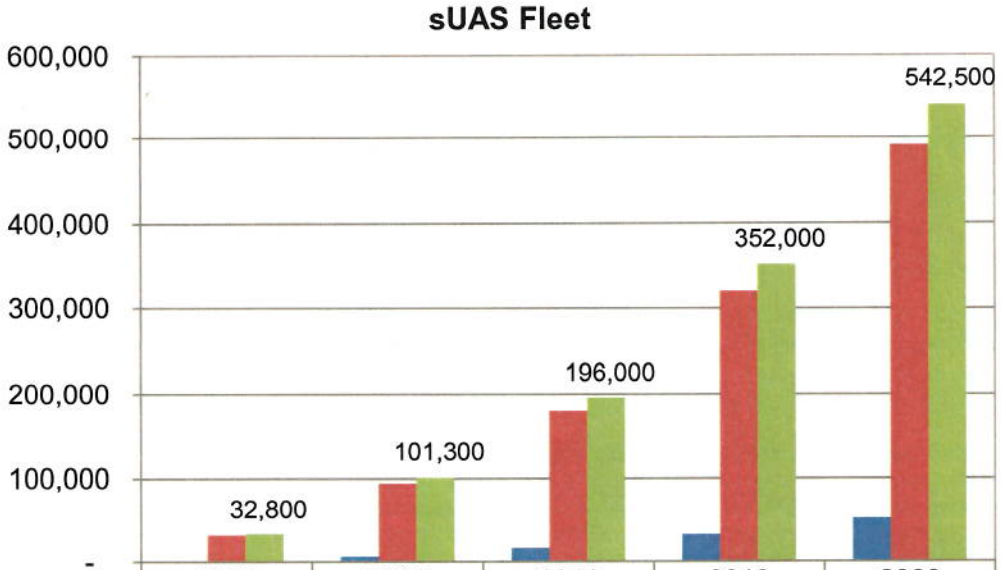
Commercial Forecast

In 2015, in support of the small UAS registration rule, a sales forecast for commercial UAS was developed to derive the potential demand for the new on-line registration system. That forecast represents the high end of the small UAS commercial fleet. As summarized in the second row of the previous table, for 2016, the potential sales of commercial small UAS requiring registration was forecast to be over 600,000, growing to 2.7 million by 2020.

On February 23, 2015, the FAA issued the Operation and Certification of Small Unmanned Aircraft Systems Notice of Proposed Rulemaking (NPRM) proposing to amend its regulations to adopt specific rules for the operation of small UAS in the NAS. Over 4,600 public comments were submitted in response to the NPRM. The FAA expects to publish a final rule in late spring of 2016. More information on the derivation and assumptions behind this forecast will be provided in the Regulatory Impact Assessment accompanying the final rule publication.

The FAA is working with the Teal Group Corporation, an industry expert in UAS forecasting, to develop a commercial forecast for small UAS operations described in the NPRM. The civil and commercial UAS market will take time to develop and the size of the market will directly relate to the specific requirements developed along with airspace accessibility. The Teal Group has provided the FAA with a forecast for small commercial unmanned aircraft. This forecast analyzes the market demand for different sectors within the regulatory environment.

As shown in the graph below, it is expected that, once the final small UAS rule is implemented, two different categories of small UAS (sUAS) will emerge. Higher end sUAS will have an average sales price of $40,000 per unit, while lower end units will have an average price of $2,500. Over a five year period, Teal Group forecasts the sUAS fleet to be approximately 542,500.

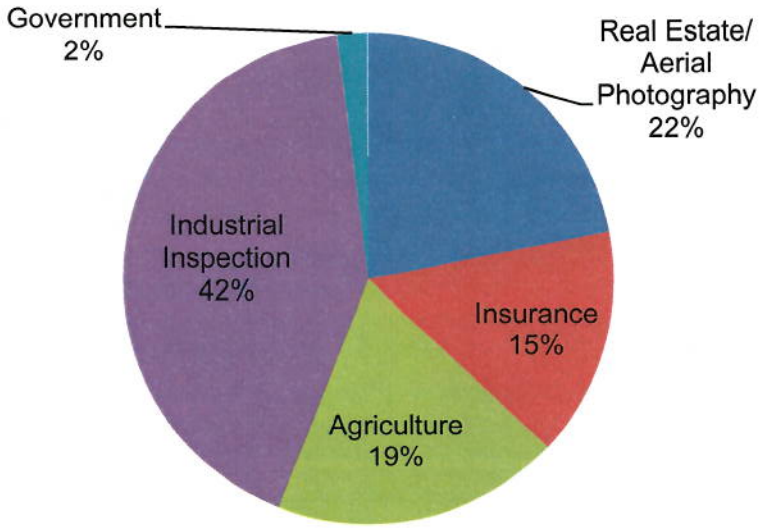


	2016	2017	2018	2019	2020
Higher end UAS	1,300	6,300	16,000	32,000	52,000
Lower end UAS	31,500	95,000	180,000	320,000	490,500
Total Fleet	32,800	101,300	196,000	352,000	542,500

Of this estimated fleet, it is expected that roughly 90% of the demand will satisfied by the lower end units.

The number of small UAS forecasted is highly uncertain and is dependent on the regulatory structure ultimately adopted. Once a final rule for small UAS is published, they will become more commercially viable than they are today. The total fleet shown in the previous table is expected to satisfy the market for the top five industries that will employ the use of sUAS.

Top Five sUAS Markets



Looking beyond existing regulatory initiatives, FAA has developed the UAS Focus Area Pathfinders initiative. This initiative explores how UAS might be safely used in populated areas, how UAS flights outside the pilot's direct vision might allow greater UAS use in rural areas, and some of the command-and-control challenges of using UAS beyond visual line of sight in rural/isolated areas. The overall demand for commercial UAS will soar once regulations more easily enable beyond visual line of sight (BVLOS) operations and operations of multiple UA by a single pilot. Once a framework is enabled for BVLOS operations, the projected market sizes could be higher than the forecast

Venture capitalists are already investing considerable amounts of money into this emerging industry with the intention to build early market share in this technology. Manufacturers' efforts are focused on building systems optimized for particular segments of the market. Unmanned aircraft systems will be the most dynamic growth sector within aviation. The FAA will continue to work with industry and stakeholders to safely integrate UAS into the NAS.