

“The Disrupter Series: The Fast-Evolving Uses and Economic Impacts of Drones”
House of Representatives Committee on Energy and Commerce
Subcommittee on Commerce, Manufacturing, and Trade

Questions for the Record: Responses from John Villasenor
December 12, 2015

Responses to questions from the Honorable Michael C. Burgess, M.D.

1. There has been some concern expressed over forcing casual drone users into a bureaucratic registry process. What impact do you think the FAA’s drone registration requirement will have on the growth of the UAS market?

I will note at the outset that I am not convinced that a registration process for casual users on the scale apparently sought by the FAA is needed. For example, model aircraft hobbyists have operated for decades without FAA registration, and with zero negative impact on the safety of manned aircraft operations. That said, I also understand that at this point the decision has already been made to require registration, and that the only thing left to decide is what *type* of registration system to implement.

With the above caveat, and provided that the FAA effectively implements the registration system in the form recommended in November 2015 by the UAS Registration Task Force, I think the overall impact on the market has the potential to be minimal. The UAS Registration Task Force has done a very good job in designing a system that responds to the FAA’s decision to require registration in association with recreational/hobby UAS uses, while also, to the extent possible, avoiding placing an unreasonable burden on UAS operators.

For example, structuring the registration to be free and owner-based (as opposed to fee-based and/or UAS platform-specific) will make it easier for operators to comply. As a result, I do not expect the introduction of the registration requirement to significantly reduce the number of recreational UAS users. Accordingly, I expect the market demand for UAS products to generally be similar to what it would have been in the absence of the registration requirement.

However, one exception is that I think there will be some interesting market impacts for platforms just above and below the 250-gram (0.55 pound) weight for registration cutoff. Toy UAS manufacturers will offer greater numbers of products just under this cutoff, since that will make it possible to market them with tag lines like “No FAA Registration Needed.” By contrast, there will probably be relatively few product offerings weighing just over 250 grams, since, due to the registration framework, the potential market size for a 255-gram toy UAS is significantly smaller than for a 245-gram toy UAS.

One issue that the UAS Registration Task Force addressed only tangentially is penalties and enforcement. The Task Force noted, correctly, that the current penalties available to the FAA were designed to deter crimes such as the use of unregistered manned aircraft in

drug trafficking, and are far too high to make sense in the context of casual UAS users. However, beyond recommending that the FAA establish a “reasonable and proportionate penalty schedule,” the task force did not recommend any specific approach.

Like many other people, I am concerned with over-criminalization in the U.S. Code and regulations. To the extent possible, I recommend that any new UAS registration regulations be written to include a *mens rea* requirement, so that penalties (which should be very modest) for failure to register would apply only to those who “knowingly” disregard registration regulations, and not to those who in good faith were simply unaware that those regulations existed.

2. As you know, companies like Google, Amazon and Verizon, among others, are playing leading roles in a public-private partnership to establish reliable unmanned aerial systems traffic management (UTM) structures for commercial drone use.

a) In your opinion, what potential benefits and/or challenges are presented by private-sector leadership in this area?

I think that private sector participation in UTM system development is not only beneficial, it is essential. The private sector is extremely well positioned to understand the range of UAS applications and operations that should be accommodated in a UTM system, and to make the investments in time and resources to team with NASA to perform the testing aimed at ensuring that all the relevant operational scenarios are accommodated.

b) What is the role of the FAA where the private sector is in charge of air traffic control?

While I am a strong believer in the potential value of private sector leadership in UTM system development, I think the FAA will bring enormous value to the process as well. While the FAA has sometimes been criticized for its work generally as well as in the context of UAS, I think it is important to appreciate the complexities involved in managing the NAS, which, according to an FAA “Fact Sheet” published in 2010, “encompasses an average of more than 100,000 aviation operations per day, including commercial air traffic, cargo operations, and business jets.”¹

Thus, even *without* UAS, managing the NAS is no easy task. And, thanks in significant part due to the work of the FAA, manned aircraft operations (including commercial air travel) in the United States are extraordinarily safe. With UAS now set to enter the picture in much more significant numbers than in the past, the FAA is in a difficult position: If it proceeds too slowly, it is criticized as impeding innovation and economic

¹ *Fact Sheet: Unmanned Aircraft Systems (UAS)*, FED. AVIATION ADMIN., https://web.archive.org/web/20110802192920/http://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=6287 (last visited Dec. 12, 2015)

growth. Yet if a manned aircraft were to be involved in an accident attributable to a UAS, the FAA would be criticized for moving too hastily on UAS integration.

With this context, the best approach is one that combines innovation and investment coming from the private sector with the decades-long experience of the FAA in safe airspace management. Concretely, this means that we should look to the private sector to develop new approaches to air traffic management using technologies such as cloud computing and novel communications and collaboration approaches among aircraft. But in deploying those technologies we should look to the FAA to ensure that there is no negative impact on the safety of manned aircraft operations, and no increase in risks to persons and property on the ground.

c) Given that this apparatus is being developed by NASA and the private sector, what is Federal Aviation Administration's (FAA) role in its development? Should there be more coordination with the FAA?

I think it is important for UTM development efforts to be done in close coordination with the FAA. Having the FAA as a regular and active participant in the dialog can help ensure that the resulting solutions will maximize the safety of an airspace that will increasingly be shared between manned and unmanned aircraft. This is particularly important under circumstances when a manned aircraft (e.g., a helicopter making a medical evacuation after an automobile accident) is transitioning through airspace that is also being used by UAS.

d) How important is it to develop a system like the UTM? Is it essential to integrating commercial drones into the national airspace system?

A good UTM system will be essential to the successful integration of commercial UAS into the NAS.

The traditional approach to managing the NAS, which was developed under a set of assumptions associated with manned aircraft traffic relating to platform sizes, speeds, and operational characteristics, is in some ways ill suited to the traffic management challenges that will arise with sUAS in the low-altitude airspace. Among other challenges, the traditional air traffic management approach doesn't "scale" well in an environment where the number of UAS in a given volume of airspace could be much higher than what occurs with manned aircraft. The traditional approach also assumes an ability to easily communicate with aircraft operators that may not always be available with UAS. To address these differences, the UTM system can be designed to leverage and enable a collection of innovative approaches including cloud-based processing, cooperation among UAS, autonomous operation, and operation beyond the visual line of sight.