

OPPORTUNITY RISING: THE FAA'S NEW REGULATORY FRAMEWORK FOR COMMERCIAL DRONE OPERATIONS

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TUESDAY, SEPTEMBER 27, 2016

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SMALL BUSINESS,
SUBCOMMITTEE ON INVESTIGATIONS, OVERSIGHT AND
REGULATIONS
Washington, DC.

The Subcommittee met, pursuant to call, at 11:00 a.m., in Room 2360, Rayburn House Office Building. Hon. Crescent Hardy [chairman of the Subcommittee] presiding.

Present: Representatives Hardy, Hanna, Davidson, Velázquez, and Adams.

Chairman HARDY. Good morning. I would like to call this hearing to order.

We are bearing witness to the next great aviation renaissance. Advances in technology have cleared the way for a reality that, only a short time ago, was merely a dream. From the delivery of goods to the survey of land, unmanned aircraft systems, otherwise known as UAS or drones, are poised to change how we do business. And with the initial report indicating that the overwhelming majority of companies operating UAS for commercial purposes have 10 employees or less, this industry will truly be a small business industry.

Our airspace, however, is not alone in its experiencing of the shifting environment. The office charged with overseeing our civil aviation industry, the Federal Aviation Administration, is racing to keep pace with the progress being made, on the ground and in the air, by small businesses across the country. As the FAA moves forward in an effort to fully integrate UAS into the national airspace system, the safety of those in the air and on the ground, and privacy concerns that many citizens hold dear, must be balanced with the needs of this industry. This balance must be achieved for economic possibilities and efficiencies to become a reality.

In my home state of Nevada, which is one of the six FAA selected UAS test sites, businesses are taking steps to innovate and test their ideas for commercial application. However, and I saw this in my district, a lack of guidance from the FAA regarding our skies was prohibiting companies from taking much needed next steps.

To address some of the uncertainty and provide a time framework for the future, FAA took a major step forward by finalizing the rules for civil operation of small UAS this summer. Located

within Section 14 of the Code of Federal Regulations, the new rule created Part 107 and includes requirements and some flexibilities for operators of small unmanned aircraft, those that weigh less than 55 pounds.

Today, the Subcommittee will hear from industry participants on how the rules are impacting their businesses and their future plans now that we are approximately a month into the implementation of Part 107. I am looking forward to hearing of the new rule and how it is allowing businesses in the unmanned aircraft industry to make important strides needed in this sector to continue growing and innovating at a rapid pace.

I appreciate all the witnesses for being here today. I look forward to your testimonies.

I now turn the time over to the ranking member for her remarks.

Ms. ADAMS. Thank you, Mr. Chairman, for holding this important meeting. Madam Ranking Velázquez, thank you for being here as well.

As we have progressed further into the 21st Century, technology has become increasingly more sophisticated. This development has brought new opportunities to the United States and the global economy, which provides exciting new pathways on the road to innovation.

At the forefront of this innovation is the commercial use of drones in civilian life, drones which have been mainly used in military intervention are now becoming commonplace within our lives. Civilian drone use offers aerial information and transportation services that are time and cost efficient and useful in a variety of markets. In fact, some companies seek to utilize drone technology for deliveries of consumer goods, while others like real estate professionals use them for marketing purposes. Drone technology has the potential to change our lives, and as with any new development, there must be more discussions of just how much of an impact they will have. Civilians have, and will continue to have, more and more usages for drones in their daily lives for personal and commercial use. But most importantly, small businesses have a particular interest in drone technology because they are not only users of these drones, but also manufacturers.

These interests have now pushed this issue to the forefront of importance and relevance. The Federal Aviation Administration regulations appear to be beneficial not only for our overall economy, but also for small firms. The FAA estimates that more than 7,000 businesses will obtain drone permits within 3 years.

Today's hearing gives us the opportunity to learn more about the final regulations and how they will impact small businesses. I look forward to hearing the insights of our witnesses, and I thank you all for being here today on the lasting implications of drone technology on our economy.

Thank you very much. I yield back the balance of my time, Mr. Chair.

Chairman HARDY. First of all, I would like to explain how we work around here. If the Committee members have an opening statement, I would ask that they submit it for the record.

I would like to take a moment to explain the timing on the lights. You will each have 5 minutes. It will begin green, and as

your time gets down to 1 minute it will turn yellow. And at the end of 5 minutes it will turn red and we would appreciate you trying to keep within those guidelines if you can.

Now I would like to introduce our witnesses here today. First, I would like to introduce our first witness, Mr. Gabriel Dobbs. He is the vice president of Business Development and Policy for Kespri in Menlo Park, California, and is working to help customers use the Kespri UAS to collect and analyze data. At Kespri, Mr. Dobbs works with civil aviation agencies around the world to craft policy for the next generation of UAS. In 2014, he secured the first section of the 333 exemption for drone operations in construction in the United States. Mr. Dobbs was recently selected for Forbes 30 under 30 list of having an impact on law and policy in the United States. Mr. Dobbs has earned his law degree and master's degree from Stanford University. Prior to Kespri, he worked with Google, 23andMe and SpaceX in various roles. Thank you for being here. Thank you for bringing a sample of your product.

Our next witness is Mr. Brian Wynne. Mr. Wynne is the president and CEO of Association for Unmanned Vehicle Systems International (AUVSI). AUVSI is the largest trade association representing the unmanned systems in the robotics industry. Mr. Wynne has significant transportation and technology experience. He has served in the executive position at the Electric Drive Transportation Association, the Intelligent Transportation Society of America, and the Association for Automatic Identification and Mobility. Mr. Wynne holds a bachelor's degree from the University of Scranton, and a master's degree from John Hopkins University. Thank you for being here.

Next, we have Mr. Jonathan Daniels. Our third witness is the president of Praxis Aerospace Concepts International, Inc., in Henderson, Nevada. Praxis is a service-disabled, veteran-owned small business that provides practical solutions for multi-modal-ground, air, sea, and industrial-robotics and unmanned systems. As president of Praxis, Mr. Daniels leads the design and management of Aerodrome LLC, the "teaching airport" that provides technical education and training to future and current aviation professionals. Mr. Daniels has served in the U.S. Army for 23 years and is a retired officer. He holds a bachelor of science from Excelsior College, and a master's degree from Kaplan University, and a graduate certificate in strategic studies from the U.S. Army War College. Mr. Daniels, thank you for your service.

With that, I would like to turn the time over to Ms. Adams for our next witness.

Ms. ADAMS. Thank you, Mr. Chair.

It is my pleasure to introduce Lisa Ellman. Ms. Ellman is a partner at Hogan Lovells where she co-chairs the firm's unmanned aircraft systems practice, a group dedicated to helping businesses succeed in the dynamic UAS market. Prior to entering private practice, Ms. Ellman held top-level positions in the Obama Administration and the U.S. Department of Justice. Most recently, she led DOJ's effort to develop policy that would govern the use of UAS in the United States and represented the DOJ in the Federal inter-agency process considering UAS-related policy issues. She holds a

joint J.D./M.P.P. from the University of Chicago, and a B.A. from the University of Michigan. Welcome, Ms. Ellman.

Chairman HARDY. Thank you all for being here again.
Mr. Dobbs, we will begin with you. You have 5 minutes.

STATEMENTS OF GABRIEL DOBBS, VICE PRESIDENT, BUSINESS DEVELOPMENT AND POLICY, KESPRY INC.; BRIAN WYNNE, PRESIDENT & CEO, ASSOCIATION FOR UNMANNED VEHICLE SYSTEMS INTERNATIONAL; JONATHAN H. DANIELS; PRESIDENT, PRAXIS AEROSPACE CONCEPTS INTERNATIONAL, INC.; LISA ELLMAN, PARTNER, HOGAN LOVELLS US LLP

STATEMENT OF GABRIEL DOBBS

Mr. DOBBS. Thank you.

Chairman Hardy, Ranking Member Adams, and distinguished members of the Subcommittee, thank you for the opportunity to testify today on behalf of Kespry and the Small UAV Coalition. This is both an exciting and critical time for the commercial unmanned aerial systems (UAS) industry, and I appreciate the opportunity to discuss Part 107, particularly as it impacts small businesses like Kespry.

I would also like to thank the Small UAV Coalition, the first group of its kind focused solely on commercial drone operations, for its leadership in working with policymakers and regulators to develop a robust, yet flexible framework that will no longer be built around exemptions and exceptions. Thanks to its hard work, this industry is now “open for business.”

Like many small businesses across the country, Kespry was started on the floor of an apartment by a few college graduates passionate about the promise of drone technology and its potential to have meaningful impact on businesses around the world. Today, Kespry has been in business for over 3 years. We have customers operating drones in every state, generating millions in revenue. We now employ over 60 people and continue to grow aggressively. Kespry is a “made in America” business. We design and manufacture our fully integrated drone systems entirely in the United States.

Kespry’s mission is to create technology that significantly advances the effectiveness, efficiency, and safety of workers in the real world. This can mean everything from creating a 3D model of hard-to-reach areas of construction, to inventory management, to identifying damage on structures faster to help homeowners and businesses get back on their feet after a major storm.

The drone industry, particularly the commercial sector, also represents a largely untapped market that stands to add billions of dollars to our economy. One recent report estimated that the commercial drone segment will grow to a \$21 billion industry within 5 years. This growth will allow American companies of all sizes, including small businesses, to create countless high-paying, highly-skilled jobs, but none of this is possible without Part 107 and subsequent rulemakings that open the skies to commercial drones while maintaining the highest safety standards.

Two years ago, the drone revolution was just beginning and the FAA had devoted very limited resources to small UAS. Operators had to ask the Secretary of Transportation for permission to ignore certain federal regulations on the books relating to aircraft, since these regulations treated a small drone the same as a Boeing 777.

In late 2014, the first so-called Section 333 exemptions were granted. However, the many conditions and limitations on the FAA's exemption authority were commercially impractical and significantly limited the growth of the small UAS industry, leading many companies to conduct operations in other countries where regulatory advances had been made more quickly.

Kespry worked with partners from the Small UAV Coalition to help the FAA create a rule that put robust safety precautions in place for small commercial operations, while eliminating many of the categorical restrictions in the proposed rule that would have been economically impractical with no material impact on safety.

From the moment it went into effect on August 29th, Part 107 was a huge improvement over the Section 333 process. First, commercial operators no longer need to petition for the FAA approval if they plan to operate within the scope of the rule. Second, the FAA no longer requires UAS pilots to have manned aircraft flying experience, which has little correlation to the skills required to safely operate UAS.

While Part 107 is a solid first step towards a comprehensive regulatory framework for commercial drone operations, there are several key components that the FAA must address expeditiously or American companies will lose out to foreign competitors eager to invest in this developing technology.

As urged by the Small UAV Coalition, Part 107 allows operators to seek a waiver from several regulatory limitations, perhaps most notably to operate at night, directly over people, and beyond the visual line of sight. These elements are critical to the successful and widespread integration of commercial drones into the national airspace that will help create tens of thousands of jobs. Time will tell whether the waiver process will be more efficient and flexible than the Section 333 exemption process.

While we appreciate that Part 107 allows for such waivers, the FAA's next phase of regulations must provide for even more efficient approval of these type of operations. Technology already exists that ensures safe beyond visual line of sight operations and eliminates the need for operators to seek waivers on a case-by-case basis, a burdensome endeavor for both companies, especially small businesses and the FAA.

Equally as critical to realizing the full potential of commercial drone applications is the ability to safely operate UAS over populated areas. The FAA has announced its intention to publish a proposed rule for operations over people for public comment before the end of the year. We hope that the FAA will act expeditiously to finalize this rulemaking and that the proposed rule will recognize that very light UAVs pose the least risk and therefore could be permitted to operate over people under certain circumstances without compromising safety. A micro UAS classification would create an even more efficient regulatory framework, further reducing the

burden on small UAS operators without creating any significant safety concerns.

As you can see, the commercial drone industry standards to deliver major economic and consumer benefits that will allow businesses of all sizes to thrive. Part 107 is a positive first step in developing a comprehensive regulatory framework for small commercial drone operations. It is also proof that it is possible to boost opportunities for American innovation and manufacturing without being overly prescriptive and hindering industry's ability to compete.

Thank you for the opportunity to appear before you today.

Chairman HARDY. Thank you, Mr. Dobbs.

Mr. Wynne?

STATEMENT OF BRIAN WYNNE

Mr. WYNNE. Thank you, Mr. Chairman, Madam Ranking Member Adams. It is a pleasure to be here before the Committee today on behalf of the Association for Unmanned Vehicle Systems International, the largest not-for-profit organization serving the unmanned systems and robotics community. We have more than 7,500 members, including many small businesses that support and supply this innovation industry.

From inspecting pipelines to surveying bridges, to filming movies, UAS helps save time, save money, and most importantly, save lives. It is no wonder why thousands of businesses, small and large, have already embraced this technology. We now have initial regulations governing civil and commercial UAS operations, which means even more businesses are cleared for takeoff. While these regulations have been in effect for less than a month, there is strong evidence that the commercial UAS market is poised for significant growth, particularly among small businesses. Let me explain.

On August 29th, the Federal Aviation Administration implemented the small UAS rule. The rule established a flexible, risk-based approach to regulating UAS. This new regulatory framework helps reduce many barriers to low risk, civil, and commercial UAS operations, allowing businesses to harness the tremendous potential of UAS.

It is clear that businesses are eager to take off. On the first day that the rule went into effect, more than 3,300 people had already signed up to take the aeronautical knowledge test, a requirement under the new rule. Of the more than 530,000 people who have registered their UAS with the FAA since last December, about 20,000 have indicated that they are commercial operators. The FAA expects that more than 600,000 UAS could be flying for commercial use over the next year.

Even before the rule, thousands of businesses had received approval to fly under Section 333 of the 2012 FAA Reauthorization Act. The FAA started granting these exemptions in September 2014 and approved more than 5,500 by the time the rule took effect. These exemptions provide a window into how the commercial market is taking shape. AUVSI found that more than 5,200 distinct businesses received approval to fly, the vast majority of which were small businesses. Over 90 percent earn less than 1 million annually and have fewer than 10 employees. For example, one of these

businesses is Las Vegas-based Verascan. It provides imaging, mapping, and surveying services to Nevada's agriculture, mining, construction, and oil and gas industries. Recently, it provided aerial survey data to assist in the construction of the I-11 Boulder City bypass, part of a proposed highway link between Phoenix and Las Vegas.

This is just one of many businesses around the country taking advantage of this emerging technology. AUVSI projects that the expansion of UAS technology will create more than 100,000 jobs and generate more than 82 billion in economic activity in the first decade following integration. After witnessing the growth of the industry over the last few years and now with the small UAS rule in effect, I am confident those numbers will go even higher.

In addition to the implementation of the small rule, Congress passed, and the president signed, an FAA extension which will advance UAS research, expand commercial operations, and enhance the safety of the airspace for all aircraft, manned and unmanned. While this measure will provide some short-term stability through September 27th, it is critical that Congress pass a long-term bill next year that will set the industry and the country on a glide path to reap all of the benefits of UAS. The extension is a good start but there is still a lot of work to be done.

Government and industry collaboration is critical for keeping up with the pace of our industry's innovations. Key stakeholders in the industry and government have successfully fostered a working relationship that has led to a more flexible and nimble approach to regulating UAS. At the same time, small businesses have led the charge in adopting the technology. We are hopeful that the sustained efforts of all parties will help pave the way for a true, holistic plan for full UAS integration that includes beyond line of sight operations, flights over people, access to higher altitudes, and platforms above 55 pounds.

I look forward to the opportunity to answer your questions, and thank you for the opportunity.

Chairman HARDY. Thank you, Mr. Wynne.

Mr. Daniels?

STATEMENT OF JONATHAN H. DANIELS

Mr. DANIELS. Good morning, Chairman Hardy, Ranking Member Adams, and members of the Committee. Thank you for hosting this hearing and for your invitation to provide testimony.

My name is Jonathan Daniels, and I am honored to be here today. I am the cofounder and CEO of Praxis Aerospace Concepts International, a service-disabled, veteran-owned small business headquartered in Henderson, Nevada.

I cofounded PACI in 2011 with four amazing female veterans, all of whom had experience in aviation and operations, unmanned systems, and military intelligence. We had known each other for years and maintained our connection throughout multiple organizational changes and combat deployments. We decided to take the same skillsets and experience that we had used in the military and create a company that would be at the leading edge of very disruptive commercial technology: robotics.

We are best known for our activities involving civil unmanned aircraft systems, which has included flight as public aircraft, under Section 333 and within Part 107, as well as our work with several FAA UAS test sites and industry standards organizations. Praxis Aerospace was a proud participant in NASA's UAS Traffic Management demonstration of 22 simultaneous test flights at seven different locations conducted in April 2016. Praxis Aerospace is a proud partner with the Clark County Fire Department and currently assists the department in managing its Public Safety Blanket COA. We work cooperatively with the City of Boulder City, home to the Eldorado Droneport, the world's first public airport dedicated to UAS, and we are currently building a prototype cargo small UAS in our Nevada facilities as part of a collaborative effort between Local Motors, Inc. and a little company known as Airbus.

First, I want to say that I have a great relationship with the FAA that dates back a decade to the early days of the Unmanned Aircraft Program Office. I am very thankful and appreciative for the work that they do. After spending years attempting to coordinate flights within European airspace, in and outside of the European Union, I find the FAA to be responsive, accommodating, and very open-minded.

As an industry, we hoped for a regulatory structure for UAS that would be affordable for users and safe for communities on the ground and in the sky. Many of our peers and competitors have publicly derided the FAA for their perceived inertia and misunderstandings. I did not then, and do not now, share their views. I am grateful for the crawl-walk-run process and its preservation of the safety of the national airspace system.

The FAA release of Part 107 effectively opened the skies and lowered barriers for entry of civil UAS. The rules brought clarity to an industry described by many as "the Wild West."

One of the changes out of the Notice of Proposed Rulemaking was the removal of military competency. We have found that the statement by the FAA that says that there was no consistent standard even though there were various different training methods throughout the Armed Services was correct but not complete.

In 2009, the Chairmen of the Joint Chiefs of Staff issued Instruction 3255 for Joint Unmanned Minimum Training Standards which provided that consistent standard. We feel by leaving that military competency we have disadvantaged the more than 3,000 enlisted unmanned aircraft pilots who are trained by the Army and Marine Corps and thus allowing them not to immediately enter the field.

Looking at safety and equipment, one of the challenges we have continuing forward relates down to repairmen. The focus has been on pilots, and Part 107 very heavily has knowledge and questions about the piloting and not necessarily maintenance. There is a vast difference between a 40-year experienced AMA pilot who has built and developed the aircraft themselves to someone who took a \$150 test and bought a \$200 airframe at a local big box store. We found as we look at continuously operations and expanding the operations to beyond visual line of sight, operations over people, at night, and altitude, will have to have a higher level and standard to continue their worthiness.

The approval and implementation of Part 107 was definitely a watershed moment for UAS within the United States, and the new rules provide a substantial foundation for small businesses to use as an entry point into the multi-million dollar UAS industry. Part 107 should be viewed as an outstanding success.

We look forward to another 10 years of collaboration with the FAA. As with any new technology, there are growing pains for all stakeholders and we, at PACI, are patient enough to accept that. We are appreciative of the FAA for not conceding the safety of our National Airspace System to the pressure of large corporations and their lobbyists.

Thank you, and I look forward to your questions.

Chairman HARDY. Thank you, Mr. Daniels.

Ms. Ellman?

STATEMENT OF LISA ELLMAN

Ms. ELLMAN. Chairman Hardy, Ranking Member Adams, and members of your Committee, thank you so much for inviting me here today.

I am here today with a unique understanding of UAS integration as I have worked on these issues from both the private sector side—I now lead the UAS practice group at Hogan Lovells—as well as lead the Commercial Drone Alliance, as well as the Federal Government side. I worked on innovation issues at the White House and previously ran UAS policy development at DOJ.

We are at an exciting time for innovation. Previously considered toys, UAS have emerged as essential tools for industry. They make tasks from disaster response to farming to infrastructure inspection safer and more efficient, enhancing American productivity.

But as is often the case, technology moves more quickly than policymaking, and we all understand that, and drones are no different. And to really ensure the success of this industry and to balance that with a consideration for the public good, we need rules that enable innovation while maintaining safety and privacy and security.

With the proper regulatory framework in place, the economic benefits the drone market will provide are significant. A recent PricewaterhouseCoopers report estimates the global market value of UAS-powered solutions at over \$127 billion. That is significant. And just here in our country it has been estimated that the domestic drone industry will create more than 100,000 new jobs over the next decade. And the FAA recently estimated that by 2020, just 4 years from now, there will have been 11 million commercial drones sold in our country.

Now, it is important to note the critical role that small businesses have played in the growth of the UAS industry. Small business itself is the engine driving commercial UAS adoption here in the United States. And UAS are also helping resource-constrained small business and other industries. They make dangerous tasks safer and expensive tasks cheaper. Now local news broadcasters who cannot otherwise afford helicopters, for example, can now inexpensively obtain aerial footage for major news events, and farmers can detect and mitigate disease in their crops, making their prod-

ucts healthier for all of us and more profitable for them, lowering the cost for the consumer.

For all of these reasons, the broad integration of commercial drones into the national airspace is an exciting opportunity, and this summer, as you have heard about, the U.S. took some critical steps forward. At the end of August, Part 107 went into effect and businesses are now, for the first time ever, broadly authorized to fly small drones in the United States for commercial purposes. And the floodgates are now open. Since the end of August, a few weeks ago, almost 7,000 remote pilot certificate exams were taken, and almost 15,000 applications have been submitted.

Other executive branch agencies have been engaged as well. The White House recently held a first of its kind workshop on commercial UAS where commitments were made to move the industry forward. Industry and nonprofits recently agreed on a set of privacy best practices as part of a process facilitated by the National Telecommunications and Information Administration at the Department of Commerce, and NASA has focused on moving its unmanned traffic management efforts forward designing “highways in the sky.” But challenges and government-imposed roadblocks to this industry remain, and Congress can play an important role in clearing these roadblocks, whether through next year’s FAA reauthorization process or by other means.

A few things are critical to small businesses if we expect to keep America competitive in the global UAS industry. First, the waiver process. We have talked a bit about the process for obtaining waivers under this new rule to fly beyond visual line of sight, over people, or at night. It must be streamlined and timely. The Part 107 waiver itself, the substance of the relief that is granted, must also provide the actual ability for companies to be able to fly drones in the real world for their intended purpose. And we need additional rulemakings that broadly authorize safe flights above people beyond visual line of sight and at night, and we need to see these rules develop quickly. We also need enhanced government and industry collaboration. The recently convened DAC, Drone Aviation Committee, was a good step forward, but policymakers and innovators must work more closely together at the working level especially. We call this “polivation.” And we must support a whole of government approach that enables the broader infrastructure for this industry to succeed. This includes support for NASA, FCC, and others whose work is critical to the success of this industry.

And finally, Congress must continue to support Small Business Administration programs that assist women and minority-owned small businesses. Two colleagues and I recently founded the Women of Commercial Drones Organization to bring gender diversity to the growing drones industry and continued support for programs like these SBA programs is critical.

If we do this right, the opportunities for our country will be great. We have made excellent progress in recent months and it is important that we continue that momentum. And the industry needs to do its part as well. But if we all tackle these issues properly together, we will soon regard commercial drones as we do the phones that we carry and rely on every day. Tools that make us

more efficient, more productive, safer, and more connected. I look forward to that day. Thank you.

Chairman HARDY. Thank you, Ms. Ellman.

The Committee will now have 5 minutes each to ask their questions, and I will begin with myself. This is for all the witnesses here today.

Has the FAA's final rule struck the right balance between ensuring safe operations and allowing this growing industry and its participants to operate and innovate properly? We will start with you, Ms. Ellman, on the left.

Ms. ELLMAN. Sure. Well, I think it is a great first start. Of course, it authorizes very low risk operations. So vehicles under 55 pounds, flights within visual line of sight, away from populated areas or not over people during daytime hours, and it was a critical first start to broadly authorize very low risk operations here in the national airspace. And as we have seen, the floodgates have truly opened and let's just say it is a huge improvement over the Section 333 exemption process which was having to ask permission every time a company wanted to be able to fly. That process was burdensome. Some applications remained in the queue for over a year. Some never even got relief. And so it is great that we now have this rule that broadly authorizes commercial operations. And it is an excellent first step and the FAA did a great job in that realm.

But to be honest, I think it remains to be seen whether it struck the right balance because I think that the waiver process that was baked into the rule is a critical part of it in order to enable real world operations. And I work with several companies who have applied for waivers, who have received waivers, who are getting waivers. But frankly, the process needs to be streamlined and friendly to consumers. It cannot be a replication of the Section 333 exemption process. It needs to move at the speed of industry.

And second of all, the substance of what is actually the relief that companies are actually getting needs to allow for real world operations that are safe. And the FAA needs to actually incentivize safety mitigations and innovations that make drone flights safer. For example, putting padding on your drone or propeller guards for drones, or parachutes. Hardware and software that is out there that can actually make drones safer, we need to incentivize rather than merely looking in terms of risk analysis, merely looking at one factor such as kinetic energy, which is, of course, important, but just one aspect of the risk analysis.

So I think that the FAA has done—this has moved forward. It is excellent news, but I think we have a lot more work to do.

Chairman HARDY. Thank you, Mr. Daniels. Do you care to comment?

Mr. DANIELS. I do. By delineating the difference between Part 101 hobbyists and Part 107 remote pilots, I think we very much have a simple structure. It is obviously based on a century's worth of aviation knowledge and best practice.

We learned a lot of things about that and that was codified within those rules. Part 107 established the basic operational restrictions that we have in Part 103, which has been very successful for ultralight aircraft. In fact, Part 107 is in some ways more permissive because with the written test you are now allowed to do com-

mercial operations which you cannot do with ultralights. But it is a very similar restriction as far as airspace and operations and whether you can go over people or not.

The side piece of that is we talked about the safety aspect. I briefly mentioned the “Wild West” concept and our desire for a regulatory structure that would allow that use without being burdensome and onerous. We have got that in Part 107. I think it is very easy to use and it does provide some level of safety, but I think we need some definite clear enforcement on the grounds of the black market UAS service providers. We have a problem with misfeasance and malfeasance. We have people who are providing their own, you know, they are providing services that would normally be legal except for maybe they registered an aircraft recreationally and not commercially, and they just do not understand what they are doing, right or wrong.

The other part is that we have the malfeasance, the ones who know what the regulations are supposed to be, they know what they are supposed to do, and they choose not to do that. They do not get their license, they do not register their airframes, they do not provide the insurance, and I think that is a little bit of a safety risk, and I think that is part of that challenge that we are looking for on this balance of how successful is Part 107 going to be. We need to look at that. You can search YouTube right now and find some promotional videos by giant companies that are clearly in violation of Part 107 and it just trickles down from there.

Chairman HARDY. Mr. Wynne?

Mr. WYNNE. I like the balance, Mr. Chairman. The rule itself is very conservative. The flying that is permitted is very, very low risk, but the waiver process, we are just at the very beginning of that. The waiver process allows for us to make safety cases for more complex operations and the mitigations that are required to do that. So I think that is going to generate data, and data is really, really important in the safety arena, of course. So I think it is a good balance.

Chairman HARDY. Mr. Dobbs, anything else to add?

Mr. DOBBS. Yeah. I think that you have seen just in the first month of the rule with the number of applications made for remote pilot certificates exceeding those made in the previous year and a half of Section 333 exemptions, so you see this is a much more workable process while still ensuring safety in operations. It does remain to be seen how well the waiver process works. So we are looking forward to seeing how the data pans out over the next few months.

Chairman HARDY. Thank you. My time is expired. One question and my time expired.

I will turn the time over to Ms. Adams.

Ms. ADAMS. Thank you, Mr. Chair.

Ms. ELLMAN, you mentioned the need for Congress to continue its support of SBA programs that assist women and minority-owned business firms. Is there anything that we can do to improve inclusion and diversity, not only in the drone industry but the business community at large?

Ms. ELLMAN. Ranking Member Adams, thank you so much for that question. Absolutely.

As we have talked about today, the commercial drone development and sales are on the rise, but unfortunately, the number of women in leadership positions, whether in the drone industry or more generally in technology is not.

Diversity is an important issue, not only for our own industry but also for the business community generally. Of this year's Fortune 500 list, women held only 4.2 percent of CEO positions in America's 500 largest companies, and aviation in particular, some numbers I saw from the last few years suggested that women pilots represented somewhere around 6 percent of the total pilot population.

Diversity of critical not only for the individuals who are seeking employment, but it also helps businesses to succeed in all industries, including the commercial drone industry, will benefit once we have more women and minorities in leadership positions. It is healthy and beneficial for any organization to hear different viewpoints at the top.

So my own view is that long-term effort must start at the elementary school and middle school level. STEM efforts need to focus on programs getting young girls interested in these subjects, and as increasing numbers of women go down the path of engineering and technology, it is the job of our country's leaders all working together to work with industry and with all of us to foster and to develop this growth.

We can help establish formal mentorship programs for women to help navigate technology and engineering careers, and we can continue to support minority-owned small businesses as we are today.

Ms. ADAMS. Thank you. The commercial drones organization that you have cofounded, can you speak a little bit about that?

Ms. ELLMAN. Sure. So a few amazing colleagues and I recently founded the Women of Commercial Drones. We participated in many of the drone shows, and we looked around frankly and we realized just how male dominated the field is. Of course, this is typical in Silicon Valley. And so recognizing this, we founded this Women of Commercial Drones organization. The purpose of this organization is really to encourage and mentor women and young girls at an early age to become a part of this new and growing drone industry and help women to succeed and grow as leaders in this industry.

The great news is that we have been contacted by literally hundreds of women who want to get involved, and we hope to really be able to encourage women to be bold in pursuit of their careers in this market. Our industry will be better off once we are more diverse.

Ms. ADAMS. Thank you. UAS operations are relatively new, meaning few aviation insurance carriers offer coverage or have only begun recently to do so. One study found that two-thirds of businesses operate without commercial liability. So Ms. Ellman, do you think that the clarity that the new rules bring to the industry will improve the availability of insurance?

Ms. ELLMAN. I do. Absolutely. Insurers have been in an interesting spot, right, because they are essentially policymakers in addition to UAS users. They have also suffered from regulatory uncertainty in that they have not understood how to assign and value

risk. They have all been guessing essentially. But now that we have the rule in place and they have some guidance on what is authorized and what we can expect, I definitely expect to see more insurers entering this market. And I do think that we will see more businesses adopting drone insurance. Just as good business practice, I am seeing more and more customers and end-users requiring it.

As well, FAA resources are limited and regulators do not have the time or energy to go after every illegal flight that happens. We have heard about this from others. Civil liability in case of an accident is what they are going to worry about, and for many of these small companies, one accident can mean their whole business is at stake. So yes, I do think we will see more availability, and as a result, more companies get insurance.

Ms. ADAMS. Thank you.

Mr. Wynne, your association predicted similar growth if FAA developed favorable drone regulations. So do you believe the final rule goes far enough to allow for this kind of job growth?

Mr. WYNNE. Not this rule, no. But the good news is there are additional rules that are in process and the waiver process itself will, I think, allow for us to extend value. But I think there is a tremendous amount of value that gets unlocked under these rules for inspection of vertical infrastructure for flying over farming and things like that. There is just a very long list of things that can be done under Part 107.

Additionally, we need, you know, the broadcasters have been mentioned. There are others that need the ability to fly over people. That rulemaking has already gotten started and the good news is that we have pathfinder programs that have been underway sort of point at where we need to be in order to prove the safety cases for beyond visual line of sight operations, et cetera. There are also very large platforms that will also be allowed to fly ultimately, and in some instances, that rule making is easier because when you get into the flight levels above 18,000 feet, we do not like deviation. So it will be more predictable.

Ms. ADAMS. Thank you, sir. I am out of time.

Mr. Chair, I yield back.

Chairman HARDY. Thank you, Ms. Adams.

I would like to turn the time now over to the chairman over Contracting and the Workforce, Mr. Hanna.

Mr. HANNA. Aviation does not love you sometimes, too; right? It is a two-way street.

I am a pilot, and I have Griffiss Air Force Base, which you know is one of the six. And I think it is a great opportunity. I mean, you have all laid that out quite well. I am a little surprised, Mr. Daniels, for everyone to be so positive about the FAA because frankly, most people are not. And the idea that they originally thought you had to have a pilot's license for this or that Japan has had these larger, much larger for agriculture and other purposes, for 20 years, we are way behind the eight-ball. And a lot of it is our inability to deal with regulation in a timely fashion and an emphasis on safety is appropriate, but frankly, not always practical.

The line of sight issue, the night issue, the fact that I can own 10,000 acres and I cannot go over 400 feet and I have to see this

thing is silly on its face, and I will be blunt. So I want to talk about something.

Like agriculture, it is just a tremendous opportunity. One of the largest hazards to pilots today are ag crop people, people who fly and spray have one of the highest illness rates of any profession, and yet we have this opportunity to have larger drones over big areas and isolate the amount that we spray and limit the amount. You know all this.

So I want to ask you, because I have watched the FAA. I have been here 6 years, and I have watched this process move I think for some things at a snail's pace. One of them is the idea of agriculture. So line of sight makes not a lot of sense to me, and I understand that over populated areas. But line of sight and elevation of 400 feet for, you know, that may be an appropriate elevation. I would like to give anyone who wants to talk about it an opportunity to either agree with me or disagree with me or see what you would like to see differently, because I think that is something that someone could do that is elementary and could be done very quickly and without a lot of problem.

Mr. Dobbs?

Mr. DOBBS. Thank you. Yes. We actually agree with you. We are very happy that Part 107 is finally in effect and it really opened things up for the industry, but there is still a lot of work to be done. There are technological solutions to flying beyond line of sight. On the drone that I brought in today, there is technology for sense and avoid that allows drones to avoid obstacles that are unexpected. There is also technology, including geofencing, which keeps the drone on a particular parcel of property below a particular elevation. So there are all these kind of technological solutions to ensure safety in operations. And we have also seen overseas risk-based regulation where we do not treat a 2-ounce drone the same way we treat a 50-pound gas-powered drone. And we would like to see in future rulemakings that are now under consideration micro UAS classification and looking at both the weight of a drone and the operational—

Mr. HANNA. My son owns about 20 of those.

Mr. DOBBS. That is right. Yeah. And they—

Mr. HANNA. There is no permanence there.

Mr. DOBBS. They do not pose real risk. Obviously, smaller drones in more remote areas pose a very different risk than a larger drone flying over a crowd of people at a sporting event or something like that.

Mr. HANNA. My point is that, I mean, the FAA in an effort to be safe, and I get that and everybody does, and that is their job, but it should not mean that they drag the process out in a way that guarantees that they never have a problem that comes back to them.

Mr. DOBBS. And we agree. And we are very hopeful that with the FAA reauthorization next year that Congress will help push for some new rules and that simultaneously, the FAA will be going through the rulemaking at a little bit of a quicker pace.

Mr. HANNA. But the permit process for agriculture ought to be much different than the rest of it and it is not, the exemption. So, I mean, you ought to be able to—

Mr. DOBBS. Yeah. We absolutely agree. So Part 107 does allow for operations over less populated areas more easily than it does near airports and in large cities. But there is not that risk-based classification system yet that differentiates between drones of different sizes and in remote areas versus more populated areas.

Mr. HANNA. Thank you. My time has expired.

Chairman HARDY. Thank you, Mr. Hanna.

I would like to turn the time over to the ranking member on Small Business, Ms. Velázquez.

Ms. VELAZQUEZ. Thank you, Mr. Chairman.

Mr. Dobbs, some countries have already solved some of the air-space integration problems that the FAA is addressing in these rules. Do the new regulations allow us to solve these issues at the same pace as other countries?

Mr. DOBBS. Thank you for the question. The new rule, Part 107, is a great step forward and has opened the skies for some use cases, but there are still many, including operations at night, beyond line of sight, operations over people, that are restricted under the new rule. So there is still work to be done and we are hopeful that new rulemakings will help solve this along with perhaps some new rules as part of the FAA reauthorization next year.

Overseas, we do see risk-based systems that take into account where the drone is operating, what the use case is, and what the size and weight of the drone is that better address these safety questions.

Ms. VELÁZQUEZ. And are those steps that those countries are taking in terms of addressing the issue of integration, would you think that these are the type of steps that you would like to see happen here?

Mr. DOBBS. Absolutely. We see in many European countries, and Australia and Canada, there are weight-based classifications for drones, so drones under about 4-1/2 pounds, which our new drone is built to be under that weight, are treated differently than larger drones, and there are different weight classifications and different safety standards for things like beyond line of sight flights. So we would like to see those come to the United States as well.

Ms. VELAZQUEZ. Thank you.

Ms. Ellman, you noted in your testimony that with the new regulatory certainty, additional funding dollars will be flowing into the industry. Has the industry suffered from a lack of access to capital?

Ms. ELLMAN. Yes. Thank you for this question.

Over the past several years, investors have started to invest more money into the drone market, but in the first quarter of this year we did see corporate activity dipped, but because in addition to the murkiness of the regulatory environment, investors were also concerned with public perception and privacy issues. This is something that our industry is confronting, and it is very important that we do. But with Part 107, investor skepticism has really declined and funders are looking to aggressively fund more companies in the drone market and this is a great thing. And with this increased regulatory certainty, it was a huge step forward, investors understand the market is really going to grow, and quickly, and they are also more knowledgeable about the industry as a whole. And so they can make smart decisions. So I do expect we

will see more mergers and acquisitions and investors in money flowing into the industry helping many of these small businesses that have thus far suffered as a lack of result of the regulatory certainty, but funders will understand that now is really the time to get in.

Ms. VELÁZQUEZ. If there is anything that you think that Congress can do to spur investment into the industry.

Ms. ELLMAN. Yeah. Absolutely. I mean, I think a lot of what we have talked about here, because so much of the investment money held back because of regulatory and policy issues is really supporting this whole of government approach to integration, providing funding, providing regulatory oversight so we can make sure we are meeting our deadlines and quickly, enabling the broader infrastructure for this industry to succeed. So we have talked about the NASA, UTM—unmanned traffic management—efforts, designing highways in the sky. The FCC spectrum issues is another example. They are critical where we need to consider. In order to be able to have beyond visual line of sight flights and cargo flights, we need this infrastructure.

So Congress can also support state and various state efforts that promote commercial drone innovation and growth, and use your funding, oversight, and bully pulpit functions. This hearing is a great example to ask all relevant agencies to engage with the industry now with a focus on finding solutions that can enable commercial UAS integration safely and broadly and in an expeditious way.

Ms. VELÁZQUEZ. Thank you, Mr. Chairman. I yield back.

Chairman HARDY. Thank you. I turn the time over to Mr. Davidson.

Mr. DAVIDSON. Thank you, Mr. Chairman. Thank you all for coming here and talking about an important and emerging market in the United States and around the world. I appreciate your perspectives, and I want to ask a little bit more about some of the testimony.

So Mr. Wynne, in your testimony you describe a new regulatory framework as a flexible, risk-based approach to regulating UAS. For those of us who are not familiar with how the FAA currently crafts its regulations, what is different about how the FAA is regulating unmanned aircraft?

Mr. WYNNE. That is a great question. Like Congressman Hardy, I, too, am a pilot, and there are probably others in the room. And the FAA is very control-oriented when it comes down to the smallest parts that go into an aircraft. And when you are flying, and we all fly, that is important.

With unmanned aircraft, that certification process, for example, will become very burdensome. This technology iterates very, very quickly, and in fact, we are advancing the technology and making it safer all the time. So when we say risk-based and flexible, what we are actually doing is creating an environment that allows for the safety to continue to improve at the speed of technology rather than constraining it by a regulatory process.

Mr. DAVIDSON. Thank you.

Ms. Ellman, from your perspective, what are the most pressing safety, privacy, and security issues that must be addressed in the regulatory environment that you referenced?

Ms. ELLMAN. Well, I think we are well on our way. In terms of safety issues, of course, what the federal government really cares about is—what the FAA really cares about on safety issues is, is a drone going to fall out of the sky or fly away at any time? And the key is that there is innovation and new technologies that make drones a whole lot safer, and the new regulations should really incorporate these new technologies as it is considering its additional rulemakings on, for example, beyond visual line of sight flight, night flights, that kind of thing.

Security issues, of course, there is a lot of talk about counter UAV technologies. As drones become more ubiquitous, people are worried about is a drone flying over my backyard? Companies are worried about whether drones are flying in their vicinity. Prisons, we have heard a lot about this. And so, of course, that is another area where actually the policy has very much lagged behind the technology. We have technology that can detect, identify, and track unwanted or unauthorized drones, but the question is what can you do with it? And it is unclear at a policy and legal level as well.

And, of course, the privacy issues, this is what the American public is most focused on. Are the privacy issues about is a drone spying on me in my backyard? There are a whole long list of privacy laws and rules that are technology neutral that do protect us already. But, you know, the White House released a presidential memorandum on UAS privacy issues, and as part of that required the NTIA (National Telecommunications and Information Administration) at the Department of Commerce, to convene a group of industry and stakeholders, as well as privacy advocates. And just this May we all came to consensus around a set of best practices around privacy, transparency, and accountability related to the private and commercial use of UAS. And so with that in place, our next task is simply to educate the UAS community, educate the public. There are laws and rules in place that already protect them, and we do not necessarily need duplicative efforts.

Mr. DAVIDSON. Thank you.

Mr. Dobbs, could you highlight some of the safety features that are designed, common practice now and what sort of gaps are out there in the R&D world?

Mr. DOBBS. Absolutely. Thank you for the question.

So first of all, it is pretty common practice to have geofencing whenever you fly a drone. And that makes sure that your drone stays in the area, both vertically and horizontally, that you intend to operate in. So that is a critical piece to make sure that drones are not operating in too congested airspace.

The next generation of technology includes sense and avoid. So that is something that Kesyry has built into our drone. We use a laser to scan for potential obstacles, which is critical for unexpected trees or structures or even other drones operating in more congested airspace. In the future, we have been working with NASA on UTM. NASA has led this effort on unmanned traffic management in creating this highway in the sky so that drones can talk to each other, and for full integration into the airspace, actually

talk to other manned aircraft. So those are some of the critical technology developments that are being worked on now.

Mr. DAVIDSON. Thank you.

And Mr. Daniels, similar question. What kind of things are opportunities or threats to your business as you develop?

Mr. DANIELS. Well, I think that is part of the challenge is that when we talk about expanding out into agriculture and beyond visual line of sight and that technology, you have a lot of export compliance and ITAR regulations that limit that as well, agriculture being one of them. Even though we have recently opened up to nonmilitary unmanned aircraft as a special categorization, that becomes an additional part of the challenge. And those are things the FAA has no control over and cannot mandate. So I think part of that is as we expand that technology, we find those gaps, either we cannot apply the military technology we do have or we have to create new ones outside that.

Mr. DAVIDSON. Thank you.

Mr. Chairman, I yield back my time.

Chairman HARDY. Thank you.

We still have some time and I would like to ask a number of questions, so we will go through one more time.

I would like to begin with Mr. Daniels. In your testimony, you indicated that the FAA's regulatory framework should take into account veterans with unmanned air systems training and make it easier for them to obtain an unmanned aircraft operator certificate with small UAS rating. Can you explain why this is important and how the rule's initial testing requirement would deter veterans with relevant UAS training and experience from not applying for remote pilot certificates?

Mr. DANIELS. Yes, Mr. Chairman.

So as it sits right now, the military has been using unmanned aircraft for 70-plus years; right? JFK, his older brother was killed in an unmanned aircraft accident. We kind of forget that sometimes. We think this is a new industry. In the last 20 years, the majority of experience people have with operations over people, beyond visual line of sight, flying at night, flying at these upper altitudes, has been done by the military. Much like we do with military manned pilots, we have a military competency test that the FAA gives, and then you have to prove you have the knowledge, but you do not have to go through the exact same application process that you do as if you are starting out as a civilian pilot. They take recognition of that timeframe, that recognition, that experience.

I think especially starting with the remote pilot certificate with the smalls, again, the majority of the people who fly small unmanned aircraft systems within the United States, it still is the military. The military does 1.1 billion hours of small unmanned aircraft flight a year, and they are enlisted, nonrated pilots who do not have pilot licenses and have to go through the normal process.

As we go to the larger systems, beyond 55 pounds, again, we have thousands of military pilots who are there. If we want to grab that experience and get that into the workforce, again, taking a disadvantaged community, that being veterans, this is the way we have to go forward.

Chairman HARDY. Thank you.

Mr. Wynne, have you obtained a remote pilot certificate with the small UAS rating under this new rule? And if so, did the process go smoothly?

Mr. WYNNE. Yes, sir, I have. The process was smooth. I am a Part 61 certificated pilot, so I went through that process and have recently been looking at what is on the knowledge-based test, and I think it is consistent with the kinds of skills that we would want all airmen to have. And the good news about the way they have rolled this rule out is that the concept in aviation of pilot in command is "I am responsible for the safe conduct of my flight." We have added remote in front of that. So, but they have done away with things that are not required for pilots of manned aircraft, and I think that is the right way to go. And by the way, I completely support what Mr. Daniels is saying about military pilots. We have a tremendous reservoir of talent out there that the United States taxpayer has paid for that is waiting to go to work for us and large industries that want to take advantage of that, and we should make this technology and these job opportunities as accessible to our veterans as they are for the rest of us pilots.

Chairman HARDY. Thank you.

I would like to go back to Mr. Daniels. In your testimony, you note that Praxis Aerospace has been involved in the development of the Eldorado Droneport. Can you explain what a droneport is and how you envision them operating in the future?

Mr. DANIELS. Thank you again.

So the Eldorado Droneport is a public development by the City of Boulder City. It is 50 acres of land surrounded by 100 acres or 100 square miles rather of city-owned land. It is actually working in concert with the Oneida County and Griffiss International Test Site. And the intent there is as we talk about going from non-scheduled flights to scheduled flights, right now the majority of unmanned aircraft flights are relatively impromptu and intermittent. We go out and we fly from a location, conduct a surveillance, conduct a survey, conduct an agricultural mission, whatever it is that we are doing, and then we leave and never fly there again. As we start getting larger systems, as we start getting to more scheduled flights, like delivery and cargo, you are going to want to have a location where that is done and where that is carefully scoped out for safety concerns—the lighting, the building codes around there. Additionally, we want to be able to expand that out. We do that with helipads now. So if you think of a helicopter that can land anywhere, there is a reason why we have helipads. Nobody wants Amazon drones coming in to do a delivery, a bunch of kids to come running out in the landing area. We need to figure out how to put that in place. What we are trying to do with the droneport is have a site to do that, again, tied in with the test sites as they are right now and then continuing to build forward so that as we go forward in the future, just like we did with Internet cafés where that was the place where you got your Internet and now we all have it on our cell phones, well, this will be the place where you learn how to take off and land from a droneport, and eventually it will be everywhere and you will not need a dedicated drone port for that.

Chairman HARDY. Thank you. And I am out of time again.

Ms. Adams?

Ms. ADAMS. Thank you, Mr. Chair.

Mr. Daniels, one survey conducted showed that many companies are unclear of the current FAA regulations, yet they continue to operate commercial drones anyway. The arbitrary decision to follow rules is troublesome as it could present a risk to the public safety. What can be done to avert a recurrence of this behavior and increase the level of public adherence to the regulations?

Mr. DANIELS. Ma'am, that is a very good question and one that I have literally spent sleepless nights over looking at. The idea of arbitrary rule following, again, that is a misfeasance/malfeasance. Right? Some people do it by accident. Some people do it deliberately. But it damages the industry as a whole. And it is coming. When there is that thing that happens that draws the attention, no one is going to look at whether they were doing the right thing or not. No one is going to look at whether they are actually following the rules. They are going to look at it as an industry-wide failure.

One of the things I say behind that is bring in the veterans because we have a lot of experience here. Another thing I talk about is repairmen. The whole focus for Part 107 is on remote pilot, not on the repairmen, not on the continued airworthiness. For us to do the missions that Mr. Dobbs, Mr. Wynne talk about, we are going to need people to keep those aircraft in the sky, much like we need mechanics working on our cars right now. We need to add that in there.

And then finally, and I have joked about it before, we need a 1-800-BADDRONE or some measure to, you know, Crime Stoppers, some measure to say, look, I have been at a jobsite where a guy flies up to go with his little phantom drone and takes off. And as we talked through and said, okay, do you have your certificates, they immediately packed everything up and ran away. But we need a way to self-police and maybe escalate that a little more to whether it is local law enforcement or the FAA.

Ms. ADAMS. Thank you.

Are we going to fly this drone today, Mr. Dobbs?

Mr. DOBBS. It does not fly indoors.

Ms. ADAMS. Oh, okay. Okay.

Mr. Daniels, let me follow up and ask you about the proposed rule that sought comments on whether there should be an inclusion of a micro drone category. Ultimately, a micro drone category was not included in the final rule, so how large of a role can we expect micro drones to play as commercial drone uses expand?

Mr. DANIELS. Ma'am, that is another good question, and I had the opportunity to address the micro UAS ARC about this.

My challenge with the micro drones is that at a certain point, until the technology gets there, we do not have the ability to integrate the things that we know we need for safety—the sense and avoid, the transponders, things that you will need to fly free and openly, even under Part 107 and the Part 107-type waivers. You just cannot get that on an airframe that weighs 500 grams or less. However, I see a lot of opportunity in public safety. I know that is one of the things that militaries use that will definitely transfer over where if you have a drone in your pocket as a fireman, you

are able to bring that to a local situation and immediately get eyes on. Under the rules as they exist right now it is a fantastic use for micro drones. It is much less expensive than not only large commercial aircraft that we have right now but also some of the larger drones. The second piece of that is you could put one of these things in a box next to your fire alarm, and when the fire alarm goes off the box opens up, the micro drone comes out and can actually run up and down the halls and give you immediate information to feed whoever is coming to help rescue you, whether it is the fire department, law enforcement, it does not matter. You have an immediate eyes on. I see a lot of opportunities for micro drones.

Ms. ADAMS. Okay.

Mr. Wynne, we talked a little bit about security and we know the risk that hacking plays in security, and drones are just as liable to this threat as other forms of technology. So how likely is it that a drone hacking can or will occur?

Mr. WYNNE. Well, I think it is likely enough that we as an industry have got to take measures against it. And this is one of the phenomenon that we in a rapidly advancing technology industry face, like all technology industries. The Internet has caused all manner of challenges with regard to privacy and other things and we have anti-virus software for the Internet, so our industry, one of the fastest-growing elements of our industry will be counter drone technology, for example.

I was at a cyber conference last week in Newport News and listening to people across the spectrum of technology talking about cyber challenges. It is significant. But it is no different for our industry than it is for the healthcare industry or for any other industry. So, but that is the reason I was there because we need to learn across those industries.

Ms. ADAMS. Great. Thank you very much. I yield back, Mr. Chair.

Chairman HARDY. Thank you all for being here.

But I am going to take the liberty of asking one more question. I will begin with you, Mr. Dobbs, and anybody else who would like to address it can.

As of September 20, 2016, the FAA had received 552 waiver requests under Part 107 and approved 79. However, the 79 waiver requests that have been approved were submitted under the Section 333 exemption before the final rule effective date. Does the fact that the FAA has not approved the new waiver requests submitted since Part 107 went into effect give you any concern?

Mr. DOBBS. That is a great question. Thank you, Chairman Hardy.

Absolutely. We are concerned that the waiver process will be similar to the Section 333 exemption process in that it will take quite a bit of time for these waivers to work their way through the system. What we saw with Section 333 is deadlines being missed, and there are also many use cases after a storm when you need to inspect homes or track progress on a construction site, it is critical that these waivers be processed quickly or we even create a system where these waivers are not necessary. But it is a real concern that we are watching.

Chairman HARDY. Thank you.

Anybody else?

Mr. WYNNE. I think as I understand it, what is happening now is that the UAS Integration Office inside of the FAA, which is exclusively devoted to this, is now pulling in resources from the entire FAA. It is easier for them to identify who is not working on UAS at this point than who is. But a lot of those offices are relatively new. So they made a point, Earl Lawrence, the head of that office made a point of explaining that when you put in a waiver that is not necessarily going to come into our office. It is going to get directed to a different office, and I think all of those people are trying to understand exactly what their roles are. But we have been emphasizing the importance of cadence, and yet we have to find that balance. I think like the 333 exemption process, it will accelerate over time, but will be clearer to those that are requesting waivers and permission to fly under certain circumstances, what the mitigations are they need. That will be communicated out to the public at large and this process will move quicker.

Chairman HARDY. Thank you.

Mr. DANIELS. Mr. Chairman, if I can add to that.

The FAA is working with ASTM, an industry standards organization, specifically on addressing an alternative method of compliance for this that will help accelerate the waiver process, as well as form the guidelines for the operations over people, beyond visual line of sight. And they have been doing so for a year and a half that I have been personally involved and I am sure well beyond that. The idea again is you have an industry standard that is self-certifying, self-compliant, and you have to meet what is within there, much like we do with underlying laboratories as it is now—provide that to the FAA, and it makes it much easier for them to inspect it. It follows their formats. It follows their questions. You have everything in line with that. And I know the delivery date for those is within the next 6 months. So I see that changing and being a much easier process, knowing for a fact that they are building a standard specifically for the waivers for Part 107 now.

Chairman HARDY. Thank you.

Ms. Ellman?

Ms. ELLMAN. Yeah. So one area I would talk about is in terms of flights over people. One thing to watch here, I know the FAA is requiring a lot of quantitative analysis, ballistic gel tests, drop tests, and this is where, you know, in addition to kind of all this data that is out there, it is important that the FAA actually consider the operational and technical mitigations in addition just to kinetic energy, which I think a lot of folks look at what is being required in the flights over people context and frankly, it is going to be a tall—if the process is as intense as it looks offhand, it is not going to go in any expedited way. And as the industry evolves, we really want to be incentivizing safety and incorporating this innovation and incorporating parachutes and propeller guards and padding for vehicles and allowing those mitigations to actually get broader approvals. I think what we are seeing is very, very narrow approvals for things that even weigh about a pound or so. And so I think that this is critical as we move forward that this has to be a scalable process, something that small businesses across the country are going to be able to meet that are operating safely.

Small businesses want to operate in a way that is safe, and we need to be able to incorporate innovation so that we can actually move this process forward and provide real opportunities to use these devices.

Chairman HARDY. Thank you. Thank you all for being here today. I appreciate your testimonies.

As the FAA opens the skies to commercial drone activity, the new avenues of economic opportunity are opening for the startup and small business communities. The Subcommittee will monitor implementation of the Part 107 and how well the new regulatory framework is working for small companies. We will also continue to encourage the FAA to diligently move forward with its efforts to safely integrate UAS into the national airspace while addressing safety, privacy, and other concerns.

I ask unanimous consent that all members have 5 legislative days in order to submit their statements and supporting materials for the record.

Without objection, so ordered.

This hearing is now adjourned.

[Whereupon, at 12:10 p.m., the Subcommittee was adjourned.]

A P P E N D I X



PREPARED STATEMENT OF KESPRY

for the

**COMMITTEE ON SMALL BUSINESS
OF THE U.S. HOUSE OF REPRESENTATIVES
SUBCOMMITTEE ON INVESTIGATIONS, OVERSIGHT, AND
REGULATIONS**

on

**OPPORTUNITY RISING: THE FAA'S NEW REGULATORY
FRAMEWORK FOR COMMERCIAL DRONE OPERATIONS**

**Gabriel Dobbs
Vice President of Business Development and Policy
Kespri**

September 27, 2016

Prepared Statement of Gabriel Dobbs

Chairman Hardy, Ranking Member Adams, and distinguished members of the Subcommittee, thank you for the opportunity to testify today on behalf of Kespry and the Small UAV Coalition. This is both an exciting and critical time for the commercial unmanned aerial systems (UAS) industry and I appreciate the opportunity to discuss Part 107, particularly as it impacts small businesses like Kespry. We applaud the Subcommittee's interest in this new framework as it underscores your commitment to ensure that the United States has a regulatory environment conducive to innovation and job creation for businesses of all sizes.

I would also like to thank the Small UAV Coalition—the first group of its kind focused solely on commercial drone operations—for its leadership in working with policymakers and regulators to develop a robust, yet flexible framework that will no longer be built around exemptions and exceptions. Thanks to their hard work, this industry is now “open for business.”

Like many small businesses across the country, Kespry was started on the floor of an apartment by a few college graduates passionate about the promise of drone technology and its potential to have meaningful impact on business in America and around the world. Today, we have been in business for over three years. We have customers operating drones in every state, generating millions in revenue. We now employ over 60 people and continue to grow aggressively. Kespry is a “made in America” business. We design and manufacture our fully integrated drone systems entirely in the United States.

Kespry's mission is to create technology that significantly advances the effectiveness, efficiency, and safety of workers in the real world. This can mean everything from creating a 3D model of hard-to-reach areas of construction, to inventory management, to identifying damage on structures faster to help homeowners and businesses get back on their feet after a major storm.

In less than 30 minutes, for example, a Kespry drone can provide aerial imaging and mapping solutions for a 150-acre construction site that allow project managers to track progress, manage resources, and complete projects on schedule and under budget. It takes less than five minutes for a Kespry drone to survey a roof to evaluate damage and thus inform repairs and claims adjustments, eliminating the need for insurance companies to put employees and contractors at risk of physical injury by climbing ladders and walking on damaged roofs. A quarry can use a Kespry drone to accurately measure the volume of stockpiles in a matter of minutes, rather than days. We save businesses time and money, and give workers an invaluable tool to improve safety and automate dangerous, time-consuming jobs.

The drone industry, particularly the commercial sector, also represents a largely untapped market that stands to add billions of dollars to our economy. One recent report estimated that the drone industry as a whole could be valued at \$100 billion by 2020. The largest area of growth lies in the commercial segment, which is es-

timated to grow to a \$21 billion industry within five years. This growth will allow American companies of all sizes, including small businesses, to create countless high-paying, highly-skilled jobs. These economic benefits will also permeate through other industries, from insurance to component manufacturers. But none of this is possible without Part 107 and subsequent rulemakings that open the skies to commercial drones while maintaining the highest safety standards.

Early FAA UAS Regulations

Two years ago, the drone revolution was just beginning and the FAA had devoted very limited resources to small UAS. Operators had to ask the Secretary of Transportation for permission to ignore certain federal regulations on the books relating to aircraft, since these regulations treated a small drone the same as a Boeing triple 7. An exemption was required from the requirement to maintain a paper flight manual on board the aircraft. Another one of the many regulations we requested exemption from required us to have a fourteen inch registration number or “N Number” on the “tail” of our aircraft. Since our aircraft had no tail, we found this difficult to comply with.

In late 2014, the first so-called section 333 exemptions were granted. The industry celebrated this milestone, but the fine print on the exemption grants made it clear that this was not the solution we had been waiting for. The exemptions required two persons for any drone flight, including one person who held a private pilot’s license and a visual observer. The exemption also restricted flights to at least 500 feet from all persons and buildings. This was commercially impractical and failed to acknowledge the advances in autonomous flight technology.

The many conditions and limitations on the FAA’s exemption authority significantly limited the growth of the small UAS industry in this country and led many companies to conduct operations in other countries where regulatory advances have been made more quickly. For example, drones have been operating beyond the line of visual sight—a critical element of commercial operations—in France since 2012. The Japanese government is racing to implement a regulatory framework to have drone delivery in place in rural areas by 2018 and in urban areas in time for the 2020 Tokyo Olympics. Part 107, provided it is implemented to expand the nature and scope of operations, will help ensure that the United States does not continue to cede ground to our global competitors who are aggressively embracing this rapidly developing technology and its corresponding economic and consumer benefits.

Part 107 Benefits Both the Commercial Drone Industry and Consumers

Kespry worked with partners from the Small UAV Coalition to help the FAA create a rule that put robust safety precautions in place for small commercial drone operations, while eliminating many of the categorical restrictions in the proposed rule that would have been economically impractical with no material impact on

safety. While the rulemaking process took longer than anticipated, the FAA was receptive to industry input and expertise; over two-thirds of the recommendations made by the Small UAV Coalition in response to the Notice of Proposed Rulemaking (NPRM) were incorporated into the final rule.

The moment it went into effect on August 29, Part 107 was a huge improvement over the Section 333 process, a laborious and lengthy for both industry and the FAA. First, commercial operators seeking to operate small UAVs no longer need to petition for FAA approval if they plan to operate within the scope of the rule. Second, the FAA no longer requires UAS pilots to have manned aircraft flying experience, which has little correlation to the skills required to operate a UAS. Instead, remote pilots must pass an aeronautical knowledge test to ensure they have the capability and knowledge required to safely and responsibly operate a drone for commercial purposes.

Operators may fly during daylight and within the visual line of sight in uncontrolled airspace without obtaining any additional FAA approvals. Operations can be conducted up to 400 feet above ground level, though a UAV may operate over a structure up to 400 feet above that structure if it remains within 400 feet of that structure. These parameters allow Kespri to conduct many of our operations much more efficiently than under the Section 333 regime, enabling us to expand our offerings and widen our customer base.

We hope that Part 107 will allow the FAA to devote more resources to continued development of a regulatory framework that will pave the way towards critical components of widespread commercial drone operations that the final rule either does not address or permits only under limited circumstances.

Beyond Part 107

While Part 107 is a solid first step towards a comprehensive regulatory framework for commercial drone operations, there are several key components that the FAA must address expeditiously or United States companies will lose out to foreign competitors eager to invest in this developing technology.

Improving the Part 107 Waiver Process

As urged by the Small UAV Coalition, Part 107 allows operators to seek a waiver from several regulatory limitations, perhaps most notably to operate at night, directly over people, and beyond the visual line of sight. These elements are critical to the successful and widespread integration of commercial drones into the national airspace that will help create tens of thousands of jobs. The FAA has already granted 79 waivers, the vast majority of them to allow operations at night. Time will tell whether the waiver process will be more efficient and flexible than the section 333 exemption process. We do not know whether the FAA's staffing and resources are sufficient to implement the waiver process to support the need for expanded operations that will save money, save time, and save lives.

Operations Beyond the Visual Line of Sight and Over People

While we appreciate that Part 107 allows for waivers to operate beyond the visual line of sight (BVLOS) and over people, the FAA's next phase of regulations must provide for even more efficient approval of these types of operations or the United States will fail to develop the robust commercial drone industry that other countries are actively pursuing. A rancher in Nevada or a farmer in North Carolina cannot fully benefit from drone technology if he must follow his drone in his truck to maintain the visual line of sight while inspecting his property.

France, Poland, Sweden, Norway, and the Czech Republic are just a few of the countries in which beyond visual line of sight operations have been taking place for years with high levels of safety. Technology already exists that ensures safe beyond visual line of sight operations and eliminates the need for operators to seek waivers on a case by case basis, a burdensome endeavor for both companies—especially small businesses—and the FAA.

Congress has also endorsed the need for expanded beyond visual line of sight operations. FAA reauthorization that passed the Senate 95-3 earlier this year included language that expressed the sense of Congress that “beyond visual line of sight....operations of UAS have tremendous potential to spur economic growth and development through innovative applications of technology and to improve emergency response efforts as it relates to assessing damage to critical infrastructure such as roads, bridges, and utilities, including water and power, ultimately speeding response time.”

Equally as critical to realizing the full potential of commercial drone applications is the ability to safely operate UAS over populated areas and people not directly involved in the operation of the UAS. The FAA has announced its intention to publish a proposed rule for Operations of Small Unmanned Aircraft Over People for public comment before the end of the year. The proposed rule is to be informed by an Aviation Rulemaking Committee report produced earlier this year by a task force comprised of FAA, industry and other aviation stakeholders. The report recommends risk-based performance based standards, manufacturer compliance requirements, and operational provisions that we hope to see incorporated into the proposed rule. We also hope that the proposed rule will recognize that very light weight, so-called micro UAVs pose the least risk and therefore can be permitted to operate over people under certain circumstances without compromising safety.

Risk-Based Regulations: Micro UAS Classification

Industry has been pleased to see the FAA taken an increasingly risk-based approach to UAS regulations, but it has yet to acknowledge in regulation the risk differentiation between very small UAS that weigh only a few pounds or less and a drone that pushes the 55 pound limit of vehicles subject to Part 107. A micro UAS classification would create an even more efficient regulatory framework, further reducing the burden on small UAS operators without creating any significant safety concerns.

In the preamble to the proposed rule, the FAA put forth the idea of a micro UAS classification for vehicles weighing up to 4.4 pounds, including payload, based on concepts put forth in other countries. Kespri and the Small UAV Coalition endorsed this idea, the basis for which was the belief by some at the FAA that a small UAS operation should be given more leeway where the safety risks of operating such a small vehicle are negligible. We were disappointed to see that despite receiving strong support for its micro UAS proposal, the FAA chose not to include it in the final rule.

Congress has also endorsed the concept of micro UAS classification. FAA reauthorization bills approved earlier this year by the Senate and the House Transportation and Infrastructure Committee both included provisions directing the FAA to establish a micro UAS category. Unfortunately, this direction was stalled despite strong, bipartisan support when the effort to enact comprehensive, long-term FAA reauthorization legislation was derailed and a short-term extension of current FAA authorities was enacted in its place. While we appreciate congressional support for the concept, industry cannot afford to wait for Congress to again make its intention clear when it again works to reauthorize the FAA a full year from now. We urge the FAA to include a micro UAS classification in its forthcoming Notice of Proposed Rulemaking for operations over people.

Improving Testing and Training

Early reports from the FAA indicate that the first round of individuals who have taken the aeronautical knowledge test to obtain a remote pilot certificate have experienced a high rate of passage. While this is good news, there is evidence to suggest that these numbers will decline as more people pursue a certificate. Many of us in the industry have heard that the volume of information provided by the FAA to prepare for the test is not only overwhelming, but also largely focused on manned aviation, therefore discouraging people from signing up for the test. It is also a safe assumption that many of those who signed up to take the aeronautical knowledge test at its earliest availability are individuals with experience in the industry who have a strong foundation in the knowledge and skills required to pass the test. It will take time for realtors and other professionals who don't have this experience and awareness, yet stand to benefit enormously from this technology, to endeavor to take the test and they will likely not experience the same levels of success.

Further, remote pilot applicants must take the test in person at a designated FAA testing center. In addition to the \$150 test fee, this is a burdensome and costly deterrent to compliance. The FAA acknowledged in the preamble to Part 107 that it may authorize online testing in the future if it can be conducted securely to prevent fraud and cheating. This type of security technology already exists and is used for testing and certification in other industries. The FAA should prioritize standing up an online testing program as soon as possible.

Conclusion

Thank you for holding this hearing and for the opportunity to testify on behalf of Kespry and the Small UAV Coalition. As you can see, the commercial drone industry stands to deliver major economic and consumer benefits that will allow businesses of all sizes to thrive. Part 107 is a strong and positive first step in developing a comprehensive regulatory framework for small commercial drone operations. It is also proof that it is possible to boost opportunities for American innovation and manufacturing without being overly prescriptive and hindering industry's ability to innovate and compete. We look forward to continuing to work with the FAA and Congress to ensure the United States develops and implements a comprehensive regulatory framework that allows for the safe and expedited integration of drones into the national airspace.



**PREPARED STATEMENT OF BRIAN WYNNE
PRESIDENT AND CEO, ASSOCIATION FOR UNMANNED VEHICLE SYSTEMS INTERNATIONAL**

**U.S. House of Representatives
Committee on Small Business
Subcommittee on Investigations, Oversight and Regulations
September 27, 2016**

Chairman Hardy and members of the subcommittee, thank you very much for the opportunity to participate in today's hearing on unmanned aircraft systems. I'm speaking on behalf of the Association for Unmanned Vehicle Systems International, the world's largest non-profit organization devoted exclusively to advancing the unmanned systems and robotics community. AUVSI has been the voice of unmanned systems for more than 40 years, and currently we have more than 7,500 members, including many small businesses that support and supply this innovative industry.

Unmanned aircraft systems, or UAS, increase human potential, allowing us to execute dangerous or difficult tasks safely and efficiently. From inspecting pipelines to surveying bridges to filming movies, UAS help save time, save money and, most importantly, save lives. It is no wonder why thousands of businesses—small and large—have already embraced this technology, and many more are considering integrating it into their future operations.

Today, we now have initial regulations governing civil and commercial UAS operations, which means even more businesses are cleared for takeoff. While these regulations have only been in effect for less than a month, there is strong evidence that the commercial UAS market is poised for significant growth, particularly among small businesses. Let me explain.

On August 29, the Federal Aviation Administration implemented the small UAS rule, also known as Part 107. The rule was the result of years of collaboration between government and industry that established a flexible, risk-based approach to regulating UAS. This new regulatory framework helps reduce many barriers to low-risk civil and commercial UAS operations. In reducing those barriers, the rule allows businesses and innovators to harness the tremendous potential of UAS and unlock the many economic and societal benefits the technology offers.

Part 107 allows anyone who follows the rules to fly for commercial purposes. Generally speaking, operators need to fly under 400 feet, within visual line of sight and only during daylight hours. However, recognizing the need for the rule to be flexible, the waiver process under Part 107 allows for expanded types of operations.

It is clear that businesses are eager to take off. On the first day the rule went into effect, more than 3,300 people had already signed up to take the aeronautical knowledge test, called the Unmanned Aircraft General (UAG) examination, which is one of the requirements under Part 107. Of the more than 530,000 people who have registered their UAS with the FAA since last December, about 20,000 have indicated they are commercial operators. The FAA expects that more than 600,000 UAS could be flying for commercial use over the next year.

Until the regulation became effective, individuals and companies seeking to fly UAS for commercial purposes had to apply for an exemption under the Section 333 provision of the FAA Modernization and Reform Act of 2012. The FAA started granting Section 333 exemptions for certain low-risk commercial UAS applications in September 2014. From that time until the day the final rule took effect last month, the FAA granted more than 5,500 exemptions.

These exemptions provide a window into how the commercial market is taking shape, the numerous industries embracing UAS and the most common applications for the technology. AUVSI analyzed each of the FAA exemptions and found that more than 5,200 businesses received approval to fly for commercial purposes. Of the businesses that received exemptions, the vast majority are small. Over 90 percent of these businesses make less than \$1 million in annual revenue and have fewer than 10 employees. Our analysis also found that UAS are being used in all 50 states for over 40 dif-

ferent types of applications, including aerial photography, emergency management and utility inspection.

These exemptions show that a wide number of small businesses across a range of industry sectors are adopting the technology. Whether it's aiding search and rescue missions, advancing scientific research, responding to natural disasters, or helping farmers care for their crops, UAS are transforming the way many businesses operate. They also are creating several new ones—from startups focused on developing new UAS platforms to entrepreneurs creating new business models that offer specific UAS services. Other small businesses are eager to use UAS to improve their existing services and extend their capabilities.

Let me provide some examples:

- One of these businesses is Las Vegas-based Verascan, Inc., which provides imaging, mapping and surveying services to Nevada's agriculture, mining, construction and oil and gas industries. This past year, it provided aerial survey data to assist in the construction of the I-11 Highway Boulder City Bypass, part of a proposed highway link between Phoenix and Las Vegas.¹
- Another example is North Carolina-based Flyboy Aerial Photography. It was of the first professional photography companies in the Triangle region to use unmanned aircraft. Flyboy was founded by a husband and wife team. Their passion for photography and technology has led them to work closely with real estate agents seeking to show aerial views of property to potential buyers, as well as assist construction in surveying and mapping projects more accurately.²
- Finally, Cincinnati-based Rise Above Images provides aerial images for real estate agencies and construction companies in Ohio. The company helps attorneys and insurance agencies reconstruct and analyze the scenes of accidents as well as use aerial photography to help resolve land disputes.³

These are, of course, just a handful of examples of small business currently using UAS to advance their operations and services. And there are many, many more.

An economic analysis by AUVSI projects that the expansion of UAS technology will create more than 100,000 jobs and generate more than \$82 billion to the economy in the first decade following integration in to the national airspace. After witnessing the growth of the industry over the last few years and now with Part 107 in place, I am confident those figures will be even higher.

There is no doubt that this year has been a productive one for UAS and, as a result, many American businesses are now able to fly. In addition to the implementation of the small UAS rule, Congress passed and the president signed an FAA extension measure which will advance UAS research, expand commercial operations

¹ http://www.verascaninc.com/blogs/blog_detail/29

² <http://www.flyboyinc.com/#!services/cuto>

³ <http://www.riseaboveimages.com/#/home>

and enhance the safety of the national airspace for all users—manned and unmanned.

Notably, the extension calls for the creation of a comprehensive UAS research and development roadmap to coordinate industry and government R&D initiatives. The extension also outlines a pilot program for UAs traffic management (UTM) and expands the section 333 exemption process to allow for beyond line of sight operations.

While this measure will provide some short-term stability through September 2017, it is critical that Congress pass a long-term bill next year that will set the industry and the country on a glide path to reap all of the benefits of UAS. The extension is a good start, but there is still much more work to be done.

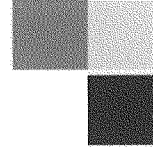
As was recently highlighted at the White House's Office of Science and Technology Policy and AUVSI Foundation's first-ever drone workshop, government and industry collaboration is critical for keeping up with the pace of our industry's innovations. Key stakeholders in industry and government have successfully fostered a working relationship that has led to a more flexible and nimble approach to regulating UAS, while small businesses have led the charge in adopting the technology.

AUVSI is eager to continue this critical collaboration with the Department of Transportation, the FAA, Congress and other industry stakeholders through initiatives such as the newly-formed Drone Advisory Committee.

In that same spirit, we are hopeful that the sustained efforts of all parties will help pave the way for a true, holistic plan for full UAS integration that includes beyond line of sight operations, flights over people, access to higher altitudes and platforms above 55 pounds. Some of these efforts are already in motion. The FAA is currently reviewing the recommendations made by the Micro-UAS Aviation Rulemaking Committee regarding flights over people and a draft rule is expected by the end of this year.

The UAS industry is primed for incredible growth, thanks to industry representatives and government regulators nurturing innovation that helps small businesses be more competitive in the marketplace than ever before. We hope that these efforts can be sustained and that we continue to reach new historic milestones in integrating this technology into the national airspace.

Thank you, again, for the opportunity to speak today. I look forward to answering any questions the committee might have.



"Opportunity Rising: the FAA's New Regulatory Framework for Commercial Drone Operations"

Testimony of:

Jonathan Daniels

CEO and Co-Founder

Praxis Aerospace Concepts International, Inc.

Before The

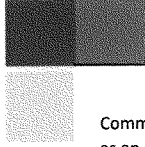
Committee on Small Business

Subcommittee on Investigations, Oversight and Regulations

United States House of Representatives

Hearing On

September 27, 2016



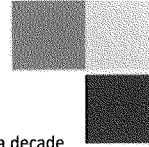
Good Morning Chairman Hardy, Ranking Member Adams and members of the Committee. Thank you for hosting this hearing, and for your invitation to provide testimony as an expert witness. My name is Jonathan Daniels, and I am honored to be here today. I am the Co-Founder and CEO of Praxis Aerospace Concepts International, Incorporated (PACI), a service-disabled veteran-owned small business headquartered in Henderson, Nevada.

I would like to provide some additional background about myself, as historical context, before describing the efforts of Praxis Aerospace. I spent over 23 years in the Army, retiring to my home in Boulder City, Nevada in December of 2011. During my period of service, I organized, programmed, trained, maintained, operated, employed and directed manned and unmanned reconnaissance equipment, teams and detachments during over 23 years of combined enlisted and officer experience as UAS pilot/sensor operator, aviator, project manager, tactics specialist and operations analyst. I have 16 years' direct aviation experience in six different manned rotary/fixed-wing airframes (rated/nonrated crew-jumpmaster) and over a decade of experience with nine military UAS on six continents in the full-spectrum of positions (pilot-sensor operator-technical observer-instructor/examiner). My final military assignments were to the Joint Unmanned Aircraft Systems Center of Excellence (JUAS COE) at Creech AFB, Nevada and as inaugural Chief of the US Army Europe Unmanned Aircraft Systems Training and Standardization Center of Excellence in Illersheim, Germany.

I cofounded PACI in 2011 with a four amazing female veterans; all of whom had experience in aviation operations, unmanned systems and military intelligence. We had known each other for years, and had maintained our connection throughout multiple organization changes and combat deployments. We decided to take the same skill sets and experience that we used in the military and create a company that would be the leading edge of a very disruptive commercial technology: robotics.

Praxis Aerospace provides practical solutions for multi-modal (ground-air-sea-industrial) robotics and unmanned systems. Praxis Aerospace is dedicated to the expert practical application of technologies, equipment, robotic systems and concepts that support manned, unmanned and teleoperated customer missions.

We are best known for our activities involving civil unmanned aircrafts systems, which has included flight as public aircraft, under Section 333 and Part 107, as well as our work with several FAA UAS Test Sites and industry standards associations. Praxis Aerospace was a proud participant in NASA's UAS Traffic Management (UTM) demonstration of 22 simultaneous UAS test flights at seven locations conducted in April 2016. Praxis Aerospace is a proud partner with the Clark County Fire Department, and currently assist the fire department in managing its Public Safety Blanket COA. We work cooperatively with the City of Boulder City, home to the Eldorado Droneport- the world's first public airport dedicated to UAS. We are currently building a prototype cargo sUAS in our Nevada facilities as part of a collaborative effort between Local Motors, Inc. and Airbus.



Great Relationship with the FAA

First, I want to say that I have a great relationship with the FAA that dates back a decade to the early days of the Unmanned Aircraft Program Office. I am very thankful and appreciative of the work that they do. After spending years attempting to coordinate flights within European airspace, in and outside of the European Union, I find the FAA to be responsive, accommodating and very open-minded.

As an industry, we hoped for a regulatory structure for UAS that would be affordable for users and safe for communities on the ground and in the sky. Many of our peers and competitors have publicly derided the FAA for their perceived inertia and misunderstandings. I did not then, and do not now, share their views. I am grateful for the crawl-walk-run process and its preservation of the safety of the national airspace system (NAS).

Section 333 Exemptions are a good example of why this method works. While the initial number of approved exemptions were time consuming and expensive (ie, crawl), once the FAA implemented the summary grant process (ie walk) the tempo of issued approvals was astounding. I am still amazed at the fact that the FAA approved over-5500 333 petitions in the less than two-year time period before Part 107 took effect.

The B4UFLY mobile device app and the Part 48 Online sUAS Registration portal are also excellent examples of how the FAA is providing aviation tools for the UAS industry. This year has witnessed many improvements and overhauls of the methods that the FAA provides for legacy manned aviation operations as well. I am happy to say that I no longer need the electric typewriter that we purchased for the sole purpose of filling out the carbon-copy Form 8050-1 Aircraft Registration Applications now that an online and downloadable version is available.

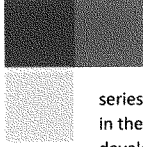
Positive effect of Part 107

The FAA release of 14 CFR Part 107 effectively opened the skies and lowered the barrier to entry for civil UAS. The rules brought clarity to an industry described by many as "the Wild West". By delineating the difference between Part 101 hobbyists and Part 107 Remote Pilots, we now have a very simple structure that is obviously based on a century's worth of aviation practice.

The rules have thoroughly codified the lessons learned through the Section 333 process. Part 107 establishes the same basic operational restrictions that are comparable to Part 103, Ultralight aircraft. In fact, Part 107 is more permissive because it also permits commercial flights for sUAS which are prohibited for ultralights.

After years of debate, Part 107 answered the "pilot vs operator" debate and formally established the new Remote Pilot certificate for individuals.

The UAS Office continues to provide assistance to the industry as it relates to Part 107. Understanding the desire of the industry to expand beyond the constraints, the FAA released a



series of performance-based standards as guidance for requesting waivers. I have participated in the collaborative work the FAA is doing with ASTM and Part 107 waiver process towards developing industry consensus-based standards that will improve the certification process. I am confident that the next eighteen months will continue to be positive for the community.

Issues with Part 107 as Published or Implemented

As mentioned earlier, there has been a long-term debate about whether the terms “operator” and “pilot” applied to UAS. The NPRM used operator and then updated to the internationally recognized “remote pilot” upon release. The problem remains that operators are not addressed or accommodated in the new rules. In legacy manned parlance, operators are the company that “operates” the aircraft, while pilots are the individuals who perform crew duties. As an example, “Eastern Airlines” is the operator and Bill is the pilot. The new rules changed the term, but not address the operator issues.

Initially we were unable to request a Part 107 waiver as an organization, as the online portal only supported an application tied to an individual’s Remote Pilot certificate and specific aircraftⁱ. I appreciate this as a preventative measure, stopping the commoditization of Part 107 waivers by corporations that only exist on paper; however, it does have an unintended effect on the company that actually owns and insures the sUA in question. I am happy to say that the FAA updated the portal to allow an organizational application within the first 30-days.

Removal of Military Competency from published Part 107

The final rule on the Operation and Certification of Small Unmanned Aircraft Systems removed a very key component of the proposed draft from the 2015 Notice of Proposed Rulemaking (NPRM). The NPRM proposed allowing pilots with military experience operating unmanned aircraft to take the recurrent knowledge test in lieu of the initial knowledge test in order to be eligible for an unmanned aircraft operator certificate with a small UAS rating.

In the final rule, the FAA stated that “The levels of training and certification for unmanned aircraft differ greatly between branches of the armed services, and therefore there is no consistent training the FAA can use as a comparison to its requirements in order to credit military UAS pilots.”ⁱⁱ. This conclusion is erroneous: while there are variations between services for UAS training, there is a minimum standard that the FAA could use as a common reference..

Chairmen of the Joint Chiefs of Staff Instruction (CJCSI) 3255.01, Joint Unmanned Aircraft Systems Minimum Training Standards, was first published on 17 July 2009 and last updated on 4 September 2012. CJCSI 3255.01ⁱⁱⁱ established a minimum set of UAS pilot requirements and standards for all Department of Defense UAS pilots.

In the final rule, the FAA also stated that “Further, many of the required knowledge areas for the part 107 initial knowledge test, such as airspace classification, airport operations, and radio communications, are not consistently covered in training across all branches of the U.S. military.”^{iv}



"The qualification standards meet or exceed existing manned aircraft Federal Aviation Administration (FAA) standards to facilitate UAS access into the National Airspace System (NAS)"

While many military remote pilots are officers with an aeronautical designation, the vast majority are enlisted soldiers, sailors, marines and airmen who do not meet the Part 61.73 requirements. The US Army trains 2000 new enlisted remote pilots annually, at both its Fort Huachuca and at remote locations worldwide*. The current rules discount these veterans, and potentially limit their entry into the job market.

A solution for this could be as simple as treating a military sUAS remote pilot in the same manner as a Part 61 manned pilot. This would still require them to complete the online course (Part 107 small Unmanned Aircraft Systems (sUAS), ALC-451) located within the FAA Safety Team (FAASafetyTeam) Web site (www.faasafety.gov) and receive a completion certificate. Any number of FAA representatives (ie, Flight Standards District Office, Designated Pilot Examiner or FAA CFI, which includes manned Certified Flight Instructors who do not hold a Remote Pilot certificate) could validate the veteran's records (ie, DD-214 and/or military training files) on the FAA Integrated Airmen Certificate and/or Rating Application (IACRA) system.

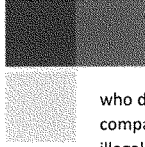
Enforcement actions of Part 107

At the beginning of this testimony, I briefly mentioned the "Wild West" mentality and desire for a regulatory structure that use of UAS that would be affordable for users and safe for communities on the ground and in the sky. I believe that Part 107 provides the latter, but still needs clear enforcement actions to contain the black market UAS service providers.

As an industry, we have a problem with misfeasance and malfeasance. Misfeasants perform legal acts improperly- this could be as simple as a someone who has a Remote Pilot certificate but registered their sUA recreationally and not for commercial use. Malfeasants are the outlaws and black marketeers who willfully refuse to follow the regulations- even if their flights would be authorized under Part 107.

Unfortunately, the list of both misfeasants and malfeasants include large corporations, small businesses and sole proprietors alike. The internet is full of illegal promotional videos, obviously flown over people, in close proximity to airports or beyond visual line of sight. My flight crews have encountered other subcontractors on a job site who were using consumer-grade sUAS without a Section 333 authorization. I have consulted about university faculty who were using Part 101 rules for funded research and couldn't understand why their clients were asking for a COA. I have spoken with numerous enthusiasts who entered the event photography business without understanding the FAA requirements.

My concern is twofold. First, there is a culture perception of premium for the cost of compliance that has deflated the market. My overhead is much greater than a black marketer



who does not have insurance, permits and bonds; even if our labor costs were the same, my company is at a disadvantage. Second, the public will not discriminate between a legal and illegal operations when the inevitable accident occurs. When you consider that 80% of all commercially registered sUAS are also the most popular consumer sUAS, this presents a significant potential problem for the industry.

“Droneport”

PACI has been involved in the development of the Eldorado Droneport in Boulder City, Nevada since the summer of 2015. I want to state that we are thankful for the positive support and assistance we are getting from UAS Office and Airports Division. However, during this process, we have encountered some issues as the regulatory structure does not address UAS activity on airports.

There is a need for additional regulatory improvements. The National Plan of Integrated Airport Systems 2015-2019 discussed a forecast of 7500 UAS within five years, and only summarized UAS activity over two pages^{vi}. Airports are categorized by the number of passenger boarding's or by tonnage of cargo- this metric does not work with the current limitations of UAS operation. UAS do not count towards the number of based aircraft, and there are no acceptable standards for traffic patterns for any size UAS.

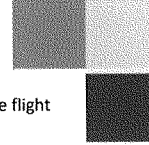
With the implementation of Part 107, the industry is now able to rapidly expand. Large corporations are now able to easily enact enterprise solutions nationwide. This will cause a shift from unscheduled to scheduled flights much like the early days of aviation. A good example of this shift is an Amazon distribution center delivering to a neighborhood mailbox- we are all roughly familiar with the time of day that each courier service delivers to our offices or homes.

Part of the issue stems from a preconceived notion of an airport that does not reflect the different types; airports include helipads and seaplane bases, and then grow into the larger, urban airports that we are more familiar with.

The most effective way for a community to realize the benefits of unmanned aircraft services is by developing or permitting the development of places where unmanned aircraft can land and takeoff. While droneports can be large and elaborate, most are not. In many situations, a wind sock on a grass area with clear approaches is sufficient to provide an effective and safe droneport.

This minimal facility may be adequate as a private use droneport, and may even suffice as the initial phase in the development of a public use droneport capable of serving the general aviation segment of the unmanned aircraft community. Once the daily activity exceeds 10 operations per day, exceeds thirty days in duration or occurs more than three days in a week, 14 CFR Part 157 requires 90-day notice for an airport.

I am frequently asked – “Why do you need a droneport? Can't you just operate from anywhere?”. My answer is threefold and directly related to safety:



- 1) We need operating approval as an airport in order to gain access to real-time flight information systems. Without operating approval or designation, we cannot participate in programs such as the Digital Notice and Awareness System (D-NAS) operated by Airmap and endorsed by the American Association of Airport Executives (AAAE)^{vii}. We cannot receive ADS-B from the FAA-contracted Harris Corporation that could be used to assist remote pilots in flight planning or operators in flight following.
- 2) We need to be depicted on aeronautical charts as an area of high UAS traffic. This depiction would provide manned pilots with notice that there is UAS activity and improve their situational awareness since Part 107 removed the need for NOTAMS for UAS operations. Operating approval as an airport would facilitate that change.
- 3) We need operating approval as an airport in order to protect the airspace around the property. Boulder City and the joint development intends to construct runways, taxiways and facilities on the Droneport for public use. Without the same long term assurances as any public airport receives, funding these developments through public-private partnerships is nearly impossible.

Next Steps

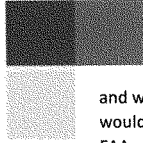
The FAA addresses aviation safety in three key areas: personnel, equipment, and operations. I would like to discuss our views on the future needs for UAS regulations.

While the Remote Pilot certificate for small UAS is a great start, we would like to encourage the FAA to develop the next step: UAS that are larger than 55lbs. We also recommend that the FAA use the CJCSI 3255 as a reference for the remote pilot certification for "not small" UAS as it was developed with the specific task of integrating UAS into the NAS.

The current focus has been on pilots. Much the same as in the manned aircraft sector, we need a repairman certificate for UAS. Part 107 places all responsibility on the remote pilot, yet the knowledge tests have minimal requirements for maintenance skills or knowledge. Simultaneously, the FAA recognizes that manufacturers do not have standardized requirements for maintenance, service and continued airworthiness.

We recommend a graduated rating similar to the Experimental/Amateur-Built Repairman Certificate^{viii} as the baseline for operations beyond Part 107. Unlike the 18-20 month course for Airframe and Powerplant Mechanics, the Experimental/Amateur-Built Repairman certificate requires proof that the applicant built the majority of the aircraft by themselves. Alternatively, the Light Sport Aircraft Repairman certificate only requires 3 weeks for completion and should be considered an acceptable minimum for UAS that exceed Part 107.

I would like to continue to encourage the FAA on supporting the droneport initiative. We have offered to partner with the FAA and use the Eldorado Droneport as a location for a potential Focus Area Pathfinder project. This project would require no funding from the FAA



and would be conducted in concert with a UAS Test Site and the UAS Center of Excellence. We would gladly share the information and practices gained through such an initiative with the FAA.

I would also ask the Subcommittee consider including a proposed definition of droneport into the regulatory structure, as the simplest method of remedying the current discrepancies related to scheduled UAS activity.

Droneport - An airport whose physical design characteristics, visual aids, navigation aids, and infrastructure are created to support safe and effective unmanned aircraft systems operations in and out of densely populated urban areas as well as to and from rural areas.

The FAA does not have the authority to prescribe point-of-sale registration for sUAS. I would ask that this Subcommittee consider engaging the Federal Trade Commission and require a transfer of registration at the time of sale for all UAS that are larger than .55lbs.

Due to the larger influx of international UAS manufacturers, I would also ask that the Subcommittee consider engaging Custom and Border Protection in ensuring the proper classification of these imports. Many UAS used in commercial operations are imported under the HTSUS classification under Chapter 95 as "Toys" or "Models". This may have an economic effect on the domestic manufacturing base in the future, and skews the Department of Commerce's Bureau of Industry and Security census. BIS is currently unable to accurately track the number of UAS imported into the US due to no tariff differentiation from toys.

Conclusion

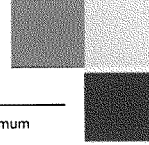
The approval and implementation of Part 107 was a watershed moment for UAS in the United States. The new rules provide a substantial foundation for small business to use as an entry point into the multimillion dollar UAS industry. Part 107 should be viewed as an outstanding success.

We look forward to another ten years of collaboration with the FAA. As with any new technology, there are growing pains for all stakeholders and we (at PACI) are patient enough to accept that. We are appreciative of the FAA for not conceding the safety of our National Airspace System to the pressure of large corporations and their lobbyists.

Thank you, and I look forward to your questions.

¹ Request a Waiver/Airspace Authorization, Small Unmanned Aircraft System (sUAS)
https://www.faa.gov/uas/request_waiver/

² Final Rule on the Operation and Certification of Small Unmanned Systems,
http://www.faa.gov/uas/media/RIN_2120-AJ60_Clean_Signed.pdf



ⁱⁱⁱ Chairmen of the Joint Chiefs of Staff Instruction (CJCSI) 3255.01, Joint Unmanned Aircraft Systems Minimum Training Standards, http://www.dtic.mil/cjcs_directives/cdata/unlimit/3255_01.pdf

^{iv} Final Rule on the Operation and Certification of Small Unmanned Systems, http://www.faa.gov/uas/media/RIN_2120-AJ60_Clean_Signed.pdf

^v UASTB largest UAS training center, 'pilots' unique mission By Amy Sunseri,

https://www.army.mil/article/39475/UASTB_largest_UAS_training_center___039_pilots___039_unique_mission

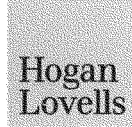
^{vi} Report to Congress, National Plan of Integrated Airport Systems 2015-2019

http://www.faa.gov/airports/planning_capacity/npias/reports/media/npias-2015-2019-report-narrative.pdf

^{vii} <https://www.airmap.com/airmap-and-aaae-launch-uas-notice-system-dnas/>

^{viii} FSIMS, CHAPTER 25. CERTIFICATE REPAIRMAN FOR EXPERIMENTAL AIRCRAFT, available at

http://fsims.faa.gov/WDocs/8300.10%20Airworthiness%20Insp%20Handbk/Volume%202/2_025_00.htm



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Statement of Lisa Ellman
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Hogan Lovells US LLP
Co-Executive Director, Commercial Drone Alliance

Before the United States House of Representatives Committee on Small Business
Subcommittee on Investigations, Oversight and Regulations

For the Committee's Hearing:
*"Opportunity Rising: the FAA's New Regulatory Framework for
Commercial Drone Operations"*

September 27, 2016

Chairman Hardy and Ranking Member Adams:

Thank you for inviting me to testify before the House Committee on Small Business and the Subcommittee on Investigations, Oversight and Regulations. It is an honor to speak with you today about the remarkable recent growth in the commercial unmanned aircraft industry, the exciting opportunities for small businesses across the country that were unleashed by Part 107 opening the skies to commercial Unmanned Aircraft Systems (UAS), or drones, and the challenges for the industry that remain.

I come here today with a unique understanding of UAS integration, as I have worked on these issues from both the private sector and the government side. From 2009-2014, I worked at the top levels of the Executive Branch, both at the White House and U.S. Department of Justice (DOJ), in various roles focusing on emerging technologies. Most recently, I led DOJ's effort to develop policy that would govern the use of UAS in the United States, and participated in the federal interagency process considering UAS-related policy issues. I now chair Hogan Lovells' UAS Practice, assisting businesses to succeed in the dynamic UAS marketplace. I also co-founded a nonprofit called the Commercial Drone Alliance to bring policymakers and innovators together to move the commercial UAS industry forward.

We are at an exciting time for innovation in our country. Technology has moved forward rapidly, and our nation's capabilities over the next few decades will be limited only by our collective imagination. Previously considered toys, UAS have emerged as "must-have"

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tools for industry and public agencies. UAS make tasks, from disaster response to farming to infrastructure inspection, safer and more efficient, enhancing American productivity. UAS are critical to the future of transportation and an exponential enabler of research and development.

Technology often moves more quickly than policy, and UAS are no different. But to ensure the success of the UAS industry, and balance that with consideration for the good of the American public, we need rules and laws that enable innovation while maintaining safety, privacy and security. From my government experience, I know how difficult a task this is. But to maintain America's competitive edge, it is critical that policy moves forward in a timely way.

Background: The UAS Market

The economic benefits the UAS market will provide are significant. Expert estimates vary, but the numbers are all large. A recent Teal Group Corporation study estimates civil UAS as a \$2.6B market in 2016, quadrupling to \$10.9 billion by 2025.¹ A recent PricewaterhouseCoopers report estimates the global market value of UAS-powered solutions at over \$127 billion.² Here in the United States, over the next decade and assuming the regulatory framework keeps pace, some predict that the domestic UAS industry will grow to be an \$82 billion market while creating more than 100,000 new jobs.³ And the FAA recently estimated that by 2020—just four years from now—there will be 11 million commercial UAS sold in our country.⁴

Even given these economic benefits, despite U.S. leadership in the broader technological revolution, the federal government has been playing catch-up on commercial UAS. Japan, for example, has been crop dusting with UAS for decades – and commercial

¹ Finnegan, Philip. *World Civil Unmanned Aerial Systems: Market Profile & Forecast*. Teal Group Corporation, 2016. Available at <https://dl.dropboxusercontent.com/u/1665888/TGCTOC/sample-WUASC2016.pdf>. Accessed September 22, 2016. This number represents an estimate of the "future worldwide market for civil government and commercial unmanned aerial vehicles."

² Michal Mazur et al., *Clarity From Above: PwC Global Report on the Commercial Applications of Drone Technology*, PwC Polska Sp, May 2016. Available at <http://www.pwc.pl/pl/pdf/clarity-from-above-pwc.pdf>. Accessed September 21, 2016. This number represents the "value of current business services and labour that have a high potential for replacement in the very near future by drone powered solutions."

³ *White House Fact Sheet: New Commitments to Accelerate the Safe Integration of Unmanned Aircraft Systems*. August 2, 2016. Available at <https://www.whitehouse.gov/the-press-office/2016/08/02/fact-sheet-new-commitments-accelerate-safe-integration-unmanned-aircraft>. Accessed September 21, 2016.

⁴ Cheryl Miner et al, *Final Rulemaking Regulatory Evaluation: Small Unmanned Aircraft Systems*, 14 CFR Part 107, U.S. Department of Transportation, Federal Aviation Administration, June 2016, page 155.

drones are routinely flown all over Canada, Australia and many other countries. Meanwhile, many U.S. companies that are driving UAS innovation have been forced to do so largely outside of our borders.

We have made great progress over the last few months, but it is important to keep the momentum going.

UAS Impact on Small Business

Before discussing the developing policy framework, it is important to note the critical role small businesses have played in the growth of the UAS industry. As is usually the case with new technologies and nascent industries, small business – which has always been the pride of our country and source of economic growth – is the engine driving commercial UAS adoption in the United States. Right now, a small business in Illinois is seeking to use UAS for disaster and emergency response. In California, a small company is designing UAS for cargo delivery. A small business in Michigan is enabling wind farm owners to track the health of their wind turbines with UAS. And this same type of activity is happening in towns and communities across the United States.

Moreover, the ability to use UAS has breathed new life into resource-constrained small businesses of all kinds. UAS make dangerous tasks safer, and expensive tasks cheaper. Local news broadcasters who cannot afford manned helicopters are now able to obtain aerial footage of major news events, helping Americans receive the news they want and need. Small-town realtors are now able to market and sell homes using unique aerial shots from UAS. And farmers can detect and mitigate disease in their crops with pinpoint precision from the air, making their products healthier, more consistent and more profitable, while also saving precious time and resources – without having to rely on more expensive manned aircraft.

UAS Policy Development

Given the many benefits of this technology, the broad integration of commercial UAS into the National Airspace represents an exceedingly exciting opportunity for our country. But innovation does not happen in a vacuum; we need the policy in place to enable it. While the possibilities for the UAS industry are great, there are safety, privacy and security issues that must be tackled. I confronted many of these issues during my time in the federal government. My interagency colleagues and I asked the first order questions: How do we take advantage of the many benefits of UAS, in a way that wins the public's trust? What does a fully integrated National Airspace System look like, and how can we keep it safe and secure?

In many ways, if we were to start over, it would make better sense to create a new regulatory framework that is focused on ensuring safety and preventing actual harms from very small vehicles that resemble toys and gadgets more than manned aircraft. The Federal Aviation Administration (FAA) does an excellent job of implementing its statutory mandate: keeping our National Airspace safe and secure. But as it is today, the government has essentially bolted the new small UAS regulations onto the old manned aviation regulatory structure. Meanwhile, a 5 pound UAS has almost nothing in common with a large manned aircraft. With some creativity, we should have drafted a different set of rules for UAS and other small vehicles that do not cite and relate back to manned aircraft regulations – rules that require companies to jump through legal hoops in order to obtain relief from those same manned aircraft regulations. It would be a cleaner approach, while still ensuring our safety, and we would not have the absurd results that burden industry with little benefit.

Update: Part 107 is Major Step Forward

Nevertheless, we are where we are – and this summer, the United States took some critical steps forward. After years of work by FAA and industry partners, just a few weeks ago, Part 107 of the Federal Aviation Regulations went into effect. For the first time, businesses are now broadly authorized to fly small UAS in the United States for commercial purposes. UAS operations that comply with the rule's flight restrictions – including generally traveling no higher than 400 feet, within visual line of sight, away from people and during daytime hours – can now benefit a range of industries in innovative ways.

This is welcome progress, and has finally opened the benefits of UAS to small businesses across the country. In just the first few weeks since Part 107 went into effect, 6,768 Remote Pilot Certificate Exams were taken, with a "pass" rate of 88 percent, and 14,909 applications have been submitted – with 10,996 of those processed by the FAA. Small businesses like Measure, Uplift Data Partners, and DataWing, UAS service providers for the industry, now have increased access to certificated pilots. And in the same time period, 552 waiver applications requesting the ability to fly outside the scope of the rule have been filed; 79 of them have been approved. With regulatory certainty, funding dollars are now able to flow into the industry.

In addition to the new rule, we have seen significant interest from the Executive Branch in keeping the commercial UAS adoption momentum going. The White House held its first workshop on commercial UAS just last month, where a broad range of commitments were made to move the industry forward. In May, industry and nonprofits agreed on a set of voluntary best practices for protecting privacy while operating commercial and private UAS as part of a process that was facilitated by the National Telecommunications

and Information Administration. And NASA has focused on moving its Unmanned Aircraft Traffic Management efforts forward, a critical component toward designing “highways in the sky.”

Challenges for the Commercial UAS Industry Remain

Yet while we have taken some crucial steps forward, challenges remain. There are still government-imposed roadblocks to commercial UAS operations in the United States. Congress can play an important role in clearing these roadblocks, whether through next year’s FAA Reauthorization process or by other means.

Indeed, the following items are critical to small businesses if we expect to keep America competitive in the global UAS industry:

Waiver Process. While the rule represents excellent progress overall, the operational limitations of Part 107 are actually quite strict; amongst other conditions, one must operate a UAS within visual line of sight, during daytime hours, and away from people. The ability for businesses to seek a waiver for operations beyond the scope of Part 107 is an appreciated step forward. However, it is critical that the process for obtaining waivers under Part 107 is streamlined. The process should greatly improve upon the process for applying for and receiving a Section 333 exemption – the special FAA license most commercial UAS operators must have received prior to August 29, 2016 in order to fly. That process moved at a snail’s pace, with some of the several thousand applications sitting in the FAA’s queue for over a year, and some never even receiving a response. The Part 107 waiver process must be user-friendly, clear and expeditious – moving at the speed of industry.

The Part 107 waiver itself must also provide meaningful relief for companies operating UAS in the real world. To take advantage of the safety and efficiency benefits of UAS, companies need to be able to fly in urban and suburban environments, where people are. To inspect pipelines and railroads, they need to be able to fly beyond visual line of sight. To respond to disasters, they need to be able to fly at night. Congress should help the FAA move beyond the current operating envelope so that it reflects a common sense view of the world. Regulations that are unduly strict will have the counter-effect of encouraging businesses to flout the rules; safety suffers as a result. The waiver process should enable real-world operations while protecting safety.

Additional Rulemakings. We need additional rules that broadly authorize safe flights above people, beyond visual line of sight and at night – and we need them soon. Otherwise, critical UAS operations that often must occur in these conditions, such as

disaster response, news gathering or time-sensitive agriculture operations, will be stalled. It is common sense that very small UAS ("micro-UAS") should be allowed to fly permissively; right now, a two pound UAS is treated the same as a 55 pound UAS. Just this incremental change would enable all sorts of beneficial applications.

As the FAA crafts additional rules, the agency should consider risk factors broadly; for example, the risks inherent in the dangerous tasks that UAS operations would replace must be part of its analysis. And for flights over people, the FAA should consider operational and technical mitigations in addition to kinetic energy; as the industry evolves, we have an excellent opportunity to incentivize innovation around parachutes, propeller guards and padding for vehicles to make them safer.

Enhanced Government-Industry Collaboration. From 2011-2013, I worked in the White House's Office of Science and Technology Policy and Office of Management and Budget to open up our federal government and bring about increased collaboration. I appreciate how difficult it can be for bureaucracies to change their ways; but I also know that transparency and collaboration are key to better government.

To properly capitalize on the possibilities ahead, innovators and policymakers must work more closely together – a process called "polivation." Innovators must help policymakers understand what is possible with the technology, while policymakers must create rules of the road that offer the best returns from UAS technology that will benefit everyone – while protecting Americans' safety and privacy.

We have seen great progress from the FAA in recent years. Just this month, the first meeting of the Drone Advisory Committee was convened, bringing together both large and small companies with policymakers to craft solutions for challenges facing the industry. But still, challenges remain. There needs to be greater government-industry collaboration at the working level. And we need to make it easier for everyone, including small businesses, to participate in the regulatory process. Big companies may be able to afford to take big bets on technology, but small businesses lack this luxury. In some cases, UAS represent a small company's entire business model, with employees' families and communities dependent on revenue from those businesses.

Whole-of-Government Approach to Integration. We must support a whole-of-government approach to enable the broader infrastructure for this industry to succeed: NASA is tackling critical issues through its Unmanned Aircraft Traffic Management efforts, and needs the resources necessary to do so. The FCC is considering spectrum issues. The FTC is hosting a workshop on UAS privacy issues. And there is more. It is important

that all interested agencies engage with the industry now, with a focus on finding solutions that enable commercial UAS integration safely and broadly – and in an expeditious way.

Industry Diversity. Congress must continue to support Small Business Administration programs that assist women and minority-owned small businesses. Along with two of my colleagues, I recently founded the Women of Commercial Drones organization to bring gender diversity to the growing UAS industry. Continued support for programs like these is critical.

Conclusion

The opportunities for the UAS industry are great. We have made excellent progress in recent months, and it is important to provide the federal government the support it needs to continue that momentum.

Notably, the work ahead is not just on the government side. The industry must do its part. That is why this summer, UAS industry associations (including the Commercial Drone Alliance) pledged to implement a broad educational effort around privacy best practices for users of UAS technology. The Alliance also committed to leading a broad effort to educate the American public on the integration of UAS into the National Airspace System, and to engage the UAS end-user community, NASA, and UAS UTM collaborators to further enable the acceptance of autonomy and UAS technology. And small businesses across the country are working every day to make UAS smart and safe.

We all must do our part. By keeping the dialogue open between innovative companies and government, small businesses that are doing new, interesting and life-saving work will be able to prosper – and in a way that wins the public's trust and keeps the public safe.

If we tackle these issues properly, we will soon regard commercial UAS as we do the phones we carry and rely on every day: tools that make us more efficient, productive, safer and more connected.

Thank you.

Lisa Ellman

Partner
Lisa.Ellman@hoganlovells.com
D (202) 637-6934



September 30, 2016

The Honorable Crescent Hardy
Chairman
House Small Business Subcommittee on
Investigations, Oversight and Regulations
U.S. House of Representatives
2361 Rayburn House Office Building
Washington, D.C. 20515

The Honorable Alma Adams
Ranking Member
House Small Business Subcommittee on
Investigations, Oversight and Regulations
U.S. House of Representatives
B343-C Rayburn House Office Building
Washington, D.C. 20515

Dear Chairman Hardy and Ranking Member Adams:

On behalf of DJI, I am writing to thank you for holding the recent hearing "*Opportunity Rising: The FAA's New Regulatory Framework for Commercial Drone Operations*." The title of this hearing could not be more apt: Drones are expanding opportunities for businesses across the U.S. economy, particularly small businesses. Tasks that used to require manned aircraft and a commensurate amount of capital – like aerial mapping, agricultural surveys, and commercial TV and film production, to name just a few – can now be accomplished using unmanned aircraft systems (UAS) for a fraction of the cost. This technology revolution is enabling the growth of small firms across the country.

The FAA's new rules will help accelerate this progress, by making it easier for small businesses to use UAS for commercial purposes. But "easier" is relative. The new rules are a significant improvement over the prior Section 333 exemption process. However, they fall short of the risk-based regulatory framework for the smallest and safest category of UAS that other countries have implemented. Adopting a "micro UAS" classification subject to risk-based safety and operational restrictions for this category would keep the U.S. regulatory framework consistent with our international peers, and let America's entrepreneurs devote more time to growing their small businesses and less time to red tape.

Under a "micro UAS" classification, regulatory compliance would be easy to promote and easy to achieve. People strive for compliance when rules make sense. However, overly burdensome requirements including pilot certification, aeronautical knowledge testing, traveling to test facilities, and re-testing every two years will create high barriers for low-risk users – including many small businesses. Australia, Canada, and Mexico are just a few of the countries that have embraced a micro UAS framework in their domestic regulations. Without drawing a distinction between 0 and 55 pounds, the U.S. will be far less innovative in its use of the safest form of this technology than peer countries and far less welcoming to entrepreneurs.

The FAA had the opportunity to adopt a "micro UAS" classification in its new rules, but declined to do so. Additionally, both the House and Senate included provisions regarding a "micro UAS" classification in their respective FAA authorization bills this Congress. While we are hopeful that the FAA will revisit this issue in the context of its forthcoming "flights over people" rulemaking, we believe that Congressional action is necessary for America's small businesses and other low-risk users to realize the benefits of a "micro UAS" classification sooner rather than later. We would welcome the opportunity to work with your Committee to advance this concept in legislation, or by establishing a dialogue between Congress and the FAA.

In closing, we thank you again for your leadership in holding the recent hearing and look forward to building on the positive track record of collaboration between our industry and your Committee in the future.

Sincerely,

Brendan Schulman
Vice President of Policy & Legal Affairs



Statement
of the
National Association of Mutual Insurance Companies
to the
United States House of Representatives
Committee on Small Business, Subcommittee on Investigations,
Oversight and Regulations
Hearing on
Opportunity Rising: the FAA's New Regulatory Framework for
Commercial Drone Operations
2360 Rayburn House Office Building
September 27, 2016

The National Association of Mutual Insurance Companies (NAMIC) is pleased to provide a statement designed to address the recent rulemaking of the Federal Aviation Administration (FAA) pertaining to the commercial use of unmanned aircraft systems (UAS). Specifically, whether the rulemaking has adequately addressed the many unanswered questions surrounding safety and privacy that need to be answered in order for the property/casualty insurance industry to effectively use, and write coverages applicable to, the commercial use of UAS.

NAMIC is the largest and most diverse property/casualty trade association in the country, with 1,400 member companies including regional and local mutual insurance companies on main streets across America and many of the country's largest national insurers. NAMIC members serve more than 135 million auto, home and business policyholders, with more than \$208 billion in premiums accounting for 48 percent of the automobile/homeowners market and 33 percent of the business insurance market.

This hearing is being held to enable the Subcommittee to better understand the final rule, its implementation, and other issues that must be addressed as the FAA works to safely integrate unmanned aircraft into the national airspace system.

NAMIC has been a leader with respect to UAS safety and privacy issues, submitting comments to the Federal Aviation Administration (FAA) on proposed UAS rules, publishing a white paper, testifying before Congress, and developing a Compendium Of State Laws And Proposed Legislation Related To Unmanned Aerial Systems/Drones for the National Telecommunications and Information Administration (NTIA) Multi-Stakeholder Meeting on Privacy, Transparency, and Accountability Regarding Commercial and Private UAS.

The development of recreational and commercial uses for unmanned aircraft systems is accelerating. More and more individuals and industry sectors – including the property/casualty insurance industry – are now using UAS, but regulations and laws in the U.S. have not kept up with that development. But a regulatory scheme which defines and accommodates commercial or recreational use of UAS has been slow to develop, resulting in a system of regulation-through-exemptions, and across states and localities, a hodgepodge of restrictions that are still being sorted out.

Insurance companies are a great example of how this innovation can benefit an industry. The property/casualty industry is currently exploring how UAS can help better appraise property, evaluate risk levels, and assess damage more quickly and accurately for policyholders. Before the FAA's recent rulemaking, a number of property/casualty insurance companies were granted Federal Aviation Administration (FAA) Section 333 exemptions, which provided our members the opportunity to better determine how UAS could serve policyholders in the normal course of business, or in disaster situations. Important tasks that formerly required employees to put

themselves in precarious positions - such as roof inspection, damage assessment, and disaster recovery - could now be accomplished using UAS to significantly reduce, if not eliminate, dangers to individuals and property.

With the rise of recreational UAS use coinciding with an increasing number of industry sectors employing UAS during their course of business, accidents are unavoidable. Property/casualty insurers, with their ability to pool risk and insure liability stemming from such mishaps, will be critical to the rise of the use of UAS, as auto insurers were critical to rapid growth of the individual use of the automobile. But in order to properly assess risk, the property/casualty industry must first be able to evaluate parameters of safety. Unfortunately, the absence of a regulatory scheme until recently has precluded both users of UAS and the property/casualty insurance industry from being able to properly and adequately gauge the level of safety associated with various applications of UAS. Therefore, insurers, who will be critical in eventually shaping the answers to the unresolved issues of safety and privacy, currently find it very difficult to accurately identify and price risk surrounding their use, hampering their ability to protect policyholders from potential liability.

NAMIC believes that the reasonable, effective, and efficient regulation of UAS is not only possible, but is necessary to clarify the parameters of safety and privacy, expose actual levels of risk, and offer proper protections from liability.

The FAA's New Regulatory Framework for Commercial Drone Operations

The Government Accountability Office proposed in 2008 that the United States develop a clear and common understanding of what is required to safely and routinely operate UAS in the National Airspace System. Congress specifically called for UASs' integration into the NAS by September 2015 when it enacted the FAA Modernization and Reform Act of 2012. The FAA then stitched together patchwork guidelines and interpretations upon which the agency based its jurisdiction and enforcement. All unmanned aircraft, according to the FAA, are aircraft within the definitions found in statute under title 49 of U.S. Code, section 40102(a)(6) and title 14 of the Code of Federal Regulations section 1.1. Section 40102(a)(6) defines an aircraft as "any contrivance invented, used, or designed to navigate or fly in the air" and FAA's regulations (14 C.F.R. § 1.1.) define an aircraft as "a device that is used or intended to be used for flight in the air.

Because an unmanned aircraft is a contrivance or device that is invented, used, and designed to fly in the air, the FAA took the position that an unmanned aircraft is an aircraft based on the unambiguous language in the FAA's statute and regulations. In June 2014, the FAA provided its interpretation that "any operation not conducted strictly for hobby or recreation purposes could not be operated under the special rule for model aircraft. Clearly, commercial operations would

not be hobby or recreation flights.” The FAA specified that flights in furtherance of a business, or incidental to a person’s business, would not be a hobby or recreation flight.

Section 333 of the FAA Modernization and Reform Act of 2012 granted the Secretary of Transportation and, therefore, the FAA authority to determine:

1. If an unmanned aircraft system, as a result of its size, weight, speed, operational capability, proximity to airports and populated areas, and operation within visual line-of-sight does not create a hazard to users of the NAS or the public or pose a threat to national security; and
2. Whether a certificate of waiver, certificate of authorization, or airworthiness certification under 49 USC § 44704 is required for the operation of unmanned aircraft systems identified under paragraph (1).

Section 333 exemptions were then granted after a two-step process. First, the FAA determined that the UAS would not pose a risk to those operating in the NAS, the general public, or national security, and it could be safely operated without an airworthiness certificate. The FAA then used its existing exemption authority to grant relief from FAA regulations that may apply. Once an exemption was granted, the applicant would then apply for a civil certificate of waiver or authorization permitting the operator to conduct the proposed operation. In petitioning for the relief afforded under Section 333, UAS operators would seek exemption from regulations applicable to the specific circumstances of their operations with which they believe they were unable to comply. The FAA published detailed guidance to people interested in submitting a petition for exemption to the FAA to operate UASs in the NAS.

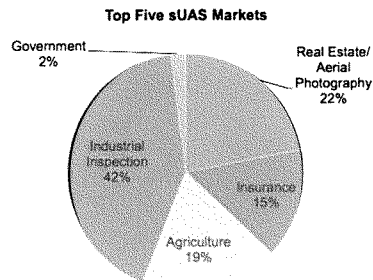
In considering further regulations, the FAA set up an Unmanned Aircraft Systems Registration Task Force Aviation Rulemaking Committee and a Micro Unmanned Aircraft Systems Aviation Rulemaking Committee. Participants in these advisory groups these groups were selected by the FAA.

On August 29, new FAA drone rules went into effect that allow for drones to legally be used for commercial purposes without going through the Section 333 approval process, provided that the drones are operated by a certified remote pilot in compliance with safety requirements. The rule does not apply to recreational users. Commercial operators of drones weighting no more than 55 pounds can operate under new Part 107 rules. Part 107 requires remote pilots-in-command to pass exams and be certified by the TSA, and then operate the drone under specific conditions. The drone cannot fly higher than 400 feet, faster than 100 mph, operate after daytime hours, over non-participants, or beyond the visual line of sight of the pilot or observer. These limitations can be waived by the FAA if the operator can prove through a waiver application process that the waived operation is safe.

The FAA's New Regulatory Framework for Commercial Drone Operations – Opportunities Missed

While we are supportive of the commitment and focus of the FAA in most of its development of commercial drone policy and regulation, NAMIC is seriously concerned that the FAA has afforded the users of drones too minimal of a role in the development of the new regulatory framework for commercial drone operations. The commercial users of drones – and particularly the small business users of drones – will make up a large portion, if not a majority, of commercial users of drones soon and these drone users have not been given an adequate voice in the development of commercial drone policy and regulation.

Who are the commercial drone users? According to the FAA's own forecast, within five years the largest commercial users of drones will be industrial inspectors, realtors and aerial photographers, agriculture, and insurance.



Source: FAA Forecast Report

These users have requested and have mostly been denied a voice in the FAA's integration of the public into development of commercial drone policy and regulations. There have been several important steps in which the FAA has looked for public input into the regulatory framework for commercial drone operations and in each case, the FAA generally excluded representatives from these industries, although they had asked to be included.

In each of the FAA's Unmanned Aircraft Systems Registration Task Force Aviation Rulemaking Committee, the Micro Unmanned Aircraft Systems Aviation Rulemaking Committee and in the newly formed Drone Advisory Committee, the representatives selected by the FAA represented industries and interest groups other than these FAA identified drone user groups, almost without exception. Representatives of these user groups had requested – formally and informally – that they be included in the FAA's policy and regulatory development and were denied. At this year's White House Office of Science and Technology Policy workshop on Drones and the Future of Aviation, two speakers did represent these drone groups and both lamented in their

statements the fact that users were generally not included in the FAA's policy and regulatory developments.

To be fair, FAA officials have been available to meet with these user groups and have given a modicum of deference to the comments of these users to formally proposed regulations. But the FAA has missed a tremendous opportunity to provide these user groups – which represent tens of thousands of small businesses – the same level and importance of participation that the FAA has afforded to the largest companies and interests.

NAMIC would encourage members of this committee to urge the FAA to consider more involvement from the commercial users of drones, particularly from those industries which have been identified as the biggest utilizers of this technology in the near future. Thank you for the opportunity to comment and we look forward to working with you on these important issues.

