STATEMENT OF MICHAEL P. HUERTA, ADMINISTRATOR, FEDERAL AVIATION ADMINISTRATION, BEFORE THE SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION, ON THE FUTURE OF UNMANNED AVIATION IN THE U.S. ECONOMY; SAFETY AND PRIVACY CONSIDERATIONS, JANUARY 15, 2014.

Chairman Rockefeller, Senator Thune, Members of the Committee:

Thank you for the opportunity to appear before you today to discuss unmanned aircraft systems (UAS). This emerging technology has been of great interest to state and federal government agencies, the public, and Congress for the past several years. Many new technologies have abstract benefits that are sometimes hard to succinctly describe or understand. UAS have applications that are not only readily understandable, but have the potential for broad benefits for virtually all Americans. From homeland security, emergency management and law enforcement, to food and package delivery, the potential uses for UAS technology are limitless. Realistically, neither the technical nor operational capabilities necessary exist today to implement the opportunities described by visionaries, but their promises for 21st century conveniences are compelling.

Meeting the challenges for realizing this potential will take a concerted effort and must achieve the requisite balance of maximizing the technological benefits, while maintaining safety and efficiency of the national airspace system (NAS). I would like to update you on the Federal Aviation Administration's (FAA) efforts as we work with government and industry to improve the technologies associated with UAS so that their integration into the NAS can be achieved in a safe and acceptable manner.

It is important to put the integration of UAS into the NAS in its proper context. The FAA has a history of accommodating new technology into the NAS safely and effectively. UAS is the latest

technology to be developed that FAA is working to integrate. While FAA's role in this effort is critical, it is limited to NAS safety and operational efficiency. As with other manned technologies, FAA's role does not extend to directing or otherwise limiting the underlying purposes for which the aircraft is used. Consequently, if a particular UAS operation does not impact the safety or efficiency of the NAS, it is beyond FAA's authority to enforce or otherwise correct that action. However, because FAA is uniquely positioned to gather information from our regulated entities, we are committed to sharing pertinent information to better enable the resolution of all issues affecting the use of UAS, even when they are not specifically safety-related.

For example, in November 2013, FAA released a privacy policy that will apply by contract to the UAS test sites that were selected on December 30, 2013. This will enable interested organizations and government partners to evaluate a broad range of information provided by the work done at the test sites and assess the potential impact of UAS operations on privacy concerns.

I am very interested in the selection of the test sites and the important work they will be doing, but before getting ahead of myself, I would like to set forth a basic framework for how the FAA will integrate unmanned aircraft into the NAS. In some ways, unmanned aircraft are inherently different from manned aircraft. They possess a wider operational range than manned aircraft, with a wider number of different physical and operational characteristics. Some UAS are the size of a fist, and fly at low altitudes and slow speeds. Others have glider-like bodies with the wing span of a 737 and can fly above 60,000 feet. Many can fly and hover longer than manned aircraft. Their common characteristic, distinguishing UAS from manned aircraft, is that their

pilot is on the ground and not on board the aircraft. This is a very new and different common denominator.

For the last two decades, the FAA has authorized the limited use of unmanned aircraft for important missions in the public interest. These include firefighting, disaster relief, search and rescue, law enforcement, border security, military training, and testing and evaluation. About 36 law enforcement agencies operate unmanned aircraft now under certificates of authorization. Universities also use unmanned aircraft for research into weather, agriculture, and industrial uses.

FAA estimates that we can expect 7,500 small unmanned aircraft in the NAS over the next five years, provided regulations and operational guidelines/policies are in place to handle them. We recognize that, while the expanded use of UAS presents great opportunities, integrating them also presents significant challenges. Operational issues, such as pilot training, must be addressed. Additionally, we need to make sure that unmanned aircraft can detect and avoid other aircraft and that they operate safely, even if they lose the link to the pilot in command. Likewise, manned aircraft must be able to detect these aircraft as well.

Our airspace system is not static and it is important for industry to understand that unmanned operations will evolve over time, just as they have over the past decade. Today, unmanned aircraft are used to keep our borders safe. They help with scientific research and environmental monitoring. They support law enforcement agencies and help state universities conduct research.

As we move forward, the use of small unmanned aircraft is likely to grow most quickly in civil commercial operations. These UAS are extremely versatile and have relatively low initial cost

and operating expenses. The FAA is working on a proposed rule governing the use of a wide range of smaller UAS, which, in accordance with the roadmap, we expect to issue this year.

FAA's long term goal of UAS integration will rely on the test sites to answer key questions and provide solutions to the issues noted above, as well as how they will interface with the air traffic control system. This information will help the FAA to develop regulations and operational procedures for future civil commercial use of UAS in the NAS.

Last year, the FAA, often in consultation with other key government partners and industry stakeholders, issued a number of key documents intended to assist in defining parameters to safely integrate these very diverse systems into the world's most complex airspace. The Integration of Civil UAS in the NAS Roadmap outlines, within a broad timeline, the tasks and considerations needed to enable UAS integration into the NAS. The five year Roadmap, updated annually, provides stakeholders with proposed agency actions to assist with their planning and development. One concrete achievement facilitated by the roadmap took place in September 2013 when the first commercial flight of an unmanned aircraft took place in the skies above the Arctic Circle. A Scan-Eagle completed a 36 minute flight to view marine mammals and survey ice. There are hopes that UAS can be used to meet environmental and safety requirements in the Artic. The flight was coordinated by Insitu (the UAS manufacturer), Conoco Phillips, and other federal and international agencies. The Arctic region is the only area to date where we have authorized the use of small unmanned aircraft for commercial purposes.

The UAS Comprehensive Plan was drafted by the Joint Planning and Development Office (JPDO) in coordination with JPDO Board participants from the Departments of Defense (DOD), Commerce (DOC), Homeland Security (DHS), the National Aeronautics and Space

Administration (NASA) and the FAA. It is a document that considers UAS issues beyond 2015, including technologies necessary for safe and routine operation of civil UAS and the establishment of a process to inform FAA rulemaking projects related to certification, flight standards and air traffic requirements. The Comprehensive Plan details work that has been accomplished, along with future efforts needed to achieve safe integration of UAS into the NAS. It sets overarching, interagency goals, objectives, and approaches to achieving integration. Each partner agency will work to achieve these national goals and may develop agency-specific plans that are aligned to the national goals and objectives.

The safe integration of UAS in the NAS will be facilitated by new technologies being deployed in the NAS as part of NextGen. The NAS Voice System will allow unmanned aircraft pilots to communicate directly with the air traffic controllers – a key requirement in integration. Safe integration will lead us from today's need for accommodation of UAS through individual approvals to a time when unmanned aircraft can "file and fly" in the NextGen environment.

With respect to another important issue for UAS development, in November 2013, FAA also released a privacy policy that applies to the UAS test sites. This policy requires operators to comply with all local, state and federal laws concerning privacy and civil liberties. FAA is requiring the test site operators to create a privacy policy that is available to the public. The test site operator must require anyone operating unmanned aircraft at the site to have a written plan for how they will use and retain any test data acquired. On a broader level, agencies across the government are coming together to work on privacy issues that may arise with the increasing use of unmanned aircraft beyond these test sites. Ensuring that UAS integration does not erode individuals' privacy is a goal supported by both government and industry.

This brings me to the announcement of the selection of the test sites. FAA received 25 applications from 24 states, so I was quite pleased with the depth and range of the proposals we reviewed. In selecting the sites, FAA considered many factors. We made a concerted effort to pick sites that reflected both geographic and climactic diversity. We also took into consideration the location of ground infrastructure. We looked at the type of research that would happen at each site and the aviation experience of the applicants, as well as the type and volume of aircraft that fly near the sites. Our research goals are focused on (1) gathering system safety data, (2) aircraft certification, (3) command and control link issues, (4) control station layout and certification criteria, (5) ground and airborne detect and avoid capabilities, and (6) impacts on affected populations and the environment.

The following test sites were selected by the FAA, after consultation with DOD and NASA:

- **University of Alaska.** The University of Alaska proposal contained a diverse set of test site range locations in seven climatic zones as well as geographic diversity with test site range locations in Hawaii and Oregon. The research plan includes the development of a set of standards for unmanned aircraft categories, state monitoring and navigation. Alaska also plans to work on safety standards for UAS operations.

- **State of Nevada.** Nevada's project objectives concentrate on UAS standards and operations as well as operator standards and certification requirements. The test site's research will also include a concentrated look at how air traffic control procedures will evolve with the introduction of UAS into the civil environment and how these aircraft will be integrated with NextGen. Nevada's selection contributes to geographic diversity.

- **New York's Griffiss International Airport.** Griffiss International plans to work on developing test and evaluation as well as verification and validation processes under FAA safety oversight. The test site also plans to focus its research on sense and avoid capabilities for UAS and its sites will aide in researching the complexities of integrating UAS into the congested, northeast airspace.

- **North Dakota Department of Commerce.** North Dakota plans to develop UAS airworthiness essential data and validate high reliability link technology. This test site will also conduct human factors research. North Dakota's application was the only one to offer a test range in the Temperate (continental) climate zone and included a variety of different airspace which will benefit multiple users.

- **Texas A&M University – Corpus Christi.** Texas A&M plans to develop system safety requirements for UAS vehicles and operations with a goal of protocols and procedures for airworthiness testing. The selection of Texas A&M contributes to geographic and climatic diversity.

- **Virginia Polytechnic Institute and State University (Virginia Tech).** Virginia Tech plans to conduct UAS failure mode testing and identify and evaluate operational and technical risks areas. This proposal includes test site range locations in both Virginia and New Jersey.

As required by Congress, we expect the first test site to be operational within 180 days of the December 30, 2013, announcement and that the test sites will continue to operate until at least February 2017.

As I noted at the outset, the FAA has successfully brought new technology into the nation's aviation system for more than 50 years, and I have no doubt that we will do the same with unmanned aircraft. The announcements of the UAS Roadmap, the Comprehensive Plan, the test site privacy policy and the test site selections are all concrete steps in support of an emerging technology that has extraordinary potential. We have the safest aviation system in the world, and our goal is to introduce this new and important technology while still maintaining safety as our highest priority.

We are cognizant of the goals that have been set by Congress for us to integrate UAS into the NAS. We will meet these goals with the collective technological and creative innovations of our government and industry colleagues.

This concludes my statement. I will be happy to answer your questions at this time.