

NTIA WORKING GROUP ON UAS: POSITIVE SOCIETAL BENEFITS

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The purpose of this document is to catalog the benefits of Unmanned Aircraft Systems (“UAS”) as described by the participants in the NTIA’s Multistakeholder Process. We encourage participants to add information to this document at any time. Please email all submissions to John "JB" Byrd (jbyrd@jmpa.us).

The benefits of commercial and private UAS are substantial. Technology has moved forward rapidly, and what used to be considered toys are quickly becoming powerful commercial tools that provide enormous benefits in terms of safety and efficiency. UAS integration is estimated to have an \$82 billion economic impact on the U.S. over the next 10 years—with 100,000 new jobs created. Whether UAS are performing search and rescue missions, helping farmers grow better crops in a more sustainable manner, inspecting power lines and cell towers, gathering news and enhancing the public’s access to information, performing aerial photography to sell real estate, surveying and mapping areas for stewardship decisions and public policy, delivering medicine to rural locations, providing wireless internet, enhancing construction site safety, or more—society is only just beginning to realize the full potential of UAS. Indeed, the demand for UAS for business purposes has been far-reaching, and continues to grow. UAS technology is already bringing substantial benefits to people’s daily lives, including cheaper goods, innovative services, safer infrastructure, and greater economic activity. Inevitably, creative minds will devise many more UAS uses that will save lives, save money and make our society more productive.

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American Farm Bureau Federation (AFBF)

For farmers using a drone as a service to enhance crop source, their return on investment is \$12 per acre for corn, \$2.60 per acre for soybeans, and \$2.30 per acre for wheat. (www.measure.aero/wp-content/uploads/2015/07/AFBF-Fact-Sheet.pdf).

Farm Bureau sees the benefit of UAS through their ability to provide detailed scouting information on weed emergence, insect infestations and potential nutrient shortages. This valuable information allows the farmer to catch these threats before they develop into significant and catastrophic problems. By addressing threats quickly, the farmer has a greater likelihood of being able to respond appropriately so as to optimize yields. The imagery from UAS also allows the farmer to spot-treat sections of the fields as opposed to watering or spraying the entire field. The quicker a farmer can discover a potential threat, the quicker the farmer can address the issue. Images from UAS allow the farmer to identify the specific location where a specific treatment –be it fertilizer, water, pesticides or herbicides—is necessary; in doing so, the farmer can eliminate the need to use these applications more broadly across the entire field. By spot-treating threats to the crop, the farmer not only lowers the cost of treatment but also has the potential of lowering the environmental impact by minimizing application.

www.commerce.senate.gov/public/_cache/files/ad204b8f-5d60-4d65-a8c0-ae324e466eae/49E67224784E92E457429CEE781E434.drones-commerce15-0317.pdf

Association for Unmanned Vehicle Systems International (AUVSI)

From inspecting utility infrastructure and surveying bridges to filming television shows and providing farmers with multispectral surveys of their crops, the applications of UAS are virtually limitless and they enable researchers, public entities and businesses to do things previously impossible.

http://judiciary.house.gov/_cache/files/77b560f1-3df2-4c33-a987-bc20067cc09f/09.10.15-wynne-testimony.pdf

Cognizant

Drones have the potential to significantly change the way property adjusting is performed. Easy portability, navigation and the ability to take high-resolution videos and photos make drones the ideal solution for supplementing claims adjudication, since adjusters would no longer need to climb dangerous ladders with a point-and-shoot camera in one hand and a notepad in the other... As part of property and liability risk assessments, risk engineers travel from one location to another to conduct risk-assessment surveys, gather information, and produce risk assessment reports for underwriters and clients... With the availability of drones, a generalist, rather than a specialist, can be sent to the field to assess risk. The generalist can easily navigate the drone through the property and capture videos and photos. Voice dictations can serve as notes, which help create accurate and timely reports. Drones also enable multiple specialists to actively participate in the survey, from anywhere... Drones can accelerate claims adjudication. Given their portability and their ability to quickly take videos and photos using latitudinal and longitudinal coordinates, drones can reduce claims settlement time and thereby improve the customer experience... Drones can also be used effectively in crop insurance — not only to determine the actual cultivatable land, but also during the claims process to understand the extent of loss and the actual yield.

www.cognizant.com/InsightsWhitepapers/drones-the-insurance-industry's-next-game-changer-codex1019.pdf

Consumer Technology Association (CTA)

[Wind Turbine Inspection](#). Researchers estimate that there will be a high demand for wind turbine inspection. Drones are particularly suited to this application because they significantly mitigate the safety risks inherent in ground-based inspections. According to [Navigant Research](#), the “cumulative global revenue for wind turbine UAV sales and inspection services is expected to reach nearly \$6 billion by 2024.” Trade magazines [have already been hyping the rise of wind turbine repair bots](#) like AutoCopter—large, sturdy drones that can ascend quickly and observe the system in HD video. And companies like [Aibotix are marketing its drones](#) specifically to wind turbine companies.

[Cellular Tower Inspection](#). Every year there are several deaths related to cell tower inspection. Drones can mitigate this risk by entirely removing the need to climb the tower. With sensor suites, drones can also measure signal strength of antennas and other electromagnetic characteristics.

[First-person Drone Racing](#). Self-organizing clubs in the US and UK are popularizing the sport of drone racing from a first-person view, which combines TV goggles with onboard cameras to create a unique sporting experience.

[Consumer/Recreational Photography](http://dronelife.com/product-filter?field_dollars_value=1000&sort_bef_combine=field_dollars_value+DESC&field_feature3_tid[]=52). The proliferation of products (see, for example: [http://dronelife.com/product-filter?field_dollars_value=1000&sort_bef_combine=field_dollars_value+DESC&field_feature3_tid\[\]=52](http://dronelife.com/product-filter?field_dollars_value=1000&sort_bef_combine=field_dollars_value+DESC&field_feature3_tid[]=52)) for consumer aerial photography demonstrates that there is a strong demand for new ways to capture all kinds of images.

CTIA – The Wireless Association

UAS will provide significant commercial and societal benefits. UAS provide greater operational flexibility and lower capital and operating costs, which make them a potentially transformative technology, offering wide-ranging benefits. The development and deployment of UAS has already begun to provide efficiencies and new capabilities in numerous sectors: communications, infrastructure inspection, agriculture, package delivery, recreation, news and entertainment, disaster response, and rescue operations. (www.ntia.doc.gov/files/ntia/ctia_comment.pdf)

Information Technology and Innovation Foundation (ITIF)

UAS can be used for a wide variety of commercial and private purposes, including aerial photography, package delivery, farm management, and the provision of Internet service. ... The integration of UAS into the national airspace holds the potential to usher in a new wave of innovation, allowing many different stakeholders to increase efficiency in a variety of sectors, including transportation, healthcare, law enforcement, telecommunications, energy, the creative arts, and agriculture. UAS technology could bring incredible benefits to the daily lives of U.S. citizens, including cheaper goods, innovative services, safer infrastructure, and greater economic activity. (www.ntia.doc.gov/files/ntia/itif_04202015.pdf)

International Association of Amusement Parks and Attractions (IAAPA)

In brief, IAAPA supports regulations that would allow of UAS for ride inspections. (www.ntia.doc.gov/files/ntia/iaapa_04202015.pdf)

MAPPS - An Association of Photogrammetry, Mapping and Geospatial Firms

The geospatial field is a \$73 billion market that drives more than \$1 trillion in economic activity. It is estimated that more than 500,000 American jobs are related to the collection, storage and dissemination of geospatial data, and another 5.3 million workers utilize such data. As much as 90 percent of government information has a geospatial information component and up to 80 percent of the information managed by business is connected to a specific location. Geospatial technology has been identified by the Department of Labor as one of just fourteen high growth sectors of the United States workforce projected to add substantial numbers of new jobs to the economy or affect the growth of other industries or where there are existing or emerging businesses being transformed by technology and innovation requiring new skills sets for workers to prepare to take advantage of new and increasing job opportunities in high-growth, high-demand, and economically vital sectors of the American economy. ... geospatial data is essential to E911 emergency response and dispatching of police personnel, fire trucks, emergency medical technicians, and ambulances; • geospatial data is utilized in precision agriculture to assist farmers with maximizing crop yields, minimizing non-source point pollution into America's lakes, streams, and rivers; • geospatial data is the underpinning for topographic mapping used in hunting, fishing, hiking, skiing and other recreational activities; • geospatial data is used for management of storm-water runoff

and mapping of impervious surfaces, flood plain mapping, and equitable assessment of local property taxes levied and collected by municipalities; geospatial data is used in a variety of applications by all levels of government on a daily basis, such as mapping to provide for zoning and comprehensive planning; efficient routing of trash collection trucks; safe, energy-efficient, and time-saving routing of school buses; • the timely acquisition of geospatial data is critical to assessment, realtime decision making, and mitigation during and immediately following both natural and anthropogenic disasters, including earthquakes, tornados, blizzards, floods, volcanic eruptions, wildfires hurricanes, infrastructure disasters including collapsed buildings, bridges and dams, ruptured pipelines, various types of terrorist incidents and in emergency “blue tarp” surveys to support post-disaster response; • geospatial data is the foundation to engineering design and construction of wide range of infrastructure improvements, including roads, water, electric, fiber-optic and other utilities; • geospatial data is routinely integrated into GPS and navigation systems, on-board vehicles and handheld devices that are so popular among consumers today; • geospatial data is essential to the Census and to establishment of electoral districts for municipal, state legislative, or Congressional representation; • Congress and government agencies are increasingly reliant upon geospatial imagery and data for the management of natural resources, economic development, the management, adjudication, and prevention of future disruptions in the home mortgage system, the development and implementation of a smart energy grid, the deployment of universal domestic broadband service, the management of Federal real property assets, emergency preparedness and response, homeland security, the delivery of efficient health care and other services provided, financed, or regulated by the Federal Government, measuring, monitoring, verifying and validating the effects of climatic and environmental phenomena, and the maintenance, rehabilitation, and enhancement of public works, transportation, and other infrastructure of the United States; • geospatial data is derived from images and data collected from a variety of airborne and spaceborne platforms, as well as other mobile and terrestrial-based acquisition systems; and • geospatial imagery and data is regularly and historically collected, utilized and applied by companies engaged in the free market commerce of the United States and by government authorities operating within the safeguards, rights and framework established by the Fourth and Fourteenth amendments to the Constitution of the United States.

www.ntia.doc.gov/files/ntia/mapps_comments_04202015.pdf

Motion Picture Association of America (MPAA)

Not only will continued development of sUAS make aerial photography even safer and help tell stories in exciting new ways, it will also help start generating the economic benefits that the technology can bring.

www.ntia.doc.gov/files/ntia/mpaa_comments_0420-2015.pdf

National Association of Broadcasters (NAB)

...UAS have the potential to enhance the public’s access to information through compelling and previously inaccessible photos and video. UAS particularly should improve news coverage of emergency situations to the benefit of the general public and government first responders, who both routinely turn to breaking news accounts for information during emergencies. UAS also will generate a number of other benefits for the media industry, including smaller news organizations previously unable to utilize aerial newsgathering, by reducing the costs of aerial photography and by eliminating certain safety concerns. ... The public stands to benefit enormously from journalists’ use of UAS. UAS have the currently-unrealized potential to facilitate better and more cost-efficient access to significant news events. Specifically, UAS

have the ability to capture striking images and video, offering vantage points that previously only could be obtained by manned aircraft at far greater cost. Integrating UAS into the national airspace also would allow the media to deliver enhanced reporting to the public in a manner considerably safer than today's aerial newsgathering. For these reasons, news organizations and journalists eagerly anticipate incorporating UAS among the tools they use for newsgathering. The significance of photos and video in newsgathering is self-evident. Journalists use both mediums to tell stories that inform, educate and sometimes even bring about social change. Photographs and video add context to a story, providing rich illustrations of details such as the scale of crowds at a political protest or the impact of natural disasters, among others. Indeed, the information provided through visual images may be particularly important during emergencies. Audiences are naturally attracted to – and today expect – news stories to be accompanied by compelling visual content. (www.ntia.doc.gov/files/ntia/nab_04202015.pdf)

National Association of Mutual Insurance Companies (NAMIC)

Our members are interested in UAS use for insurance business purposes and our member's policyholders are interested in obtaining insurance coverage for UAS use.

(www.ntia.doc.gov/files/ntia/namic_20150420.pdf)

National Association of REALTORS (NAR)

The applications for use of UAS technology in real estate are plentiful and encompass a variety of activities. The images and videos obtained through using UAS technology are the next step in consumer information for the digital age. A residential real estate practitioner can use a video or images obtained through UAS technology to create a robust web-based listing that can be viewed by potential purchasers. Buyers can see the interior and exterior of the home, and views afforded by different vantage points on the property previously difficult or too expensive to access for photographs. The aerial imagery brings a new level of sophistication and accessibility to the images and information that is available to both the real estate practitioner and his or her clients. This is an incredible tool for potential homeowners in several common situations such as moving to a different city, buying a second home, or trying to streamline the research process necessary to buy a new home. Being able to easily view the information obtained through the use of UAS technology will help better inform the consumer. Just as digital photography made it easier to create high-quality, affordable images that are listing-ready, real estate practitioner want to use UAS technology to take their listings into the next level in technical creativity and quality. ... The same benefits also apply to land sales. Real estate practitioners often work on deals with properties that are hundreds or thousands of acres of farmland, timber, or undeveloped land. Potential buyers can see the topography, geography, hydrogeology features, as well as examine what plants are growing and what animals live on the property. Spending a few minutes looking at the images collected from an UAS is more efficient and safer than spending hours or days driving around a property or even flying above it in a chartered plane or helicopter. Any consumer making a real estate purchase or entering into a lease can benefit from the images obtained by using an UAS. The images are another tool for a real estate professional to use to help a consumer make an informed decision about the 3 property he or she is considering purchasing. UAS-obtained images are a cost-effective way to get more information to the consumer, when compared with previous methods for aerial photography such as a helicopter or small airplane. Just like online listings and 360 degree virtual tours, UAS-obtained imagery is a further advancement of technology that puts brokers and agents in a better position to serve their clients, and the

consumers in a better place to make an informed decision.
(www.ntia.doc.gov/files/ntia/nar_comments_04202015.pdf)

National Association of Tower Erectors (NATE)

The commercial availability and deployment of UAS has the potential to complement and enhance the safety and well-being of communication tower workers who climb towers. UAS use will in some instances minimize the risks associated with climber fatigue, weather, and distractions, while reducing repetitive stress injuries. At the same time, UAS's have and will continue to become an asset in multiple facets of the telecommunications industry, with the added benefits of cutting costs and promoting efficiency while assisting with tower inspections and site surveys. As a result, UAS deployment will enhance our nation's vital communications capabilities. As a demonstration of NATE's abiding interest in this technology, the Association recently created a UAS Committee; its members include telecommunications Subject Matter Experts and licensed pilots, who lend considerable experience and expertise in the proper use of UAS's within our industry, while adhering to the rules and regulations already set by the FAA (<http://natehome.com/2015/11/09/nate-statement-on-positive-societal-benefits-of-unmanned-aerial-systems/>).

National Society of Professional Surveyors (NSPS)

NSPS strongly supports the safe integration of commercial unmanned aircraft systems (UAS) into the National Air Space (NAS). UAS presents an extraordinary opportunity for utilization by surveyors to provide services to contribute to public health, safety, and welfare, and enhance the quality of life of all Americans, foster economic growth, increase the efficiency of surveying activities, and create business opportunities for the surveying profession. Geospatial data is essential to commercial and governmental activities, the collection, storage and use of which can and should continue to be permitted and encouraged for the benefit of the citizens of the United States. Geospatial data is derived from images and data collected from a variety of manned and unmanned airborne platforms, satellites, as well as other mobile and terrestrial-based acquisition systems. (www.regulations.gov/#!documentDetail;D=FAA-2015-0150-3901)

New America Foundation (NAF)

The New America Foundation released a report outlining how transformative aerial and satellite mapping can be in lowering the cost and complexity of defining and maintaining property rights, as well as resolving entrenched conflicts and systematically empowering individuals and communities around the world. UAVs hold out the promise of even lower costs and easier use in defining and maintaining property rights. (<http://drones.newamerica.org/primer/DronesAndAerialObservation.pdf>)

Newspaper Association of America (NAA)

UAS are an important tool for media organizations that allow journalists to cover news stories such as natural disasters and important public events in a safe and cost-effective manner. ... UAS have the potential to revolutionize newsgathering by providing greater access to newsworthy events. Media organizations could use drones to cover events such as natural disasters, riots, and protests. Compared to alternatives such as helicopters, drones often can capture higher-quality images and video at a lower cost.

These efficiencies are crucial for smaller news organizations with limited resources. UAS also allow the media to cover events such as forest fires more safely. (www.ntia.doc.gov/files/ntia/naa_04202015.pdf)

Property Drone Consortium (PDC)

The PDC represents companies in the insurance, roofing as well as construction industries that rely on structural inspection for safe and reliable continued operations. Many positive societal benefits of UAS can be envisioned in these industries – with UAS being able to safely undertake tasks that are of great use to humanity, but difficult or dangerous for humans to access. The ability to simply and accurately understand a property is critical to many sectors. Individuals, homes, insurance, and safety all benefit from UAS access professionally. The PDC recognizes that UAS benefits are not confined to just these industries, but offer a multitude of benefits to agriculture, infrastructure, emergency management, and across the whole scope of property assessment.

One potential use of UAS in pre-catastrophe applications is for structural inspection. Site visits often present hazards to the inspectors – climbing a roof to assess roof damage can result in falls with serious injuries and death. The UAS will keep these inspectors out of harms way. They will further be able to access more targets in a given day helping the populace as a whole.

While aerial imagery collected from manned aircraft and helicopters can provide some level of visual detailing of a roof or other structure, it is often expensive, not of sufficient resolution or temporally viable for access.

The use of UAS for such inspections can reduce cost, as well as reduced probability of injury – at a faster turnaround.

An electric utility could examine its assets such as poles and look for encroachments that could pose hazards, such as tree branches that could bring down wires in high winds.

Engineers could prepare and identify infrastructure such as bridges, levees or dams that need attention in order to withstand a severe event.

Emergency Operations Centers may be able to cost effectively have access to very current imagery of their entire jurisdiction and all critical areas.

UAS could potentially save lives when an impending catastrophic situation exists. In instances of severe weather, such as tornados, UAS may one day be able to be in the air in relatively close proximity to a tornado for transmission of real-time data to emergency operations centers and meteorologists on the ground. Again enable the populace with the best and most current content to understand their personal and property risk.

In the case of wildfires, where it may be too dangerous for manned aircraft to gather images and data regarding the path of a fire, a UAS could provide detailed imagery, video and life-saving information to firefighters on the ground below. That data and imagery could allow them to accurately and strategically set the proper fire breaks and position resources in the right locations to stop the fire and save homes and lives.

The potential exists with UAS, in coordination with manned aircraft for it to get into the airspace over a disaster-stricken area rapidly. This means that emergency responders can efficiently allocate resources, determine if there is a need to recruit additional resources and identify access points and areas in need of more immediate response.

The impact goes beyond initial emergency response. Data and imagery gathered by the UAS post-event will aid insurance companies in determining whether to call a CAT without waiting to rely on feedback from a boots-on-the-ground team conducting physical inspections. This means that homeowners and business owners will have faster resolution of claims through immediate aerial inspection of damage.

These are just a few examples the PDC envisions as to how UAS can provide tremendous societal benefit – undertaking work that is dangerous for or inaccessible to humans.

<http://propertydrone.org/docs/Property-Drone-Consortium-Societal-Benefits.pdf>

Small UAV Coalition

Small UAVs will provide major economic, public safety, environmental, and other benefits to U.S. consumers and businesses. ... The Presidential Memorandum states that these technologies "may play a transformative role in fields as diverse as urban infrastructure management, farming, public safety, coastal security, military training, search and rescue, and disaster response." ... Participants in this developing industry produce benefits such as obtaining information for journalists and cinematography; making timely deliveries, including to remote areas, and in a manner that reduces surface road congestion and reduces wear-and-tear on our nation's infrastructure, of a host of goods that may add enjoyment, or could save and improve lives, including medicine and life-saving supplies.⁹ UAVs can be used to provide valuable communications tools, produce new, accurate and up-to-date maps of many kinds, assist with fanning, and help manage fish and wildlife. They can be used to spot and sometimes even fix a multitude of infrastructure problems, affecting bridges, pipelines, wind turbines, mines, cell towers, roads, etc. They may be able to rapidly, systematically and effectively plant trees over large areas, and produce critical environmental information. UAVs can quickly and safely locate injured persons or others needing help, track fires, and survey disaster damage, as well as speed insurance assessments of damage to foster more rapid recovery. (www.ntia.doc.gov/files/ntia/small_uav_coalition.pdf)

Wisconsin Legislature (12 cosigners)

Surveying and mapping businesses need the ability to fly over areas and where infrastructure and people exist. For example, mapping:

- Parcels for infill development such as industrial parks.
- Environmental remediation of construction sites over time.
- Corridors for telecommunications and utility lines.
- Flood modeling including: bridges, levees, topography.
- Industrial plans for energy generation and distribution.

... The opportunity exists for UAS technology to provide significant economic and societal benefits. The private sector is poised to fully participate in the development and implementation of this emerging technology.

http://c.ymcdn.com/sites/www.mapps.org/resource/resmgr/Docs/WISateLegislature_Letter_to.pdf

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