BEFORE THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

In the Matter of	)	
	)	
Safe and Secure Operations of Small Unmanned Aircraft Systems	)	Docket No. FAA-2018-1086
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COMMENTS OF THE AMERICAN PUBLIC POWER ASSOCIATION, EDISON ELECTRIC INSTITUTE, AND NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

The American Public Power Association ("APPA"), Edison Electric Institute ("EEI"), and National Rural Electric Cooperative Association ("NRECA") welcome the opportunity to submit comments on the *Safe and Secure Operations of Small Unmanned Aircraft Systems Advanced Notice of Proposed Rulemaking* ("ANPRM") issued by the Federal Aviation Administration's ("FAA").[1] Collectively, our organizations represent the needs and interests of the electric utilities that provide electricity to almost every home, business, and building in the nation. Small Unmanned Aircraft Systems ("UAS") continue to play an important role in our members' ability to ensure the safety, security, and reliability of the nation's electric grid.

We appreciate the FAA's continuing efforts to integrate small UAS into the National Airspace System and look forward to working with the FAA to create a regulatory landscape which will allow this technology to reach its full potential while ensuring public safety. The comments below explain the importance of electric reliability, the role small UAS currently play

[1] Safe and Secure Operations of Small Unmanned Aircraft Systems, 84 FR 3732 (Feb. 13, 2019) (Docket No. FAA-2018-1086).

in meeting this demand, and how changes to the current regulations can enable more useful deployment of UAS technology by the electric industry.

I. Background

APPA is the voice of not-for-profit, community-owned utilities that power 2,000 towns and cities nationwide. It represents public power before the federal government to protect the interests of the more than 49 million people that public power utilities serve, and the 93,000 people they employ. Approximately 70 percent of APPA's members serve communities with less than 10,000 residents.

EEI is the national association of U.S. investor-owned electric companies, with international affiliates and industry associates worldwide. Investor-owned electric companies provide electricity for 220 million Americans, operate in all 50 states and the District of Columbia, and directly and indirectly employ more than seven million people in communities across the United States. EEI's members invest more than $100 billion each year to build a smarter energy infrastructure and to transition to even cleaner generation resources.

NRECA is the national service organization for nearly 900 not-for-profit rural electric utilities that provide electric energy to over 42 million people in 47 states. Electric cooperatives own and maintain 2.6 million miles or approximately 42 percent of the nation's electric distribution lines, covering 56 percent of the U.S landmass.

Collectively, our organizations cover the spectrum of electric utilities responsible for providing safe, secure, and reliable electricity to nearly every American. Doing so requires more than 8,500 power plants, nearly 200,000 miles of high voltage transmission lines, and hundreds of thousands of miles of overhead and below-ground distribution lines. Carrying out this responsibility is a matter of great importance to the economy,[2] to national security,[3] and to public health, safety, and welfare.[4]

UAS Role in Electric Power Reliability

Providing safe, reliable, and efficient electric power to the public is a key national priority and responsibility of the electric industry. In recognition of that fact, the electric industry is subject to mandatory and enforceable reliability standards, set by the North American Electric Reliability Corporation ("NERC"), making this sector one of only two critical sectors (the second being nuclear power) to have such mandatory and enforceable standards. The electric industry takes numerous steps to ensure reliability, including routinely inspecting and repairing electric power equipment such as substations, transformers, conductors, towers, poles, equipment, and pole attachments. The ability to quickly inspect and identify areas of damage is even more critical following a storm, natural disaster, or other power outages where a rapid response is necessary to minimize hazards to life, economic harm, and threats to national security.

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2 Kristina Hamachi LaCommare & Joseph H. Eto, Ernest Orlando Lawrence Berkeley National Laboratory, "Understanding the Cost of Power Interruptions to U.S. Electricity Customers" (Sept. 2004)(developing an economic model which estimated that power outages cost the U.S economy about $80 billion annually).

3 Defense Science Board, Office of the Undersecretary of the Defense, "Report of the Defense Science Board Task Force on DoD Energy Strategy" 20 (Feb. 2008) (stating that certain defense-related activities that "must function 24/7" are wholly dependent on continued power to the buildings and equipment involved

4 Mary Casey-Lockyet et alia, "Deaths Associated with Hurricane Sandy-October-November 2012" Morbidity and Mortality Weekly Report (May 24, 2013) Vol. 62 No. 20 (indicating that at least 6 deaths in the aftermath of Hurricane Sandy were indirectly related to "burn/electric current" and that several factors, including power outages led to "challenging, and sometimes deadly, conditions for residents."); and G. Brooke Anderson & Michelle L. Bell "Lights Out: Impact of the August 2003 Power Outage on Mortality in New York" Toxicology, Vol. 23, No. 2 (2012) (finding 90 deaths directly attributable to the August 2003 power outage in the city of New York).

Working on, and around, electric power equipment is hazardous, costly, and time consuming.[5] The hazards that exist during routine inspections are significantly compounded when the equipment has been damaged or the surrounding terrain has been made more dangerous by storms or other events. Historically, the electric industry primarily conducted inspections and damage assessments visually using personnel, either working from the ground, a bucket truck, or in a manned aircraft. This visual assessment must be completed before electric companies can deploy restoration workers and request additional support from other utilities.

UAS technology gives the electric industry the ability to conduct these same inspections without putting personnel in potentially dangerous proximity to power equipment.[6] Additionally, the technology has the potential to provide utilities with better information than visual inspection[7] on a faster timeline[8] and at a lower cost.[9] The evidence is compelling:

- With the use of a UAS equipped with an infrared camera, "what used to take three days takes two hours instead."[10]

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[5] U.S Dept. of Labor, Occupational Safety & Health Administration ("OSHA"), "Safety and Health Topics: Electrical" (last visited March 29, 2019).

[6] Andrew Shelley & Heather Andrews, "Economic Benefits to New Zealand from Beyond Line-of-Sight Operation of UAVs" 43 (Feb. 10, 2015) (reporting globally in 2014 three crashes resulting in five fatalities for helicopters conducing electric power line inspections)

[7] Wesley J. Oliphant, ReliaPOLE Inspection Service Co., "To Drone or Not to Drone?" Presentation at NESC Summit (2015) (citing data from an Electric Power Research Institute study comparing the accuracy of different inspection methods. Aerial patrols found 0.4 percent of defects, ground patrols found 17.1 percent of defects, a climbing patrol found 29.3 percent of defects, and a detailed aerial patrol using high-resolution cameras found 47.6 percent of defects).

[8] Chuang Deng, et al. "Unmanned Aerial Vehicles for Power Line Inspection: A Cooperative Way in Platforms and Communications", Journal of Communications Vol. 9, No. 9 (Sept. 2014) (finding UAS inspection could accomplish in a matter of hours an inspection that would take manned crews weeks to complete).

[9] AUVSI "Are UAS More Cost Effective than Manned Flights?" (Oct. 24, 2013) (https://www.auvsi.org/are-uas-more-cost-effective-manned-flights).

[10] Jason Reagan, Drone Life, "Inspection Drones Illuminate Duke Energy's World" (Mar. 12, 2018), https://dronelife.com/2018/03/12/inspection-drones-illuminate-duke-energys-world/.

- UAS inspections of solar facilities "take less than 10 minutes per MW and save, on average, $1200/MW in costs" over traditional inspections.[11]

- UAS inspections of wind turbines "reduce man-hours and turbine downtime for maintenance checks by over 75 percent."[12]

In preparing for and responding to storms and natural disasters,[13] utilities have used UAS to map their systems prior to a storm in order to more quickly identify storm related damage,[14] inspect equipment that is hard to reach as a result of flooding or other storm damage,[15] and even support the labor necessary to restore power.[16] As our nation faces increasingly volatile weather, UAS technology enables utilities to prepare better prior to a storm[17] and respond more efficiently to outages.[18]

The introduction of the Part 107 regulations has allowed more utilities to integrate UAS operations. However, the nature of utility UAS operations require flexibility to realize maximum benefits. UAS must be able to inspect diverse structures, from tall wind turbines, to miles long

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11 Measure, "The Case for Drones in Energy" at 15, available at: https://www.measure.com/hubfs/whitepapers/The-Business-Case-for-Drones-in-Energy-Operations.pdf (last visited April 2, 2019).

12 *Id.*

13 Katie Flash, InterDrone, "2017: The Year of Natural Disasters and Putting Drones to Work" (Dec. 27, 2017) (https://www.interdrone.com/news/emergency-services/2017-the-year-of-natural-disasters-and-putting-drones-to-work/).

14 Jack Stewart, WIRED, "As Hurricane Florence Looms, Drone Pilots Prepare for Recovery" (Sep. 13, 2018) (https://www.wired.com/story/hurricane-florence-drone-recovery/).

15 Dusty Weis, Association of Equipment Manufacturers, "Hurricane Responses Demonstrates Growing Role of Drones in Utility Industry" (Nov. 30, 2017) (https://www.aem.org/news/november-2017/hurricane-responses-demonstrate-growing-role-of-drones-in-utility-industry/).

16 Jessica Wells, Duke Energy, "Duke Energy uses drones to restore power in Puerto Rico" (Feb. 15, 2018) (https://illumination.duke-energy.com/articles/duke-energy-uses-drones-to-restore-power-in-puerto-rico).

17 Reed Karaim, Rural Electric Magazine, "Predictive Maintenance. Sophisticated vegetation-management systems help co-ops battle storm outages" (July 18, 2018) https://www.cooperative.com/remagazine/articles/Pages/predictive-maintenance-vegetation-management-storm-outages.aspx.

18 John Lowery, Rural Electric Magazine, "The Era of the UAS. Drone use gets boost from 2017 hurricane recovery efforts" (January 2, 2018) https://www.cooperative.com/remagazine/articles/Pages/electric-co-ops-drone-uas.aspx.

transmission lines across varied and potentially remote terrain, to substations that may be in more urban environments. In response to weather and other outage events, UAS are needed at all times of day to respond to these emergent situations. As a result, electric industry UAS operations are likely to occur in proximity to people, roadways, and buildings, and they may occur at night. As discussed in more detail below, the flexibility that exists in the current regulations must be retained and strengthened for UAS technology to reach its potential for utility operations.

II. Discussion

The ANPRM invites comment to help the FAA assess whether to conduct further rulemaking on subjects such as stand-off distances, payload restrictions, altitude, airspeed, and performance limitations. APPA, EEI, and NRECA provide the following comments in response to those questions that relate directly to electric utility services:

A. Stand-off Distances

A1. If the FAA were to establish specific horizontal or vertical stand-off distances for all small UAS operations, what should those stand-off distances be and why?[19]

The FAA should not establish an across the board stand-off distance restriction for all small UAS operations. The electric industry has successfully operated under the Part 107 performance-based rules which properly balance the need for flexibility in our operations with public safety. For example, prior to Part 107, utilities conducting UAS operations did so under Part 333 exemptions. Most of those exemptions included a restriction that operations remain 500 feet away from uninvolved persons or property. This restriction prevented electric utilities from using UAS to inspect many parts of their systems because many transmission lines, substations,

[19] 84 FR at 3734.

or other equipment fell within this 500-foot stand-off. The flexibility in Part 107's performance-based rules allows for much wider UAS operations to be safely conducted. As a result, the electric industry knows from experience that the adoption of any specific stand-off distance, whether vertical or horizontal, has the potential to negatively impact electric utility UAS operations.

Further, a majority of electric industry UAS operations occur in close proximity to poles, structures, or facilities. UAS technology development indicates that future utility operations could include deploying UAS to assist in the actual construction, repair, or physical inspection of utility infrastructure and would therefore come in contact with those structures. Any stand-off requirement that would prevent these operations would prevent utilities from using UAS technology more effectively and efficiently. It is also useful to remember that UAS operations increase safety by allowing for inspections of high voltage equipment from a safe distance. As a result, applying a prescriptive, one-size-fits-all stand-off distance to the diverse electric utility industry would reduce both the usefulness of the technology as well as the safety of electric utility personnel. [20]

Should the FAA determine a stand-off distance is necessary, it should adopt separate stand-off distances for the owner/operators of the electric facilities similar to how the OSHA

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[20] Isaac Bruns, Electric Light & Power, "Puget Sound Energy Innovates with Drones to Save Time and Money" (Oct. 9, 2018), https://www.elp.com/Electric-Light-Power-Newsletter/articles/2018/10/puget-sound-energy-innovates-with-drones-to-save-time-and-money.html (Discussing the utility of UAS when conditions were treacherous "The beauty of using drones was that we just flew down that corridor, and we could pretty much pick up everything we needed and get out of there without ever putting anybody on a road with downed trees, close to a mudslide, near a train track, or on the edge of a river or rocky peak.")

regulations have different sets of Minimum Approach Distances (i.e., stand-off distances) to electric facilities for qualified and non-qualified electrical workers.[21]

While APPA, NRECA, and EEI do not support an across-the-board mandatory stand-off distance, we would support the establishment of stand-off distances for non-utility operated UAS near electric infrastructure. UAS operated by inexperienced or careless non-utility pilots have the potential to cause outages, violate federal reliability standards, and potentially expose critical energy infrastructure information.[22] These concerns have led our organizations to support Section 2209 of the FAA Extension, Safety, and Security Act of 2016, Public Law 114-190, 114th Congress, which would allow electric utilities to petition the FAA to restrict the operation of UAS in close proximity to energy infrastructure. Creating a stand-off distance from electric infrastructure would protect this infrastructure from UAS interference, whether benign or nefarious, thereby reducing the potential for harm to some of our nation's most critical infrastructure.

A2. If the FAA were to establish horizontal or vertical stand-off distances for only certain types of small UAS operations, what types of operations should require a stand-off distance, what should the stand-off distance be, and why? Examples of types of operations include, but are not limited to, night operations, operations in controlled airspace under an ATC authorization, and beyond-visual-line-of-sight operations.[23]

APPA, EEI, and NRECA submit to the FAA on this question the same comment as II.A. A1 above. The FAA should establish a one-size-fits-all stand-off requirement, but if the FAA

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21 Electric Power Generation, Transmission, and Distribution Standard https://www.osha.gov/dsg/power_generation/index.html (last visited March 29, 2019).

22 *See i.e.* Federal Energy Regulatory Commission ("FERC") Critical Energy/Electric Infrastructure Information https://www.ferc.gov/legal/ceii-foia/ceii.asp.

23 84 FR at 3734.

does establish such a requirement, the electric industry should be provided an exception to any rule adopted. Electric utilities have a unique use case in that they need to make inspections, assist with construction, and make repairs to the electrical infrastructure using UAS. Accordingly, the electric industry and their UAS service providers (to the extent they are doing work for electric utilities) should be granted an exemption from any horizontal or vertical stand-off distances in order to construct, inspect, and maintain electric infrastructure.

A3. What types of operations, if any, should be excluded from a proposed stand-off distance requirement and why?[24]

APPA, EEI, and NRECA submit to the FAA on this question the same comments as those on II.A. A1 and A2 above. Electric utility operations require inspection of critical infrastructure to ensure safe, reliable, and efficient service to customers. All operations being performed by electric utilities or their UAS service providers in the process of performing inspections, construction, and maintenance of critical electric infrastructure should be excluded from any proposed stand-off requirements.

A4. How would a horizontal or vertical stand-off distance requirement help reduce hazards to public safety and national security?[25]

APPA, EEI, and NRECA submit to the FAA on this question the same comments as those on comment as II.A. A1, A2, and A3. An across-the-board stand-off distance requirement would be overly restrictive and could harm public safety and national security by restricting utilities' abilities to use UAS to ensure a safe and reliable electric grid. However, we support a stand-off requirement to keep non-utility UAS pilots away from electric facilities and equipment. Requiring non-utility UAS operations to maintain a certain distance from these facilities would

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[24] 84 FR at 3734.
[25] 84 FR at 3734.

increase the safety and reliability of the electric grid by decreasing the potential for UAS accidents which may result in a disruption of electric service.

A5. What are the incremental costs of introducing a stand-off distance requirement compared to how operations are conducted today?[26]

Limiting electric utilities' ability to use UAS has the potential to increase the cost to inspect and maintain the electrical infrastructure while restricting the electric industry's flexibility to use the inspection method that is best suited for the circumstances. A mandatory stand-off distance would require utilities to either conduct inspections "traditionally" using manned aircrafts, bucket trucks, or ground visual inspections, or to use UAS from a further distance. Limiting electric utilities to only traditional inspection methods deprives those utilities of the ability to identify and implement the inspection method that is safest, most efficient, and most cost effective. Continuing to use UAS might require upgrading the cameras used to enable better resolution and zoom capabilities to obtain the same quality of inspection. This would require larger digital storage capacity and a faster data offloading pipeline.

A6. Does requiring a minimum stand-off distance necessitate additional instrumentation? If yes, provide costs and other relevant information.[27]

APPA, EEI, and NRECA submit to the FAA on this question the same comments as those on II.A.A5 above. It is likely that all devices would need accurate distance reading sensors that work with meshed objects such as tree limbs, branches, small wires, etc. This type of technology does not appear to currently be available in the market. These limitations would restrict the ability of the electric utilities to use their expertise to select the inspection method that will maximize safety and reduce costs.

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[26] 84 FR at 3734.
[27] 84 FR at 3734.

A7. If minimum stand-off distances are required, would training or testing be necessary? If yes, provide estimate of time and cost.[28]

Electric utilities already require specialized skills and knowledge to perform activities associated with inspecting and maintaining the electric grid. Training and testing are a component of ensuring electrical workers are proficient at these duties. Additional specialized UAS training and testing will be included for electrical workers as UAS is integrated into the utility workforce.

Regarding costs, most costs would be for UAS manufacturers, but they would ultimately be passed on to consumers. Devices already purchased would have limited use unless they could be retrofitted at a cost, therefore requiring additional redundant equipment purchase.

B. Altitude, Airspeed, and Other Performance Limitations

B1. If the FAA were to establish additional operating or performance limitations for small UAS, what should those operating or performance limitations be and why?[29]

For line-of-sight missions, current Part 107 restrictions satisfactorily address issues regarding public safety and national security risks regarding the utilization of UAS by electric utilities. This would include all applications regarding daytime and nighttime operations. Our member utilities are generally comfortable with the Part 107 speed and altitude restrictions and believe they appropriately balance the need for flexibility with the need to ensure public safety. For example, utilities deploy UAS to inspect wind turbines and cooling towers. Given the height of these structures, any altitude restriction beyond those included in Part 107 could limit the ability for electric utilities to use UAS to conduct these inspections. Additional operating or

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[28] 84 FR at 3734.
[29] 84 FR at 3735.

performance limitations for small UAS operations by electric utilities in remote, rural areas would hamper utility use of small UAS and provide little or no public benefit.

Additional limitations such as redundancy of certain functions or features may be necessary as additional operations are allowed over people or beyond visual line of sight ("BVLOS"). Redundancy leads to safety, therefore requiring redundant systems to protect critical device operations would generally lead to safer operations.

B2. If the FAA were to establish additional operating or performance limitations for only certain types of small UAS operations, what types of small UAS operations should require additional operating or performance limitations, what should they be, and why?[30]

APPA, EEI, and NRECA submit to the FAA on this question the same comments as those on B1 above. If the FAA adopts its Proposed Rule for Operation of Small Unmanned Aircraft Over People, small UAS for the Category 2 and 3 operations[31] are likely to have incremental redundant systems built in by the manufacturer. These systems would include things like battery backup, emergency landing devices, and protective systems designed to limit effects of impact.

B3. How would additional operating or performance limitations help to reduce risks to public safety or national security?[32]

Additional operating or performance limitations to electric utilities would not significantly reduce the risks to public safety or national security for current Part 107 operations or nighttime operations. In fact, limiting the ability to use UAS will require conducting

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30 84 FR at 3735.

31 Operation of Small Unmanned Aircraft Systems Over People, 84 FR 3856 (Feb. 13, 2019) (FAA Docket No. FAA-2018-1087).

32 84 FR at 3735.

inspections manually thereby placing electric personnel in more frequent proximity to hazardous electric equipment.

B4. What types of current small UAS operations would be impacted by establishing additional operating or performance limitations?[33]

Additional operating or performance limitations for the electric industry would reduce the ability to use UAS technology to maintain and inspect electric infrastructure. Operations currently being performed under Part 107 rules would be further restricted, thereby foregoing the opportunity to use UAS to decrease the costs of inspecting and maintaining the electric grid, as well as the opportunity to reduce risks to the safety of the workers performing these tasks.

B5. What are the incremental costs of altitude, airspeed, and other performance limitations?[34]

APPA, EEI, and NRECA submit to the FAA on this question the same comments as provided in response to B1 above. To the extent that the FAA adopts additional altitude restrictions, it should exempt electric industry operations. Furthermore, although airspeeds are not currently a concern in utility UAS operations, any airspeed restrictions may impact response times when BVLOS is allowed. This could inhibit the ability to respond to major outages, storms, or natural disasters.

C. Unmanned Traffic Management (UTM) Operations

C1. How can additional information sharing (e.g. intended flight path, operational boundary) via UTM help reduce risks to public safety and national security? What suite of capabilities should UTM have?[35]

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[33] 84 FR at 3735.
[34] 84 FR at 3735.
[35] 84 FR at 3735.

Additional UTM operations are not necessary for electric utilities performing current Part 107 flight operations while inspecting or maintaining the electric grid or other infrastructure. This would also include additional flight operations near the electrical infrastructure at night. Additional UTM operations may be beneficial as small UAS operations are allowed over people or BVLOS. When operating small UAS over people or BVLOS, additional UTM operations may be beneficial to manage the additional risk associated with these operations. For BVLOS operations, devices that broadcast location and communicate to the public airspace users would be beneficial in mitigating any additional risks. Additional UTM operations for small UAS operations by electric utilities in remote, rural areas would be costly and provide less public benefit.

If UTM operations are ultimately required, all devices should broadcast location and communicate to public airspace users. The system should retain mapping display, interactive query, communication forum and instant messaging, identification beacons, and be required to enable detect and avoid.

C2. What types of small UAS operations should be subject to UTM requirements? Should any be excluded? Should the requirement be based on geographical location, the type of operation, or other factors? Please provide data or explanations to justify your response.[36]

Additional UTM requirements should not be required of electric utilities performing inspections and maintenance of the electric grid and infrastructure under current Part 107 limitations. These inspections are performed in relatively proximity to the electric infrastructure and not within airspace likely to be occupied by other aircraft.

[36] 84 FR at 3735.

C3. For small UAS subject to UTM requirements, what type of information should be available to the general public? What type of information should be available to security personnel?[37]

Additional UTM requirements should not be required of electric utilities performing inspections and maintenance of the electric grid and infrastructure under current Part 107 limitations. However, for small UAS subject to UTM requirements, the same information should be required to be provided as is required of manned aircraft, including pilot ID, device registration, location, elevation, and optional display fields.

C4. What are the initial nonrecurring investment costs associated with establishing a UTM architecture? Once implemented, what are the annual recurring operation and maintenance costs?[38]

Establishing a UTM architecture would require small UAS to be either retrofitted or replaced with new devices.

C5. For questions C.1., C.2., and C.3., please include information in your response identifying the costs that would be necessary to equip small UAS to comply with UTM requirements.[39]

Given the unknowns of the specifics regarding complying with UTM requirements, APPA, EEI, and NRECA do not have an estimate of the potential cost. However, these costs could be significant, and applying UTM requirements to small UAS operations under current Part 107 would impede the use of small UAS to inspect and maintain the electric grid and provide little public benefit.

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[37] 84 FR at 3736.
[38] 84 FR at 3736.
[39] 84 FR at 3736.

C6. Would additional testing or training be required for a remote pilot to safely operate a small unmanned aircraft subject to UTM requirements? Please explain.

Yes. However, the costs and type of training should be contingent and commensurate with the specific requirements of the UTM, which are not known at this time.

C7. What would be the costs for information sharing if UAS operations are subject to UTM requirements?[40]

Any information sharing requirements must recognize that many elements of the electric grid are considered critical energy infrastructure, and that information about these assets is confidential.[41] Sharing this information could have an impact on national security generally and specifically on the security and reliability of the electric grid.

D. Payload Restrictions

D1. Should the prohibition from carrying hazardous materials in § 107.36 be expanded to include other types of payloads or installed equipment that could pose a threat to public safety or national security? If yes, what types of payloads should be prohibited and why?[42]

UAS should be prohibited from carrying payloads that have the potential to harm public safety and national security. However, any additional restrictions should be carefully and narrowly drafted to ensure they do not inadvertently cover installed equipment with a beneficial purpose. Electric utilities may need UAS to carry or utilize specialized equipment to aid in the inspection, maintenance, and construction of the electric grid. Improvements in UAS technology have opened the potential for UAS to not only detect a defect, but to assist in the repair.[43] As a

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[40] 84 FR at 3736.

[41] *See* https://www.ferc.gov/legal/ceii-foia/ceii.asp

[42] 84 FR at 3736.

[43] *See e.g.* Derrill Holly and Victoria Rocha, NRECA, "After Hurricanes, Co-op Drones Take Flight. Restoration time was cut by days thanks to the flying machines" (Sept. 18, 2017) https://www.electric.coop/hurricanes-co-op-drones-take-flight/.

result, electric industry UAS may carry diverse payloads and have the need for varied and specialized installed equipment. Any payload restrictions should be mindful of this fact to allow UAS operations to meet their full potential.

D2. Should the FAA consider rulemaking to restrict the use of certain types of small UAS payloads or installed equipment? If yes, what types of payloads should be restricted, under what conditions should they be restricted? Should there be exceptions or special provisions applicable to certain conditions or other factors such as location, time, population density, or purpose? Please provide data or explanations to justify your response.[44]

APPA, EEI, and NRECA submit to the FAA on this question the same comments as those to D1 above.

D3. What types of operations would be affected if additional restrictions are placed on the type of payloads and equipment that can be installed on a small UAS? Would there be any costs or lost revenues associated with those restrictions?[45]

Additional restrictions on electric industry UAS users have the potential to limit their ability to use UAS to inspect, maintain, and construct the electric grid. These restrictions could require the electric industry to forego opportunities to use UAS to improve the reliability of the grid, particularly the speed and efficiency of restoration after outages, as well as opportunities to use UAS to increase the safety of utility workers.

E. Small UAS Critical System Design Requirements

E1. For small UAS operations beyond the visual line of sight of the remote pilot, should the FAA establish design requirements, such as redundancy, for systems critical to safety of

[44] 84 FR at 3736.
[45] 84 FR at 3736.

flight? If yes, what should these requirements be and why? Are there other means the FAA should consider to address public safety and national security risk for BVLOS operations?[46]

As operations extend BVLOS critical system design requirements will be necessary to ensure safe operations. These requirements should include redundancy in battery/fuel performance, landing and emergency landing procedures, detect-and-avoid technology, and other properties of safety related to BVLOS operations.

E2. For small UAS operations over people that exceed the NPRM safety thresholds indicated above and therefore still must seek a waiver to §107.39 to operate over people, should the FAA establish design requirements, such as redundancy, for systems critical to safety of flight? If yes, what should these requirements be and why? Are there other means the FAA should consider to address public safety and national security risk for operations over people?[47]

The requirement for redundancy in UAS systems would increase the safety associated with flight operations over people. Flight operations over people is not a major need for electric utilities. Typically, flights are performed over electric infrastructure and not over people. Nevertheless, waiver and authorization procedure for extenuating operational circumstances should mirror the procedure currently in place, but with increased transparency on the type of information sought. Examples of successful waivers should also be made available for review to allow interested parties to more efficiently evaluate the potential for successfully obtaining a waiver. The FAA should recognize that no known safety issues have arisen from current approved BVLOS testing scenarios.

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[46] 84 FR at 3737.

[47] 84 FR at 3737.

E4. What are the costs and benefits to incorporate redundant systems critical to safety of flight for BVLOS operations or operations over people that exceed the NPRM safety thresholds indicated above?[48]

These costs likely will be limited because BVLOS and over people operations are currently not permitted absent a waiver. As a result, UAS operators likely have likely not made significant investments in this type of equipment. It is possible that requiring redundant systems will increase the cost of the UAS used for BVLOS operations; however, such equipment likely would increase the safety to the public for these operations.

III. Conclusion

APPA, EEI, and NRECA appreciate the efforts the FAA has taken to incorporate small UAS into the National Airspace System. Electric utilities' use of small UAS continues to grow and, under the right regulatory environment, has the potential to increase the reliability and security of the national grid while reducing risks to the men and women who work diligently to keep the lights on. We look forward to working with the FAA to craft regulations that will ensure public safety while enabling UAS to reach its full potential for electric utilities.

Respectfully Submitted,

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[48] 84 FR at 3737.

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