U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

April 20, 2015

Exemption No. 11389
Regulatory Docket No. FAA–2015–0005

Mr. William V. O'Connor
Mr. William D. Janicki
Ms. Joanna L. Simon
Counsel for Consumers Energy Company
Morrison & Foerster LLP
12531 High Bluff Drive, Suite 100
San Diego, CA 92130

Dear Messrs. O'Connor and Janicki and Ms. Simon:

This letter is to inform you that we have granted your request for exemption. It transmits our decision, explains its basis, and gives you the conditions and limitations of the exemption, including the date it ends.

The Basis for Our Decision

By letter dated December 31, 2014, you petitioned the Federal Aviation Administration (FAA) on behalf of Consumers Energy Company (hereinafter petitioner or operator) for an exemption. The exemption would allow the petitioner to operate an unmanned aircraft system (UAS) to conduct research and development for public and worker safety; power restoration following storms; and new methods to effectively inspect power lines, electrical facilities, and vegetation, and rights of way.

See Appendix A for the petition submitted to the FAA describing the proposed operations and the regulations that the petitioner seeks an exemption.

The FAA has determined that good cause exists for not publishing a summary of the petition in the Federal Register because the requested exemption would not set a precedent, and any delay in acting on this petition would be detrimental to the petitioner.

Airworthiness Certification

The UAS proposed by the petitioner is a DJI S-1000.

The petitioner requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*. In accordance with the statutory criteria provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 44704, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that the requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

You have requested to use a UAS for aerial data collection. The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grants of Exemption Nos. 11062 to Astraeus Aerial (*see* Docket No. FAA−2014−0352), 11109 to Clayco, Inc. (*see* Docket No. FAA−2014−0507), 11112 to VDOS Global, LLC (*see* Docket No. FAA−2014−0382), and 11213 to Aeryon Labs, Inc. (*see* Docket No. FAA−2014−0642), the FAA found that the enhanced safety achieved using an unmanned aircraft (UA) with the specifications described by the petitioner and carrying no passengers or crew, rather than a manned aircraft of significantly greater proportions, carrying crew in addition to flammable fuel, gives the FAA good cause to find that the UAS operation enabled by this exemption is in the public interest.

Having reviewed your reasons for requesting an exemption, I find that—

- They are similar in all material respects to relief previously requested in Grant of Exemption Nos. 11062, 11109, 11112, and 11213;
- The reasons stated by the FAA for granting Exemption Nos. 11062, 11109, 11112, and 11213 also apply to the situation you present; and
- A grant of exemption is in the public interest.

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, Consumers Energy Company is granted an exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a)

and (b), to the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

In this grant of exemption, Consumers Energy Company is hereafter referred to as the operator.

Failure to comply with any of the conditions and limitations of this grant of exemption will be grounds for the immediate suspension or rescission of this exemption.

1. Operations authorized by this grant of exemption are limited to the DJI S-1000 when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

2. Operations for the purpose of closed-set motion picture and television filming are not permitted.

3. The UA may not be operated at a speed exceeding 87 knots (100 miles per hour). The exemption holder may use either groundspeed or calibrated airspeed to determine compliance with the 87 knot speed restriction. In no case will the UA be operated at airspeeds greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.

4. The UA must be operated at an altitude of no more than 400 feet above ground level (AGL). Altitude must be reported in feet AGL.

5. The UA must be operated within visual line of sight (VLOS) of the PIC at all times. This requires the PIC to be able to use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued airman medical certificate or U.S. driver's license.

6. All operations must utilize a visual observer (VO). The UA must be operated within the visual line of sight (VLOS) of the PIC and VO at all times. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS capability. The VO and PIC must be able to communicate verbally at all times; electronic messaging or texting is not permitted during flight operations. The PIC must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC must ensure that the VO can perform the duties required of the VO.

7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating

documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents, the conditions and limitations herein take precedence and must be followed. Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS−80) may be contacted if questions arise regarding updates or revisions to the operating documents.

8. Any UAS that has undergone maintenance or alterations that affect the UAS operation or flight characteristics, e.g., replacement of a flight critical component, must undergo a functional test flight prior to conducting further operations under this exemption. Functional test flights may only be conducted by a PIC with a VO and must remain at least 500 feet from other people. The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.

9. The operator is responsible for maintaining and inspecting the UAS to ensure that it is in a condition for safe operation.

10. Prior to each flight, the PIC must conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies, e.g., inoperable components, items, or equipment. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight.

11. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.

12. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.

13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal

government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with 14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs (training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

15. UAS operations may not be conducted during night, as defined in 14 CFR § 1.1. All operations must be conducted under visual meteorological conditions (VMC). Flights under special visual flight rules (SVFR) are not authorized.

16. The UA may not operate within 5 nautical miles of an airport reference point (ARP) as denoted in the current FAA Airport/Facility Directory (AFD) or for airports not denoted with an ARP, the center of the airport symbol as denoted on the current FAA-published aeronautical chart, unless a letter of agreement with that airport's management is obtained or otherwise permitted by a COA issued to the exemption holder. The letter of agreement with the airport management must be made available to the Administrator or any law enforcement official upon request.

17. The UA may not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.

18. If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the private or controlled-access property.

19. The PIC must abort the flight in the event of unpredicted obstacles or emergencies.

20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the intended operation and to operate after that for at least five minutes or with the reserve power recommended by the manufacturer if greater.

21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The

exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the attached COA.

22. All aircraft operated in accordance with this exemption must be identified by serial number, registered in accordance with 14 CFR part 47, and have identification (N−Number) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.

23. Documents used by the operator to ensure the safe operation and flight of the UAS and any documents required under 14 CFR §§ 91.9 and 91.203 must be available to the PIC at the Ground Control Station of the UAS any time the aircraft is operating. These documents must be made available to the Administrator or any law enforcement official upon request.

24. The UA must remain clear and give way to all manned aviation operations and activities at all times.

25. The UAS may not be operated by the PIC from any moving device or vehicle.

26. All Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:
    a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately in a manner ensuring the safety of nonparticipating persons; and
    b. The owner/controller of any vessels, vehicles or structures has granted permission for operating closer to those objects and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard.

    The PIC, VO, operator trainees or essential persons are not considered nonparticipating persons under this exemption.

27. All operations shall be conducted over private or controlled-access property with permission from the property owner/controller or authorized representative. Permission from property owner/controller or authorized representative will be obtained for each flight to be conducted.

28. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA must be reported to the FAA's UAS Integration Office (AFS−80) within 24 hours. Accidents must be

reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.ntsb.gov.

If this exemption permits operations for the purpose of closed-set motion picture and television filming and production, the following additional conditions and limitations apply.

29. The operator must have a motion picture and television operations manual (MPTOM) as documented in this grant of exemption.

30. At least 3 days before aerial filming, the operator of the UAS affected by this exemption must submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed filming. The 3-day notification may be waived with the concurrence of the FSDO. The plan of activities must include at least the following:
    a. Dates and times for all flights;
    b. Name and phone number of the operator for the UAS aerial filming conducted under this grant of exemption;
    c. Name and phone number of the person responsible for the on-scene operation of the UAS;
    d. Make, model, and serial or N−Number of UAS to be used;
    e. Name and certificate number of UAS PICs involved in the aerial filming;
    f. A statement that the operator has obtained permission from property owners and/or local officials to conduct the filming production event; the list of those who gave permission must be made available to the inspector upon request;
    g. Signature of exemption holder or representative; and
    h. A description of the flight activity, including maps or diagrams of any area, city, town, county, and/or state over which filming will be conducted and the altitudes essential to accomplish the operation.

31. Flight operations may be conducted closer than 500 feet from participating persons consenting to be involved and necessary for the filming production, as specified in the exemption holder's MPTOM.

Unless otherwise specified in this grant of exemption, the UAS, the UAS PIC, and the UAS operations must comply with all applicable parts of 14 CFR including, but not limited to, parts 45, 47, 61, and 91.

This exemption terminates on April 30, 2017, unless sooner superseded or rescinded.

Sincerely,

/s/
John S. Duncan
Director, Flight Standards Service

MORRISON | FOERSTER

12531 HIGH BLUFF DRIVE
SAN DIEGO, CALIFORNIA
92130-2040

TELEPHONE: 858.720.5100
FACSIMILE: 858.720.5125

WWW.MOFO.COM

MORRISON & FOERSTER LLP

BEIJING, BERLIN, BRUSSELS, DENVER,
HONG KONG, LONDON, LOS ANGELES,
NEW YORK, NORTHERN VIRGINIA,
PALO ALTO, SACRAMENTO, SAN DIEGO,
SAN FRANCISCO, SHANGHAI, SINGAPORE,
TOKYO, WASHINGTON, D.C.

December 31, 2014

Writer's Direct Contact
+1 (858) 720.7932
WOConnor@mofo.com

U.S. Department of Transportation
Docket Operations, M-30
1200 New Jersey Avenue, SE
Room W12-140, West Building Ground Floor
Washington, DC 20590-0001

Re: ***Petition of Consumers Energy Company for an Exemption Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 to Operate an Unmanned Aircraft System***

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the Reform Act) and 14 C.F.R. Part 11, Consumers Energy Company hereby applies for an exemption from the Federal Aviation Regulations identified below to allow for the commercial operation of the DJI S1000 with the A2 Flight Control System, manufactured by DJI Innovations (the S1000").

I. REGULATIONS FOR WHICH EXEMPTION IS REQUESTED

Consumers Energy Company requests exemption from the following regulations:

- 14 C.F.R Part 21, Subpart H;
- 14 C.F.R Part 27;
- 14 C.F.R § 45.23(b);
- 14 C.F.R. § 45.27(a);
- 14 C.F.R § 61.113;
- 14 C.F.R § 91.7(a);
- 14 C.F.R § 91.9(b)(2);
- 14 C.F.R § 91.9(c);
- 14 C.F.R § 91.103;
- 14 C.F.R § 91.109(a);
- 14 C.F.R § 91.119;
- 14 C.F.R § 91.121;
- 14 C.F.R § 91.151(a) & (b)

- 14 C.F.R § 91.203 (a) & (b);
- 14 C.F.R § 91.405(a);
- 14 C.F.R § 91.407(a)(l);
- 14 C.F.R § 91.409(a)(2);
- 14 C.F.R § 91.417 (a) & (b).

This petition incorporates the material contained in the Consumers Energy Company Operations, Inspection, and Maintenance Manual, the DJI S1000 User Manual, the A2 Flight Control System User Manual, the Consumers Energy Company S1000 Pilot Operating Handbook, and the Consumers Energy Company S1000 Training Manual (together, the "Manuals"). The Manuals are submitted herewith as confidential under 14 C.F.R. § 11.35(b), because they contain commercial and proprietary information that Consumers Energy Company has not and will not share with others, is not available to the public, and is protected from release under the Freedom of Information Act, 5 U.S.C. § 552 *et seq*.

II. STATUTORY AUTHORITY FOR REQUESTED EXEMPTIONS

This petition for exemption is submitted in accordance with Section 333 of the Reform Act. Congress has directed the FAA "to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system." Pursuant to Section 333 of the Reform Act, the FAA Administrator is to permit operation of an unmanned aircraft system where it does not create a hazard to users of the national airspace system (NAS) or the public or pose a threat to national security based on the following considerations:

- The size, weight, speed and operational capability;
- Operation in proximity to airports and populated areas; and
- Operation within visual line of sight of the operator.

Furthermore, the Federal Aviation Act grants the FAA Administrator general authority to grant exemptions from the agency's safety regulations and minimum standards when the Administrator decides a requested exemption is in the public interest. *See* 49 U.S.C. §§ 106(f), 44701-44716, *et seq*. A party requesting an exemption must explain the reasons why the exemption: (1) would benefit the public as a whole, and (2) would not adversely affect safety or how it would provide a level of safety at least equal to the existing rules. 14 C.F.R. § 11.81.

III. DESCRIPTION OF CONSUMERS ENERGY COMPANY AND ITS SERVICES

Consumers Energy Company is a public utility that provides natural gas and electricity to more than 6 million Michigan residents. It is headquartered in Jackson, Michigan, and serves customers in 68 counties in Michigan's Lower Peninsula.

At present, Consumers Energy Company has seven power plants. Consumers Energy Company's largest power plant is the Karn-Weadock coal-fired generating station located on Saginaw Bay near Bay City. Other Consumers Energy Company coal-fired plants are the JH Campbell power plant between Holland and Grand Haven; the Cobb power plant in Muskegon and the Whiting Power Plant on Lake Erie in Luna Pier, just north of the Michigan/Ohio state line. Consumers Energy Company also operates and co-owns (with Detroit Edison) the Ludington Pumped Storage Power Plant near Ludington.

Two generating facilities previously owned by Consumers Energy Company (but still serving Consumers Energy Company's system) are the Palisades Nuclear Generating Station, 5 miles south of South Haven and The Midland Cogeneration Venture in Midland.

On the Muskegon River, in Newaygo and Mecosta counties, Consumers Energy Company operates 3 Hydroelectric Powerplant complexes. Together, the three dams (Rogers, Hardy and Croton) can generate about 45,500 kilowatts.

Consumers Energy Company has secured nearly 60,000 acres to develop wind generation farms in Mason and Tuscola counties. Consumer Energy's first wind farm began operations in 2013, and today the wind farms generate between 100 and 111 Megawatts of energy each. Development of wind power generation protects the Michigan environment and will bolster Michigan's economy. By combining renewable energy with efficiency measures and new, environmentally advanced large-scale electric generation, Consumers Energy Company is meeting the needs of its customers, the state economy, and the environment.

The contact information for the petitioner, Consumers Energy Company, is as follows:

Jason Milstone
Litigation Attorney
Consumers Energy Company
One Energy Plaza
Jackson, MI 49201
Tel. (517) 788-1188
Jason.Milstone@cmsenergy.com

C/O William V. O'Connor
William D. Janicki
Joanna L. Simon
Morrison & Foerster LLP
12531 High Bluff Drive
San Diego, CA 92130
Tel (858) 720-5100
WOConnor@mofo.com
WJanicki@mofo.com
JoannaSimon@mofo.com

IV. DESCRIPTION OF PROPOSED OPERATIONS

Consumers Energy Company is requesting exemptions from applicable Federal Aviation Regulations (FARs) pursuant to Section 333 of the Reform Act to perform research and development using the DJI S1000 UAS. Key areas of focus for Consumers Energy Company's research and development are (i) public and worker safety; (ii) safe and timely power restoration following storms; and (iii) new methods to effectively inspect power lines, electrical facilities, vegetation and rights of way.

Consumers Energy Company is committed to improving power reliability for customers by more safely and quickly restoring power to customers after storm related damage to the electrical system. The Michigan Public Service Commission has emphasized to Consumers Energy Company the importance of reducing outage response time, a critical component of which is more accurate and timely storm damage assessment presently conducted by employees in motor vehicles or on foot. Use of the S1000 will help to reduce power restoration time and safety-related incidents involving employees working in adverse weather conditions.

Additionally, current inspections of high voltage (HVD) power lines are done one to two times a year by helicopter. Use of the S1000 will allow such inspections at considerable savings, as well as reduce safety risks because the drone will not carry a flammable fuel source. The S1000 will also allow better visual inspection of facilities installed on poles, as helicopter inspection of a utility pole usually involves less than 5 seconds of visual inspection.

Further, inspections of lower voltage power (LVD) lines are typically done by motor vehicle or on foot. Due to visibility limitations based on the design of utility poles, a certain portion of the pole and its facilities is never inspected. Using the S1000 to do LVD inspections will increase their effectiveness, decrease their safety risks, and reduce the time needed for the inspection cycle.

Thus, the research and development use proposed here will allow Consumers Energy Company to determine the efficacy of the S1000 for increasing public safety, restoring outages in a safe and timely manner, and creating new methods for inspecting electrical facilities.

The research and development use will take place on six Michigan research and development test sites (the R&D Sites) located in Jackson County, Tuscola County, and Mason County. The sites are owned by Consumers Energy Company and have low nearby residential populations. Two sites will focus on UAS research and development for power line monitoring; four sites will focus on UAS research and development for wind turbine

inspection. The satellite imagery of each site included below confirms that surrounding properties have few structures built on them. *See* Figures 1-7.

Research and Development Sites Chart

Site No.	Name	Location	Type of R&D
1	Cary Rd Sub	Columbia Township Jackson County Michigan	Power line monitoring
2	Lake Leann	Somerset Township Hillsdale County Michigan	Power line monitoring
3	Clear Lake	Grass Lake Township Jackson County Michigan	Power line monitoring
4	Crosswinds WTG-46	Columbia Township Tuscola County Michigan	Wind turbine inspection
5	Crosswinds WTG-28	Akron Township Tuscola County Michigan	Wind turbine inspection
6	Lake Winds WTG-8	Riverton Township Mason County Michigan	Wind turbine inspection
7	Lake Winds WTG-22	Riverton Township Mason County Michigan	Wind turbine inspection

Figure 1 – R&D Site Number 1: Cary Rd Sub

Figure 2 – R&D Site Number 2: Lake Leann Sub

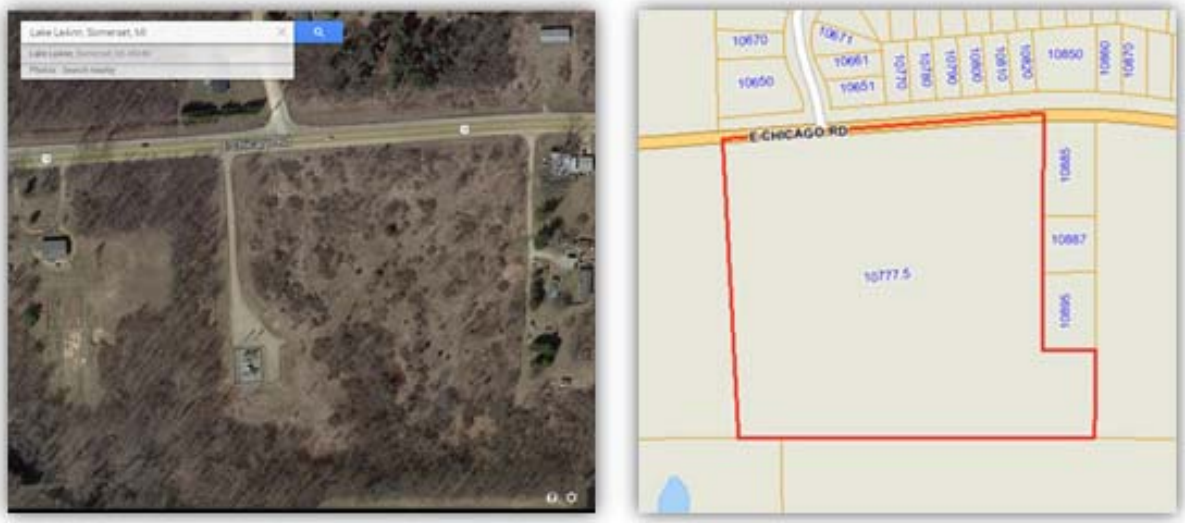


Figure 3 – R&D Site Number 3: Clear Lake Sub

Figure 4– R&D Site Number 3: Cross Winds WTG-46

Figure 5 – R&D Site Number 5: Cross Winds WTG-28

Figure 6 – R&D Site Number 6: Lake Winds WTG-8

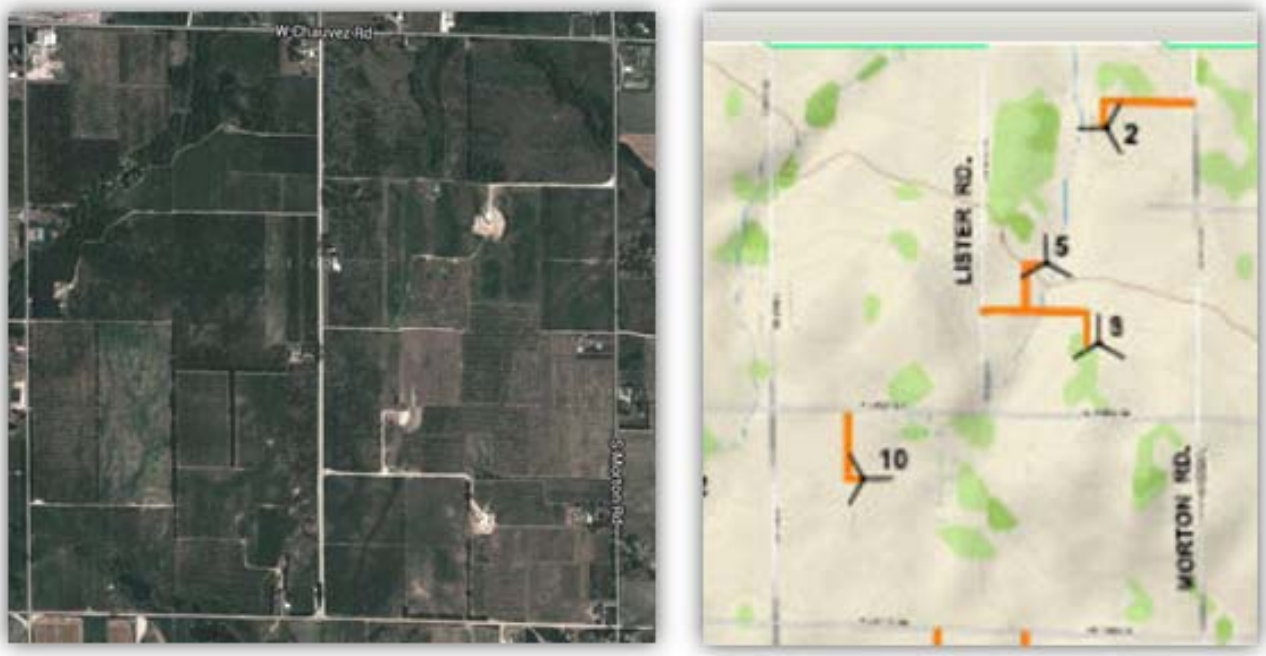


Figure 7 – R&D Site Number 7: Lake Winds WTG-22

A. The DJI S1000

Consumers Energy Company will operate the DJI S1000 with the A2 Flight Control System, manufactured by DJI Innovations (the "S1000"). The S1000 is a battery operated octocopter with a maximum flight time of 25 minutes. The vehicle weighs approximately 8.8 pounds with a maximum takeoff weight of approximately 24 pounds. It has retractable landing gear, vibration dampers, small frame air incline and minimalized gimbal mount, which allows for a 360 degree view from the camera. Although the vehicle's ground speed has a maximum of 45 mph, it will be operated between 5 and 15 miles per hour, and it will operate at or below 500 feet AGL.

The S1000 manufacturer's specifications are shown below in Figure 8. The S1000 is shown below in in Figure 9.

Figure 8 – DJI S1000 Specifications

Frame	
Diagonal Wheelbase	1045mm
Frame Arm Length	386mm
Frame Arm Weight (with Motor, ESC, Propeller)	325g
Center Frame Diameter	337.5mm
Center Frame Weight (with Landing Gear Mounting Base, Servos)	1330g
Landing Gear Size	460mm(Length)×511mm(Width)×305mm(Height) (Top width: 155 mm)
Motor	
Stator Size	41×14mm
kV	400rpm/V
Max Power	500W
Weight (with Cooling Fan)	158g
ESC	
Working Current	40A
Working Voltage	6S LiPo
Signal Frequency	30Hz - 450Hz
Drive PWM Frequency	8KHz
Weight (with Radiators)	35g
Foldable Propeller (1552/1552R)	
Material	High strength performance engineered plastics
Size	15×5.2inch
Weight	13g
Flight Parameters	
Takeoff Weight	6.0Kg ~ 11.0Kg
Total Weight	4.2Kg
Power Battery	LiPo (6S, 10000mAh~20000mAh, 15C(Min))
Max Power Consumption	4000W
Hovering Power Consumption	1500W (@9.5Kg Takeoff Weight)
Hovering Time	15min (@15000mAh& 9.5Kg Takeoff Weight)
Working Environment Temperature	-10 °C ~ +40 °C

Figure 9 – DJI S1000

B. The DJI A2 Flight Control System

The DJI S1000 will be used in conjunction with the A2 multi-rotor stabilization flight control system that provides self-leveling and altitude holding. The A2 is a complete flight control system for various multi-rotor platforms, including the S1000. The A2 provides precise positioning and flight control through its high performance antenna and low noise anti-interference front-end RF design. Notable features of the A2 Flight Control System include:

- **Auto Return-To Home/One Key Go-Home:** If the S1000 disconnects from the A2 during flight, the system's failsafe protection will enable the S1000 to return to home and land automatically. The operator can also setup a One Key Go Home function to activate this feature manually.

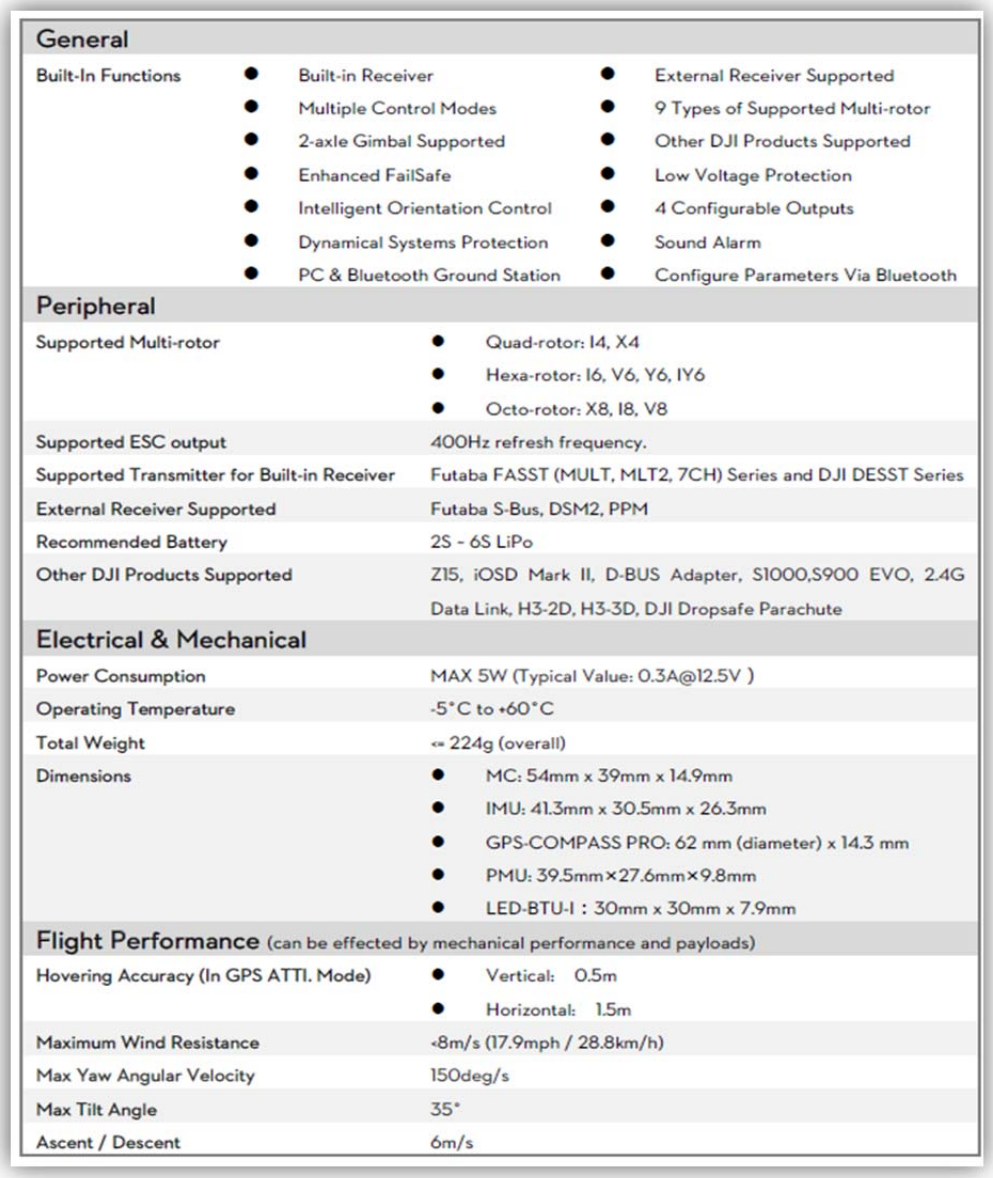
- **Multi-Rotor One-Motor Fail Protection:** When the S1000 is in attitude or GPS attitude mode, and one of the motors stops, the aircraft will retain good attitude and rotate around the frame arm with the stopped motor. In this condition, the S1000 is still under control and returns home safely, highly reducing the risk of a crash.

- **Set Speed Feature:** Ability to lock the S1000 craft into its current horizontal speed.

- **Point of Interest:** Users can record the current position of the S1000 as a point of interest by a preset switch on the remote control. The S1000 can achieve a circling flight around the point of interest with the nose pointing at the POI in an area of 5 meters to 500 meters radius, when the roll command is given. This function is easy to set and simple to operate, it is suitable for all-round shooting of a fixed scenic spot.

The A2's specifications are shown in Figure 10.

Figure 10 – A2's Specifications



General		
Built-In Functions	● Built-in Receiver	● External Receiver Supported
	● Multiple Control Modes	● 9 Types of Supported Multi-rotor
	● 2-axle Gimbal Supported	● Other DJI Products Supported
	● Enhanced FailSafe	● Low Voltage Protection
	● Intelligent Orientation Control	● 4 Configurable Outputs
	● Dynamical Systems Protection	● Sound Alarm
	● PC & Bluetooth Ground Station	● Configure Parameters Via Bluetooth
Peripheral		
Supported Multi-rotor	● Quad-rotor: I4, X4	
	● Hexa-rotor: I6, V6, Y6, IY6	
	● Octo-rotor: X8, I8, V8	
Supported ESC output	400Hz refresh frequency.	
Supported Transmitter for Built-in Receiver	Futaba FASST (MULT, MLT2, 7CH) Series and DJI DESST Series	
External Receiver Supported	Futaba S-Bus, DSM2, PPM	
Recommended Battery	2S - 6S LiPo	
Other DJI Products Supported	Z15, iOSD Mark II, D-BUS Adapter, S1000,S900 EVO, 2.4G Data Link, H3-2D, H3-3D, DJI Dropsafe Parachute	
Electrical & Mechanical		
Power Consumption	MAX 5W (Typical Value: 0.3A@12.5V)	
Operating Temperature	-5°C to +60°C	
Total Weight	≈ 224g (overall)	
Dimensions	● MC: 54mm x 39mm x 14.9mm	
	● IMU: 41.3mm x 30.5mm x 26.3mm	
	● GPS-COMPASS PRO: 62 mm (diameter) x 14.3 mm	
	● PMU: 39.5mm×27.6mm×9.8mm	
	● LED-BTU-I：30mm x 30mm x 7.9mm	
Flight Performance (can be effected by mechanical performance and payloads)		
Hovering Accuracy (In GPS ATTI. Mode)	● Vertical: 0.5m	
	● Horizontal: 1.5m	
Maximum Wind Resistance	≤8m/s (17.9mph / 28.8km/h)	
Max Yaw Angular Velocity	150deg/s	
Max Tilt Angle	35°	
Ascent / Descent	6m/s	

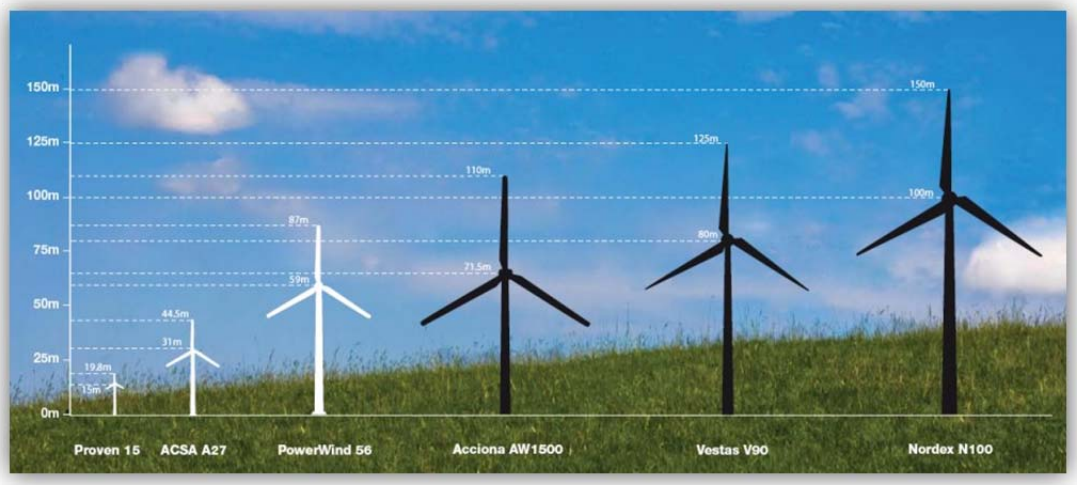
C. Consumer Energy Company's Proposed Operations Demonstrate an Equivalent Level of Safety

1. General Description of Proposed Flight Operations

Consumers Energy Company proposes to operate only on the R&D Sites and within the limitations and performance specifications listed in the Manuals, which are summarized below. These limitations provide for at least an equivalent, or higher, level of safety for operations under the current regulatory structure because the proposed operations represent a safety enhancement to the protocols currently used by Consumers Energy Company for power line and wind turbine monitoring. Moreover, the R&D Sites were specifically chosen as appropriate test grounds to determine the efficacy of using the S1000 on a wider scale.

The proposed operations do not create any hazard to users of the national airspace system or pose a threat to national security. The aircraft is a battery operated octocopter with a maximum flight time of 25 minutes. The vehicle weighs approximately 8.8 pounds with a maximum takeoff weight of approximately 24 pounds. It has retractable landing gear, vibration dampers, and small frame air incline. The vehicle's ground speed has a maximum of 45 mph but it will be operated between 5 and 15 miles per hour, and it will operate at or below 500 feet AGL. The requirement for clearance up to 500 feet AGL is necessitated by the size of the wind turbines on the R&D Sites, which can vary greatly in size and may reach as high as 150 meters, or 492.126 feet AGL, when the blades are positioned vertically. Figure 11, below, shows the varying sizes of exemplar wind turbines.

Figure 11: Wind Turbine Size



Manned aircraft are at risk of fuel spillage and fire in the event of an incident or accident. The S1000 carries no fuel, and therefore the risk of fire following an incident or accident due to fuel spillage is eliminated. Compared to manned aircraft, the unmanned aircraft being operated by the petitioner reduces the risk to participating persons in close proximity to the aircraft due to the limited size, weight, operating conditions, and design safety features of the S1000.

Consumers Energy Company's operations will be in remote areas at least 5 miles from any airport and away from population centers, as demonstrated by Figures 1-6 (the R&D Sites). The S1000 will be operated only on the R&D Sites, which are owned by Consumers Energy Company. Additionally, the wind turbine towers on R&D Sites 3-6 are already subject to obstruction marking, lighting and notification requirements set forth by the FAA.

The FAA has determined that the risk of not having an electronic means to monitor and communicate with other aircraft, such as transponders or sense and avoid technology, is mitigated by placing limits on altitude, requiring stand-off distance from clouds, permitting daytime operations only, and requiring that the aircraft be operated within visual line of sight and yield right of way to all other manned operations. Additionally, the operator will request a NOTAM prior to operations to alert other users of the NAS. *See* Exemption No. 11062, Docket No. FAA 2014-0352, at p. 13, attached hereto as Attachment 6.

The petitioner's aircraft has the capability to operate safely after experiencing certain in-flight failures, as specified above in the description of the A2 Flight Control System. The aircraft is also able to respond to a lost-link event with a pre-coordinated, predictable, automated flight maneuver.

2. Specific Limitations on Proposed Flight Operations

Given the small size involved, the restricted environment within which they will operate, the procedures listed below, and pilot certification requirements, Consumer Energy's proposed operations using the S1000 would "not create a hazard to users of the national airspace system or the public or pose a threat to national security." Reform Act Section 333(b)(1).

1. The aircraft is approximately 8.8 pounds.

2. The aircraft will be identified by serial number, registered with the FAA, and have identification (N-Number) markings as large as practicable.

3. Flights will be operated within visual line of sight of the pilot in command (PIC).

4. Prior to each flight, a zero altitude initiation point will be established and confirmed for accuracy by PIC.

5. Maximum flight time for each operational flight will be 20 minutes.

6. The aircraft will be safely landed with no less than the greater of (a) 20% battery life remaining or (b) five minutes of flight time remaining.

7. The aircraft will be operated during daylight and in VFR conditions.

8. Flights will not exceed 500 feet AGL, so as to accommodate inspections of wind turbines.

9. Flights will be operated at a lateral distance of at least 50 feet from any persons or property not associated with the operation who have not given prior permission.

10. Flights will be limited to a groundspeed of 45 mph.

11. Minimum crew for each flight will consist of a PIC and an Observer.

12. The PIC will possess at least a private pilot certificate, a third class medical certificate, and a designee from Consumers Energy Company will have completed a Factory Certified Basic Operator Course for the S1000.

13. Prior to the flight, a Mission Plan will be created setting forth the limitations for the flight as well as contact information for the PIC.

14. The flight operations will yield the right of way to other manned aircraft operations.

15. All persons who are not involved with Consumer Energy's operations will be required to be at least 500 feet from flight operations.

16. The aircraft will only operate within the R&D Sites.

17. Consumers Energy Company will provide NOTAM details to the FAA 24 hours prior to each flight.

18. All required permissions and permits will be obtained from territory, state, county or city jurisdictions prior to flight.

19. Prior to commencing operations, Consumers Energy Company will obtain a Certificate of Waiver or Authorization (COA) from the FAA.

20. If the aircraft loses communications, it will have the capability to return to a pre-determined location within the operational area and land.

21. If the aircraft loses its GPS signal it will have the capability of being flown manually to a predetermined location within the operational area and land.

22. The flight will be aborted in case of unpredicted obstacles or emergencies.

23. Each flight will be recorded in an Operations Log Book.

24. Maintenance on the aircraft will be recorded in a Maintenance Log Book.

3. Flight Recovery, Lost Communications, and Lost GPS Procedures

The flight recovery, lost communications, and lost GPS procedures are documented above, and are more fully documented in the attached A2 Flight Control System information and Consumers Energy Company Pilot Operating Handbook. (*See* Attachments 3 and 4).

4. Proposed Flight Areas

Consumers Energy Company is requesting to operate in the R&D Sites.

V. SPECIFIC FAR EXEMPTIONS REQUESTED

Consumers Energy Company seeks an exemption from several interrelated provisions of 14 C.F.R. Parts 21, 45, 61, and 91 for purposes of conducting the requested operations using the S1000. Listed below are (1) the specific FAR sections for which exemption is sought, and (2) the operating procedures and safeguards that Consumers Energy Company has established which will ensure a level of safety better than or equal to the rules from which exemption is sought. *See* 14 C.F.R. § 11.81 (e).

A. 14 C.F.R. Part 21, Subpart H – Airworthiness Certificates and 14 C.F.R. § 91.203(a)(1)

The FAA has stated that no exemption is needed from this section if a finding is made under the Reform Act that the UAS selected provides an equivalent level of safety when compared to aircraft normally used for the same application. These criteria are met, and therefore no exemption is needed. *See* Grant of Exemption to Astraeus Aerial, Docket No. FAA 2014-

0352 at 13-14, 22. If, however, the FAA determines that there are some characteristics of the S1000 that fail to meet the requirements of the Reform Act, an exemption is requested.

Equivalent Level of Safety: The S1000 is safe when taking into account its size, weight, speed, and operational capability. The S1000 weighs approximately 8.8 pounds and will be flown at speeds less than 45 miles per hour, in visual line of sight of the operator, and in remote and unpopulated airspace, specifically, on the R&D Sites. The S1000 does not carry pilots, passengers, explosive materials, or flammable liquid fuels. The S1000 will be operated within the parameters of the Manuals.

Consumers Energy Company will also provide the FAA with advance notice of all operations via NOTAM and coordination with the local FSDO. The proposed operations will be at least as safe as, or safer than, conventional rotorcraft operating with an airworthiness certificate without the restrictions and conditions proposed here. The proposed operations will also be as safe, or safer than, traditional power line monitoring and/or wind turbine inspection methods.

B. 14 C.F.R. Part 27 Airworthiness Standards: Normal Category Rotorcraft

14 C.F.R. Part 27 sets forth the procedural requirements for airworthiness certification of normal category rotorcraft. To the extent the S1000 would otherwise require certification under Part 27, Consumers Energy Company seeks an exemption from Part 27's airworthiness standards for the same reasons identified in the request for exemption from 14 C.F.R. Part 21, Subpart H.

C. 14 C.F.R. §§ 45.23(b), 45.27(a) and 91.9(c): Aircraft Marking and Identification Requirements

14 C.F.R. §45.23(b), Markings of the Aircraft states:

> When marks include only the Roman capital letter "N" and the registration number is displayed on limited, restricted or light-sport category aircraft or experimental or provisionally certificated aircraft, the operator must also display on that aircraft near each entrance to the cabin, cockpit, or pilot station, in letters not less than 2 inches nor more than 6 inches high, the words "limited," "restricted," "light-sport, "experimental," or "provisional," as applicable.

14 C.F.R. § 45.27(a) states:

> **Rotorcraft.** Each operator of a rotorcraft must display on that rotorcraft horizontally on both surfaces of the cabin, fuselage, boom, or tail the marks required by § 45.23.

14 C.F.R. § 91.9(c) states:

> No person may operate a U.S.-registered civil aircraft unless that aircraft is identified in accordance with part 45 of this chapter.

In a previous Grant of Exemption, the FAA determined that exemption from these requirements was warranted provided that the aircraft "have identification (N-Number) markings in accordance with 14 CFR part 45, Subpart C if the markings are "as large as practicable." *See* Exemption No. 11062, Docket No. FAA 2014-0352, at p. 14.

Equivalent Level of Safety: Consumers Energy Company will mark all S1000s with their N-Number in a prominent spot on the fuselage with markings that are as large as practicable.

D. 14 C.F.R. § 61.113: Private Pilot Privileges and Limitations

Consumers Energy Company seeks exemption from 14 CFR § 61.113, which restricts private pilots from flying aircraft for compensation or hire and would also require a second class medical certificate. The purpose of Part 61 is to ensure that the skill and competency of any PIC matches the airspace in which the PIC will be operating, as well as requiring certifications if the pilot is carrying passengers or cargo for hire.

While the S1000 will be operated as part of a commercial operation, it carries neither passengers nor cargo. In the Grant of Exemption in FAA Docket No. FAA-2014-0352, the FAA determined that the unique characteristics of UAS operation outside of controlled airspace did not warrant the additional cost and restrictions attendant with requiring the PIC to have a commercial pilot certificate and a class II medical certificate. The FAA has also determined that the required knowledge for a commercial pilot covers the same fundamental principles as a private pilot.

The PIC will possess at least a private pilot certificate, a third class medical certificate, and will have completed a DJI Factory-Certified Basic Operator Course for the S1000. This is a 3-day program that includes ground school and flight training. *See* the Consumers Energy Company S1000 Training Manual for more information on this Course. (Attachment 5.)

The FAA stated in its grant of an exception to Astraeus Aerial the "the FAA considers the overriding safety factor for the limited operations proposed by the petitioner to be the airmanship skills acquired through UAS-specific flight cycles, flight time, and specific make and model experience, culminating in verification through testing." See Exemption No. 11062, Docket No. FAA 2014-0352, at p. 18. The proposed operations can achieve an equivalent level of safety by requiring the knowledge and experience in S1000 operations described above.

Furthermore, the security screening conducted by the Transportation Security Administration of certificated airmen satisfies the statutory requirement of Section 333 for operations to not pose a threat to national security.

The restrictions Consumers Energy Company has placed on its S1000 operations meet or exceed the restrictions similarly imposed on Astraeus Aerial in FAA Docket No. FAA-2014-0352. Consumers Energy Company will operate in restricted areas (the R&D Sites) away from persons and property not involved in the operation. The aircraft will be flown based on VLOS at or below 500 feet AGL, so as to accommodate inspections of wind turbines on R&D Sites 3-6. A NOTAM will be issued at least 24 hours before the flight is to occur, and the flight will be coordinated with the applicable FSDO.

E. 14 C.F.R. § 91.7(a): Civil Aircraft Airworthiness

Consumers Energy Company seeks an exemption from 14 C.F.R. § 91.7(a), which requires that a civil aircraft be in airworthy condition to be operated. The FAA has stated that no exemption is required to the extent that the requirements of Part 21 are waived or found inapplicable. Accordingly, Consumers Energy Company requests that the requirements for Section 91.7 be treated in accordance with FAR Part 21 Subpart H. *See* Grant of Exemption No. 11062, p. 19.

F. 14 C.F.R. § 91.9(b)(2): Civil Aircraft Flight Manual in the Aircraft; 14 C.F.R. §§ 91.203(a) and (b): Carrying Civil Aircraft Certification and Registration

Pursuant to 14 C.F.R. § 91.9(b)(2):

> (b) No person may operate a U.S.-registered civil aircraft -
> …
>
> (2) For which an Airplane or Rotorcraft Flight Manual is required by § 21.5 of this chapter, unless there is available in the aircraft a current approved Airplane or Rotorcraft Flight Manual, approved manual material, markings, and placards, or any combination thereof.

Pursuant to 14 C.F.R. § 91.203(a) and (b):

> (a) Except as provided in § 91.715, no person may operate a civil aircraft unless it has within it the following:
>
> (1) An appropriate and current airworthiness certificate…

> (b) No person may operate a civil aircraft unless the airworthiness certificate required by paragraph (a) of this section or a special flight authorization issued under § 91.715 is displayed at the cabin or cockpit entrance so that it is legible to passengers or crew.

Consumers Energy Company does not request an exemption from this section but instead notifies the FAA that, in accordance with FAA Office of Chief Counsel's Opinion dated August 8, 2014, the UAS flight manual, registration certificate and other documentation will be kept at the control station with the PIC during flight. The Chief Counsel's Office has held that for all UAS operations, this alternate method constitutes full compliance with the regulations. *See also* Grant of Exemption No. 11062, pp. 19-20, and Grant of Exemption No. 8607.

G. 14 C.F.R. § 91.103: Preflight Action

Consumers Energy Company seeks an exemption from 14 C.F.R. § 91.103, which requires a PIC to become familiar with specific information before each flight, including information contained in the FAA-approved Flight Manual on board the aircraft. The aircraft will not have a Flight Manual on board. The PIC will take all actions including reviewing weather, flight battery requirements, landing and takeoff distances and aircraft performance data before initiation of flight. Under these circumstances, the FAA has stated that no exemption is required. *See* Grant of Exemption No. 11062, p. 20. An exemption is requested to the extent that an FAA-approved Flight Manual is required.

Equivalent Level of Safety: An equivalent level of safety will be provided by following the Manuals. The PIC will take all required preflight actions - including performing all required checklists and reviewing weather, flight requirements, battery charge, landing and takeoff distance, aircraft performance data, and contingency landing areas - before initiation of flight. The Manuals will be kept at the ground station with the operator at all times.

H. 14 C.F.R. § 91.109(a): Flight Instruction

Consumers Energy Company seeks an exemption from 14 C.F.R. § 91.109(a), which provides that "[n]o person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls." UASs and remotely piloted aircraft, by their design, do not have functional dual controls. Instead, flight control is accomplished through the use of the A2 Flight Control System/Ground Control Station (GCS) that communicates with the aircraft via radio communications.

Equivalent Level of Safety: When flight instruction is performed, no pilots will be on the aircraft and the GCS will be a safe distance from the aircraft and the public, causing no

safety hazard. Given the size and speed of the S1000, an equivalent level of safe training can still be performed without dual controls because no pilot or passengers are aboard the aircraft, and all persons will be a safe distance away in the event that the aircraft experiences any difficulties during flight instruction. In addition, Consumers Energy Company will conduct flight training at a remote facility away from population centers. These training flights will be conducted on the R&D Sites and will otherwise comply with the provisions in the Manuals. Accordingly, Consumer Energy's proposed method of operation provides superior levels of safety.

I. 14 C.F.R. § 91.119(c): Minimum Safe Altitudes in Uncongested Areas

Consumers Energy Company requests an exemption from the minimum safe altitude requirements of 14 C.F.R. § 91.119(c). Section 91.119(c) prescribes that an aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure. The Manuals provide for operations away from congested populations areas on the R&D Sites, but in close proximity to wind turbines and towers on R&D Sites 306. The FAA has already determined that relief from Section 91.119(c) is warranted for UAS operations in uncongested areas with similar flight restrictions as those imposed by Consumers Energy Company. *See* Grant of Exemption No. 11062, p. 20-21.

Equivalent Level of Safety: Compared to flight operations with rotorcraft weighing far more than the maximum weights proposed herein, and given the lack of flammable fuel, any risk associated with these operations is far less than those that presently exist with conventional aircraft. An equivalent level of safety will be achieved given the size, weight, and speed of the S1000, as well as the locations where it is operated – the R&D Sites. In order to avoid any risk to aircraft, flight operations will be restricted to 500 feet AGL or below. Other aircraft are already prohibited from operating closer than 500 from the wind turbine structures where Consumers Energy Company proses to operate. This is airspace where other aircraft do not normally operate. As set forth in the Manuals and herein, the S1000 will be operated in the remote R&D Sites, away from persons or structures not involved in the operation. All persons who are not involved with Consumers Energy Company's operations will be required to be at least 500 feet from flight operations. This will pose no risk to the public because other aircraft are not operating in these areas.

J. 14 C.F.R. § 91.121: Altimeter Settings

This petition seeks an exemption from 14 C.F.R. § 91.121, which requires a person operating an aircraft to maintain cruising altitude or flight level by reference to an altimeter that is set to the elevation of the departure airport. The S1000 uses both barometric pressure sensors and GPS to determine altitude but does not have the ability to set in a current altimeter

setting. An exemption is required to the extent that the S1000 does not have a barometric altimeter setting. The altitude of the aircraft is monitored by the PIC on the ground control station and by the visual observer.

Equivalent Level of Safety: The FAA has stated that an equivalent level of safety can be achieved if the aircraft will be operated at or below 400 feet AGL and within visual line-of-sight in addition to GPS based altitude information relayed in real time to the operator. *See* Grant of Exemption No. 11062, p. 20-21. As the attached Manuals indicate, the S1000 will be operated at or below 500 feet AGL and otherwise complies with the limitations in the Grant of Exemption No. 11062.

K. 14 C.F.R. § 91.151(a): Fuel Requirements for Flight in VFR Conditions

Consumers Energy Company requests an exemption from 14 C.F.R. § 91.151(a)'s fuel requirements for flight in VFR conditions. Section 91.151 states:

> (a) No person may begin a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed -
>
> (1) During the day, to fly after that for at least 30 minutes; or
>
> (2) At night, to fly after that for at least 45 minutes.

Here, the technological limitations on S1000 battery power means that no meaningful flight operations can be conducted while still maintaining a 30 minute reserve. The aircraft is battery powered with a maximum flight time of 30 minutes. Consumers Energy Company proposes that the maximum flight time for each operational flight will be 25 minutes. The aircraft will be safely landed with no less than the greater of (a) 20% battery life remaining or (b) five minutes of flight time remaining.

Equivalent Level of Safety: The FAA has stated that an equivalent level of safety is provided if the UAS flight is conducted under daytime VFR flight conditions using VLOS, and terminated with at least 25% reserve battery power still available. *See* Grant of Exemption No. 11062, p. 21-22. The Manuals providing an equivalent level of safety by safely landing with no less than the greater of (a) 20% battery life remaining or (b) five minutes of flight time remaining and otherwise complying with the flight restrictions above.

L. 14 C.F.R. §§ 91.405(a), 91.407(a)(l), 91.409(a)(2); 91.417(a) and (b): Maintenance Inspections

Consumers Energy Company seeks an exemption from the maintenance inspection requirements contained in 14 C.F.R. § 91.405(a), 91.407(a)(l), 91.409(a)(2); 91.417(a) and (b). These regulations specify maintenance and inspection standards in reference to 14 C.F.R. Part 43. *See*, *e.g.*, 14 C.F.R. § 91.405(a) (stating that each owner or operator of an aircraft "[s]hall have the aircraft inspected as prescribed in subpart E of this part and shall between required inspections ... have discrepancies repaired as prescribed in part 43 of this chapter"). An exemption from these regulations is needed because Part 43 and these sections only apply to aircraft with an airworthiness certificate, which the S1000 will not have.

Equivalent Level of Safety: An equivalent level of safety will be achieved because maintenance and inspections will be performed in accordance with the Manuals. This includes maintenance, overhaul, replacement, and inspection requirements for the aircraft and procedures to document and maintain maintenance records for the aircraft. This also includes preflight inspection procedures. *See* Exemption No. 11062, Docket No. FAA 2014-0352, at p. 14-15.

As provided in the Manuals, flights will not be conducted unless a flight operations checklist is performed that includes all of the aircraft's components. The Manuals also set requirements for maintenance log books and record keeping as well as routine and post-flight maintenance. The Manuals set requirements for both annual maintenance and preventative maintenance.

VI. PUBLIC INTEREST

Granting Consumer Energy's petition for exemption furthers the public interest. National policy set by Congress favors early integration of UAS into the NAS in controlled, safe working environments such as the R&D Sites proposed in this petition. By granting this petition, the FAA will fulfill Congress's intent of allowing UAS to operate safely in the NAS before completion of the rulemaking required under Section 332 of the Reform Act.

Moreover, use of unmanned aircraft operations will improve power reliability for Consumer Energy's customers by reducing the time necessary to restore power after storm-related damage to the electrical system. The use of the S1000 will also decrease safety-related incidents involving employees working in adverse weather conditions.

Additionally, current inspections of high voltage (HVD) power lines are done one to two times a year by helicopter. Use of the S1000 will allow such inspections at considerable savings, as well as reduce safety risks because the drone will not carry a flammable fuel source. Drones will also allow better visual inspection of facilities installed on poles, as

helicopter inspection usually involves less than 5 seconds of visual inspection of a utility pole.

Further, inspections of lower voltage power (LVD) lines are typically done by motor vehicle or on foot. Due to visibility limitations based on the design of utility poles, a certain portion of the pole and its facilities is never inspected. Using the S1000 to do LVD inspections will increase their effectiveness, decrease their safety risks, and reduce the time needed for the inspection cycle.

Thus, the research and development use proposed here will allow Consumers Energy Company to determine the efficacy of the S1000 for increasing public safety, restoring outages in a safe and timely manner, and creating new methods enabling Consumer Energy's customers to save energy every day.

In addition, unmanned aircraft operations will replace the use of rope access or helicopters and small aircraft to monitor wind turbines. Traditionally, monitoring and inspection of the turbines involves an individual using either a manned aircraft or rope access to climb the large tower in order to visually inspect the turbine's blades for edge erosion, moisture intrusion, freeze/thaw cycling and lightning strikes, among other damage. Knowing the condition of the turbine's blades is essential to maximizing blade life. Thus, the inspections are intended to ensure that wind generation as a whole is both safe and reliable.

Yet performing this vital activity presents significant risk to the individual climbing the turbine or operating the manned aircraft in the vicinity of the turbines. For example, a 2011 newspaper article regarding wind- and solar-powered installations noted accidents involving wind turbines have tripled in the last decade. At least 78 wind-turbine related fatalities have occurred since the 1970s, with more expected as wind installations spread.[1] Use of an unmanned aircraft, like Consumers Energy Company's proposed use of the S1000 would significantly reduce the risk associated with turbine inspection.

The S1000 is approximately 8.8 pounds, carries no passengers or crew, has no flammable fuel, as opposed to larger and more powerful helicopters and small airplanes. The public has an interest in reducing the hazards and emissions associated with alternate use of helicopters and small airplanes to conduct similar inspection operations.

Additionally, Consumer Energy's intended uses for the S1000 have real-world benefits for the renewable energy industry and the public at large. Through the R&D Sites, Consumers

[1] "More Accidents Feared as Wind, Solar-Powered Installations Spread," 8/14/2011 Los Angeles Times article located online at http://www.toledoblade.com/Energy/2011/08/14/More-accidents-feared-as-wind-solar-power-installations-spread.html.

Energy Company may ultimately determine that it will be able to inspect and survey wind turbine blades and towers supporting the renewable energy industry. The use of the S1000 will also reduce the risks to human life associated with the traditional use of rope access for these operations. This program may prevent accidents and injuries, and there is a strong public interest in making these operations more safe and effective through the use of UASs.

VII. PRIVACY

All flights will occur over the R&D Sites, owned by Consumers Energy Company. All flights will be conducted in accordance with any federal, state or local laws regarding privacy.

VIII. SUMMARY FOR FEDERAL REGISTER

Pursuant to 14 C.F.R. Part 11, the following summary is provided for publication in the Federal Register, should it be determined that publication is needed:

Consumers Energy Company seeks an exemption from the following rules for the commercial operation of a small unmanned aerial system to inspect wind turbine blades and towers for the renewable energy industry: 14 C.F.R Part 21, Subpart H; 14 C.F.R Part 27; 14 C.F.R § 45.23(b); 14 C.F.R. § 45.27(a); 14 C.F.R § 61.113; 14 C.F.R § 91.7(a); 14 C.F.R § 91.9(b)(2); 14 C.F.R § 91.9(c); 14 C.F.R § 91.103; 14 C.F.R § 91.109(a); 14 C.F.R § 91.119; 14 C.F.R § 91.121; 14 C.F.R § 91.151(a) & (b) 14 C.F.R § 91.203 (a) & (b); 14 C.F.R § 91.405(a); 14 C.F.R § 91.407(a)(l); 14 C.F.R § 91.409(a)(2); 14 C.F.R § 91.417 (a) & (b).

The exemption will enhance safety by reducing risk to the operator, the general public and property owners from the substantial hazards associated with performing equivalent work using traditional rope access or using conventional aircraft and rotorcraft.

IX. ATTACHMENTS

Attachment 1: Consumers Energy Company Operations, Inspection, and Maintenance Manual

Attachment 2: DJI S1000 User Manual

Attachment 3: A2 Flight Control System User Manual

Attachment 4: Consumers Energy Company S1000 Pilot Operating Handbook

Attachment 5: Consumers Energy Company S1000 Training Manual

Attachment 6: Exemption No. 11062, Docket No. FAA 2014-0352

Attachments 2 and 3 are confidential documents submitted under 14 C.F.R. § 11.35(b) and are exempt from disclosure under the Freedom of Information Act, 5 U.S.C. § 552 et seq., and any other requirements established by the FAA pursuant to Section 333 of the Reform Act). If you have any questions or require any additional information, please do not hesitate to contact the undersigned attorneys for Consumers Energy Company.

X. CONCLUSION

Satisfaction of the criteria provided in Section 333 of the Reform Act - size, weight, speed, operating capabilities, proximity to airports and populated areas, operation within visual line of sight, and national security considerations - provides more than adequate justification for the grant of the requested exemptions to permit Consumers Energy Company to operate the S1000 on the R&D Sites.

Granting the requested exemption will benefit the public interest as a whole in many ways, including (1) significantly improving safety and reducing risk by alleviating human exposure to danger; (2) improving the quality of services Consumers Energy Company can provide to its customers; and (3) decreasing operating costs compared with traditional power line monitoring and wind turbine inspection.

Respectfully submitted,
Morrison & Foerster LLP
Counsel for Consumers Energy Company

By 

William V. O'Connor
William D. Janicki
Joanna L. Simon
Morrison & Foerster LLP
12531 High Bluff Drive, Suite 100
San Diego, CA 92130-2040
Telephone: (858) 720-5100
Facsimile: (858) 720-5125
woconnor@mofo.com
wjanicki@mofo.com
joannasimon@mofo.com