

**BEFORE THE
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C.**

IN THE MATTER OF

Petition of Ars Electronica Linz GmbH for Exemption

Docket Number: FAA-2014-1095

COMMENTS OF THE SMALL UAV COALITION

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July 13, 2015

Filed with www.regulations.gov

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Introduction

The Small UAV Coalition¹ is pleased to provide its comments in support of the petition for exemption submitted by Perkins Coie LLP on behalf of Ars Electronica Linz GmbH (ARS) under section 333 of the FAA Modernization and Reform Act of 2012 (“the Act”). ARS, in cooperation with the Intel Corporation,² proposes to operate as many as 100 or more Hummingbird AscTec small unmanned aerial vehicles and systems (“UAV” and “UAS”) for the purpose of conducting light shows. Members of the Small UAV Coalition share an interest in advancing regulatory and policy changes that will permit the operation of small UAVs in the near term, within and beyond the line of sight, with varying degrees of autonomy, for commercial, consumer, recreational and philanthropic purposes.

We applaud the Federal Aviation Administration (“FAA”) for recently accelerating the pace of exemptions, as well as reforming the terms and conditions for such exemption, although the Coalition believes there are many additional steps the FAA can take to improve the section 333 process and broaden the authority to conduct commercial operations. In particular, we believe the FAA has the authority and the discretion to approve Ars’ petition and accordingly permit: (1) commercial operations to be conducted by a person who does not hold a private, recreational, or sport pilot certificate; (2) highly automated operations under the operational control of a

¹ Members of the Small UAV Coalition include 3D Robotics, Aerialtronics, AirMap, Airware, AGI, Amazon Prime Air, Botlink, DJI Innovations, Drone Deploy, EHang, Flirtey, Google[x] Project Wing, GoPro, HAZON Solutions, Intel, InterMedia Development Corporation, Kespry, Parrot, PrecisionHawk, Sky-Futures, SkyWard IO, SkyPan, Strat-Aero, Verifly, and Zero Tech.

² Intel is a member of the Coalition.

certificated pilot; (3) operations from dusk until the end of twilight; and (4) operations of 30-35 UAVs by a single flight controller; (5) operations close to airports; and (6) operations closer than 500 feet from persons not involved with the operations, with appropriate protections.

The Coalition supports Ars' petition in full. By virtue of both operational limitations and technological capabilities, Ars has operated several light shows in other countries without an accident or major incident. Indeed, Ars made operational adjustments in response to a few minor incidents at previous light shows that will minimize the risk of collisions among the UAVs or with structures.

Ars will conduct its light shows within a cylindrical airspace less than 1,100 feet in diameter, below 400 feet AGL, and within the visual line of sight of the operators. The Hummingbird UAV weighs less than 2 pounds fully loaded and flies slower than 6 knots during a light show. The light show occurs within two concentric geo-fencing barriers as well as an outer "exclusion zone" for additional protection for persons in attendance.

With respect to technological capabilities in addition to geo-fencing, the position and altitude of the UAVs are controlled by an automated flight control system; UAVs fly between preprogrammed GPS position and altitude waypoints. There is lost link and emergency home protocols in the event of a loss of GPS signal or command and control link.

The Coalition also believes that Ars' successful performances in other countries show the safety and reliability of its UAS light show operations. We address below each issue in which Ars seeks authority beyond what the FAA has permitted in its standard conditions and limitations of section 333 exemption.

- (1) Commercial operations may be flown by a person who does not hold a private, recreational, or sport pilot certificate.

We believe the FAA should follow the provision in its sUAS proposed rule and require only that such an operator successfully conclude an aeronautical knowledge test that addresses the particular skills needed safely to operate the particular small UAS(s) the operator intends to fly.

As the Coalition has stated in many previous comments submitted in support of section 333 petitions, pilot certification is neither required by law nor necessary for small UAV operations. The FAA's position that the law does not allow the FAA to waive the requirement of a UAV operator to hold an *airman certificate* is at odds with the text of section 333 and, also at odds with the FAA's grant of authority under 333 to *private pilot* certificate holders to conduct *commercial* operations. Although 49 U.S.C. 44711 requires an "aircraft" operator to hold an airman certificate, section 333 is a more recent enactment and provides explicit authority to the FAA to exempt a UAV operator from *any* certification requirement. Section 333 instructs the FAA to consider whether to require airworthiness certificates, certificates of waiver, and certificates of authorization, "*at a minimum.*" (Emphasis added.) Thus, Congress vested FAA with discretion to waive certificate requirements other than an airworthiness certificate, including airman and medical certificates.

Even if the pilot certification requirement is not waived, FAA has plenary exemption authority under section 44701(f) to exempt UAV operators from the particular requirements of Parts 61 and 67 – such as the requirement to conduct flight training on board an aircraft – and develop airman certification requirements specifically designed for small UAV operations. Applying manned aircraft pilot certification requirements to small UAVs is not necessary as a matter of safety, and does not make sense as a matter of public policy. The FAA has implicitly recognized this in its sUAS NPRM. Without a change in section 47111, the FAA is proposing to authorize a pilot to conduct commercial operations without obtaining a private, recreational, or sport pilot certificate. The FAA believes its proposed concept of an *unmanned aircraft operator certificate* meets the statutory requirement for an *airman certificate*.

Accordingly, the FAA has discretion to waive or exempt the pilot certification requirements with respect to small UAS operators and should do so here. Ars will use a certificated pilot to exercise operational control and supervise the flight controllers, who will be sufficiently trained in operating the Hummingbird and in the light show formations but will not themselves hold a pilot or medical certificate. Applying manned aircraft pilot certification requirements to small unmanned aircraft is not necessary as a matter of safety, and does not make sense as a matter of public policy. The Coalition believes the FAA should apply its proposal to its section 333 exemption authority, and grant Ars' request in this regard.

- (2) Highly automated operations under the operational control of a certificated pilot should be authorized.

Ars has made a sufficient showing that, based on its experience with other light shows, its geofencing, lost link and emergency home capabilities, and its operational limitations, automated formation flights of up to 100 or more Hummingbird UAVs should be authorized. The oversight of such automated operations by flight controllers means that automation remains under the ultimate control of a human operators who themselves operate the computer commands.

- (3) Operations from dusk until the end of twilight should be authorized.

A standard condition of a section 333 exemption is that the operations must occur between sunrise and sunset. This condition is also reflected in proposed section 107.29. In comments the Coalition submitted in response to the sUAS proposed rule, we have urged the FAA to authorize nighttime operations of UAS upon an equivalent level of safety demonstration, in consideration of technological capabilities of the sUAS – including lighting equipage – the capability of the UAS operator, the presence of one or more visual observers, the particular use scenario, and the operating environment, including the degree of illumination. Here, Ars will be flying the UAVs as part of a light show, and proposes to do so only from dusk to the end to twilight. With these operating environment protections, the Coalition believes that operations during this period of the evening should be permitted.

- (4) Operations of 30-35 UAVs by a single flight controller should be authorized in these circumstances.

The FAA proposes to limit the operation of sUAS to a single person in proposed section 107.35. In comments to the sUAS proposed rule, the Coalition suggests the FAA should authorize a

sUAS operator to operate more than one UAV at a time, at least initially on a case-by-case basis, through a showing of the operator's capability, in tandem with the technological capabilities of the sUAS. Given Ars' successful operation of up to 49 UAVs simultaneously by a few flight controllers, and its successful operations at nine other light shows in which , we believe the FAA should authorize operations of up to 35 UAVs by a single flight controller in the heavily controlled setting of a light show as Ars has proposed. Ars states that "unmanned formation flight demonstrates the ability of numerous unmanned aircraft to fly in small spaces near populated areas using sophisticated flight control technology and helps promote public acceptance of unmanned aircraft systems, especially in novel use cases that were not possible with manned aircraft." The Coalition agrees. This experience will assist the FAA and industry in developing the standards and protocols for safe operation of multiple UAVs by a single operator with the aid of preprogramming and automation.


(5) Operations close to airports should be authorized with appropriate protections.

The Coalition supports the FAA's proposal to adopt a functional, risk-based standard in place of a required minimum distance from airports. Ars' statement that it or Intel will coordinate with ATC and the operator of any airport within 5 miles of the flight area well in advance of the flight" provides sufficient assurance that light show operations proximate to airports will not interfere with airport operations.

(6) Operations closer than 500 feet to persons not involved with the operation should be authorized with appropriate protections.

Ars recognizes that it will conduct its light shows closer to the audience than the 500 foot margin provided in 14 C.F.R. 91.119(c) and in section 333 exemptions, but maintains that the 65 meter "safety buffer" provided in the "exclusion zone" assures safety because it is intended to ensure that any UAV that may inadvertently leave the geo-fencing area will land safely well inside the exclusion zone. We note also that the audience will be alert to the UAVs being operated as part of the light show. Moreover, the weight to the Hummingbird is well under the micro UAS limit the FAA is considering adopting in the sUAS rulemaking. In the preamble to its proposed rule, FAA suggests that a micro UAV, because of its light weight and slower speed (here, 6 knots is well under the FAA's suggested maximum of 30 knots), may be safely operated *over* people not involved with the operation. We believe similarly that the Hummingbird UAVs may be safely operated *in front of* people not involved with the operation, under the protections Ars will implement.

Accordingly, the Small UAV Coalition strongly supports Ars' petition and recommends that it be granted.



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