

## Supporting Statement UAS Market Survey

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### **B. Statistical Methods**

#### **1. Describe the potential respondent universe.**

Potential universe is UAS engineers, operators, instructors, and managers who have submitted waivers to the FAA to conduct UAS air carrier operations, who have submitted Part 107 waiver applications to operate UAS outside the limits of Part 107 (but not as air carrier operations), were identified in an academic/training faculty search as having recently taught UAS-related courses, or individuals known to our group who specifically deal with UAS pilots and/or training. Recipients of the survey invitation link are encouraged to forward the link to colleagues. The size of this potential universe can be estimated from the number of Part 107 Waivers issued, reflecting the number of UAS pilots who wish to operate their aircraft outside current regulatory limits. Between August 31, 2016 and July 29, 2020, the FAA has issued 4,479 waivers<sup>1</sup>.

#### **2. Describe the procedures for the collection of information.**

*Statistical methodology for stratification and sample selection:* Because the questions in the survey ask about UAS air carrier operations that are still new, the strategy employed here is to cast a “wide net” of individual experience/knowledge and to probe as variable viewpoints regarding UAS operations (including UAS air carrier operations) as possible. The sample consists of names compiled from publicly available docket on the Federal Register (which identifies corporations who received blanket waivers from Part 107), the FAA’s publicly-available Part 107 waivers website (which identifies individuals who have been granted waivers from Part 107)<sup>2</sup>, Google searches<sup>3</sup>, and names provided by the research sponsors and contractors. To accommodate electronic distribution, only those individuals with email addresses on file will be included in the initial sample list (n=381). Participants will also be encouraged to share the survey link with their colleagues who were not included on the initial sample list.

*Estimation procedure:* Since the survey link can be shared outside of the initial sample list, we will not be able to calculate a response rate. There are 4 main stakeholder groups (UAS pilots/operators, UAS instructors, managers, and UAS cargo/sensor operators) and 2 additional groups (engineers and other crewmembers). The survey will remain open for 90 days or until quotas for each stakeholder group have been reached (UAS pilots/operators (n=40), UAS instructors (n=40), managers (n=40), UAS cargo/sensor operators (n=40), engineers (n=10), and other crewmembers (n=10) whichever comes first. This survey does not require statistical significance tests. However, for the purposes of estimation, a G\*Power analysis suggests that 40 participants per group would result in a power of 0.8, providing a statistically representative

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<sup>1</sup> [https://www.faa.gov/uas/commercial\\_operators/part\\_107\\_waivers/waivers\\_issued/](https://www.faa.gov/uas/commercial_operators/part_107_waivers/waivers_issued/)

<sup>2</sup> In particular, the FAA’s Part 107 waivers website did not contain complete email contact information. Company and Individual (applicant) names were entered into Google searches to identify missing email addresses. Names and addresses that did not result in a hit (i.e., no associated website) were excluded because it is likely that these companies or individuals are no longer in business or operating UAS, and thus would not be able to provide information on current practices as required by the survey.

<sup>3</sup> Searches include combinations of keywords: UAS, drone, instructor, teacher, pilot, engineer

sample of the population. The additional groups of engineers and other crewmembers are included to provide additional assurance of generalizability.

*Degree of accuracy needed for the purpose described in the justification:* Not applicable. This survey does not sample a single well-defined population.

*Unusual problems requiring specialized sampling procedures:* None

*Any use of periodic (less frequent than annual) data collection cycles to reduce burden:* This survey is a one-time data collection.

### **3. Describe methods to maximize response rates.**

The survey will remain open for 90 days or until all stakeholder quotas have been met. To achieve the desired quotas, the following actions will be taken:

- Respondents will be compensated (paid) for time spent in completing the survey.
- Invitation email containing an anonymous link will be sent to the initial sample list; recipients of the invitation email will be encouraged to forward the email to colleagues who work with UAS.
- A follow-up email will be sent to remind contacts on the initial sample list to take the survey and to encourage them to forward the invitation to colleagues. The reminder message will be sent to all email addresses on the contact list and is not limited to non-respondents. The reminder will be sent approximately halfway through the data collection period (i.e., 45 days after beginning the collection period).

*Methods to assess generalizability:* This data collection represents an initial “wide net” approach to understanding the state of UAS operations today. This is ensured through the use of quotas described above.

### **4. Describe tests of procedures and methods to be undertaken.**

Survey instrument was reviewed by a group of experienced FAA researchers and sponsors for clarity of instructions and technical details. In addition, pilot testing was conducted with SMEs in the UAS Office and conducted within the research team to evaluate the quality of the survey. Feedback from all vested parties was discussed, incorporated, and reviewed again to develop the proposed survey.

### **5. Provide the names of consultants and the person who will collect and analyze the information.**

The survey design and analysis will be conducted under the direction of Dr. Tom Nesthus [tom.nesthus@faa.gov or (405) 954-6297] and Dr. Kevin Williams [kevin.williams@faa.gov or (405) 954-6843], Engineering Research Psychologists, located at the Civil Aerospace Medical Institute, in Oklahoma City, OK.

The survey will be distributed and the data will be collected by an in-house contractor, Cherokee Nation 3S. Their point of contact will be Janine King (janine.ctr.king@faa.gov).