

Appendix B

Biological Resources and Agency Consultation



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

Aviation Safety

800 Independence Ave., SW.

Washington, DC 20591

Ms. Grace Trankina
Nebraska Ecological Services Field Office
9325 South Alda Road
Wood River, NE 68883

**SUBJECT: Endangered Species Act Section 7 Consultation for Drone Commercial Package
 Delivery Operations in Nebraska
 Project Code: 2026-0064551**

In accordance with Section 7 of the Endangered Species Act (ESA), the Federal Aviation Administration (FAA) is requesting U.S. Fish and Wildlife Service (USFWS) concurrence that the FAA's action of authorizing Amazon Prime Air (Prime Air) to conduct commercial drone package delivery operations from a Prime Air Drone Delivery Center (PADDC) located in Nebraska (the Proposed Action), is **Not Likely to Adversely Affect**, tricolored bat (*Perimyotis subflavus*), and northern long-eared bat (*Myotis septentrionalis*). Additionally, the Proposed Action would have **No Effect** on the Piping Plover (*Charadrius melodus*), pallid sturgeon (*Scaphirhynchus albus*), western regal fritillary (*Argynnis idalia occidentalis*), Suckley's cuckoo bumble bee (*Bombus suckleyi*), monarch butterfly (*Danaus plexippus plexippus*), and western prairie fringed orchid (*Platanthera praeclara*). Our biological evaluation is provided below, including a brief background, project description, identification of the action area, and a discussion of potential effects to ESA-listed species.

Project Description

Prime Air is seeking authorization to conduct commercial package deliveries using drones in one location in the Omaha Nebraska area. Prime Air intends to introduce its drone delivery capabilities in 2026 and has requested the FAA to authorize the operation of its MK30 drone, so it can provide drone package delivery services across its operating area. The proposed MK30 operating area and PADDC are depicted in **Attachment A**.

Prime Air anticipates flying up to 1,000 MK30 drone flights per operating day from one PADDC in the Omaha area, with each flight taking a package to a customer delivery address before returning to the PADDC. The number of flights per day would vary based on customer demand and weather conditions. Prime Air is taking an incremental approach to operations and expects to gradually ramp up to approximately 1,000 flights per day per PADDC as consumer demand increases over time. Drone flights could be conducted up to 365 days a year between 6:00 A.M. and 10:30 P.M., but, due to optical sensor requirements, operations would be limited to between civil morning and evening twilight.

Unmanned Aircraft

As pictured in **Attachment B**, the MK30 drone is a hybrid multicopter fixed-wing tail-sitter drone with six propulsors allowing it to take off and land vertically and transition to wing borne flight. Its airframe is composed of staggered tandem wings for stable wing borne flight. The drone weighs approximately 78 pounds and has a maximum takeoff weight of approximately 83 pounds, which includes a maximum package payload of 5 pounds. It has a maximum operating range of 7.5 miles (or about 15 minutes) and can fly up to 58 knots (67 miles per hour) during wing-borne flight. It uses electric power from rechargeable lithium-ion batteries and is launched vertically using powered lift and converts to using wing lift during en route flight. The MK30 is equipped with collision avoidance technology to help avoid conflicts with other aircraft and drones; however, no effective technology exists that can be used to help avoid collisions with wildlife.

Flight Operations

The MK30 drone would generally be operated at an altitude between 180 and 377 feet above ground level (AGL). The outbound en route altitude to a delivery location is expected to be flown between 180 and 279 feet AGL. The inbound en route altitude is expected to be flown between 279 and 377 feet back to the PADDC. At a delivery location, the drone would descend vertically to a stationary hover and drop a package to the ground. Once a package has been delivered, the drone would ascend vertically to the inbound transition altitude and depart the delivery area while climbing to the en route altitude to return to the PADDC. The PADDC is a controlled area wherein drone flights are launched and recovered. The drone would fly a predefined flight path that is set prior to takeoff. Flight missions would be automatically planned by Prime Air's flight planning software, which assigns, deconflicts, and routes each flight. In accordance with FAA safety requirements, the drone would avoid operating over areas with dense human populations, such as over roadways, public gathering spots, etc.

As depicted in **Attachment C**, the MK30 drone's operational flight profile includes the following phases:

Takeoff

Once a package is loaded onto the MK30 drone and the drone is cleared for departure from the PADDC, the drone takes off from the ground vertically to an altitude of about 115 feet AGL and then transitions and climbs to its en route altitude of about 200 feet AGL (ranges from 180 and 279 feet AGL). The takeoff phase of flight would last less than one minute and result in maximum noise exposure levels (L_{max}) of approximately 70 dB at a distance of 75 feet from the PADCC. These noise levels are equivalent to the noise generated from a household vacuum cleaner at a distance of ten feet.

En Route Outbound

The en route outbound phase is the part of flight in which the MK30 drone transits from the PADDC to a delivery point on a predefined flight path. During this flight phase, the drone will typically operate at a typical en route altitude of 200 feet AGL with a typical airspeed of 58 knots (67 miles per hour). Noise levels generated from enroute outbound flight would be approximately 60 dB L_{max} at a distance of 76 feet abeam the drone's flight path and are equivalent to the noise generated from normal speech at a distance of 3 feet.

Delivery

The delivery phase consists of descent from the en route altitude to a delivery point to deliver a package. The MK30 drone transitions and descends to about 140 feet AGL and then vertically descends to about 13 feet AGL while maintaining position over the delivery point. The drone hovers while dropping the package and then proceeds to climb vertically back to the inbound transition altitude of

197 feet AGL. The MK30 then transitions and climbs to its en route inbound altitude of 345 feet AGL (ranges from 279 to 377 feet AGL). The delivery phase of flight would last approximately one minute and result in noise levels of approximately 69 dB Lmax at a distance of 75 feet from the delivery location. These noise levels are nearly identical to those generated during takeoff and would be equivalent to a household vacuum cleaner at a distance of ten feet.

En Route Inbound

The MK30 drone continues to fly at a typical altitude of about 345 feet AGL with at a speed of 67 mph towards the PADDC. Noise levels generated from enroute outbound flight would be nearly identical to those from enroute inbound flight with an Lmax of approximately 61 dB at a distance of 76 feet abeam the drone's flight path.

Landing

The drone decelerates as it approaches the PADDC and descends to the transition altitude of 197 feet AGL and where it transitions from horizontal flight to vertical flight, coming to a zero-speed position over its assigned landing pad. The MK30 drone slowly vertically descends over its assigned landing pad and lands on the pad. Noise levels generated from landing would be nearly identical to those generated from takeoff with an Lmax of approximately 70 dB at a distance of 75 feet from the PADCC.

Predicted Sound Levels

Based on a noise analysis using sound level measurement data for the MK30 drone, the estimated maximum sound exposure level (SEL) for the takeoff, delivery, and landing phases of flight is approximately 90.5 (at 20 feet), 92.1 (at 25 feet), and 91.8 dB (at 20 feet), respectively. Predicted sound levels decrease as distances from the drone increase. The maximum SEL for the en route phase is approximately 63.7 dB when the drone at an altitude of 200 feet AGL and flying at approximately 58 knots (67 miles per hour). The detailed noise analysis is provided as **Attachment D**.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR § 402.02). For this Proposed Action, the action area is defined as Prime Air's proposed MK30 operating area, as depicted in Attachment A. This area capture all possible flight routes to the delivery areas and where potential effects (e.g., visual, auditory, physical) to listed species could occur.

The operating area is located within the Western Corn Belt Plains Nebraska/Kansas Loess Hills USEPA Level IV Ecoregion. The Proposed Action within this ecoregion would take place largely over high to medium density developed urban and commercial areas in the northern half of the operating area and the majority of the southern portion of the operating area consisting of agricultural use. A small portion of the southern edge operating area occurs over the Platte River. Therefore, wildlife habitats within the operating area predominantly include parks, a few open spaces, waterways, and vacant lands. These areas provide habitat for many of the more common fauna in the region, including white tailed deer, coyotes, raccoons, wild turkeys, and black-tailed prairie dogs.

The Nebraska/Kansas Loess Hills includes lands from south of South Sioux City to Omaha, west of the Missouri River, and lands from Omaha, south of the Platte River to Leavenworth, Kansas, and east of the Platte River to east of Columbus, Nebraska. The entirety of the OMA2 PADDC operating area is located within this ecoregion. The greater relief and deep loess hills of the Nebraska/Kansas Loess Hills are markedly different from the flat alluvial valley of neighboring Missouri Alluvial Plain. Dissected hills with

deep, silty, well drained soils supported a potential natural vegetation of tallgrass prairie with scattered oak-hickory forests along stream valleys. Cropland agriculture is now common and ample precipitation in the growing season supports dryland agriculture, with only a few areas requiring irrigation.

ESA-Listed Species and Critical Habitat in the Action Area

The FAA acquired the Official Species List (see **Attachment E**) from the USFWS Information for Planning and Conservation (IPaC) online system to identify ESA-listed, proposed, and candidate species within the action area (**Table 1**). The action area does not contain designated critical habitat for any species.

Table 1. ESA-Listed Species and Species Proposed for Listing, Potentially Present in the Action Areas

Species	Common Name	Species Name	Federal Status	Critical Habitat
Mammals	Tricolored bat	<i>Perimyotis subflavus</i>	Proposed Endangered	N
	Northern long-eared bat	<i>Myotis septentrionalis</i>	Endangered	N
Birds	Piping Plover	<i>Charadrius melodus</i>	Endangered	N
Fish	Pallid Sturgeon	<i>Scaphirhynchus albus</i>	Endangered	N
Insects	Western regal fritillary	<i>Argynnis idalia occidentalis</i>	Proposed Threatened	N
	Suckley's cuckoo bumble bee	<i>Bombus suckleyi</i>	Proposed Endangered	N
	Monarch butterfly	<i>Danaus plexippus</i>	Proposed Threatened	N
Plants	Western prairie fringed orchid	<i>Platanthera praeclara</i>	Threatened	N

SOURCE: USFWS IPaC, accessed March 2026.

Potential Effects of the Proposed Action on ESA-Listed and Species Proposed for Listing

Drone noise, visual presence, and the potential for airborne strikes with flying species are the Proposed Action's potential stressors or threats to ESA-listed species. Flight operations would take place mostly in an urban environment, within airspace, and typically remain well above the tree line while en route to and from the PADDCC. The duration of exposure by wildlife on the ground to visual or noise impacts from the drone would be of very short duration (approximately 30 seconds during takeoff/landing and delivery and a few seconds during the en route phase).

As noted above, the highest estimated SEL associated with Prime Air's proposed operations is 92.1 dB, which would occur during a delivery. For reference, the sound level of a diesel truck at 50 feet or a noisy urban environment during the day is approximately 80 to 90 dB. The SEL on the ground when the drone is at an altitude of 200 feet AGL is estimated to be around 63.7 dB, which is comparable to the sound of an air conditioning unit at 100 feet (60 dB). The MK30 drone is expected to operate at altitudes higher than 200 feet AGL during en route flight; as such, the en route sound level is expected to be less than 63.7 dB.

A descriptor for noise effects on wildlife has not been universally adopted, but some research indicates SEL is the most useful predictor of responses. Characteristic of the bulk of research to date has been lack of systematic documentation of the source noise event. Many studies report "sound levels" without specifying the frequency spectrum or duration. A notable exception is a study sponsored by U.S. Air Force that identifies SEL as the best descriptor for response of domestic turkey poults to low-altitude aircraft overflights (Bradley et al. 1990). This study identified a threshold of response for disturbance of

domestic turkeys (“100 percent rate of crowding”) as SEL 100 dB. None of the predicted sound levels for the different flight phases exceed SEL 92.1 dB.

Since noise levels are not anticipated to impact wildlife, no ground disturbance is proposed, and there will be no impacts to streams or aquatic habitats; it is anticipated that there would be **no effect** on terrestrial or aquatic species including the fish or plant species listed in **Table 1**. The following paragraphs describe the anticipated effects of the Proposed Action on the remaining ESA-listed and proposed-listed species.

Mammals

Federally listed bat species including the northern long-eared bat, and the tricolored bat, which is proposed for listing, may be located within the operating area. The Proposed Action would include drone operations up until 10:30 p.m., which is anticipated to overlap with the dusk emergence of bat activity; however, drone operations will not affect the dawn civil twilight hours. The MK30 drone is not equipped nor is it authorized to operate in periods of darkness (before Morning Civil Twilight or after Evening Civil Twilight). Although operations may occur during dusk emergence, the listed bat species typically forage in areas near water or along forested edges. Research suggests that drones have “minimal impact on bat behavior” and that bats do not appear to be disturbed by drones. Also, the risk of bat conflicts is only present for three to six months each year (when bats are not hibernating). Bats at roost or in flight could experience drone noise during the en route and delivery flight phases. Bats foraging at or near the tree line at the time a drone flies by would experience the greatest sound levels. Roosting bats or bats foraging near the ground at the time a drone flies by would experience lower sound levels. Given the estimated sound levels of the drone, the drone’s linear flight profile to and from the PADDC and delivery locations, the short period of time the drone would be in any particular location, and the low probability of encountering an individual bat in the operating area, drone noise is not expected to adversely affect bats. Any increase in ambient sound levels caused by the drone’s flight would only last a few seconds during the en route phase and approximately 49 seconds during delivery. Given the bat’s ability to avoid flying into objects, the brief amount of time the drone would be in a single location, and the low probability of encountering a bat during operations, the likelihood of a drone striking a bat is extremely low.

A DKey determined the Action would have no effect on the northern long-eared bat, and the tricolored bat. However, DKeys were not originally intended for use in drone delivery projects. Therefore, based on an abundance of caution effect determinations are being made outside of the DKey. Based on (1) operations occurring mostly in an urban environment, (2) the altitude at which the drone flies in the en route phase (180 to 377 feet AGL), (3) the expected low sound levels experienced by a bat, (4) the short duration of any increases in ambient sound levels, (5) the low probability of a listed bat species occurring in the operating area, and (6) the low likelihood of the drone striking a bat, the FAA has determined that the Proposed Action is **Not Likely to Adversely Affect** the northern long-eared bat and tricolored bat.

Piping Plover

The Piping Plover has a moderate potential to occur within the operating area, particularly during the breeding season (mid-April–August). Occurrence is most likely along the Platte River in undeveloped or protected beaches or sandbar areas with minimal human disturbance. Due to the nature of the

Proposed Action, which will occur primarily in the airspace above developed urban and suburban environments with avoidance measures maintaining buffers from sensitive shoreline areas, the project determination for the species is **No Effect**.

Pallid sturgeon

The project does not include any ground disturbance to natural areas and no modifications to wetlands or water bodies. Activities associated with the Proposed Action are anticipated to have **No Effect** on the pallid sturgeon.

Insects

The western regal fritillary is a federally threatened grassland species that typically flies low over vegetation and is unlikely to be encountered during drone flights. The Proposed Action is not expected to affect the species' life cycle; therefore, it would have **No Effect** on the western regal fritillary.

Suckley's cuckoo bumble bee, a federally proposed endangered species, is known to occur in variety of habitats across North America. The species typically flies low over vegetation and is unlikely to be encountered during drone flights. The Proposed Action is not expected to affect its life cycle; therefore, it would have **No Effect** on Suckley's cuckoo bumble bee.

The monarch butterfly, a proposed threatened species, has the potential to occur in the operating areas. Information regarding drone impacts on insects is limited and there have been no widespread negative impacts identified in scientific literature. Some research shows that monarch butterflies are not commonly observed at higher AGL altitudes (generally between 1 and 300 feet) and would not be expected to frequently occur at the altitudes where Prime Air is proposing to operate. Because the project will not alter milkweed availability, floral resources, or habitat structure, and monarchs generally fly well below typical drone operating altitudes, it is not anticipated to affect the life cycle or habitat of the monarch butterfly. Therefore, it is anticipated that the Action will have **No Effect** on the monarch butterfly.

Western prairie fringed orchid

Since the operations would continue to occur within airspace only, and there would be no construction or ground disturbance under the proposed action, it is anticipated that there would be **No Effect** on the federally threatened Western prairie fringed orchid identified within the USFWS IPaC official species list.

Conclusion

Based on the analysis above, the FAA has determined the following:

- There is no critical habitat, or proposed critical habitat, for any listed species, located within the action areas.
- The action areas are mostly urbanized, with minimal suitable habitat for the ESA-listed species identified in them.
- Any increase in ambient sound levels would be short in duration.
- Drone dwell/hover time during takeoff and delivery would be less than one minute.

- Drones would generally operate at an altitude between 200 and 345 feet AGL.
- Drone activity would be highly concentrated over developed areas, where there is consumer demand for drone delivery service.
- Based on all of these factors, the probability of a drone/wildlife interaction would be low.

It is important to note that Prime Air has been performing similar drone delivery operations at its Tolleson, AZ facility, for more than two years. A recent assessment of drone maintenance and telemetry records indicates zero instances of drone/wildlife collisions over the course of more than 8,000 delivery operations.

Accordingly, the FAA has determined the Proposed Action is ***Not Likely to Adversely Affect*** the tricolored bat and northern long-eared bat. The FAA has also determined that the Proposed Action would have ***No Effect*** on the Piping Plover, pallid sturgeon, western regal fritillary, Suckley's cuckoo bumble bee, monarch butterfly, and western prairie fringed orchid.

Because the delivery of commercial goods by drones is an emerging technology and its potential effects on wildlife are still not well understood, Prime Air is proposing to implement an "Biological Monitoring Program" for this project, which would include:

- Record and analyze daily maintenance and telemetry records to document any potential drone/wildlife interactions,
- If applicable, report wildlife movement / activity in and around airport property that may be obtained from operations or wildlife management staff from nearby airports.
- If applicable, recover and analyze potential biological materials (e.g., snarge, feathers, etc.), generally in accordance with existing protocols used in cases of aircraft bird strikes at airports
- Report findings to the USFWS on an annual basis

The proposed Biological Monitoring Program would serve as a useful tool for Prime Air, the FAA, and USFWS to better understand the possible interactions between drones and wildlife.

The FAA appreciates your review of the proposed project and requests your concurrence with (1) our "may affect" determination as stated above and (2) implementation of the proposed Biological Monitoring Program within 30 days of receiving this letter. If you have any questions, please contact Christopher Hurst via email at 9-faa-drone-environmental@faa.gov.

Sincerely,

Joseph K. Hemler Jr Digitally signed by Joseph K.
Hemler Jr
Date: 2026.05.14 06:28:23 -04'00'

Joseph Hemler
Manager, General Aviation and Commercial Branch (AFS-752)
Emerging Technologies Division
Office of Safety Standards, Flight Standards Service

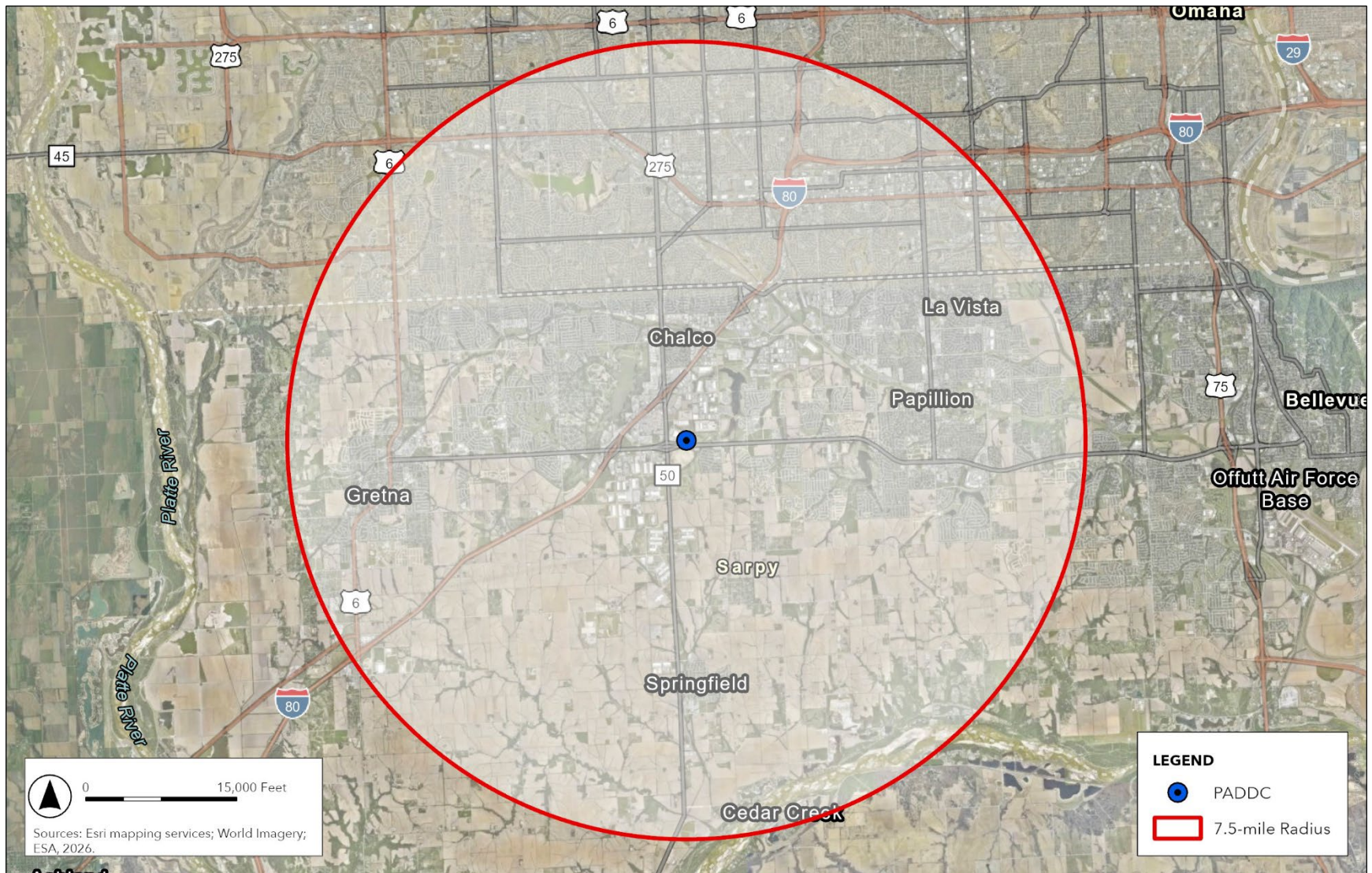
Attachments:

Attachment A – Proposed MK30 Operating Areas
Attachment B – MK 30 Drone
Attachment C – MK30 Drone Flight Profile
Attachment D – Technical Noise Report
Attachment E – Official Species List

References

- August, T. and T. Moore. 2008. Autonomous Drones Are a Viable Tool for Acoustic Bat Surveys. Available: <https://www.biorxiv.org/content/10.1101/673772v1.full.pdf>. Accessed April 2026.
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- Gibo, David L. Altitudes attained by migrating monarch butterflies, *Danaus p. plexippus* (Lepidoptera: Danaidae), as reported by glider pilots. Available: <https://cdnsiencepub.com/doi/10.1139/z81-084ppus> (Lepidoptera: Danaidae), as reported by glider pilots. Accessed February 2026.
- U.S. Department of Agriculture, Natural Resources Conservation Service. *Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin* (USDA Handbook 296, 2006).
- USEPA, Ecoregion Download Files by State - Region 7. Available at: <https://www.epa.gov/eco-research/ecoregion-download-files-state-region-7>. Accessed April 2026.
- USFWS. 2020. *Species Status Assessment Report for the Monarch Butterfly (Danaus plexippus plexippus)*. U.S. Fish and Wildlife Service, Midwest Region.
- USFWS. Available: <https://www.fws.gov/species/tricolored-bat-perimyotis-subflavus>. Accessed: March 2026.

Attachment A
Proposed MK30 Drone Operating Area



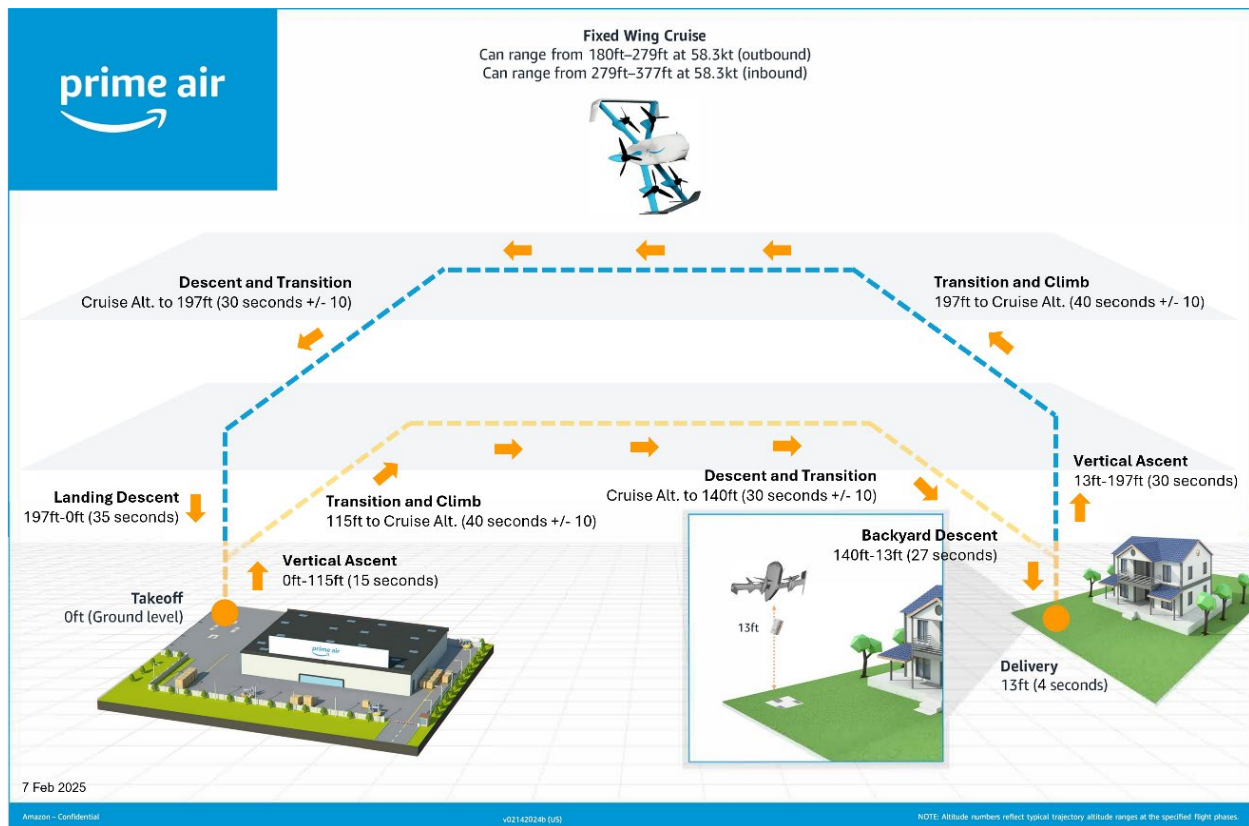
OMA2 PADDCC Action Area

Attachment B
MK30 Drone



Amazon Prime Air MK30 Drone

Attachment C
MK30 Drone Flight Profile



MK30 Drone Flight Profile

Attachment D
Technical Noise Report

The Technical Noise Report included in the original agency consultation has been omitted from this appendix, but can be found in Appendix E.

Attachment E
Official Species List



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Nebraska Ecological Services Field Office
9325 B South Alda Rd., Ste B
Wood River, NE 68883-9565
Phone: (308) 382-6468 Fax: (308) 384-8835
<https://fws.gov/office/nebraska-ecological-services>

In Reply Refer To:

03/18/2026 21:00:40 UTC

Project Code: 2026-0064551

Project Name: Amazon Drone Delivery - Omaha OMA2

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the [IPaC website](#) at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may

affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the [Endangered Species Consultation Handbook](#) or at our [Nebraska Ecological Services Field Office - Project Review and Planning webpage](#). **For recommendations to minimize the effects of project actions on federally listed species or designated critical habitat, please view the [Nebraska Ecological Service's Field Office Conservation Measures Technical Assistance Guide](#).**

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Project Consultation Code in the header of this letter (i.e., YEAR-XXXXXXX) with any request for consultation or correspondence about your project that you submit to our office.

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Act, there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts and permitting see <https://www.fws.gov/program/migratory-bird-permit>

It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on threats to birds and recommended conservation measures visit <https://www.fws.gov/library/collections/threats-birds>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit:

<https://www.federalregister.gov/documents/2012/10/03/2012-24433/migratory-bird-conservation-executive-order-13186>

Platte River System: The Platte River, its tributaries, and associated wetland habitats are resources of national importance. Due to the cumulative effect of many water depletion projects

in the Platte River basin, the Service considers any direct or indirect depletion of flows from the Platte River system to be significant and will continue to further deteriorate the already stressed habitat conditions. Federal agencies must consult with the Service under section 7 of the ESA for projects in Nebraska that may lead to water depletions or have the potential to impact water quality in the Platte River system, because these actions may affect threatened and endangered species inhabiting the downstream reaches of these river systems. The federally listed species that could be impacted from Platte River water depletions include the federally endangered Whooping Crane (*Grus americana*), and Pallid Sturgeon (*Scaphirhynchus albus*); the threatened Piping Plover (*Charadrius melodus*) and Western Prairie Fringed Orchid (*Platanthera praeclara*). In general, depletions include evaporative losses and/or consumptive use of surface or groundwater within the affected basin, often characterized as diversions minus return flows. Project elements that could be associated with depletions include, but are not limited to: borrow sites, ponds, lakes, and reservoirs (e.g., for detention, recreating, irrigation, storage, stock watering, municipal storage, and power generation); hydrostatic testing of pipelines; wells; dust abatement; diversion structures; and water treatment facilities. For more information on consultation requirements for the Platte River species, please visit <https://fws.gov/partner/platte-river-recovery-implementation-program>.

Nebraska Nongame and Endangered Species Conservation Act: Federally listed species protected under the Endangered Species Act are also state-listed under the Nebraska statute, the Nebraska Nongame and Endangered Species Conservation Act. There may be state-listed species affected by the proposed project that are not federally listed. To determine if the proposed project may affect state-listed species, the Service recommends that the project proponent contact the Nebraska Game and Parks Commission (NGPC) Planning and Program Division located at 2200 North 33rd Street Lincoln, Nebraska 68503-0370. For more information and to request an environmental review from the NGPC, visit their Environmental Review website at <http://outdoornebraska.gov/environmentalreview/> for instructions and contact information.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Nebraska Ecological Services Field Office

9325 B South Alda Rd., Ste B

Wood River, NE 68883-9565

(308) 382-6468

PROJECT SUMMARY

Project Code: 2026-0064551

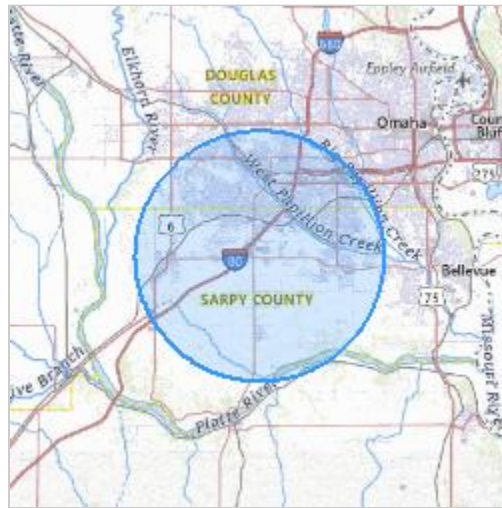
Project Name: Amazon Drone Delivery - Omaha OMA2

Project Type: Drones - Use/Operation of Unmanned Aerial Systems

Project Description: Drone delivery

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@41.14873085,-96.13182903061991,14z>



Counties: Cass , Douglas , and Sarpy counties, Nebraska

ENDANGERED SPECIES ACT SPECIES

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045 General project design guidelines: https://ipac.ecosphere.fws.gov/project/LQUTAWF2GVCRZKNFPMVBKWDROI/documents/generated/9357.pdf	Endangered
Tricolored Bat <i>Perimyotis subflavus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515 General project design guidelines: https://ipac.ecosphere.fws.gov/project/LQUTAWF2GVCRZKNFPMVBKWDROI/documents/generated/9357.pdf	Proposed Endangered

BIRDS

NAME	STATUS
Piping Plover <i>Charadrius melodus</i> Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened

FISHES

NAME	STATUS
Pallid Sturgeon <i>Scaphirhynchus albus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7162 General project design guidelines: https://ipac.ecosphere.fws.gov/project/LQUTAWF2GVCRZKNFPMVBKWDROI/documents/generated/8697,9357.pdf	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> There is proposed critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743 General project design guidelines: https://ipac.ecosphere.fws.gov/project/LQUTAWF2GVCRZKNFPMVBKWDROI/documents/generated/8697,9357.pdf	Proposed Threatened
Suckley's Cuckoo Bumble Bee <i>Bombus suckleyi</i> Population:	Proposed Endangered

NAME	STATUS
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10885 General project design guidelines: https://ipac.ecosphere.fws.gov/project/LQUTAWF2GVCRZKNFPMVBKWDROI/documents/generated/9357.pdf	
Western Regal Fritillary <i>Argynnis idalia occidentalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/12017	Proposed Threatened

FLOWERING PLANTS

NAME	STATUS
Western Prairie Fringed Orchid <i>Platanthera praeclara</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1669 General project design guidelines: https://ipac.ecosphere.fws.gov/project/LQUTAWF2GVCRZKNFPMVBKWDROI/documents/generated/8697,9357.pdf	Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act ² and the Migratory Bird Treaty Act (MBTA) ¹. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

1. The [Bald and Golden Eagle Protection Act](#) of 1940.

2. The [Migratory Birds Treaty Act](#) of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your [project](#) area.

Measures for Proactively Minimizing Eagle Impacts

For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the [National Bald Eagle Management Guidelines](#). You may employ the timing and activity-specific distance recommendations in this document when designing your project/activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to [Bald Eagle Nesting and Sensitivity to Human Activity](#).

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional [Migratory Bird Office](#) or [Ecological Services Field Office](#).

If disturbance or take of eagles cannot be avoided, an [incidental take permit](#) may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the [Do I Need A Permit Tool](#). For assistance making this determination for golden eagles, please consult with the appropriate Regional [Migratory Bird Office](#) or [Ecological Services Field Office](#).

Ensure Your Eagle List is Accurate and Complete

If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the [Supplemental Information on Migratory Birds and Eagles](#), to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read ["Supplemental Information on Migratory Birds and Eagles"](#), specifically the FAQ section titled "Proper

Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)

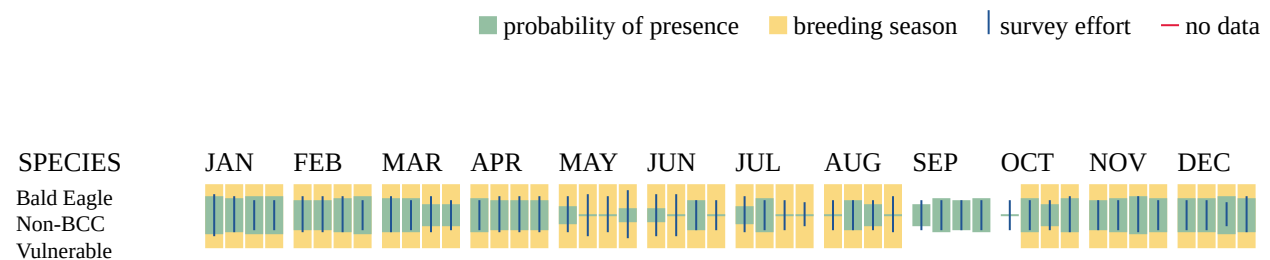
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)

Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (—)

A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) ¹ prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Golden-plover <i>Pluvialis dominica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10561	Breeds elsewhere
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink <i>Dolichonyx oryzivorus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9454	Breeds May 20 to Jul 31
Cerulean Warbler <i>Setophaga cerulea</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 21 to Jul 20
Chimney Swift <i>Chaetura pelagica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Eastern Whip-poor-will <i>Antrostomus vociferus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10678	Breeds May 1 to Aug 20
Grasshopper Sparrow <i>Ammodramus savannarum perpallidus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8329	Breeds Jun 1 to Aug 20

NAME	BREEDING SEASON
Hudsonian Godwit <i>Limosa haemastica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9482	Breeds elsewhere
Kentucky Warbler <i>Geothlypis formosa</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9443	Breeds Apr 20 to Aug 20
Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Pectoral Sandpiper <i>Calidris melanotos</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9561	Breeds elsewhere
Prairie Loggerhead Shrike <i>Lanius ludovicianus excubitorides</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8833	Breeds Feb 1 to Jul 31
Prothonotary Warbler <i>Protonotaria citrea</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9439	Breeds Apr 1 to Jul 31
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Ruddy Turnstone <i>Arenaria interpres morinella</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/10633	Breeds elsewhere
Rusty Blackbird <i>Euphagus carolinus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9478	Breeds elsewhere
Semipalmated Sandpiper <i>Calidris pusilla</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9603	Breeds elsewhere

NAME	BREEDING SEASON
Short-billed Dowitcher <i>Limnodromus griseus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Upland Sandpiper <i>Bartramia longicauda</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9294	Breeds May 1 to Aug 31
Wood Thrush <i>Hylocichla mustelina</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "[Supplemental Information on Migratory Birds and Eagles](#)", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)

Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)

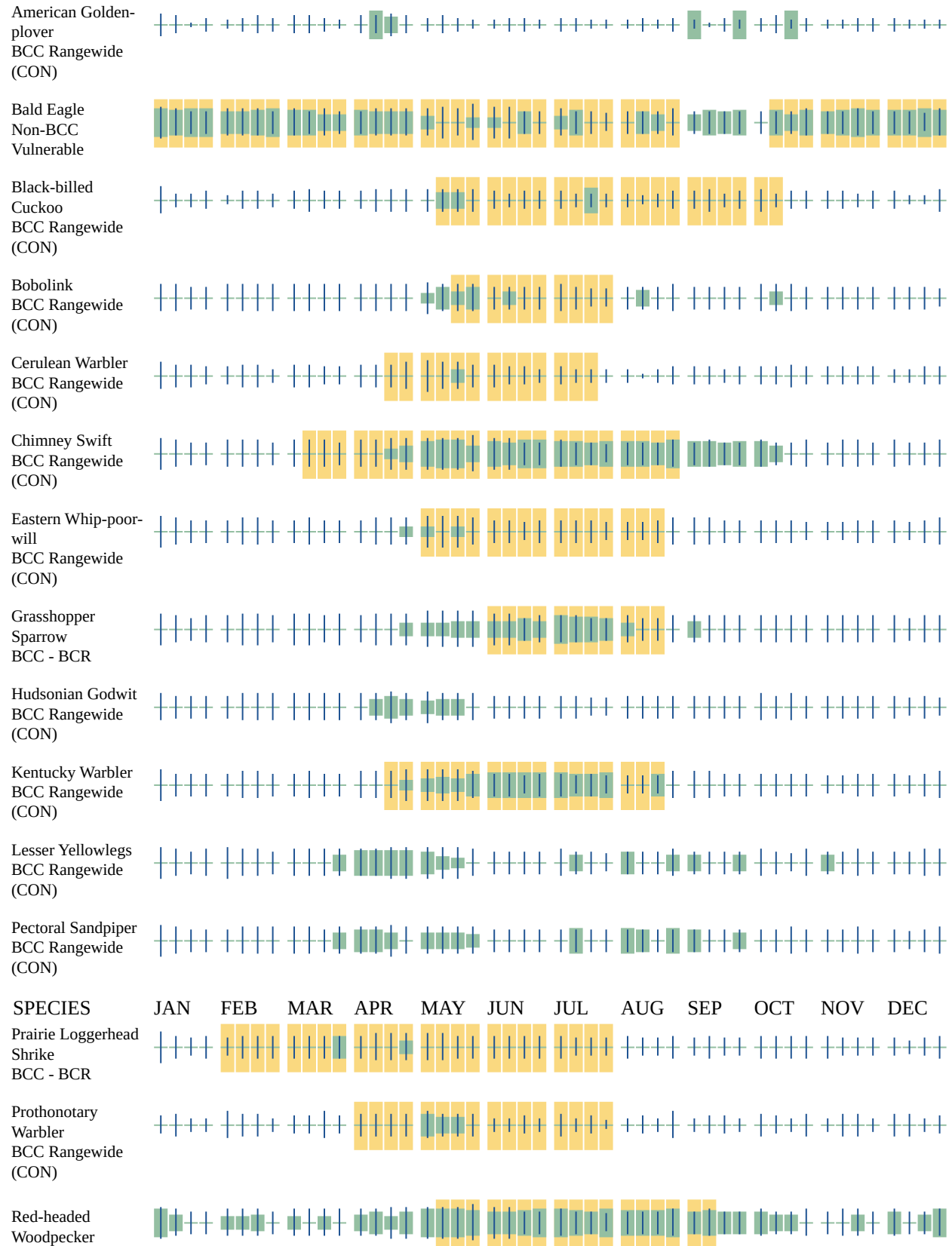
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (—)

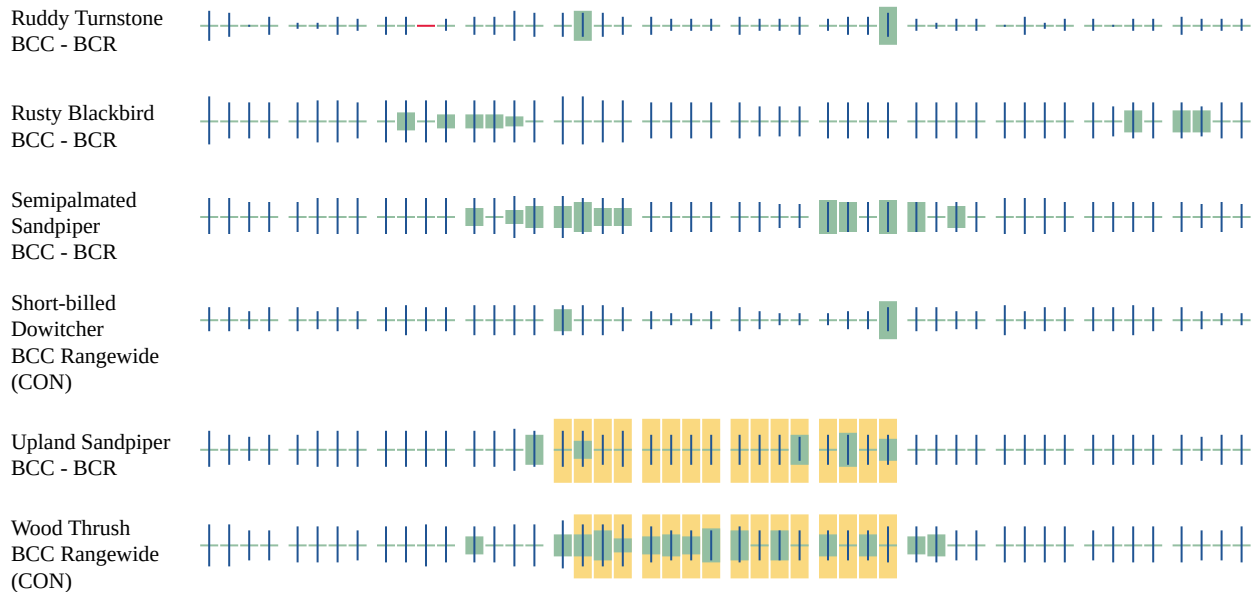
A week is marked as having no data if there were no survey events for that week.

■ probability of presence ■ breeding season | survey effort — no data

SPECIES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC



BCC Rangewide (CON)



Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

WETLANDS

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

LAKE

- L1UBHh
- L2USC_x

- L1UBHx

FRESHWATER POND

- PUBFx
- PUSCx
- PABF
- PABFh
- PUSCh
- PUBGx
- PUSAh
- PUBFh
- PABFx
- PUSAx
- PUSC

FRESHWATER EMERGENT WETLAND

- PEM1A
- PEM1Cx
- PEM1Ch
- PEM1Ah
- PEM1Ax
- PEM1C
- PEM1Fh

RIVERINE

- R4SBC
- R2UBH
- R2UBG
- R4SBA
- R4SBCx
- R2UBGx
- R5UBH
- R2USA
- R2USC

FRESHWATER FORESTED/SHRUB WETLAND

- PSSA
- PFOAh
- PFOAx
- PSSAx

- PFOA

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Alexandra Hipolito
Address: 5404 Cypress Center Drive
Address Line 2: 125
City: Tampa
State: FL
Zip: 33609
Email: ahipolito722@gmail.com
Phone: 7745733623

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Federal Aviation Administration



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Nebraska Ecological Services Field Office
9325 B South Alda Rd., Ste B
Wood River, NE 68883-9565
Phone: (308) 382-6468 Fax: (308) 384-8835
<https://fws.gov/office/nebraska-ecological-services>

In Reply Refer To:

03/18/2026 20:53:59 UTC

Project code: 2026-0064551

Project Name: Amazon Drone Delivery - Omaha OMA2

Federal Nexus: yes

Federal Action Agency (if applicable): Federal Aviation Administration

Subject: Record of project representative's no effect determination for 'Amazon Drone Delivery - Omaha OMA2'

Dear Alexandra Hipolito:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on March 18, 2026, for 'Amazon Drone Delivery - Omaha OMA2' (here forward, Project). This project has been assigned Project Code 2026-0064551 and all future correspondence should clearly reference this number. **Please carefully review this letter.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project.

Failure to accurately represent or implement the Project as detailed in IPaC or the **Northern Long-eared Bat and Tricolored Bat Range-wide Determination Key (Dkey)**, invalidates this letter. ***Answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid.***

Determination for the Northern Long-Eared Bat and/or Tricolored Bat

Based upon your IPaC submission and a standing analysis, your project has reached the following effect determinations:

Species	Listing Status	Determination
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Northern Long-eared Bat (<i>Myotis septentrionalis</i>)	Endangered	No effect
Tricolored Bat (<i>Perimyotis subflavus</i>)	Proposed	No effect
	Endangered	

Federal agencies must consult with U.S. Fish and Wildlife Service under section 7(a)(2) of the Endangered Species Act (ESA) when an action *may affect* a listed species. Tricolored bat is proposed for listing as endangered under the ESA, but not yet listed. For actions that may affect a proposed species, agencies cannot consult, but they can *confer* under the authority of section 7(a)(4) of the ESA. Such conferences can follow the procedures for a consultation and be adopted as such if and when the proposed species is listed. Should the tricolored bat be listed, agencies must review projects that are not yet complete, or projects with ongoing effects within the tricolored bat range that previously received a NE or NLAA determination from the key to confirm that the determination is still accurate.

To make a no effect determination, the full scope of the proposed project implementation (action) should not have any effects (either positive or negative), to a federally listed species or designated critical habitat. Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (See § 402.17).

Under Section 7 of the ESA, if a federal action agency makes a no effect determination, no consultation with the Service is required (ESA §7). If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required except when the Service concurs, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat [50 CFR §402.02, 50 CFR§402.13].

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination key for the northern long-eared bat and tricolored bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Monarch Butterfly *Danaus plexippus* Proposed Threatened
- Pallid Sturgeon *Scaphirhynchus albus* Endangered
- Piping Plover *Charadrius melodus* Threatened
- Suckley's Cuckoo Bumble Bee *Bombus suckleyi* Proposed Endangered
- Western Prairie Fringed Orchid *Platanthera praeclara* Threatened
- Western Regal Fritillary *Argynnis idalia occidentalis* Proposed Threatened

You may coordinate with our Office to determine whether the Action may affect the animal species listed above and, if so, how they may be affected.

Next Steps

If there are no updates on listed species, no further consultation/coordination for this project is required with respect to the species covered by this key. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions occurs, additional coordination with the Service should take place to ensure compliance with the Act.

If you have any questions regarding this letter or need further assistance, please contact the Nebraska Ecological Services Field Office and reference Project Code 2026-0064551 associated with this Project.

Compliance with Nebraska Nongame and Endangered Species Conservation Act Federally listed species protected under the Endangered Species Act are also state-listed under the Nebraska state statute, the Nebraska Nongame and Endangered Species Conservation Act. To determine if the proposed project may affect state-listed species, the Service recommends that the project proponent contact the Nebraska Game and Parks Commission (NGPC) Planning and Program Division located at 2200 North 33rd Street Lincoln, Nebraska 68503-0370. To request an environmental review from the NGPC, visit their Environmental Review website at <http://outdoornebraska.gov/environmentalreview/> for instructions.

Action Description

You provided to IPaC the following name and description for the subject Action.

1. Name

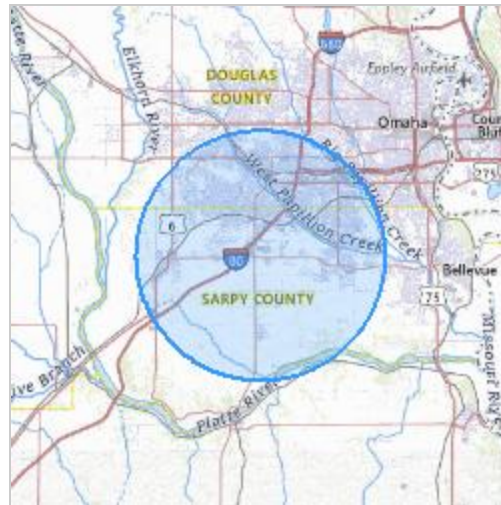
Amazon Drone Delivery - Omaha OMA2

2. Description

The following description was provided for the project 'Amazon Drone Delivery - Omaha OMA2':

Drone delivery

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@41.14873085,-96.13182903061991,14z>



DETERMINATION KEY RESULT

Based on the information you provided, you have determined that the Proposed Action will have no effect on the species covered by this determination key. Therefore, no consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required for those species.

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of listed bats or any other listed species?

Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

No

2. Is the action area wholly within Zone 2 of the year-round active area for northern long-eared bat and/or tricolored bat?

Automatically answered

No

3. Does the action area intersect Zone 1 of the year-round active area for northern long-eared bat and/or tricolored bat?

Automatically answered

No

4. Does any component of the action involve leasing, construction or operation of wind turbines? Answer 'yes' if the activities considered are conducted with the intention of gathering survey information to inform the leasing, construction, or operation of wind turbines.

No

5. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

Note for projects in Pennsylvania: Projects requiring authorization under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act would be considered as having a federal nexus. Since the U.S. Army Corps of Engineers (Corps) has issued the Pennsylvania State Programmatic General Permit (PASPGP), which may be verified by the PA Department of Environmental Protection or certain Conservation Districts, the need to receive a Corps authorization to perform the work under the PASPGP serves as a federal nexus. As such, if proposing to use the PASPGP, you would answer 'yes' to this question.

Yes

6. Is the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), or Federal Transit Administration (FTA) funding or authorizing the proposed action, in whole or in part?

No

7. Are you an employee of the federal action agency or have you been officially designated in writing by the agency as its designated non-federal representative for the purposes of Endangered Species Act Section 7 informal consultation per 50 CFR § 402.08?

Note: This key may be used for federal actions and for non-federal actions to facilitate section 7 consultation and to help determine whether an incidental take permit may be needed, respectively. This question is for information purposes only.

No

8. Is the lead federal action agency the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC)? Is the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC) funding or authorizing the proposed action, in whole or in part?

No

9. Is the lead federal action agency the Federal Energy Regulatory Commission (FERC)?

No

10. [Semantic] Is the action area located within 0.5 miles of a known bat hibernaculum or winter roost? Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your state wildlife agency.

Automatically answered

Yes

11. Does the action area contain any winter roosts or caves (or associated sinkholes, fissures, or other karst features), mines, rocky outcroppings, or tunnels that could provide habitat for hibernating bats?

No

12. Does the action area contain (1) talus or (2) anthropogenic or naturally formed rock shelters or crevices in rocky outcrops, rock faces or cliffs?

No

13. Will the action cause effects to a bridge?

Note: Covered bridges should be considered as bridges in this question.

No

14. Will the action result in effects to a culvert or tunnel at any time of year?

No

15. Are trees present within 1000 feet of the action area?

Note: If there are trees within the action area that are of a sufficient size to be potential roosts for bats answer "Yes". If unsure, additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>.

Yes

16. Does the action include the intentional exclusion of bats from a building or building-like structure? **Note:** Exclusion is conducted to deny bats' entry or reentry into a building. To be effective and to avoid harming bats, it should be done according to established standards. If your action includes bat exclusion and you are unsure whether northern long-eared bats or tricolored bats are present, answer "Yes." Answer "No" if there are no signs of bat use in the building/structure. If unsure, contact your local Ecological Services Field Office to help assess whether northern long-eared bats or tricolored bats may be present. Contact a Nuisance Wildlife Control Operator (NWCO) for help in how to exclude bats from a structure safely without causing harm to the bats (to find a NWCO certified in bat standards, search the Internet using the search term "National Wildlife Control Operators Association bats"). Also see the White-Nose Syndrome Response Team's guide for bat control in structures.

No

17. Does the action involve removal, modification, or maintenance of a human-made building-like structure (barn, house, or other building) **known or suspected to contain roosting bats?**

No

18. Will the action cause construction of one or more new roads open to the public?

For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

No

19. Will the action include or cause any construction or other activity that is reasonably certain to increase average night-time traffic permanently or temporarily on one or more existing roads? **Note:** For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.). .

No

20. Will the action include or cause any construction or other activity that is reasonably certain to increase the number of travel lanes on an existing thoroughfare?

For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

No

21. Will the proposed Action involve the creation of a new water-borne contaminant source (e.g., leachate pond, pits containing chemicals that are not NSF/ANSI 60 compliant)?

Note: For information regarding NSF/ANSI 60 please visit <https://www.nsf.org/knowledge-library/nsf-ansi-standard-60-drinking-water-treatment-chemicals-health-effects>

No

22. Will the proposed action involve the creation of a new point source discharge from a facility other than a water treatment plant or storm water system?

No

23. Will the proposed action involve blasting or drilling?

No

24. Will the action involve military training (e.g., smoke operations, obscurant operations, exploding munitions, artillery fire, range use, helicopter or fixed wing aircraft use at night)?

No

25. Will the proposed action involve the use of herbicides or pesticides (e.g., fungicides, insecticides, or rodenticides)?

No

26. Will the action include or cause activities that are reasonably certain to cause chronic or intense nighttime noise (above current levels of ambient noise in the area) in suitable summer habitat for the northern long-eared bat or tricolored bat during the active season?

Chronic noise is noise that is continuous or occurs repeatedly again and again for a long time. Sources of chronic or intense noise that could cause adverse effects to bats may include, but are not limited to: road traffic; trains; aircraft; industrial activities; gas compressor stations; loud music; crowds; oil and gas extraction; construction; and mining.

Note: Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>.

No

27. Does the action include, or is it reasonably certain to cause, the use of permanent or temporary artificial lighting within 1000 feet of suitable forested northern long-eared bat or tricolored bat roosting habitat? **Note:** Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>.

No

28. Will the action include tree cutting or other means of knocking down or bringing down trees, tree topping, or tree trimming?

No

29. Will the proposed action result in the use of prescribed fire?

Note: If the prescribed fire action includes other activities than application of fire (e.g., tree cutting, fire line preparation) please consider impacts from those activities within the previous representative questions in the key. This set of questions only considers impacts from flame and smoke.

No

30. Does the action area intersect the northern long-eared bat species list area?

Automatically answered

Yes

31. [Semantic] Is the action area located within 0.5 miles of radius of an entrance/opening to any known NLEB hibernacula or winter roost? Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

Automatically answered

Yes

32. Is suitable summer habitat for the northern long-eared bat present within 1000 feet of project activities?

If unsure, answer "Yes."

Note: Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>.

Yes

33. Has a presence/probable absence summer bat survey targeting the northern long-eared bat following the Service's [Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines](#) been conducted within the project area?

No

34. Does the action area intersect the tricolored bat species list area?

Automatically answered

Yes

35. Is the action area located within 0.5-mile of radius of an entrance/opening to any known tricolored bat hibernacula or winter roost?

Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your state wildlife agency.

Automatically answered

Yes

36. Has a presence/probable absence bat survey targeting the [tricolored bat and following the Service's Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines](#) been conducted within the project area?

No

37. Is suitable summer habitat for the tricolored bat present within 1000 feet of project activities?

(If unsure, answer ""Yes."")

Note: If there are trees within the action area that may provide potential roosts for tricolored bats (e.g., clusters of leaves in live and dead deciduous trees, Spanish moss (*Tillandsia usneoides*), clusters of dead pine needles of large live pines) answer ""Yes."" For a complete definition of suitable summer habitat for the tricolored bat, please see Appendix A in the [Service's Range-wide Indiana Bat and Northern long-eared Bat Survey Guidelines](#).

Yes

38. Do you have any documents that you want to include with this submission?

No

PROJECT QUESTIONNAIRE

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Lead Agency: Federal Aviation Administration



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

Aviation Safety

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Washington, DC 20591

The U.S. Fish and Wildlife Service concurs with your determinations that the described project will not adversely affect listed species or critical habitat. Contact this office if changes are made or new information becomes available.

Mark
Porath

Digitally signed
by Mark Porath
Date: 2026.06.25
11:01:51 -05'00'

Project Leader, Nebraska Field Office Supervisor

Ms. Grace Trankina
Nebraska Ecological Services Field Office
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**SUBJECT: Endangered Species Act Section 7 Consultation for Drone Commercial Package
 Delivery Operations in Nebraska
 Project Code: 2026-0064551**

In accordance with Section 7 of the Endangered Species Act (ESA), the Federal Aviation Administration (FAA) is requesting U.S. Fish and Wildlife Service (USFWS) concurrence that the FAA's action of authorizing Amazon Prime Air (Prime Air) to conduct commercial drone package delivery operations from a Prime Air Drone Delivery Center (PADDC) located in Nebraska (the Proposed Action), is **Not Likely to Adversely Affect**, tricolored bat (*Perimyotis subflavus*), and northern long-eared bat (*Myotis septentrionalis*). Additionally, the Proposed Action would have **No Effect** on the Piping Plover (*Charadrius melodus*), pallid sturgeon (*Scaphirhynchus albus*), western regal fritillary (*Argynnis idalia occidentalis*), Suckley's cuckoo bumble bee (*Bombus suckleyi*), monarch butterfly (*Danaus plexippus plexippus*), and western prairie fringed orchid (*Platanthera praeclara*). Our biological evaluation is provided below, including a brief background, project description, identification of the action area, and a discussion of potential effects to ESA-listed species.

Project Description

Prime Air is seeking authorization to conduct commercial package deliveries using drones in one location in the Omaha Nebraska area. Prime Air intends to introduce its drone delivery capabilities in 2026 and has requested the FAA to authorize the operation of its MK30 drone, so it can provide drone package delivery services across its operating area. The proposed MK30 operating area and PADDC are depicted in **Attachment A**.

Prime Air anticipates flying up to 1,000 MK30 drone flights per operating day from one PADDC in the Omaha area, with each flight taking a package to a customer delivery address before returning to the PADDC. The number of flights per day would vary based on customer demand and weather conditions. Prime Air is taking an incremental approach to operations and expects to gradually ramp up to approximately 1,000 flights per day per PADDC as consumer demand increases over time. Drone flights could be conducted up to 365 days a year between 6:00 A.M. and 10:30 P.M., but, due to optical sensor requirements, operations would be limited to between civil morning and evening twilight.

Unmanned Aircraft

As pictured in **Attachment B**, the MK30 drone is a hybrid multicopter fixed-wing tail-sitter drone with six propulsors allowing it to take off and land vertically and transition to wing borne flight. Its airframe is composed of staggered tandem wings for stable wing borne flight. The drone weighs approximately 78 pounds and has a maximum takeoff weight of approximately 83 pounds, which includes a maximum package payload of 5 pounds. It has a maximum operating range of 7.5 miles (or about 15 minutes) and can fly up to 58 knots (67 miles per hour) during wing-borne flight. It uses electric power from rechargeable lithium-ion batteries and is launched vertically using powered lift and converts to using wing lift during en route flight. The MK30 is equipped with collision avoidance technology to help avoid conflicts with other aircraft and drones; however, no effective technology exists that can be used to help avoid collisions with wildlife.

Flight Operations

The MK30 drone would generally be operated at an altitude between 180 and 377 feet above ground level (AGL). The outbound en route altitude to a delivery location is expected to be flown between 180 and 279 feet AGL. The inbound en route altitude is expected to be flown between 279 and 377 feet back to the PADDC. At a delivery location, the drone would descend vertically to a stationary hover and drop a package to the ground. Once a package has been delivered, the drone would ascend vertically to the inbound transition altitude and depart the delivery area while climbing to the en route altitude to return to the PADDC. The PADDC is a controlled area wherein drone flights are launched and recovered. The drone would fly a predefined flight path that is set prior to takeoff. Flight missions would be automatically planned by Prime Air's flight planning software, which assigns, deconflicts, and routes each flight. In accordance with FAA safety requirements, the drone would avoid operating over areas with dense human populations, such as over roadways, public gathering spots, etc.

As depicted in **Attachment C**, the MK30 drone's operational flight profile includes the following phases:

Takeoff

Once a package is loaded onto the MK30 drone and the drone is cleared for departure from the PADDC, the drone takes off from the ground vertically to an altitude of about 115 feet AGL and then transitions and climbs to its en route altitude of about 200 feet AGL (ranges from 180 and 279 feet AGL). The takeoff phase of flight would last less than one minute and result in maximum noise exposure levels (L_{max}) of approximately 70 dB at a distance of 75 feet from the PADCC. These noise levels are equivalent to the noise generated from a household vacuum cleaner at a distance of ten feet.

En Route Outbound

The en route outbound phase is the part of flight in which the MK30 drone transits from the PADDC to a delivery point on a predefined flight path. During this flight phase, the drone will typically operate at a typical en route altitude of 200 feet AGL with a typical airspeed of 58 knots (67 miles per hour). Noise levels generated from enroute outbound flight would be approximately 60 dB L_{max} at a distance of 76 feet abeam the drone's flight path and are equivalent to the noise generated from normal speech at a distance of 3 feet.

Delivery

The delivery phase consists of descent from the en route altitude to a delivery point to deliver a package. The MK30 drone transitions and descends to about 140 feet AGL and then vertically descends to about 13 feet AGL while maintaining position over the delivery point. The drone hovers while dropping the package and then proceeds to climb vertically back to the inbound transition altitude of

197 feet AGL. The MK30 then transitions and climbs to its en route inbound altitude of 345 feet AGL (ranges from 279 to 377 feet AGL). The delivery phase of flight would last approximately one minute and result in noise levels of approximately 69 dB Lmax at a distance of 75 feet from the delivery location. These noise levels are nearly identical to those generated during takeoff and would be equivalent to a household vacuum cleaner at a distance of ten feet.

En Route Inbound

The MK30 drone continues to fly at a typical altitude of about 345 feet AGL with at a speed of 67 mph towards the PADDC. Noise levels generated from enroute outbound flight would be nearly identical to those from enroute inbound flight with an Lmax of approximately 61 dB at a distance of 76 feet abeam the drone's flight path.

Landing

The drone decelerates as it approaches the PADDC and descends to the transition altitude of 197 feet AGL and where it transitions from horizontal flight to vertical flight, coming to a zero-speed position over its assigned landing pad. The MK30 drone slowly vertically descends over its assigned landing pad and lands on the pad. Noise levels generated from landing would be nearly identical to those generated from takeoff with an Lmax of approximately 70 dB at a distance of 75 feet from the PADCC.

Predicted Sound Levels

Based on a noise analysis using sound level measurement data for the MK30 drone, the estimated maximum sound exposure level (SEL) for the takeoff, delivery, and landing phases of flight is approximately 90.5 (at 20 feet), 92.1 (at 25 feet), and 91.8 dB (at 20 feet), respectively. Predicted sound levels decrease as distances from the drone increase. The maximum SEL for the en route phase is approximately 63.7 dB when the drone at an altitude of 200 feet AGL and flying at approximately 58 knots (67 miles per hour). The detailed noise analysis is provided as **Attachment D**.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR § 402.02). For this Proposed Action, the action area is defined as Prime Air's proposed MK30 operating area, as depicted in Attachment A. This area capture all possible flight routes to the delivery areas and where potential effects (e.g., visual, auditory, physical) to listed species could occur.

The operating area is located within the Western Corn Belt Plains Nebraska/Kansas Loess Hills USEPA Level IV Ecoregion. The Proposed Action within this ecoregion would take place largely over high to medium density developed urban and commercial areas in the northern half of the operating area and the majority of the southern portion of the operating area consisting of agricultural use. A small portion of the southern edge operating area occurs over the Platte River. Therefore, wildlife habitats within the operating area predominantly include parks, a few open spaces, waterways, and vacant lands. These areas provide habitat for many of the more common fauna in the region, including white tailed deer, coyotes, raccoons, wild turkeys, and black-tailed prairie dogs.

The Nebraska/Kansas Loess Hills includes lands from south of South Sioux City to Omaha, west of the Missouri River, and lands from Omaha, south of the Platte River to Leavenworth, Kansas, and east of the Platte River to east of Columbus, Nebraska. The entirety of the OMA2 PADDC operating area is located within this ecoregion. The greater relief and deep loess hills of the Nebraska/Kansas Loess Hills are markedly different from the flat alluvial valley of neighboring Missouri Alluvial Plain. Dissected hills with

deep, silty, well drained soils supported a potential natural vegetation of tallgrass prairie with scattered oak-hickory forests along stream valleys. Cropland agriculture is now common and ample precipitation in the growing season supports dryland agriculture, with only a few areas requiring irrigation.

ESA-Listed Species and Critical Habitat in the Action Area

The FAA acquired the Official Species List (see **Attachment E**) from the USFWS Information for Planning and Conservation (IPaC) online system to identify ESA-listed, proposed, and candidate species within the action area (**Table 1**). The action area does not contain designated critical habitat for any species.

Table 1. ESA-Listed Species and Species Proposed for Listing, Potentially Present in the Action Areas

Species	Common Name	Species Name	Federal Status	Critical Habitat
Mammals	Tricolored bat	<i>Perimyotis subflavus</i>	Proposed Endangered	N
	Northern long-eared bat	<i>Myotis septentrionalis</i>	Endangered	N
Birds	Piping Plover	<i>Charadrius melodus</i>	Endangered	N
Fish	Pallid Sturgeon	<i>Scaphirhynchus albus</i>	Endangered	N
Insects	Western regal fritillary	<i>Argynnis idalia occidentalis</i>	Proposed Threatened	N
	Suckley's cuckoo bumble bee	<i>Bombus suckleyi</i>	Proposed Endangered	N
	Monarch butterfly	<i>Danaus plexippus</i>	Proposed Threatened	N
Plants	Western prairie fringed orchid	<i>Platanthera praeclara</i>	Threatened	N

SOURCE: USFWS IPaC, accessed March 2026.

Potential Effects of the Proposed Action on ESA-Listed and Species Proposed for Listing

Drone noise, visual presence, and the potential for airborne strikes with flying species are the Proposed Action's potential stressors or threats to ESA-listed species. Flight operations would take place mostly in an urban environment, within airspace, and typically remain well above the tree line while en route to and from the PADDCC. The duration of exposure by wildlife on the ground to visual or noise impacts from the drone would be of very short duration (approximately 30 seconds during takeoff/landing and delivery and a few seconds during the en route phase).

As noted above, the highest estimated SEL associated with Prime Air's proposed operations is 92.1 dB, which would occur during a delivery. For reference, the sound level of a diesel truck at 50 feet or a noisy urban environment during the day is approximately 80 to 90 dB. The SEL on the ground when the drone is at an altitude of 200 feet AGL is estimated to be around 63.7 dB, which is comparable to the sound of an air conditioning unit at 100 feet (60 dB). The MK30 drone is expected to operate at altitudes higher than 200 feet AGL during en route flight; as such, the en route sound level is expected to be less than 63.7 dB.

A descriptor for noise effects on wildlife has not been universally adopted, but some research indicates SEL is the most useful predictor of responses. Characteristic of the bulk of research to date has been lack of systematic documentation of the source noise event. Many studies report "sound levels" without specifying the frequency spectrum or duration. A notable exception is a study sponsored by U.S. Air Force that identifies SEL as the best descriptor for response of domestic turkey poults to low-altitude aircraft overflights (Bradley et al. 1990). This study identified a threshold of response for disturbance of

domestic turkeys (“100 percent rate of crowding”) as SEL 100 dB. None of the predicted sound levels for the different flight phases exceed SEL 92.1 dB.

Since noise levels are not anticipated to impact wildlife, no ground disturbance is proposed, and there will be no impacts to streams or aquatic habitats; it is anticipated that there would be **no effect** on terrestrial or aquatic species including the fish or plant species listed in **Table 1**. The following paragraphs describe the anticipated effects of the Proposed Action on the remaining ESA-listed and proposed-listed species.

Mammals

Federally listed bat species including the northern long-eared bat, and the tricolored bat, which is proposed for listing, may be located within the operating area. The Proposed Action would include drone operations up until 10:30 p.m., which is anticipated to overlap with the dusk emergence of bat activity; however, drone operations will not affect the dawn civil twilight hours. The MK30 drone is not equipped nor is it authorized to operate in periods of darkness (before Morning Civil Twilight or after Evening Civil Twilight). Although operations may occur during dusk emergence, the listed bat species typically forage in areas near water or along forested edges. Research suggests that drones have “minimal impact on bat behavior” and that bats do not appear to be disturbed by drones. Also, the risk of bat conflicts is only present for three to six months each year (when bats are not hibernating). Bats at roost or in flight could experience drone noise during the en route and delivery flight phases. Bats foraging at or near the tree line at the time a drone flies by would experience the greatest sound levels. Roosting bats or bats foraging near the ground at the time a drone flies by would experience lower sound levels. Given the estimated sound levels of the drone, the drone’s linear flight profile to and from the PADDC and delivery locations, the short period of time the drone would be in any particular location, and the low probability of encountering an individual bat in the operating area, drone noise is not expected to adversely affect bats. Any increase in ambient sound levels caused by the drone’s flight would only last a few seconds during the en route phase and approximately 49 seconds during delivery. Given the bat’s ability to avoid flying into objects, the brief amount of time the drone would be in a single location, and the low probability of encountering a bat during operations, the likelihood of a drone striking a bat is extremely low.

A DKey determined the Action would have no effect on the northern long-eared bat, and the tricolored bat. However, DKeys were not originally intended for use in drone delivery projects. Therefore, based on an abundance of caution effect determinations are being made outside of the DKey. Based on (1) operations occurring mostly in an urban environment, (2) the altitude at which the drone flies in the en route phase (180 to 377 feet AGL), (3) the expected low sound levels experienced by a bat, (4) the short duration of any increases in ambient sound levels, (5) the low probability of a listed bat species occurring in the operating area, and (6) the low likelihood of the drone striking a bat, the FAA has determined that the Proposed Action is **Not Likely to Adversely Affect** the northern long-eared bat and tricolored bat.

Piping Plover

The Piping Plover has a moderate potential to occur within the operating area, particularly during the breeding season (mid-April–August). Occurrence is most likely along the Platte River in undeveloped or protected beaches or sandbar areas with minimal human disturbance. Due to the nature of the

Proposed Action, which will occur primarily in the airspace above developed urban and suburban environments with avoidance measures maintaining buffers from sensitive shoreline areas, the project determination for the species is **No Effect**.

Pallid sturgeon

The project does not include any ground disturbance to natural areas and no modifications to wetlands or water bodies. Activities associated with the Proposed Action are anticipated to have **No Effect** on the pallid sturgeon.

Insects

The western regal fritillary is a federally threatened grassland species that typically flies low over vegetation and is unlikely to be encountered during drone flights. The Proposed Action is not expected to affect the species' life cycle; therefore, it would have **No Effect** on the western regal fritillary.

Suckley's cuckoo bumble bee, a federally proposed endangered species, is known to occur in variety of habitats across North America. The species typically flies low over vegetation and is unlikely to be encountered during drone flights. The Proposed Action is not expected to affect its life cycle; therefore, it would have **No Effect** on Suckley's cuckoo bumble bee.

The monarch butterfly, a proposed threatened species, has the potential to occur in the operating areas. Information regarding drone impacts on insects is limited and there have been no widespread negative impacts identified in scientific literature. Some research shows that monarch butterflies are not commonly observed at higher AGL altitudes (generally between 1 and 300 feet) and would not be expected to frequently occur at the altitudes where Prime Air is proposing to operate. Because the project will not alter milkweed availability, floral resources, or habitat structure, and monarchs generally fly well below typical drone operating altitudes, it is not anticipated to affect the life cycle or habitat of the monarch butterfly. Therefore, it is anticipated that the Action will have **No Effect** on the monarch butterfly.

Western prairie fringed orchid

Since the operations would continue to occur within airspace only, and there would be no construction or ground disturbance under the proposed action, it is anticipated that there would be **No Effect** on the federally threatened Western prairie fringed orchid identified within the USFWS IPaC official species list.

Conclusion

Based on the analysis above, the FAA has determined the following:

- There is no critical habitat, or proposed critical habitat, for any listed species, located within the action areas.
- The action areas are mostly urbanized, with minimal suitable habitat for the ESA-listed species identified in them.
- Any increase in ambient sound levels would be short in duration.
- Drone dwell/hover time during takeoff and delivery would be less than one minute.

- Drones would generally operate at an altitude between 200 and 345 feet AGL.
- Drone activity would be highly concentrated over developed areas, where there is consumer demand for drone delivery service.
- Based on all of these factors, the probability of a drone/wildlife interaction would be low.

It is important to note that Prime Air has been performing similar drone delivery operations at its Tolleson, AZ facility, for more than two years. A recent assessment of drone maintenance and telemetry records indicates zero instances of drone/wildlife collisions over the course of more than 8,000 delivery operations.

Accordingly, the FAA has determined the Proposed Action is ***Not Likely to Adversely Affect*** the tricolored bat and northern long-eared bat. The FAA has also determined that the Proposed Action would have ***No Effect*** on the Piping Plover, pallid sturgeon, western regal fritillary, Suckley's cuckoo bumble bee, monarch butterfly, and western prairie fringed orchid.

Because the delivery of commercial goods by drones is an emerging technology and its potential effects on wildlife are still not well understood, Prime Air is proposing to implement an "Biological Monitoring Program" for this project, which would include:

- Record and analyze daily maintenance and telemetry records to document any potential drone/wildlife interactions,
- If applicable, report wildlife movement / activity in and around airport property that may be obtained from operations or wildlife management staff from nearby airports.
- If applicable, recover and analyze potential biological materials (e.g., snarge, feathers, etc.), generally in accordance with existing protocols used in cases of aircraft bird strikes at airports
- Report findings to the USFWS on an annual basis

The proposed Biological Monitoring Program would serve as a useful tool for Prime Air, the FAA, and USFWS to better understand the possible interactions between drones and wildlife.

The FAA appreciates your review of the proposed project and requests your concurrence with (1) our "may affect" determination as stated above and (2) implementation of the proposed Biological Monitoring Program within 30 days of receiving this letter. If you have any questions, please contact Christopher Hurst via email at 9-faa-drone-environmental@faa.gov.

Sincerely,

Joseph K. Hemler Jr Digitally signed by Joseph K.
Hemler Jr
Date: 2026.05.14 06:28:23 -04'00'

Joseph Hemler
Manager, General Aviation and Commercial Branch (AFS-752)
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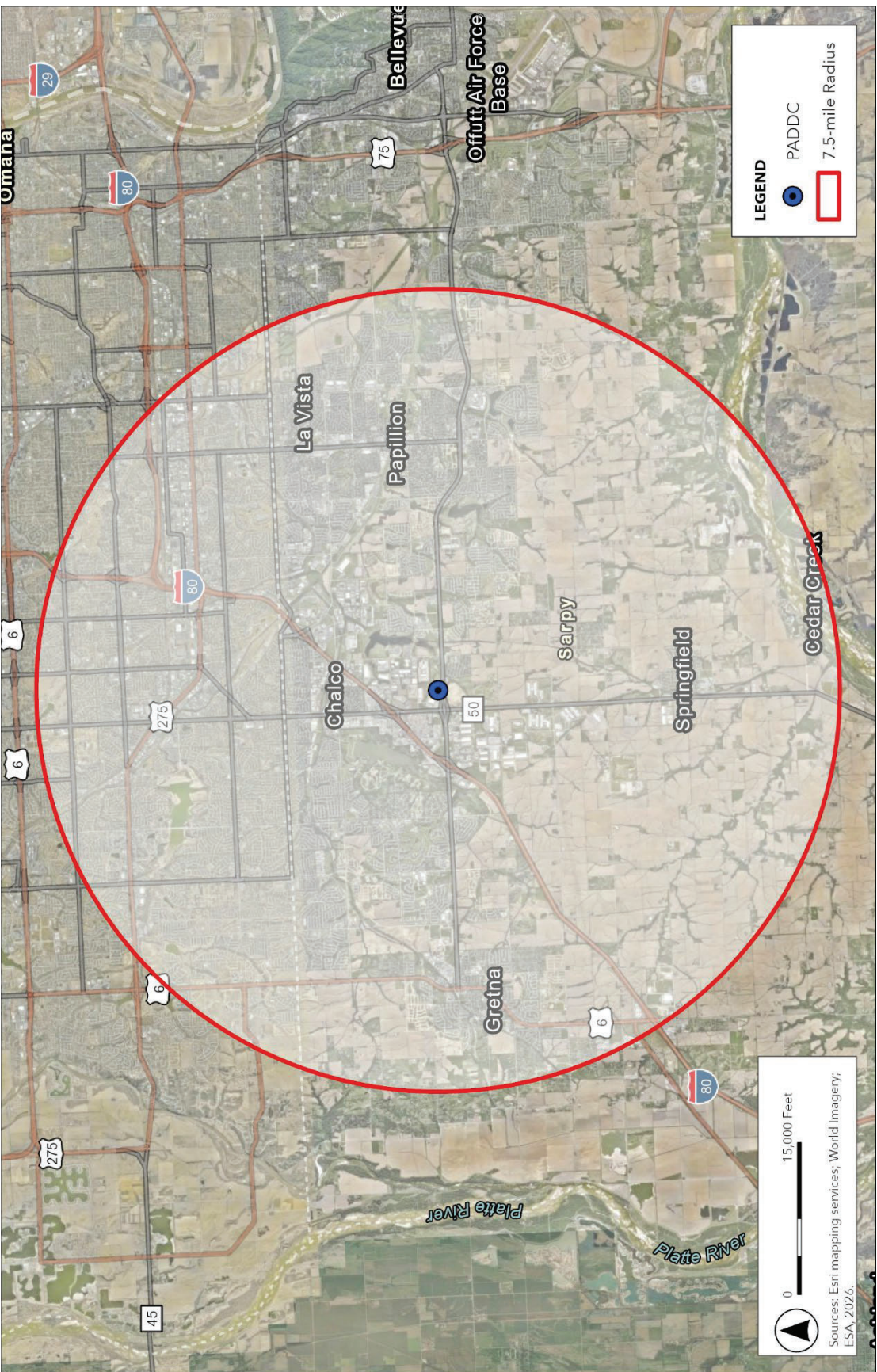
Attachments:

Attachment A – Proposed MK30 Operating Areas
Attachment B – MK 30 Drone
Attachment C – MK30 Drone Flight Profile
Attachment D – Technical Noise Report
Attachment E – Official Species List

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Attachment A
Proposed MK30 Drone Operating Area



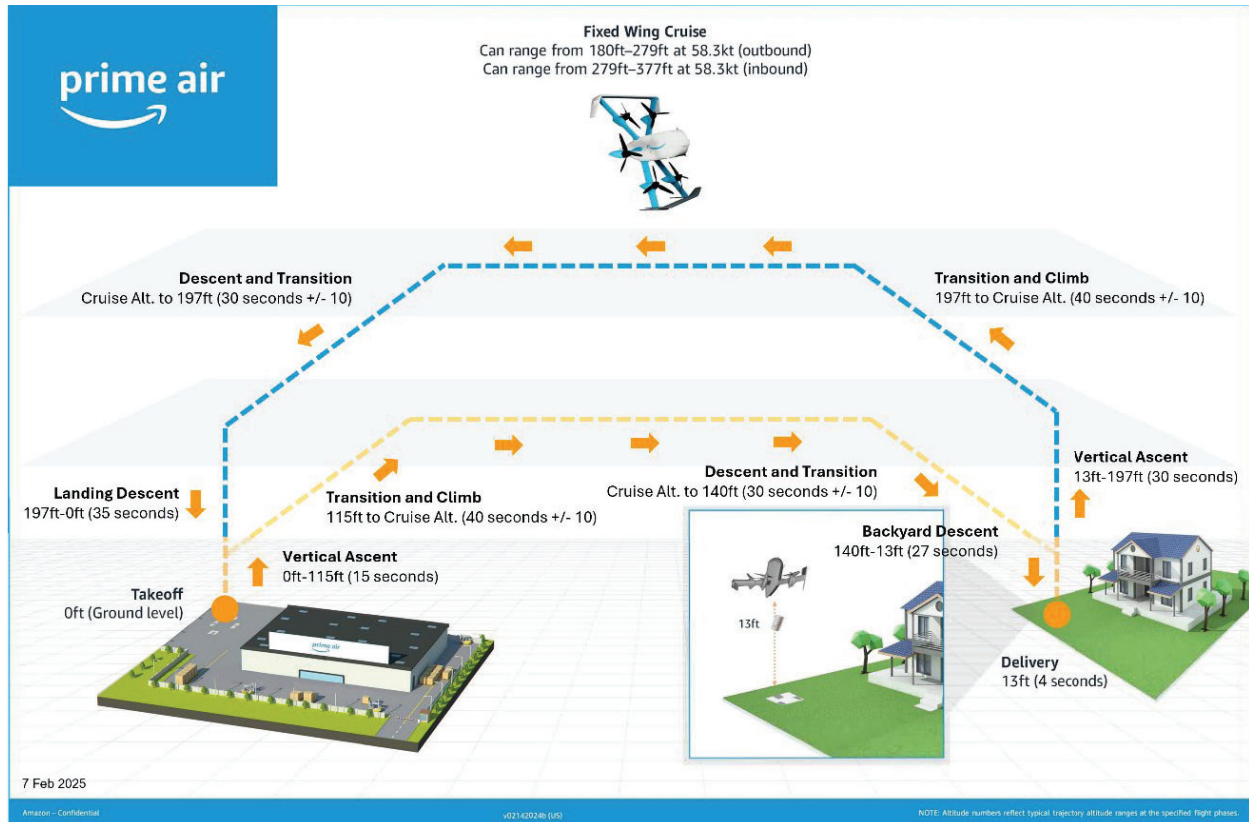
OMA2 PADDC Action Area

Attachment B
MK30 Drone



Amazon Prime Air MK30 Drone

Attachment C
MK30 Drone Flight Profile



MK30 Drone Flight Profile

Attachment D
Technical Noise Report

ESTIMATED NOISE LEVELS FOR AMAZON PRIME AIR MK30 DRONE

Technical Noise Report

September 2025



ESTIMATED NOISE LEVELS FOR AMAZON PRIME AIR MK30 DRONE

Technical Noise Report

September 2025

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1 Introduction

This document presents the methodology and estimation of noise exposure of Amazon Prime Air (Prime Air) package delivery operations under 14 CFR Part 135. Prime Air is proposing to conduct package delivery operations with the MK30 drone at selected distribution hubs (the Prime Air Drone Delivery Center, or PADDC).

The MK30 is an electric powered drone that uses a vertical take-off and landing (VTOL) then transitions to fixed-wing flight using wing lift during en route flight. The drone systems include hardware and software designed for safety and efficiency. The airframe is composed of staggered wings, the propulsion system includes a rechargeable lithium-ion battery, and six (6) motors that include propellers designed for noise reduction. The package delivery system contains the package in a two-door interior receptacle, and a camera and avionics system that has redundancy for critical systems. The drone weighs approximately 78 lbs. and has a maximum takeoff weight of 83.2 lbs., which includes a maximum payload of 5 lbs. It has a maximum operating range of 7.5 mi and can fly up to 400 ft above ground level (AGL) at a maximum cruise speed of 73 mph (64 knots) during horizontal flight. An image of the MK30 drone is shown in **Figure 1**.

The MK30 operational flight profiles can be broken into the following general flight phases: launch, en route outbound, delivery, en route inbound, and landing. After launch, the MK30 would ascend to an altitude of less than 400 ft AGL and follow a predefined route to its delivery site.¹ The MK30 would typically fly en route at between approximately 180 to 377 ft AGL, except when descending to drop a package. Packages would be carried internally in the drone's fuselage. When making a delivery, the drone descends, opens a set of payload doors, and drops the package to the ground from approximately 13 ft AGL. Prime Air's drone would not touch the ground in any place other than the PADDC (except during safe contingent landings) and will remain airborne throughout the operation including the delivery phase.² After the package is dropped, the MK30 drone climbs vertically and follows its predefined route back to the PADDC at its assigned altitude.

This document outlines the methodology and estimation of noise exposure expected with the proposed use of Prime Air's drone package delivery operations.³ The methods presented below are suitable for the evaluation of Federal actions in compliance with the National Environmental Policy Act (NEPA) and other applicable environmental regulations or federal review standards at the discretion and approval of the FAA. In particular, this report is intended to function as a nonstandard equivalent methodology under FAA Order 1050.1G, and therefore requires prior written consent from the FAA's Office of Environment and Energy (AEE) for each project seeking a NEPA determination.⁴ The results of the noise analysis are presented in terms of the annual Day-Night Average Sound Level (DNL), considering varying levels of operations for areas at ground level below each flight phase.

¹ Prime Air may modify operations, if warranted, to avoid or minimize any negative impacts.

² The MK30 vehicle is built with multiple redundant safety features and "detect and avoid" technology. The drone is designed to handle unexpected situations; it is independently safe.

³ Environmental Assessment (EA) Noise Methodology Approval Request for Amazon Prime Air Commercial Package Delivery Operations with the MK30 Unmanned Aircraft (UA), September 2025. (See Attachment A).

⁴ See FAA Order 1050.1G, June 30, 2025,

Appendix C, Section C-1.1, for discussion on the use of "equivalent methodology", available online at

https://www.faa.gov/documentLibrary/media/Order/FAA_Order_1050.1G.pdf#page=56

Figure 1. Amazon Prime Air MK30 Drone



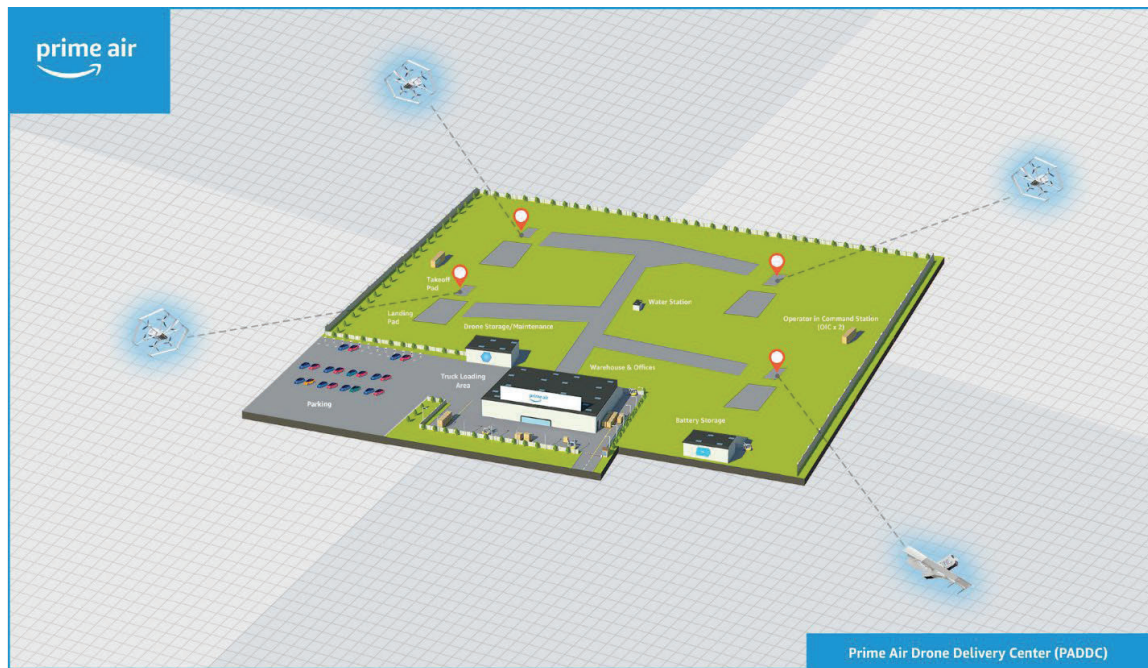
Source: Amazon Prime Air, 2023.

2 Drone Delivery Operations

The PADDC and its associated flight routes are determined by Prime Air's business and operational needs. Takeoff pads at the PADDC are four meters by four meters. Landing pads are eight meters by eight meters. Both pads are contained within a launch area approximately 35 meters by 45 meters. A diagram of a representative PADDC layout is presented in **Figure 2**.

The MK30 drone is capable of vertical ascent and descent, hovering, and flying upright with forward-facing propellers for en route travel. Airspeeds during normal en route flight are expected to be approximately 58.3 knots. A typical flight will commence with a vertical ascent from the launch pad to the transition altitude of approximately 115 feet, from which it will continue a forward-facing climb to an outbound en route altitude between 180 and 279 feet AGL. The drone then maintains altitude and follows a predetermined route, traveling at 58.3 knots toward the designated delivery point. Prior to arrival at the delivery point, the drone will begin its descent down to a transition altitude of 140 feet and decelerate to zero-speed at which time it will arrive at the delivery point. The drone then begins a vertical descent to 13 feet AGL at which time the package is released. The drone will ascend back to a transition altitude of 197 feet, begin the outbound transition and climb phase to 345 feet, while accelerating to 58.3 knots until it reaches the inbound en route altitude between 279 and 377 feet along the predetermined route back to the PADDC. Prior to arriving at the PADDC, the drone will descend to the transition altitude of 197 feet, decelerate to zero speed, and begin a vertical descent to the landing pad.

Figure 2. Representative PADDC Layout



Source: Amazon Prime Air, 2022.

2.1 Flight Profiles

Flight profiles of drone operations are broken into five general phases: takeoff, transitions to and from vertical and horizontal flight, en route, delivery, and landing. These phases can be combined to represent the typical operational profile of the drone as outlined below. A graphical representation of the operational profile is presented in **Figure 3** and each phase is summarized in **Table 1**.

Takeoff, Vertical Ascent, Transition, and Outbound Climb

The drone departs from the launch pad once cleared for takeoff. It will ascend vertically to the transition altitude of 115 feet AGL in vertical flight mode.

Upon reaching the transition altitude, and while still positioned above the launch pad, the drone transitions from zero speed to its cruise speed of 58.3 knots and continues an outbound climb to the typical cruise altitude of 200 feet AGL (ranges from 180 and 279 feet AGL). This transition is accompanied by a shift from vertical flight mode to horizontal flight mode.

Fixed-wing Outbound Cruise

The drone proceeds to fly at the typical cruise altitude of 200 feet AGL (ranges from 180 to 279 feet AGL) and 58.3 knots to the backyard descent and transition.

Backyard Descent, Delivery, Ascent, Transition, and Inbound Climb

The drone decelerates from the en route speed of 58.3 knots and descends from the typical outbound cruise altitude of 200 feet AGL (ranges from 180 to 279 feet AGL) to a transition altitude of 140 feet AGL. The drone then transitions to vertical flight mode, where it will be positioned over the delivery point at zero speed.

The drone begins a vertical descent from the transition altitude to 13 feet AGL while maintaining position above the delivery point. Once at 13 feet AGL, the drone drops the package and ascends vertically back to the transition altitude of 197 feet AGL. The nearest allowable proximity of any individual, animal, or other obstacles to the delivery point during this maneuver is 16.4 feet.

Once at the transition altitude and positioned above the delivery point, the drone transitions from zero speed to en route speed while changing from vertical flight to horizontal flight and continues to climb to the typical inbound cruise altitude of 345 feet AGL (ranges from 279 to 377 feet AGL).

Fixed-wing Inbound Cruise

The drone continues to fly at the typical en route altitude of 345 feet AGL (ranges from 279 to 377 feet AGL) and speed of 58.3 knots towards the PADDC.

Landing Descent, Transition, Vertical Descent, and Landing

The drone decelerates as it approaches the PADDC and descends to the transition altitude of 197 feet AGL and where it transitions from horizontal flight to vertical flight, coming to a zero-speed position over its assigned landing pad.

The drone descends over its assigned landing pad in vertical flight until it touches down and shuts down the motors.

Table 1. Representative Operational Profile by Phase of Flight

Phase of Flight	Altitude (feet AGL)	Ground Speed (knots)	Duration (seconds)
Takeoff and Vertical Ascent	Ascent from 0 to 115	0	15
Transition and Outbound Climb	115 to 279	0 to 58.3	40
Fixed Wing Outbound Cruise	200 ¹	58.3	Variable ³
Delivery Descent and Transition	Descent from 200 to 140	58.3 to 0	30
Backyard Descent	Descent from 140 to 13	0	27
Delivery	13	0	4
Backyard Ascent	Ascent from 13 to 197	0	30
Transition and Inbound Climb	Ascent from 197 to 377	0 to 58.3	40
Fixed-Wing Inbound Cruise	377 ²	58.3	Variable ³
Landing Descent and Transition	Descent from 377 to 197	58.3 to 0	30
Vertical Descent and landing	Descent from 197 to 0	0	35

SOURCE: Amazon Prime Air, February 2025

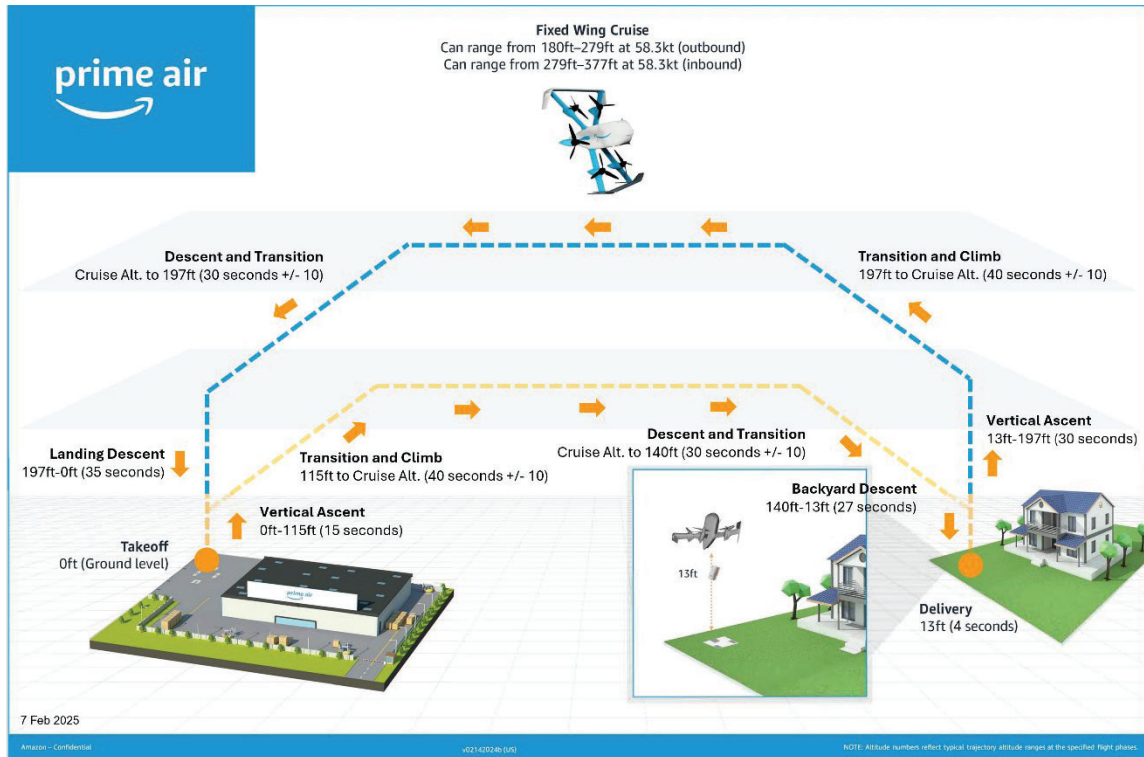
Notes:

¹ The outbound enroute altitude may range from 180 – 279 feet. For this analysis the outbound cruise altitude was assumed to be 200 feet.

² The inbound enroute altitude may range from 279 – 377 feet. For this analysis the inbound cruise altitude was assumed to be 345 feet.

³ Duration of inbound and outbound cruise flight time varies based on distance to customer.

Figure 3. Representative Operational Profile of the MK30



Source: Prime Air, 2025.

3 Methodology

As previously mentioned, there is not a standardized process for drone noise assessments. Therefore, ESA is applying technical guidance that was previously approved by the FAA Office of Environment and Energy for past analyses. The following subsections outline this methodology.

Prime Air conducted noise measurements of the MK30 drone in October 2024 at the Pendleton UAS Range located at the Eastern Oregon Regional Airport (KPDT). ESA, in coordination with the FAA, processed and analyzed the measurement data and calculated the noise levels for each of the flight phases.⁵ The following subsections show either the A-weighted Sound Exposure Levels (SEL) or formulas to calculate the SELs used for this analysis, which can be matched to each flight phase detailed in **Table 1**.

3.1 Daytime Equivalent Operations and DNL

As mentioned, results are presented as DNL which applies a 10 dB weighting, or equivalent to 10 times the number of nighttime operations, for operations between 10:00 P.M. and 7:00 A.M. Therefore, the operations near point i can be weighted to develop a daytime equivalent number of operations ($N_{equiv,i}$).

$$eq. 1. N_{equiv,i} = W_{Day} \times N_{Day,i} + W_{Eve} \times N_{Eve,i} + W_{Night} \times N_{Night,i}$$

Where:

- $N_{Day,i}$ is the number of user-specified operations between 7 A.M. and 7 P.M. local time

⁵ Prime Air MK30 Drone Noise Measurement Report, Environmental Science Associates, April 2025. (See Attachment B).

- $N_{Eve,i}$ is the number of user-specified operations between 7 P.M. and 10 P.M. local time
- $N_{Night,i}$ is the number of user-specified operations between 10 P.M. and 7 A.M. local time
- W_{Day} is the day-time weighting factor, which is 1 operation for DNL
- W_{Eve} is the evening weighting factor, which is 1 operation for DNL
- W_{Night} is the night-time weighting factor, which is 10 operations for DNL

The number of daytime equivalent operations, $N_{DNL,i}$ can be simplified to

$$eq. 2. N_{DNL,i} = N_{Day,i} + N_{Eve,i} + 10 \times N_{Night,i}$$

3.2 PADDC Infrastructure

Each PADDC accommodates four sets of launch and landing pads. In the context of this noise analysis, it is assumed that all operations would occur at one launch/landing pad, where it would be the closest to the noise-sensitive areas. This assumption is considered acoustically conservative. If the precise location of the nearest single launch or landing pad is unknown, the respective PADDC boundary should be used for the analysis.

3.3 Application of Acoustical Data

The summation of the SELs presented in subsequent sections are used to estimate the DNL for Prime Air's drone operations covered in this report. SEL results are detailed in the measurement report found in **Attachment B**.

For calculating SEL, four specific activities are considered:

- The drone taking off from the PADDC (includes transition between vertical and horizontal flight)
- En route travel of the drone in horizontal flight between the PADDC and the delivery point
- Delivery
- The drone landing at the PADDC (includes transition between vertical and horizontal flight)

3.3.1 Takeoff

The process for estimating SELs associated with takeoff as a function of distance from the PADDC is presented in Equation 3 and incorporates the parameters detailed in **Table 2**.

$$eq. 3. SEL = m \times \log_{10}(d) + b(dB)$$

Where:

- d is the distance along the ground in feet between the drone and receiver
- m and b are parameters provided in the tables below

Table 2. Parameters for Estimating Takeoff Sound Exposure Level versus Distance

Range for d (feet from launch pad)	m	b
20 to 76	-14.51	109.35
76 to 195	-13.51	107.46
195 to 372	-14.66	110.09
372 to 772	-17.08	116.32
772 to 1,205	-17.05	116.23
1,205 and greater	0.00	63.7

SOURCE: ESA, 2025.
Note: Distance is along ground from launch pad to receiver.

Application of the SEL is based on the position of the launch/landing pad, where it would be the closest to the noise-sensitive areas. However, if the exact location of the launch pad is not known, the outer boundary of the PADDC, at a point closest to the receiver, should be used as it considered to be acoustically conservative. It should be noted that the SEL values include the transition to horizontal flight and the acceleration to en route speed that would occur during the climb.

3.3.2 En Route

The anticipated outbound flight speed of the drone en route is 58.3 knots at a cruise altitude of 200 feet AGL. For inbound flight the anticipated cruise altitude is 345 feet AGL with the same 58.3 knot flight speed. As discussed in **Appendix B**, adjustments were applied to the measured data to account for how the varying speed impacts the duration of the overflight at the stationary receptor.

To compute the SEL, each measured SEL was first normalized based on the drone's intended speed and distance in its operational profile. This adjustment was necessary because each drone pass by occurred at slightly different altitudes and velocities, and each microphone was positioned at a different lateral distance from the flight path. After normalization, each microphone's corrected measurements were averaged, and the microphone with the highest corrected SEL (representing the most conservative estimate) was used to compute the en route SEL.

As shown in **Table 3**, the SEL is 63.7 dB when the drone is at maximum weight, at 200 feet from the stationary receiver and traveling at approximately 58.3 knots. The SEL is 60.9 dB when the drone is at empty weight, 345 feet from the stationary receiver, and traveling at approximately 58.3 knots.

Table 3. Estimates of En Route Sound Exposure Level

Aircraft Configuration	Reference Air Speed (knots)	Reference Altitude (feet AGL)	Uncorrected Speed (knots)	Uncorrected Altitude (feet AGL)	Uncorrected SEL (dBA)	Corrected SEL (dBA)
Maximum Weight	58.3	200	60.8	116	66.1	63.7
Empty Wight	58.3	345	60.8	98	66.9	60.9

SOURCE: ESA, 2025.

3.3.3 Delivery

The process for estimating SELs associated with delivery as a function of distance from a receiver relative to the position of the delivery point is presented in Equation 3 and incorporates the parameters detailed in **Table 4**.

Table 4. Parameters for Estimating Delivery Sound Exposure Level versus Distance

Range for d (feet from launch pad)	m	b
25 to 76	-13.18	110.56
76 to 175	-18.65	120.84
175 to 372	-13.86	110.11
372 to 772	-15.63	114.67
772 to 1,396	-15.63	114.66
1,396	0.00	65.5

SOURCE: ESA, 2025.
Note: Distance is along ground from delivery point to receiver.

The minimum distance used for calculation between the delivery point and a person is 16.4 feet.⁶ The values in **Table 4** are valid for distances from the delivery point of 25 feet or greater. SEL values for distances between 16 and 25 feet are derived by linear extrapolation of the parameters used in the 25 to 76 foot range.

It should be noted that the SEL values include the noise contribution from the horizontal flight associated with the drone transition from en route to descent and transition, including the transition to vertical flight and transition back to en route altitude.

3.3.4 Landing

The process for estimating SELs associated with landing as a function of distance from the PADDC is presented in Equation 3 and incorporates the parameters detailed in **Table 5**.

Table 5. Parameters for Estimating Landing Sound Exposure Level versus Distance

Range for d (feet from launch pad)	m	b
20 to 76	-14.95	111.28
76 to 195	-16.17	113.58
195 to 375	-21.10	124.86
375 to 1,074	-21.10	124.87
1,074	0.00	60.9

SOURCE: ESA, 2025.
Note: Distance is along ground from launch pad to receiver.

If the location of the landing pad is known, the outer boundary of the PADDC (at a point closest to the noise sensitive receiver), should be used for the modeling location as a conservative approach. It

⁶ Prime Air's safety guidance stipulates that there should not be a person, animal or object within 5 meters of the delivery point, and if the drone detects a person, animal or object within 5 meters of the delivery point, it will abort the delivery.

should be noted that the SEL values include the descent from en route altitude and the deceleration from en route speed, and the transition to vertical flight that would occur after the initial descent.

3.4 DNL Estimation Methodology

The number of operations flying over a specific receiver's ground location will fluctuate depending on the proposed operating area and demand. For a given receiver location, i , and a single instance of sound source, A , the SEL for that sound source SEL_{iA} (energy) summed for the average annual daily number of DNL daytime equivalent operations ($N_{DNL,iA}$) to compute the equivalent DNL in Equation 4.

$$eq. 4. DNL_{iA} = SEL_{iA} + 10 \times \log_{10}(N_{DNL,iA}) - 49.4, dB$$

The above equation applies to an SEL value representing one noise source such as a drone takeoff or landing. For cases where a receiver would be exposed to multiple noise sources (e.g. takeoff, transiting, en route, and departure), the complete DNL at that point was calculated with Equation 5.

$$eq. 5. DNL_i = 10 \times \log_{10}\left(10^{\left(\frac{DNL_{ia}}{10}\right)} + 10^{\left(\frac{DNL_{ib}}{10}\right)} + \dots + 10^{\left(\frac{DNL_{iz}}{10}\right)}\right), dB$$

For each of the conditions presented below, results are presented in tabular format based on the equivalent daytime operations, in DNL daytime equivalent, for the estimated DNL. The proper output of DNL is dependent on the calculation of respective daytime equivalent operations.

3.4.1 DNL at PADDC

The takeoff and landing operations are anticipated to occur at one PADDC for this analysis. Therefore, the results at the PADDC will be calculated for a single set of receptors. Operations were assumed to takeoff and land along the same flight path.

Takeoff operations are represented by two phases of flight. The drone will take off and climb to the transition altitude as discussed in **Section 2**. The drone will then transition from vertical flight to horizontal flight and accelerate to en route speed of 58.3 knots and climb to en route altitude.

Landing operations are also represented by two phases of flight. The drone flies to the PADDC at en route altitude until it begins to descend to the transition altitude while slowing down and transitions from horizontal to vertical flight as described in **Section 2**. Then the drone descends from the transition altitude to the ground and shuts down.

The two noise sources representing the complete takeoff and landing cycle associated with a single delivery departing and returning at the PADDC were added together using Equation 5.

3.4.2 DNL for En Route

A receiver will be positioned directly under the flight path, and the DNL will be calculated based on the altitude and speed-adjusted delivery SEL presented in **Table 3**. The number of operations would be based on relevant materials and assume that a drone directly overflies the receiver while at maximum and empty weight for outbound and inbound flight, respectively, for a single delivery. The en route outbound and inbound noise level are added together with Equation 5.

3.4.3 DNL for Delivery Points

Delivery operations are represented by the deceleration of the drone from en route speed and transition from horizontal flight to vertical flight over the delivery point at the transition altitude of 140 feet AGL. The drone then begins a vertical descent to where the package is dropped at the delivery point at 13 feet AGL. The drone then climbs back to the transition altitude of 197 feet AGL where it will transition from vertical flight to horizontal flight, accelerating to en route speed.

4 Estimated Noise Exposure

This section outlines the estimated noise exposure for Prime Air's proposed operations for any given number of average annual day (AAD) deliveries. Results are based off the estimated number of DNL equivalent deliveries associated with the PADDC and presented in tabular format. Note that one delivery includes the outbound takeoff and inbound landing and is representative of two operations.

The DNL equivalent deliveries, $N_{DNL,i}$ as described in **Section 4.1**, is presented below as Equation 6.

$$eq. 6. Deliveries_{DNL,i} = Deliveries_{Day} + 10 \times Deliveries_{Night}$$

$Deliveries_{Day}$ are between 7 A.M. and 10 P.M. and $Deliveries_{Night}$ are between 10 P.M. and 7 A.M. If a portion of a delivery (either takeoff or landing) occurs in the nighttime hours, then it is counted within $Deliveries_{Night}$.

For estimating noise exposure, the noise levels for each flight phase are considered separate based on the level of proposed operations for a given location. When a particular receptor is at the transition of different flight phases, the noise exposure is then determined by adding the noise from each phase.

4.1 Noise Exposure for Operations at the PADDC

For operations at the PADDC, noise generated by the drone includes takeoff, landing, and transitions from vertical to horizontal flight within the corresponding flight phases. It was assumed that all operations follow the same en route flight path, with outbound and inbound flights traversing it in opposing directions for a conservative approach.

Table 6 presents estimated extent of noise exposure for the number of average daily DNL equivalent deliveries (including the takeoff and climb, transition to en route outbound, transition from en route inbound, and descent and landing as detailed in **Section 2**) under the flight path for the PADDC. The analyses presented were rounded up conservatively to the nearest interval available from the data outlined in this section. SEL values in **Table 6** have been updated to incorporate the DNL 59.7 dB extents as well as updated base 10 logarithmic calculations for the landing phase.

Table 6. Estimated Extent of Noise Exposure from PADDC per Number of Deliveries

Number of DNL Equivalent Deliveries		Estimated Extent of Noise Exposure (feet)					
Average Daily	Annual	DNL45	DNL 50	DNL 55	DNL 59.7	DNL 60	DNL 65
<= 1	<= 365	21	21	21	21	21	21
<= 5	<= 1,825	100	50	21	21	21	21
<= 10	<= 3,650	100	50	21	21	21	21
<= 15	<= 5,475	150	100	50	21	21	21
<= 20	<= 7,300	150	100	50	21	21	21
<= 40	<= 14,600	250	150	50	50	50	21
<= 60	<= 21,900	300	150	100	50	50	21
<= 80	<= 29,200	350	200	100	50	50	21
<= 100	<= 36,500	400	200	100	50	50	21
<= 120	<= 43,800	450	250	150	100	50	50
<= 140	<= 51,100	500	250	150	100	100	50
<= 160	<= 58,400	500	300	150	100	100	50
<= 180	<= 65,700	550	300	150	100	100	50
<= 200	<= 73,000	600	300	150	100	100	50
<= 220	<= 80,300	600	350	200	100	100	50
<= 240	<= 87,600	650	350	200	100	100	50
<= 260	<= 94,900	650	350	200	100	100	50
<= 280	<= 102,200	700	400	200	100	100	50
<= 300	<= 109,500	700	400	200	100	100	50
<=320	<= 116,800	750	400	200	100	100	50
<= 340	<= 124,100	750	400	250	150	100	50
<= 360	<= 131,400	800	450	250	150	150	50
<= 380	<= 138,700	800	450	250	150	150	50
<= 400	<= 146,000	850	450	250	150	150	50
<= 420	<= 153,300	850	450	250	150	150	100
<= 440	<= 160,600	900	500	250	150	150	100
<= 460	<= 167,900	900	500	250	150	150	100
<= 480	<= 175,200	900	500	300	150	150	100
<= 500	<= 182,500	950	500	300	150	150	100
<= 520	<= 189,800	950	500	300	150	150	100
<= 540	<= 197,100	1,000	550	300	150	150	100
<= 560	<= 204,400	1,000	550	300	150	150	100
<= 580	<= 211,700	1,000	550	300	150	150	100
<= 600	<= 219,000	1,050	550	300	150	150	100
<= 620	<= 226,300	1,050	550	300	200	150	100
<= 640	<= 233,600	1,050	600	300	200	150	100
<= 660	<= 240,900	Note 3	600	350	200	200	100
<= 680	<= 248,200	Note 3	600	350	200	200	100
<= 700	<= 255,500	Note 3	600	350	200	200	100
<= 720	<= 262,800	Note 3	600	350	200	200	100
<= 740	<= 270,100	Note 3	650	350	200	200	100
<= 760	<= 277,400	Note 3	650	350	200	200	100
<= 780	<= 284,700	Note 3	650	350	200	200	100
<= 800	<= 292,000	Note 3	650	350	200	200	100

Number of DNL Equivalent Deliveries		Estimated Extent of Noise Exposure (feet)					
Average Daily	Annual	DNL45	DNL 50	DNL 55	DNL 59.7	DNL 60	DNL 65
<= 820	<= 299,300	Note 3	650	350	200	200	100
<= 840	<= 306,600	Note 3	650	350	200	200	100
<= 860	<= 313,900	Note 3	700	400	200	200	100
<= 880	<= 321,200	Note 3	700	400	200	200	100
<= 900	<= 328,500	Note 3	700	400	200	200	100
<= 920	<= 335,800	Note 3	700	400	200	200	100
<= 940	<= 343,100	Note 3	700	400	200	200	100
<= 960	<= 350,400	Note 3	700	400	250	200	100
<= 980	<= 357,700	Note 3	750	400	250	250	100
<= 1,000	<= 365,000	Note 3	750	400	250	200	100
<= 1,020	<= 372,300	Note 3	750	400	250	250	100
<= 1,040	<= 379,600	Note 3	750	400	250	250	100
<= 1,060	<= 386,900	Note 3	750	400	250	250	100
<= 1,080	<= 394,200	Note 3	750	400	250	250	100
<= 1,100	<= 401,500	Note 3	750	450	250	250	100
<= 1,120	<= 408,800	Note 3	800	450	250	250	100
<= 1,140	<= 416,100	Note 3	800	450	250	250	150
<= 1,160	<= 423,400	Note 3	800	450	250	250	150
<= 1,180	<= 430,700	Note 3	800	450	250	250	150
<= 1,200	<= 438,000	Note 3	800	450	250	250	150
<= 1,220	<= 445,300	Note 3	800	450	250	250	150
<= 1,240	<= 452,600	Note 3	800	450	250	250	150
<= 1,260	<= 459,900	Note 3	850	450	250	250	150
<= 1,280	<= 467,200	Note 3	850	450	250	250	150
<= 1,300	<= 474,500	Note 3	850	450	250	250	150
<= 1,320	<= 481,800	Note 3	850	450	250	250	150
<= 1,340	<= 489,100	Note 3	850	450	250	250	150
<= 1,360	<= 496,400	Note 3	850	500	250	250	150
<= 1,380	<= 503,700	Note 3	850	500	250	250	150
<= 1,400	<= 511,000	Note 3	900	500	250	250	150
<= 1,420	<= 518,300	Note 3	900	500	300	250	150
<= 1,440	<= 525,600	Note 3	900	500	300	250	150
<= 1,460	<= 532,900	Note 3	900	500	300	250	150
<= 1,480	<= 540,200	Note 3	900	500	300	250	150
<= 1,500	<= 547,500	Note 3	900	500	300	250	150
<= 1,520	<= 554,800	Note 3	900	500	300	300	150
<= 1,540	<= 562,100	Note 3	900	500	300	300	150
<= 1,560	<= 569,400	Note 3	950	500	300	300	150
<= 1,580	<= 576,700	Note 3	950	500	300	300	150
<= 1,600	<= 584,000	Note 3	950	500	300	300	150
<= 1,620	<= 591,300	Note 3	950	500	300	300	150
<= 1,640	<= 598,600	Note 3	950	500	300	300	150
<= 1,660	<= 605,900	Note 3	950	550	300	300	150
<= 1,680	<= 613,200	Note 3	950	550	300	300	150
<= 1,700	<= 620,500	Note 3	950	550	300	300	150

Number of DNL Equivalent Deliveries		Estimated Extent of Noise Exposure (feet)					
Average Daily	Annual	DNL45	DNL 50	DNL 55	DNL 59.7	DNL 60	DNL 65
<= 1,720	<= 627,800	Note 3	1,000	550	300	300	150
<= 1,740	<= 635,100	Note 3	1,000	550	300	300	150
<= 1,760	<= 642,400	Note 3	1,000	550	300	300	150
<= 1,780	<= 649,700	Note 3	1,000	550	300	300	150
<= 1,800	<= 657,000	Note 3	1,000	550	300	300	150
<= 1,820	<= 664,300	Note 3	1,000	550	300	300	150
<= 1,840	<= 671,600	Note 3	1,000	550	300	300	150
<= 1,860	<= 678,900	Note 3	1,000	550	300	300	150
<= 1,880	<= 686,200	Note 3	1,050	550	300	300	150
<= 1,900	<= 693,500	Note 3	1,050	550	300	300	150
<= 1,920	<= 700,800	Note 3	1,050	550	300	300	150
<= 1,940	<= 708,100	Note 3	1,050	550	350	300	150
<= 1,960	<= 715,400	Note 3	1,050	550	350	300	150
<= 1,980	<= 722,700	Note 3	1,050	600	350	300	150
<= 2,000	<= 730,000	Note 3	1,050	600	350	300	150

SOURCE: ESA, 2025.

Notes:

1. One delivery accounts for the outbound takeoff and inbound landing and is representative of two operations.
2. If a value for deliveries is not specifically defined in this table, use the next highest value. For example, if there are 50 average daily DNL equivalent deliveries, use the entry for 60 average daily DNL equivalent deliveries.
3. The DNL noise level extends more than 1,074 feet from the PADDC based on the level of operations specified as the aircraft continues along its en route flight path. En route results in Section 4.2 may be more applicable in these instances for determining noise levels.

4.2 Noise Exposure under En Route Paths

When the drone is en route, it is expected to fly the same outbound flight path between the PADDC and the delivery point and inbound flight path back to the PADDC. Therefore, each receiver under the en route path would experience two overflights for each delivery served by the corresponding en route flight path.

Table 7 provides the estimated DNL for a receiver on the ground directly under an en route path for various counts of daily average DNL equivalent deliveries. The en route noise calculated for each delivery includes both the outbound traversal of the en route path at 200 feet AGL and a ground speed of 58.3 knots and the inbound traversal of the en route path at 345 feet AGL and the same ground speed of 58.3 knots.

The drone may overfly locations at operational levels that differ from both an inbound and outbound traversal of the en route path by the drone as described above and presented in **Table 7**. For these circumstances, **Table 8** presents the equations for calculating the estimated DNL for a receiver directly under a specified given number of DNL equivalent average daily individual overflights, defined as N_o .

Table 7. Estimated Noise Exposure Directly Under En Route Flight Paths

Number of DNL Equivalent Deliveries		Estimated Extent of Noise Exposure		
Average Daily	Annual	Outbound DNL ¹	Inbound DNL ²	Total En Route DNL
<= 1	<= 365	14.3	11.5	16.1
<= 5	<= 1,825	21.3	18.5	23.1
<= 10	<= 3,650	24.3	21.5	26.1
<= 15	<= 5,475	26.1	23.3	27.9
<= 20	<= 7,300	27.3	24.5	29.1
<= 40	<= 14,600	30.3	27.5	32.2
<= 60	<= 21,900	32.1	29.3	33.9
<= 80	<= 29,200	33.3	30.5	35.2
<= 100	<= 36,500	34.3	31.5	36.1
<= 120	<= 43,800	35.1	32.3	36.9
<= 140	<= 51,100	35.8	33.0	37.6
<= 160	<= 58,400	36.3	33.5	38.2
<= 180	<= 65,700	36.9	34.1	38.7
<= 200	<= 73,000	37.3	34.5	39.1
<= 220	<= 80,300	37.7	34.9	39.6
<= 240	<= 87,600	38.1	35.3	39.9
<= 260	<= 94,900	38.4	35.6	40.3
<= 280	<= 102,200	38.8	36.0	40.6
<= 300	<= 109,500	39.1	36.3	40.9
<=320	<= 116,800	39.4	36.6	41.2
<= 340	<= 124,100	39.6	36.8	41.4
<= 360	<= 131,400	39.9	37.1	41.7
<= 380	<= 138,700	40.1	37.3	41.9
<= 400	<= 146,000	40.3	37.5	42.2
<= 420	<= 153,300	40.5	37.7	42.4
<= 440	<= 160,600	40.7	37.9	42.6
<= 460	<= 167,900	40.9	38.1	42.8
<= 480	<= 175,200	41.1	38.3	42.9
<= 500	<= 182,500	41.3	38.5	43.1
<= 520	<= 189,800	41.5	38.7	43.3
<= 540	<= 197,100	41.6	38.8	43.5
<= 560	<= 204,400	41.8	39.0	43.6
<= 580	<= 211,700	41.9	39.1	43.8
<= 600	<= 219,000	42.1	39.3	43.9
<= 620	<= 226,300	42.2	39.4	44.1
<= 640	<= 233,600	42.4	39.6	44.2
<= 660	<= 240,900	42.5	39.7	44.3
<= 680	<= 248,200	42.6	39.8	44.5
<= 700	<= 255,500	42.8	40.0	44.6
<= 720	<= 262,800	42.9	40.1	44.7
<= 740	<= 270,100	43.0	40.2	44.8
<= 760	<= 277,400	43.1	40.3	44.9
<= 780	<= 284,700	43.2	40.4	45.1
<= 800	<= 292,000	43.3	40.5	45.2
<= 820	<= 299,300	43.4	40.6	45.3

Number of DNL Equivalent Deliveries		Estimated Extent of Noise Exposure		
Average Daily	Annual	Outbound DNL ¹	Inbound DNL ²	Total En Route DNL
<= 840	<= 306,600	43.5	40.7	45.4
<= 860	<= 313,900	43.6	40.8	45.5
<= 880	<= 321,200	43.7	40.9	45.6
<= 900	<= 328,500	43.8	41.0	45.7
<= 920	<= 335,800	43.9	41.1	45.8
<= 940	<= 343,100	44.0	41.2	45.9
<= 960	<= 350,400	44.1	41.3	46.0
<= 980	<= 357,700	44.2	41.4	46.0
<= 1,000	<= 365,000	44.3	41.5	46.1
<= 1,020	<= 372,300	44.4	41.6	46.2
<= 1,040	<= 379,600	44.5	41.7	46.3
<= 1,060	<= 386,900	44.6	41.8	46.4
<= 1,080	<= 394,200	44.6	41.8	46.5
<= 1,100	<= 401,500	44.7	41.9	46.5
<= 1,120	<= 408,800	44.8	42.0	46.6
<= 1,140	<= 416,100	44.9	42.1	46.7
<= 1,160	<= 423,400	44.9	42.1	46.8
<= 1,180	<= 430,700	45.0	42.2	46.9
<= 1,200	<= 438,000	45.1	42.3	46.9
<= 1,220	<= 445,300	45.2	42.4	47.0
<= 1,240	<= 452,600	45.2	42.4	47.1
<= 1,260	<= 459,900	45.3	42.5	47.1
<= 1,280	<= 467,200	45.4	42.6	47.2
<= 1,300	<= 474,500	45.4	42.6	47.3
<= 1,320	<= 481,800	45.5	42.7	47.3
<= 1,340	<= 489,100	45.6	42.8	47.4
<= 1,360	<= 496,400	45.6	42.8	47.5
<= 1,380	<= 503,700	45.7	42.9	47.5
<= 1,400	<= 511,000	45.8	43.0	47.6
<= 1,420	<= 518,300	45.8	43.0	47.7
<= 1,440	<= 525,600	45.9	43.1	47.7
<= 1,460	<= 532,900	45.9	43.1	47.8
<= 1,480	<= 540,200	46.0	43.2	47.8
<= 1,500	<= 547,500	46.1	43.3	47.9
<= 1,520	<= 554,800	46.1	43.3	48.0
<= 1,540	<= 562,100	46.2	43.4	48.0
<= 1,560	<= 569,400	46.2	43.4	48.1
<= 1,580	<= 576,700	46.3	43.5	48.1
<= 1,600	<= 584,000	46.3	43.5	48.2
<= 1,620	<= 591,300	46.4	43.6	48.2
<= 1,640	<= 598,600	46.4	43.6	48.3
<= 1,660	<= 605,900	46.5	43.7	48.3
<= 1,680	<= 613,200	46.6	43.8	48.4
<= 1,700	<= 620,500	46.6	43.8	48.4
<= 1,720	<= 627,800	46.7	43.9	48.5
<= 1,740	<= 635,100	46.7	43.9	48.5

Number of DNL Equivalent Deliveries		Estimated Extent of Noise Exposure		
Average Daily	Annual	Outbound DNL ¹	Inbound DNL ²	Total En Route DNL
<= 1,760	<= 642,400	46.8	44.0	48.6
<= 1,780	<= 649,700	46.8	44.0	48.6
<= 1,800	<= 657,000	46.9	44.1	48.7
<= 1,820	<= 664,300	46.9	44.1	48.7
<= 1,840	<= 671,600	46.9	44.1	48.8
<= 1,860	<= 678,900	47.0	44.2	48.8
<= 1,880	<= 686,200	47.0	44.2	48.9
<= 1,900	<= 693,500	47.1	44.3	48.9
<= 1,920	<= 700,800	47.1	44.3	49.0
<= 1,940	<= 708,100	47.2	44.4	49.0
<= 1,960	<= 715,400	47.2	44.4	49.1
<= 1,980	<= 722,700	47.3	44.5	49.1
<= 2,000	<= 730,000	47.3	44.5	49.1

SOURCE: ESA, 2025.

Notes:

1. The max weight en route noise calculated for each delivery includes both the outbound traversal of the en route path at 200 feet AGL and a ground speed of 58.3 knots.
2. The empty weight en route noise calculated for each delivery includes both the inbound traversal of the en route path at 345 feet AGL and a ground speed of 58.3 knots.

Table 8. Estimated Noise Exposure Directly Under Overflights

Altitude of Overflight	SEL for One Overflight (dB)	DNL for One Overflight Between 7 A.M. and 10 P.M. (dB)	DNL Equation for the Number of DNL Equivalent Overflights
115 feet AGL	66.7	17.5	$10 \times \log_{10}(No) + 17.5$
160 feet AGL	64.9	15.7	$10 \times \log_{10}(No) + 15.5$
165 feet AGL	64.7	15.5	$10 \times \log_{10}(No) + 15.5$
180 feet AGL	64.3	15.1	$10 \times \log_{10}(No) + 15.1$
200 feet AGL	63.7	14.5	$10 \times \log_{10}(No) + 14.5$
300 feet AGL	61.5	12.3	$10 \times \log_{10}(No) + 12.3$
345 feet AGL	60.7	11.5	$10 \times \log_{10}(No) + 11.5$
N Feet AGL	$12.5 \times \log_{10}(200/N_{ft}) + 63.7$	$SEL_1 - 49.4$	$10 \times \log_{10}(No) + DNL_1$

SOURCE: ESA, 2025.

Notes:

1. The DNL value for a given number of average DNL Equivalent Operations, N_o , can be found by using the equations associated with operation of the drone at a specified altitude and speed interval. In this case, one operation represents a single overflight.
2. All values in this table are for level flight at maximum weight and 58.3 knots.

4.3 Noise Exposure for Operations at Delivery Point

Table 9 presents the estimated DNL values for a range of potential daily average DNL equivalent delivery counts at a delivery point. The DNL values include the transition from en route speed to vertical flight at transition altitude, the delivery maneuver, and the transition from vertical flight at transition altitude to en route speed as discussed in **Section 3.4.3**. The minimum listener distance is 16.4 feet from the delivery point and corresponds to minimum distance between a person and delivery point. Values are also presented at 25 feet from the delivery point which corresponds to minimum distance from the available measurement data and analysis. Values were also calculated at distances of 50 feet, 75 feet, 100 feet, and 125 feet from the delivery point and are representative of distances from which nearby properties may experience noise from a delivery.⁷

Table 9. Estimated Noise Exposure at Various Distances from a Delivery Point per Number of DNL Equivalent Deliveries

Average Daily Deliveries	Annual Deliveries	DNL at 16.4 feet ¹	DNL at 25 feet ²	DNL at 50 feet	DNL at 75 feet	DNL at 100 feet	DNL at 125 feet
<= 1	<= 365	45.1	42.7	38.8	36.4	34.1	32.3
<= 5	<= 1,825	52.1	49.7	45.8	43.4	41.1	39.3
<= 10	<= 3,650	55.1	52.7	48.8	46.4	44.1	42.3
<= 15	<= 5,475	56.9	54.5	50.5	48.2	45.9	44.1
<= 20	<= 7,300	58.2	55.7	51.8	49.5	47.2	45.3
<= 40	<= 14,600	61.2	58.8	54.8	52.5	50.2	48.4
<= 60	<= 21,900	62.9	60.5	56.5	54.2	51.9	50.1
<= 80	<= 29,200	64.2	61.8	57.8	55.5	53.2	51.4
<= 100	<= 36,500	65.1	62.7	58.8	56.4	54.1	52.3
<= 120	<= 43,800	65.9	63.5	59.6	57.2	54.9	53.1
<= 140	<= 51,100	66.6	64.2	60.2	57.9	55.6	53.8
<= 160	<= 58,400	67.2	64.8	60.8	58.5	56.2	54.4
<= 180	<= 65,700	67.7	65.3	61.3	59.0	56.7	54.9
<= 200	<= 73,000	68.2	65.7	61.8	59.5	57.2	55.3
<= 220	<= 80,300	68.6	66.2	62.2	59.9	57.6	55.8
<= 240	<= 87,600	69.0	66.5	62.6	60.2	57.9	56.1
<= 260	<= 94,900	69.3	66.9	62.9	60.6	58.3	56.5
<= 280	<= 102,200	69.6	67.2	63.2	60.9	58.6	56.8
<= 300	<= 109,500	69.9	67.5	63.5	61.2	58.9	57.1
<=320	<=116,800	70.2	67.8	63.8	61.5	59.2	57.4
<= 340	<= 124,100	70.5	68.0	64.1	61.8	59.5	57.6
<= 360	<= 131,400	70.7	68.3	64.3	62.0	59.7	57.9
<= 380	<= 138,700	70.9	68.5	64.6	62.2	59.9	58.1
<= 400	<= 146,000	71.2	68.8	64.8	62.5	60.2	58.4
<= 420	<= 153,300	71.4	69.0	65.0	62.7	60.4	58.6
<= 440	<= 160,600	71.6	69.2	65.2	62.9	60.6	58.8
<= 460	<= 167,900	71.8	69.4	65.4	63.1	60.8	59.0
<= 480	<= 175,200	72.0	69.5	65.6	63.3	61.0	59.1

⁷ The 2022 US Census national average lot size for single-family sold homes was 15,265 square feet. This is representative of a property with dimensions of a 123.55 x 123.55-foot square. 125 feet represents a 125-foot lateral width of the parcel rounded up to the nearest 25 feet. <https://www.census.gov/construction/chars/> See file "Soldlotsize_cust.xls" sheet MALotSizeSold. Accessed January 18, 2024.

Average Daily Deliveries	Annual Deliveries	DNL at 16.4 feet ¹	DNL at 25 feet ²	DNL at 50 feet	DNL at 75 feet	DNL at 100 feet	DNL at 125 feet
<= 500	<= 182,500	72.1	69.7	65.8	63.4	61.1	59.3
<= 520	<= 189,800	72.3	69.9	65.9	63.6	61.3	59.5
<= 540	<= 197,100	72.5	70.1	66.1	63.8	61.5	59.7
<= 560	<= 204,400	72.6	70.2	66.2	63.9	61.6	59.8
<= 580	<= 211,700	72.8	70.4	66.4	64.1	61.8	60.0
<= 600	<= 219,000	72.9	70.5	66.5	64.2	61.9	60.1
<= 620	<= 226,300	73.1	70.7	66.7	64.4	62.1	60.3
<= 640	<= 233,600	73.2	70.8	66.8	64.5	62.2	60.4
<= 660	<= 240,900	73.3	70.9	67.0	64.6	62.3	60.5
<= 680	<= 248,200	73.5	71.1	67.1	64.8	62.5	60.7
<= 700	<= 255,500	73.6	71.2	67.2	64.9	62.6	60.8
<= 720	<= 262,800	73.7	71.3	67.3	65.0	62.7	60.9
<= 740	<= 270,100	73.8	71.4	67.5	65.1	62.8	61.0
<= 760	<= 277,400	74.0	71.5	67.6	65.3	62.9	61.1
<= 780	<= 284,700	74.1	71.7	67.7	65.4	63.1	61.3
<= 800	<= 292,000	74.2	71.8	67.8	65.5	63.2	61.4
<= 820	<= 299,300	74.3	71.9	67.9	65.6	63.3	61.5
<= 840	<= 306,600	74.4	72.0	68.0	65.7	63.4	61.6
<= 860	<= 313,900	74.5	72.1	68.1	65.8	63.5	61.7
<= 880	<= 321,200	74.6	72.2	68.2	65.9	63.6	61.8
<= 900	<= 328,500	74.7	72.3	68.3	66.0	63.7	61.9
<= 920	<= 335,800	74.8	72.4	68.4	66.1	63.8	62.0
<= 940	<= 343,100	74.9	72.5	68.5	66.2	63.9	62.1
<= 960	<= 350,400	75.0	72.6	68.6	66.3	64.0	62.2
<= 980	<= 357,700	75.1	72.6	68.7	66.4	64.1	62.2
<= 1,000	<= 365,000	75.1	72.7	68.8	66.4	64.1	62.3
<= 1,020	<= 372,300	75.2	72.8	68.9	66.5	64.2	62.4
<= 1,040	<= 379,600	75.3	72.9	68.9	66.6	64.3	62.5
<= 1,060	<= 386,900	75.4	73.0	69.0	66.7	64.4	62.6
<= 1,080	<= 394,200	75.5	73.1	69.1	66.8	64.5	62.7
<= 1,100	<= 401,500	75.6	73.1	69.2	66.9	64.6	62.7
<= 1,120	<= 408,800	75.6	73.2	69.3	66.9	64.6	62.8
<= 1,140	<= 416,100	75.7	73.3	69.3	67.0	64.7	62.9
<= 1,160	<= 423,400	75.8	73.4	69.4	67.1	64.8	63.0
<= 1,180	<= 430,700	75.9	73.5	69.5	67.2	64.9	63.1
<= 1,200	<= 438,000	75.9	73.5	69.6	67.2	64.9	63.1
<= 1,220	<= 445,300	76.0	73.6	69.6	67.3	65.0	63.2
<= 1,240	<= 452,600	76.1	73.7	69.7	67.4	65.1	63.3
<= 1,260	<= 459,900	76.2	73.7	69.8	67.5	65.1	63.3
<= 1,280	<= 467,200	76.2	73.8	69.8	67.5	65.2	63.4
<= 1,300	<= 474,500	76.3	73.9	69.9	67.6	65.3	63.5
<= 1,320	<= 481,800	76.4	73.9	70.0	67.7	65.3	63.5
<= 1,340	<= 489,100	76.4	74.0	70.0	67.7	65.4	63.6
<= 1,360	<= 496,400	76.5	74.1	70.1	67.8	65.5	63.7
<= 1,380	<= 503,700	76.5	74.1	70.2	67.8	65.5	63.7
<= 1,400	<= 511,000	76.6	74.2	70.2	67.9	65.6	63.8
<= 1,420	<= 518,300	76.7	74.3	70.3	68.0	65.7	63.9

Average Daily Deliveries	Annual Deliveries	DNL at 16.4 feet ¹	DNL at 25 feet ²	DNL at 50 feet	DNL at 75 feet	DNL at 100 feet	DNL at 125 feet
<= 1,440	<= 525,600	76.7	74.3	70.4	68.0	65.7	63.9
<= 1,460	<= 532,900	76.8	74.4	70.4	68.1	65.8	64.0
<= 1,480	<= 540,200	76.9	74.4	70.5	68.1	65.8	64.0
<= 1,500	<= 547,500	76.9	74.5	70.5	68.2	65.9	64.1
<= 1,520	<= 554,800	77.0	74.6	70.6	68.3	66.0	64.2
<= 1,540	<= 562,100	77.0	74.6	70.6	68.3	66.0	64.2
<= 1,560	<= 569,400	77.1	74.7	70.7	68.4	66.1	64.3
<= 1,580	<= 576,700	77.1	74.7	70.8	68.4	66.1	64.3
<= 1,600	<= 584,000	77.2	74.8	70.8	68.5	66.2	64.4
<= 1,620	<= 591,300	77.2	74.8	70.9	68.5	66.2	64.4
<= 1,640	<= 598,600	77.3	74.9	70.9	68.6	66.3	64.5
<= 1,660	<= 605,900	77.3	74.9	71.0	68.6	66.3	64.5
<= 1,680	<= 613,200	77.4	75.0	71.0	68.7	66.4	64.6
<= 1,700	<= 620,500	77.5	75.0	71.1	68.8	66.4	64.6
<= 1,720	<= 627,800	77.5	75.1	71.1	68.8	66.5	64.7
<= 1,740	<= 635,100	77.6	75.1	71.2	68.9	66.5	64.7
<= 1,760	<= 642,400	77.6	75.2	71.2	68.9	66.6	64.8
<= 1,780	<= 649,700	77.7	75.2	71.3	69.0	66.6	64.8
<= 1,800	<= 657,000	77.7	75.3	71.3	69.0	66.7	64.9
<= 1,820	<= 664,300	77.7	75.3	71.4	69.0	66.7	64.9
<= 1,840	<= 671,600	77.8	75.4	71.4	69.1	66.8	65.0
<= 1,860	<= 678,900	77.8	75.4	71.5	69.1	66.8	65.0
<= 1,880	<= 686,200	77.9	75.5	71.5	69.2	66.9	65.1
<= 1,900	<= 693,500	77.9	75.5	71.6	69.2	66.9	65.1
<= 1,920	<= 700,800	78.0	75.6	71.6	69.3	67.0	65.2
<= 1,940	<= 708,100	78.0	75.6	71.6	69.3	67.0	65.2
<= 1,960	<= 715,400	78.1	75.7	71.7	69.4	67.1	65.3
<= 1,980	<= 722,700	78.1	75.7	71.7	69.4	67.1	65.3
<= 2,000	<= 730,000	78.2	75.7	71.8	69.5	67.2	65.3

SOURCE: ESA, 2025.

Notes:

1. Minimum possible listener distance from drone.
2. Minimum measured distance to listener from drone.
3. The DNL values presented in this table reflect the drone conducting delivery descent and transition, backyard descent, delivery, backyard ascent, and transition and inbound climb flight maneuvers associated with a delivery.
4. If a value for deliveries is not specifically defined in this table, use the next highest value. For example, if there are 50 average daily DNL equivalent deliveries, use the entry for 60 average daily DNL equivalent deliveries.

Attachment A

Attachment B

PRIME AIR MK30 DRONE NOISE MEASUREMENT REPORT

Technical Report

April 2025



PRIME AIR MK30 DRONE NOISE MEASUREMENT REPORT

Technical Report

April 2025

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1 Introduction

This document details Amazon Prime Air's (Prime Air's) recent National Environmental Policy Act (NEPA) Noise Data Collection Campaign, aimed at estimating the noise signature of the MK30 drone. The collected data will be used to evaluate operations under NEPA. The test campaign took place at the Pendleton UAS Range, situated at the Eastern Oregon Regional Airport (KPDT) in Pendleton, Oregon. The data analyzed in this report comes from flights conducted on October 11, 12, 15, 16, 19, and 23, 2024.

Prime Air's package delivery operations are managed through a network of Prime Air Drone Delivery Centers (PADDCs). Each PADDC serves a specific area, preventing an over-concentration of flights around any single center. The MK30 drone has a round-trip range of approximately 15 miles. PADDCs are strategically located in established, and planned development, parking lots of Amazon Prime warehouses, and adhere to local zoning and land use regulations.

The MK30 is an electric powered drone that uses a vertical take-off and landing (VTOL) then transitions to fixed-wing flight using wing lift during en route flight. The drone systems include hardware and software designed for safety and efficiency. The airframe is composed of staggered wings, the propulsion system includes a rechargeable lithium-ion battery, and six (6) motors that include propellers designed for noise reduction. The package delivery system contains the package in a two-door interior receptacle, and a camera and avionics system that has redundancy for critical systems. The drone weighs approximately 78 lbs. and has a maximum takeoff weight of 83.2 lbs., which includes a maximum payload of 5 lbs. It has a maximum operating range of 7.5 mi and can fly up to 400 ft above ground level (AGL) at a maximum cruise speed of 73 mph (64 knots) during horizontal flight. An image of the MK30 drone is shown in **Figure 1**.

The MK30 operational flight profiles can be broken into the following general flight phases: launch, en route outbound, delivery, en route inbound, and landing. After launch, the MK30 would ascend to an altitude of less than 400 ft AGL and follow a predefined route to its delivery site.¹ The MK30 would typically fly en route at between approximately 180 to 377 ft AGL, except when descending to drop a package. Packages would be carried internally in the drone's fuselage. When making a delivery, the drone descends, opens a set of payload doors, and drops the package to the ground from approximately 13 ft AGL. Prime Air's drone would not touch the ground in any place other than the PADDC (except during safe contingent landings) and will remain airborne throughout the operation including the delivery stage.² After the package is dropped, the MK30 drone climbs vertically and follows its predefined route back to the PADDC at its assigned altitude. The typical operational flight parameters can be seen below in **Table 1** and **Figure 2**. Note that these are the flight profiles for operational flights and not the flight test profiles for this noise flight test campaign.

¹ Prime Air may modify operations, if warranted, to avoid or minimize any negative impacts.

² The MK30 vehicle is built with multiple redundant safety features and "detect and avoid" technology. The drone is designed to handle unexpected situations; it is independently safe.

A custom measurement system was utilized, employing GRAS 46AO 1/2" pressure microphones and National Instruments data acquisition hardware, following the FAA's draft UA package delivery noise measurement protocol.³ Flights were conducted across three flight profiles, which included takeoff/landing/delivery, hover, and overflight, to characterize the sound exposure levels (SEL) of the MK30 drone. These SEL values will be a key input to the NEPA Environmental Assessment for assessing the potential noise impact of Prime Air's proposed drone package delivery operations.

Figure 1. Amazon Prime Air MK30 Drone



Source: Amazon Prime Air, 2024.

³ Measuring Drone Noise for Environmental Review Process, October 2023.

Table 1. Phases of Flight for Typical Flight Profile of the MK30 Drone

Phase of Flight	Altitude (feet AGL)	Ground Speed (knots)	Duration (seconds)
Takeoff and Vertical Ascent	Ascent from 0 to 115	0	15
Transition and Outbound Climb	115 to 200	0 to 58.3	40
Fixed Wing Outbound Cruise	200 ¹	58.3	Variable ³
Delivery Descent and Transition	Descent from 200 to 140	58.3 to 0	30
Backyard Descent	Descent from 140 to 13	0	27
Delivery	13	0	4
Backyard Ascent	Ascent from 13 to 197	0	30
Transition and Inbound Climb	Ascent from 197 to 345	0 to 58.3	40
Fixed-Wing Inbound Cruise	377 ²	58.3	Variable ³
Landing Descent and Transition	Descent from 345 to 197	58.3 to 0	30
Vertical Descent and landing	Descent from 197 to 0	0	35

Source: Prime Air, 2025.

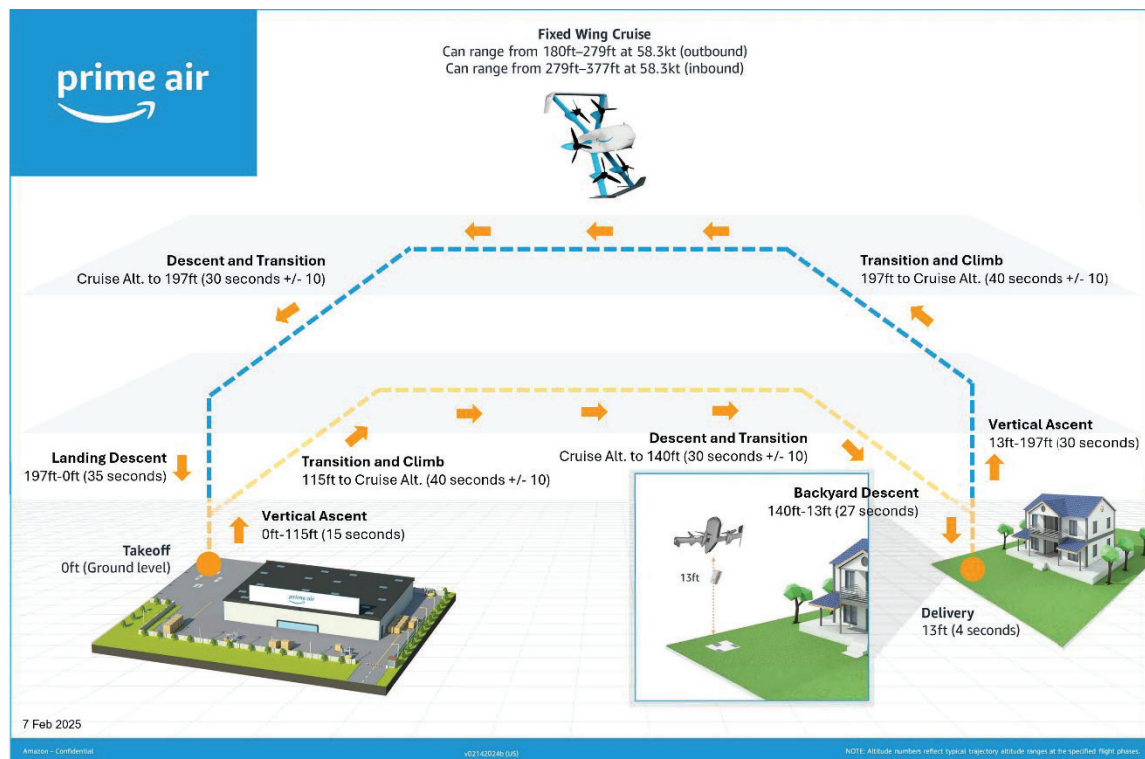
Notes:

¹ The outbound enroute altitude may range from 180 – 279 feet. For this analysis the outbound cruise altitude was assumed to be 200 feet.

² The inbound enroute altitude may range from 279 – 377 feet. For this analysis the inbound cruise altitude was assumed to be 345 feet.

³ Duration of inbound and outbound cruise flight time varies based on distance to customer.

Figure 2. Representative Operational Profile of the MK30



Source: Prime Air, 2025.

2 Test Descriptions

2.1 Overview

This section describes the methodology utilized to characterize the noise signature of the MK30 drone. The following sections describe the measurement system, and detailed description of the test plan, including flight trajectories and microphone locations.

2.2 Measurement System

Prime Air utilized a proprietary Mobile Acoustic Noise Test Array (MANTA) system for experimental measurements. This system provides time synchronized audio with respect to the drone. Microphone locations are surveyed for accurate positioning. The audio, drone-synchronized time and location data allow accurate determination of sound pressure level (SPL), distance, and incidence angle required for post-processing.

The system is composed of commercially available hardware with internal and external calibrations. The data acquisition system (DAQ) is a series of daisy-chained National Instruments cDAQ-9185 units and cDAQ-9189 units with NI-9234 analog modules capable of 51.2 kHz sampling rate at 24-bit resolution. New and calibrated GRAS 46AO ½” CCP Pressure Standard Microphones were used with the factory sensitivity values for the test. Calibration tones of the microphones were collected using a GRAS 42AG sound calibrator with a 1000 Hz signal at 114dB at the start and completion of each flight. Sensitivity values can be found in **Table 2**. While the primary components of the system are detailed above, the complete system hardware can be found in **Table 3**.

Measurement accuracy can be decomposed into system and field-installation components. Although MANTA has a GPS assigned to each microphone unit, only the time solution is used in the final product. By assigning a separate GPS unit to each microphone, the system is able to time synchronize with the on-board vehicle system to within 1 ms accuracy. Although the GPS location solution is not part of the delivered data product, it is used to confirm microphone placement with respect to desired survey locations using a nearest neighbor algorithm. This reduces geographic microphone placement from ± 1 m to ± 5 mm before installation error. When including a ± 30 degree installation error via a 1.6m tall tripod on non-level ground, horizontal and vertical location accuracy approach ± 0.8 m and ± 0.1 m, respectively.

Table 2. Microphone Data

Microphone ID	Hardware	Serial Number	Sensitivity (mV/Pa)
00	GRAS 46AO	573631	10.77
01	GRAS 46AO	573508	9.47
02	GRAS 46AO	573632	11.60
03	GRAS 46AO	573507	12.54
04	GRAS 46AO	573633	10.81
05	GRAS 46AO	573636	10.41
06	GRAS 46AO	573506	11.12
07	GRAS 46AO	573505	12.78
08	GRAS 46AO	573504	9.39
08	GRAS 46AO	573504	9.39
10	GRAS 46AO	573521	10.10
11	GRAS 46AO	573626	10.19
12	GRAS 46AO	573639	9.78

Source: Prime Air, 2024.

Note: Microphones calibrated with GRAS 42AG; Serial Number: 282324.

Table 3. Measurement System Hardware

Hardware	Quantity	Description
National Instruments cDAQ-9185	7	National Instruments cDAQ chassis with 4 module slots. 1 slot was utilized and populated with a NI-9234 4 channel Sound and Vibration module. 1 channel input was used for the GRAS 46AO microphone input.
National Instruments cDAQ-9189	3	National Instruments cDAQ chassis with 8 module slots. 1 slot was utilized and populated with a NI-9234 4 channel Sound and Vibration module. 2 channel inputs were used for the GRAS 46AO microphone input.
National Instruments Sound and Vibration Module NI-9234	10	The Sound and Vibration module used for microphone input to the system. The nidaqmx task was configured to capture microphone input at 51.2kHz at 24bits.

Source: Prime Air, 2024.

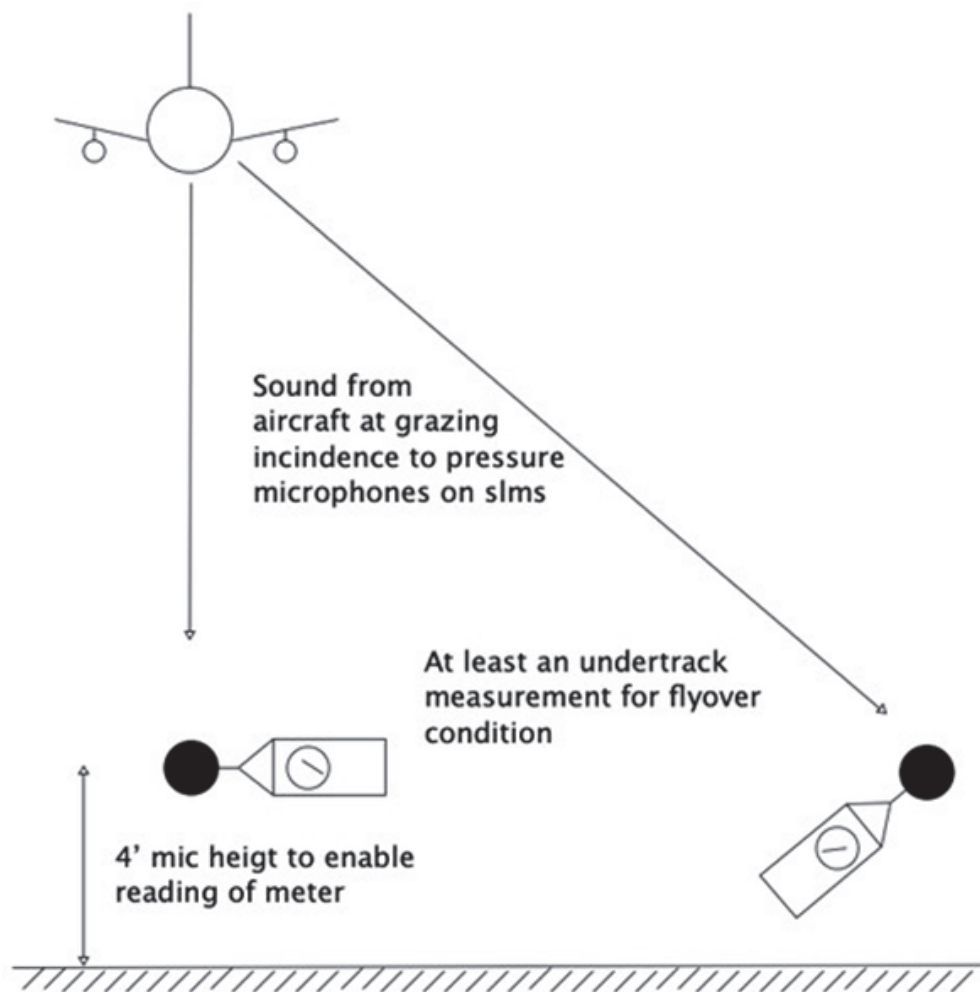
Note: All cDAQs were daisy chained together and utilized the Time-Sensitive Networking protocol to keep all data synchronized.

2.3 Microphone Locations

The microphone setup consisted of 13 pressure field microphones. In accordance with the FAA guidelines, each microphone was placed at 90 degree incidence to the sound source (drone) and is illustrated in **Figure 3**. There were no corrections applied to the measurement data due to the orientation of the microphones.

As shown in **Table 4**, microphones 00-04 were located under the takeoff, delivery, and landing flight trajectory. Microphones 05-08 were located behind the flight trajectory. Microphones 09-12 were located lateral to the flight trajectory. The table identifies the microphones used in calculating the various flight profiles. **Figure 4** provides the layout of microphones over an aerial basemap.

Figure 3. Microphone Orientation



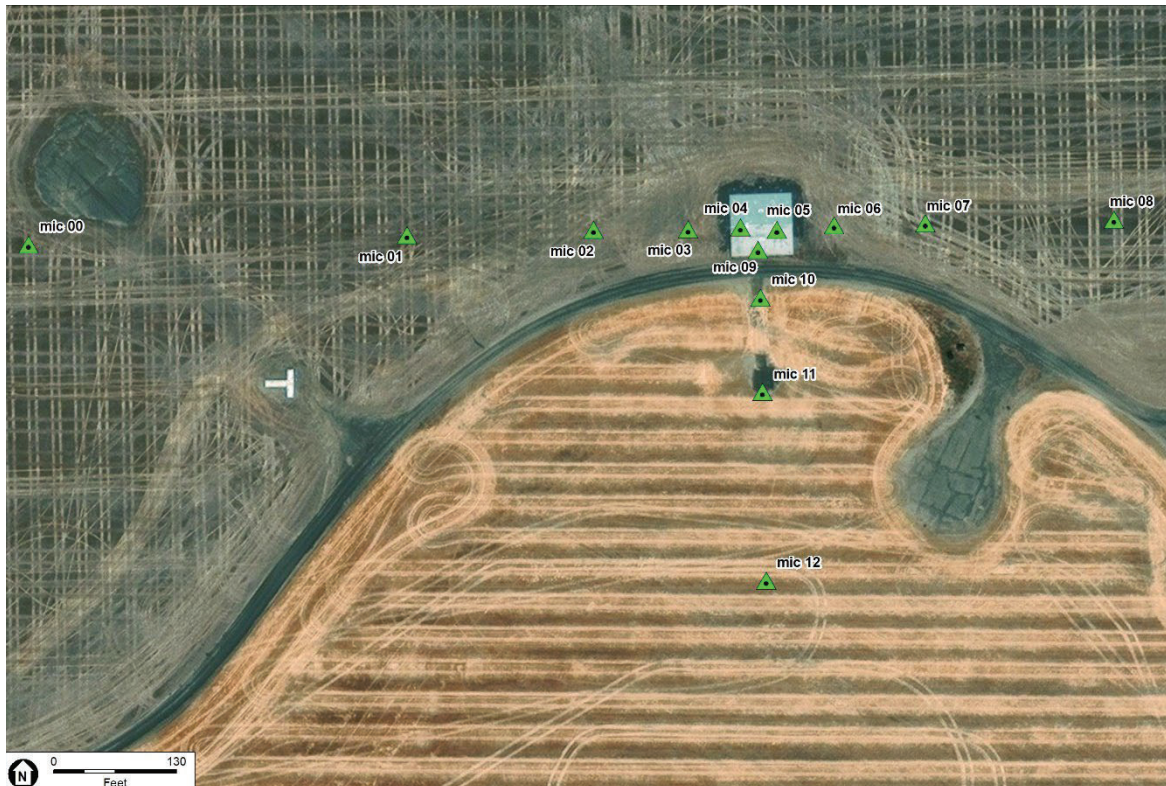
Source: FAA.

Table 4. Microphone Location and Applicable Flight Profile

Microphone ID (position)	Distance from VTOL / Delivery (ft)	Latitude	Longitude	Applicable Flight Profile		
				Takeoff/ Landing	Delivery	Enroute/ Overflight
00 (Undertrack)	772	45.70246	-118.8586	Yes	Yes	No
01 (Undertrack)	372	45.70247	-118.8571	Yes	Yes	No
02 (Undertrack)	195	45.70247	-118.8563	Yes	Yes	No
03 (Undertrack)	75	45.70247	-118.8559	Yes	Yes	No
04 (Undertrack)	20	45.70247	-118.8557	Yes	Yes	No
05 (Behind)	19	45.70246	-118.8555	Yes	Yes	No
06 (Behind)	79	45.70247	-118.8553	Yes	Yes	No
07 (Behind)	176	45.70247	-118.8549	Yes	Yes	No
08 (Behind)	375	45.70247	-118.8541	Yes	Yes	No
09 (Lateral)	25	45.7024	-118.8556	Yes	Yes	Yes
10 (Lateral)	76	45.70227	-118.8556	Yes	Yes	Yes
11 (Lateral)	175	45.70199	-118.8556	Yes	Yes	Yes
12 (Lateral)	375	45.70144	-118.8556	Yes	Yes	Yes

Source: Prime Air, 2024.

Figure 4. Location of Microphones to Launch Pad



Source: Prime Air, 2024; ESA, 2025.

2.4 Test Limitations

The test plan consists of flights with a “dog-bone” and “half dog-bone” trajectory while the MANTA (detailed in 2.2) is positioned at the vicinity of the delivery/takeoff/landing PADDC and along a parallel and perpendicular line to the flyover trajectory. Close-in and distant measurements were captured for all VTOL phases of flight.

Additionally, some phases of the test flight profiles were slightly modified from typical operations. The duration of the delivery backyard climb was, on average, 16 seconds shorter than expected for typical operation. During the test flight the drone also climbed to a lower altitude of approximately 200 feet AGL, compared to the typical 345-foot AGL ceiling. To adjust, noise measurements were manually added at the point just before the MK30 stops climbing, where the climb rate is constant, to account for the total missing duration.

Similarly, for the return to the PADDC, the VTOL descent was, on average, 10 seconds shorter than typical operations. To adjust, noise measurements were manually added at the point just after the MK30 starts its vertical descent, where the descent rate is constant, to account for the total missing duration. Both adjustments provided a conservative (i.e., louder) approach to assessing noise exposure of the MK30.

3 Measurement Profiles

3.1 Overview

The noise measurement data for each test was reviewed and takeoff, delivery, landing, and overflight events were hand-selected for each test flight based on the drone’s altitude, speed, location, and distance from the PADDC and MANTA. Events were reviewed for each test flight and each microphone in the MANTA was checked for data quality, and were discarded based on the following criteria:

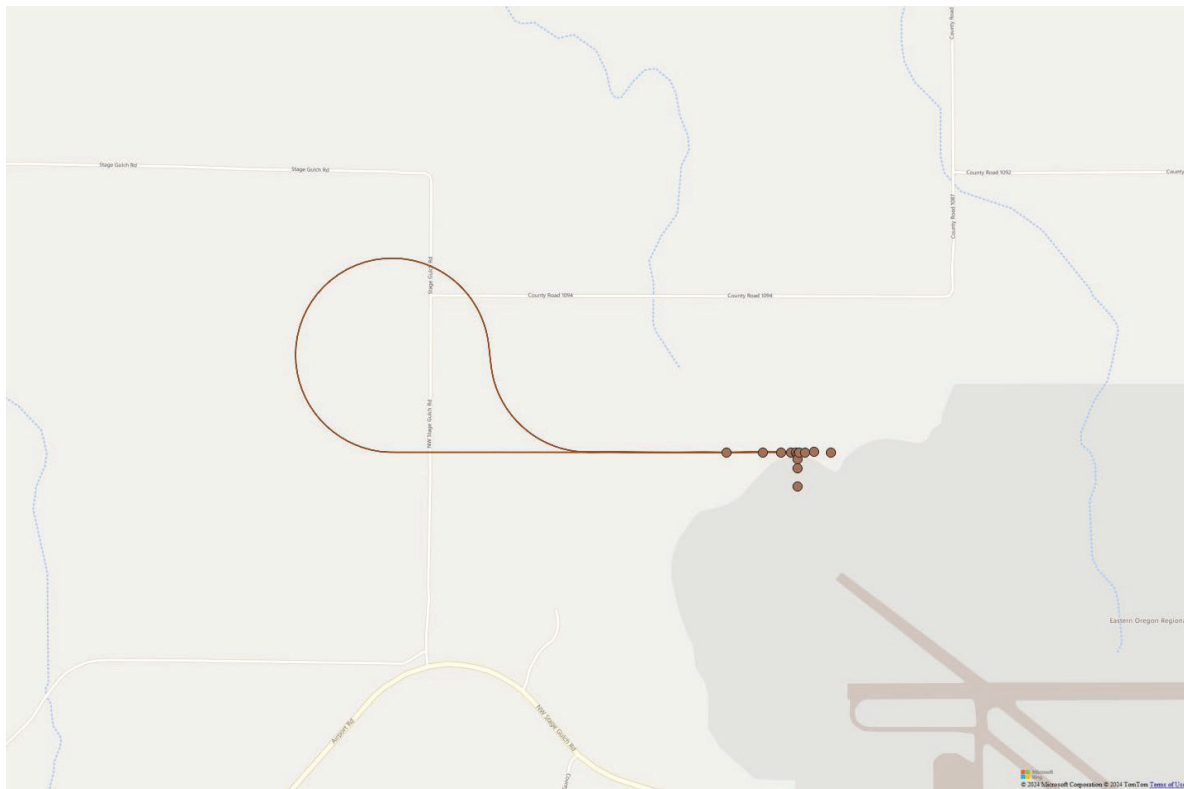
- Ambient noise level of the microphone is not reasonably close to the other microphones in the MANTA array.
- Average wind speed exceeding 5 knots during the event.
- Maximum sound level as measured by the 1-second Leq time history of the noise event not exceeding 10 dBA above the ambient noise level.
- Suspected contamination of the noise data (e.g. elevated or inconsistent ambient, sharp spikes in noise level, etc.).
- For overflight tests, data from the undertrack microphones (parallel to the direction of flight) were discarded.

3.2 Flight Test Profiles

3.2.1 Takeoff – Delivery – Landing (VTOL)

Two sets of tests were conducted with the drone performing VTOL flights at the PADDCC location at the center of the MANTA to simulate takeoff, delivery, and landing operations. A total of six test flights were measured with the drone carrying no payload, and an additional seven test flights were measured with the drone carrying maximum payload. For each of these test flights the drone was flown in a “half dog-bone” flight pattern, as shown in **Figure 5**. As depicted, the drone takes off from the PADDCC, and heads west before making a righthand turn through a full 270 degrees while attaining a cruise altitude of approximately 200 feet AGL. The drone then makes a left-hand 90 degree turn to re-align with the outbound flight path while descending back to PADDCC elevation. The drone performs this flight pattern twice per test flight. The first outbound leg represents the takeoff phase of flight, the first inbound and second outbound legs combined represent the delivery phase of flight, and the second inbound leg represents the landing phase of flight. The drone only touches down after the second inbound leg representing the landing phase.

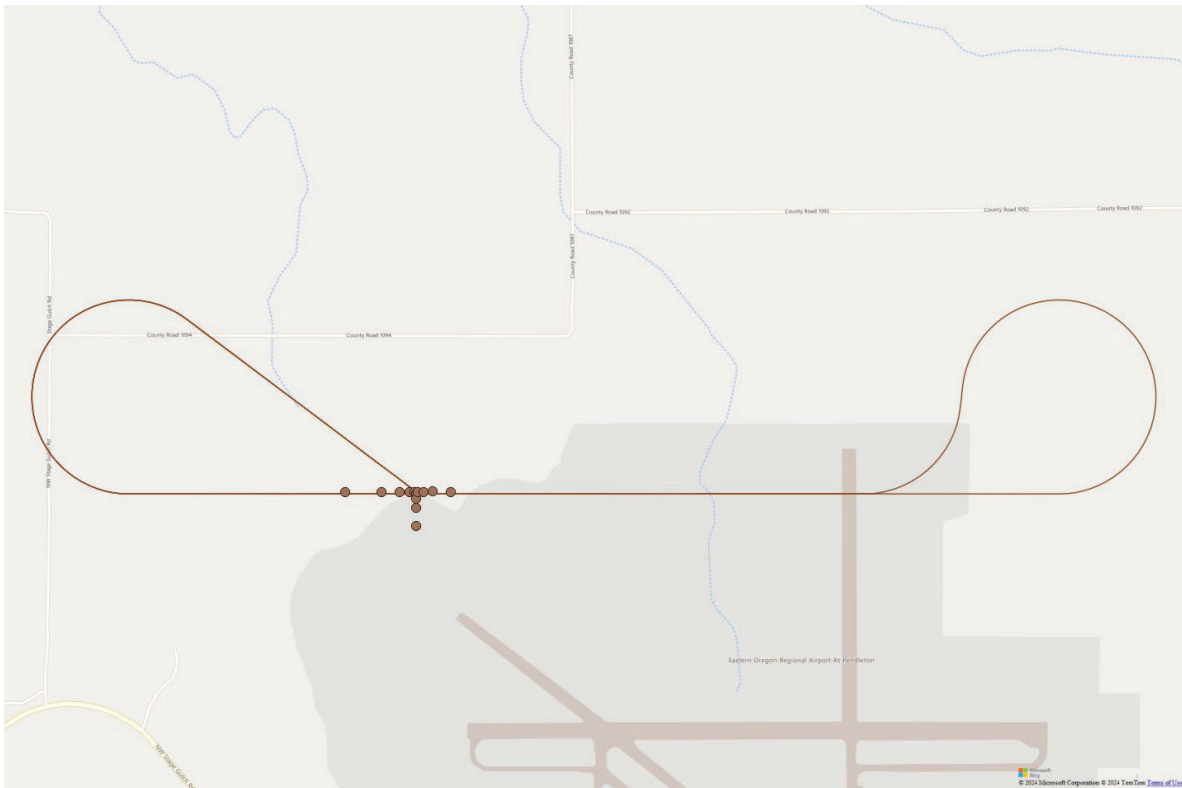
Figure 5. Takeoff, Delivery, and Landing Flight Pattern (Empty and MTOW)



3.2.2 Forward Flight (Flyover)

Two sets of tests were conducted with the drone overflying the MANTA to simulate an en route pass-by. A total of seven overflights were measured with the drone carrying no payload, and an additional six overflights were measured with the drone carrying maximum payload. For each of these overflights the drone was flown in a “dog-bone” flight pattern, as shown in **Figure 6**. As depicted, the drone takes off from the PADDC, heads northwest to transition and makes a lefthand turn while attaining a cruise altitude of 104 feet AGL at empty weight and 123 feet AGL at max weight.⁴ It then flies over the MANTA, then performs another lefthand turn through a full 270 degrees before turning right 90 degrees to realign with the eastbound portion of the flight path before overflying the MANTA again, and finally reversing the original outbound route back to the PADDC. This maneuver was repeated for each flight in both the max and empty weight test scenarios.

Figure 6. Flyover Flight Pattern (Empty and MTOW)



⁴ Empty and max weight en route flight tests were flown at different altitudes to ensure measurement was above ambient noise levels.

3.3 Test Condition: Takeoff (Max Weight)

3.3.1 Weather Conditions

The average weather conditions for each test at max weight are shown in **Table 5**. There were no weather exceedances that would deem measurements invalid.

Table 5. Takeoff (Max Weight) Weather Conditions

Test Number	Temperature (°F)	Average Wind Speed (knots)	Wind Direction (Degrees)	Average Wind Gust Speed (knots)	Relative Humidity (%)
1	49.3	4.4	114	6.2	56.5
2	55.5	2.0	165	3.5	43.9
3	59.7	4.0	275	7.4	36.4
4	60.1	3.6	233	7.0	35.6
5	50.0	3.4	101	4.3	52.7
6	45.8	4.0	90	4.9	62.5
7	47.8	4.0	121	6.2	60.2

Source: Prime Air, 2024; ESA, 2025.

3.3.2 Test Points and Validity

Appendix B and **Appendix C** present the tabulated and time history results, respectively, for all measurements. Out of the 91 data points, 17 were identified as invalid, as detailed in the **Table 6**. Therefore, 74 data points were deemed valid.

Table 6. Takeoff (Max Weight) Excluded Measurements

Microphone ID (position)	Test Number	Reason Not Included
Mic 00 (Undertrack)	7	Measurement too close to ambient
Mic 05 (Behind)	4	Elevated ambient levels across measurement
Mic 08 (Behind)	1, 5, 6, 7	Measurement too close to ambient
Mic 09 (Lateral)	1, 2, 3, 4, 5	Elevated ambient levels across measurement
Mic 12 (Lateral)	2, 3, 4, 5, 6, 7	Measurement too close to ambient

Source: Prime Air, 2024; ESA, 2025.

Notes: Measurement data that has been excluded under this noise analysis are presented in Appendix B and Appendix C.

3.4 Test Condition: Delivery (Max Weight)

3.4.1 Weather Conditions

The average weather conditions for each test at max weight are shown in **Table 7**. There were no weather exceedances that would deem measurements invalid.

Table 7. Delivery (Max Weight) Weather Conditions

Test Number	Temperature (°F)	Average Wind Speed (knots)	Wind Direction (Degrees)	Average Wind Gust Speed (knots)	Relative Humidity (%)
1	49.1	4.1	123	6.0	56.6
2	55.6	1.2	260	3.7	43.5
3	59.8	5.0	283	7.4	36.3
4	60.3	4.6	222	6.2	35.2
5	50.6	2.9	92	4.3	52.3
6	45.8	4.5	93	4.9	62.8
7	47.9	4.2	112	6.2	59.7

Source: Prime Air, 2024; ESA, 2025.

3.4.2 Test Points and Validity

Appendix B and **Appendix C** present the tabulated and time history results, respectively, for all measurements. Out of the 91 data points, 14 were identified as invalid, as detailed in **Table 8**. Therefore, 77 data points were deemed valid.

Table 8. Delivery (Max Weight) Excluded Measurements

Microphone ID (position)	Test Number	Reason Not Included
Mic 00 (Undertrack)	7	Elevated ambient levels across measurement
Mic 08 (Behind)	5, 6, 7	Measurement too close to ambient
Mic 09 (Lateral)	1, 2, 3, 4, 5	Elevated ambient levels across measurement
Mic 12 (Lateral)	2, 3, 4	Elevated ambient levels across measurement
Mic 12 (Lateral)	5, 6	Measurement too close to ambient

Source: Prime Air, 2024; ESA, 2025.

Notes: Measurement data that has been excluded under this noise analysis are presented in Appendix B and Appendix C.

3.5 Test Condition: Landing (Empty Weight)

3.5.1 Weather Conditions

The average weather conditions for each test at empty weight are in **Table 9**. Test 3 wind speed exceeded the weather threshold for wind and would invalidate the measurement.

Table 9. Landing (Empty Weight) Weather Conditions

Test Number	Temperature (°F)	Average Wind Speed (knots)	Wind Direction (Degrees)	Average Wind Gust Speed (knots)	Relative Humidity (%)
1	51.5	3.4	309	6.8	61.3
2	62.4	1.2	298	6.0	33.0
3	61.4	5.2	321	7.8	34.7
4	59.9	3.4	271	5.2	44.6
5	42.6	4.8	118	5.6	83.0
6	56.8	1.0	108	2.1	51.1

Source: Prime Air, 2024; ESA, 2025.

3.5.2 Test Points and Validity

Appendix B and **Appendix C** present the tabulated and time history results, respectively, for all measurements. Out of the 78 data points, 35 were identified as invalid, as detailed in **Table 10**. Therefore, 43 data points were deemed valid.

Table 10. Landing (Empty Weight) Excluded Measurements

Microphone ID (position)	Test Number	Reason Not Included
Mic 00-12 (all)	3 ¹	Exceeds crosswind component
Mic 01	4	Elevated ambient levels across measurement
Mic 05	1, 4, 6	Elevated ambient levels across measurement
Mic 08	4, 5, 6	Elevated ambient levels across measurement
Mic 09	1, 6	Elevated ambient levels across measurement
Mic 10	2	Elevated ambient levels across measurement
Mic 12	2	Elevated ambient levels across measurement
Mic 00	1, 2, 4, 5, 6	Measurement too close to ambient
Mic 01	5	Measurement too close to ambient
Mic 08	1	Measurement too close to ambient
Mic 11	5	Measurement too close to ambient
Mic 12	1, 4, 6	Measurement too close to ambient

Source: Prime Air, 2024; ESA, 2025.

Notes:

Measurement data that has been excluded under this noise analysis are presented in Appendix B and Appendix C.

¹ Test 3 was invalid for all microphone positions and accounts for 13 data points.

3.6 Test Condition: Flyover (Empty Weight)

3.6.1 Weather Conditions

The average weather conditions for each test at empty weight are shown in **Table 11**. Test 3-1, 3-2, and 4-2 wind speeds exceeded the weather threshold for wind and would invalidate the measurement.

Table 11. Flyover (Empty Weight) Weather Conditions

Test Number	Temperature (°F)	Average Wind Speed (knots)	Wind Direction (Degrees)	Average Wind Gust Speed (knots)	Relative Humidity (%)
1-1	45.3	4.0	102	4.5	62.8
1-2	45.5	3.8	93	4.5	62.2
2-1	65.1	2.4	177	4.1	38.7
2-2	65.1	3.0	213	4.1	38.4
3-1	62.2	5.9	326.2	10.9	34.6
3-2	62.8	7.5	312.6	10.9	35.6
4-1	63.3	4.3	300	11.1	34.1
4-2	63.9	6.4	353.4	10.7	33.9
5-1	61.3	2.2	320	9.9	37.8
5-2	61.7	3.0	341	9.9	37.4
6-1	61.3	4.4	34	9.1	37.3
6-2	61.0	2.6	22	7.4	37.0
7-1	45.5	4.2	102	4.7	61.5
7-2	45.7	3.9	105	4.7	61.3

Source: Prime Air, 2024; ESA, 2025.

3.6.2 Test Points and Validity

Appendix B and **Appendix C** present the tabulated and time history results, respectively, for all measurements. Out of the 56 data points, 25 were identified as invalid, as detailed in **Table 12**. Therefore, 31 data points were deemed valid.

Table 12. Flyover (Empty Weight) Excluded Measurements

Microphone ID (position)	Test Number	Reason Not Included
Mic 09 - 12	3-1, 3-2, 4-2	Exceeds crosswind component
Mic 09	4-1	Measurement too close to ambient
Mic 10	6-2	Measurement too close to ambient
Mic 11	6-1	Elevated ambient levels across measurement
Mic 12	1-1, 1-2, 2-2, 4-1, 5-1, 5-2, 6-1, 6-2, 7-1, 7-2	Measurement too close to ambient

Source: Prime Air, 2024; ESA, 2025.

Notes: Measurement data that has been excluded under this noise analysis are presented in Appendix B and Appendix C.

3.7 Test Condition: Flyover (Max Weight)

3.7.1 Weather Conditions

The average weather conditions for each test at max weight are shown in **Table 13**. There were no weather exceedances that would deem measurements invalid.

Table 13. Flyover (Max Weight) Weather Conditions

Test Number	Temperature (°F)	Average Wind Speed (knots)	Wind Direction (Degrees)	Average Wind Gust Speed (knots)	Relative Humidity (%)
1-1	53.4	1.6	96.6	4.4	53.8
1-2	53.2	2.9	82.3	4.1	53.6
2-1	48.4	3.3	77.3	5.8	62.8
2-2	49.3	3.6	123.5	5.8	60.9
3-1	54.5	1.7	132.1	3.5	52.2
3-2	54.9	2.2	306.5	3.5	51.3
4-1	56.7	2.1	170.8	3.9	48.7
4-2	56.1	1.9	214.0	4.1	49.2
5-1	50.9	3.3	116.9	4.7	59.1
5-2	51.1	2.7	131.5	4.7	58.6
6-1	65.5	1.6	191.3	4.1	53.5
6-2	65.3	3.7	245.7	7.0	56.7

Source: Prime Air, 2024; ESA, 2025.

3.7.2 Test Points and Validity

Appendix B and **Appendix C** present the tabulated and time history results, respectively, for all measurements. Out of the 48 data points, 12 were identified as invalid, as detailed in **Table 14**. Therefore, 36 data points were deemed valid.

Table 14. Flyover (Max Weight) Excluded Measurements

Microphone ID (position)	Test Number	Reason Not Included
Mic 12	All	Measurement too close to ambient

Source: Prime Air, 2024; ESA, 2025.

Notes: Measurement data that has been excluded under this noise analysis are presented in Appendix B and Appendix C.

4 Measurement Analysis

A range of metrics were calculated for each event and at each microphone. These metrics include ambient noise level (defined as the noise level when the drone’s rotors are not powered), Leq, Maximum Sound Level (Lmax), and SEL. Additional parameters regarding flight performance and weather conditions were also considered. It should be noted that the empty weight takeoff and max weight landing cases are not used in any subsequent analyses.

4.1 Overflight Analysis

As noted in the previous section, only the microphones positioned perpendicular to the flight path were utilized for analyzing the overflight data. For each event and microphone, the measured SEL was adjusted using correction factors to normalize the noise to the speed and distances specified by Prime Air’s typical flight profile, as described in Section 1. **Table 15** below outlines the parameters used for normalization.

Table 15. Enroute Normalization Parameters

Test Case	Normalization Speed (knots)	Normalization Distance (ft)
Empty Weight	58.3	345
Max Weight	58.3	200

Source: Prime Air, 2024; ESA, 2025.

The SELs for each microphone were averaged and the highest resulting SEL was selected for use as the computed en route noise level. The results of this analysis are presented in **Table 16** below along with the undertrack distance and point of closest approach (POCA) slant distance. The most conservative empty-weight en route noise level was computed to be 61.0 dBA. The most conservative max-weight en route noise level was computed to be 63.9 dBA. **Figure 7** and **Figure 8** present the range of measured en route SEL’s for empty weight and max weight, respectively.

Table 16. En Route Averaged A-Weighted SELs (Empty and Max Weight)

Test Case	Microphone ID (Position)	Undertrack Distance (ft)	POCA Slant Distance (ft)	Normalized SEL ¹ (dBA)
Empty Weight	09 (Lateral)	18.4	99.3	60.4
	10 (Lateral)	57.8	112.8	60.9
	11 (Lateral)	152.8	180.8	59.1
Max Weight	09 (Lateral)	20.0	118.4	63.0
	10 (Lateral)	56.0	128.9	63.7
	11 (Lateral)	152.7	191.7	61.7

Source: Prime Air, 2024; ESA, 2025.

Notes: Microphone ID 12 (lateral) is excluded as results were not sufficiently above ambient noise levels.

¹ Measured levels normalized to 58.3 kts before averaging. Using $12.5 \cdot \log_{10}(\text{POCA Slant} / \text{Normalized Adjustment Slant})$; empty weight normalized to 345 feet; max weight normalized to 200 feet.

Figure 7. Range of MK30 Averaged A-Weighted SELs from En Route at Empty Weight

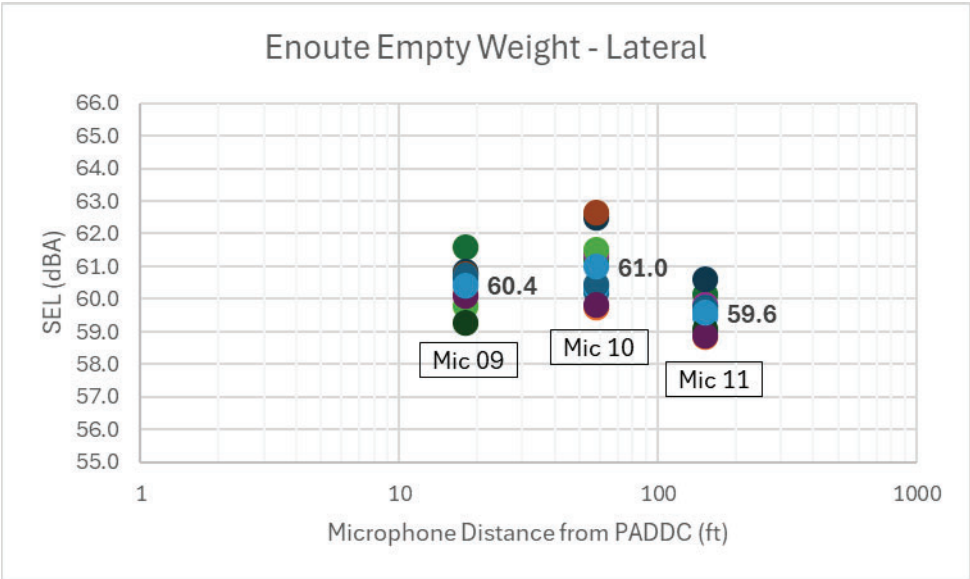
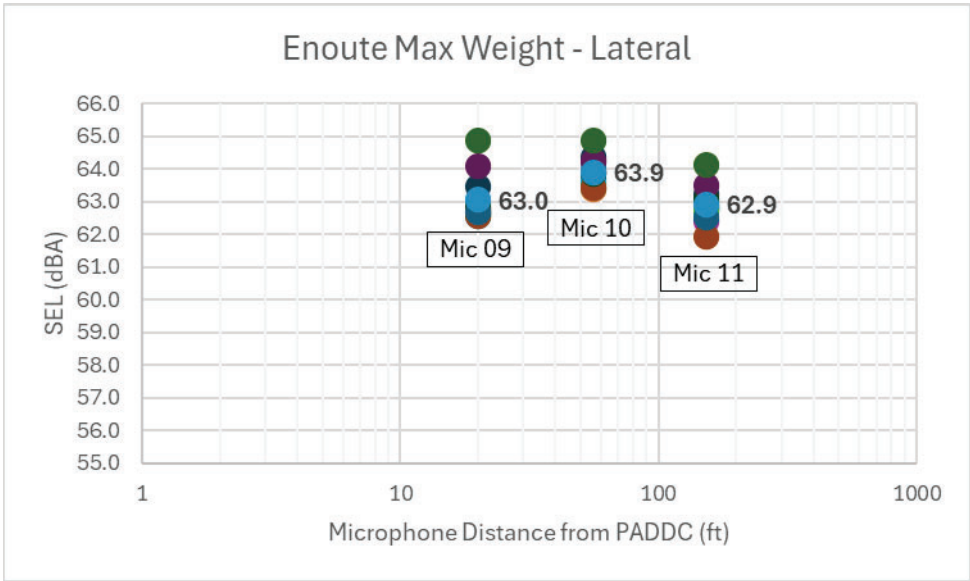


Figure 8. Range of MK30 Averaged A-Weighted SELs from En Route at Max Weight



4.2 VTOL Analysis

For each microphone and each test flight, the takeoff, delivery, and landing SELs were averaged. **Table 17** presents the results for takeoff, delivery, and landing. Scatter plots for these measurements are shown in **Figure 9** through **Figure 17**.

Table 17. Takeoff, Delivery, and Landing Averaged A-Weighted SELs

Distance to PADDCC (ft)	Max Weight		Empty Weight
	Takeoff	Delivery	Landing
Undertrack			
20	90.5	91.7	91.8
75	81.6	83.7	82.8
195	76.5	78.8	76.5
372	72.4	74.5	70.4
772	-	69.5	-
Behind			
19	89.8	92.0	91.2
79	80.0	83.2	81.6
176	73.5	77.3	75.3
375	67.3	71.3	70.5
Lateral			
25	88.8	92.1	89.9
76	82.1	85.8	83.2
175	75.5	79.0	76.3
375	68.2	71.1	-

Source: Prime Air, 2024; ESA, 2025.

Figure 9. Range of MK30 Averaged A-Weighted SELs from Takeoff at Max Weight – Undertrack

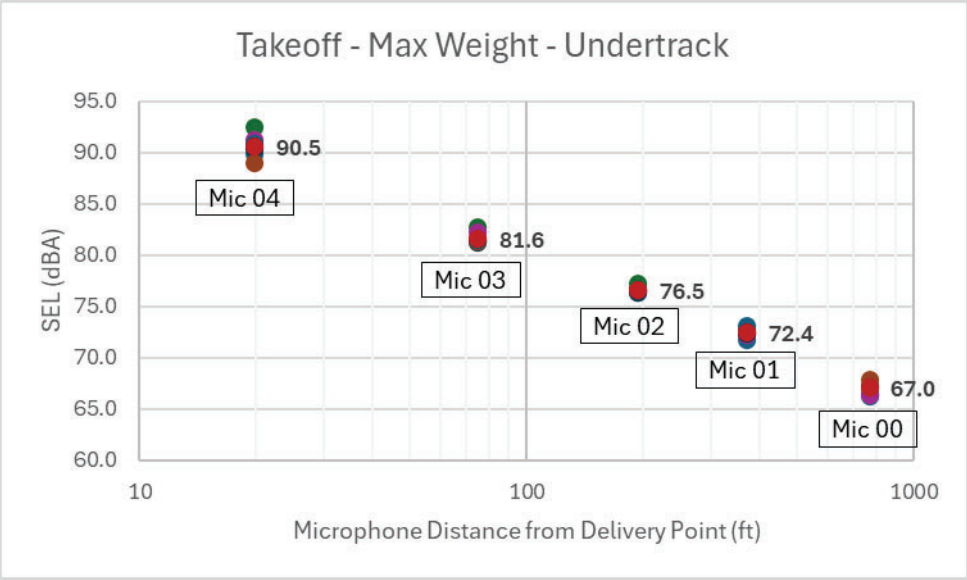


Figure 10. Range of MK30 Averaged A-Weighted SELs from Takeoff at Max Weight – Behind

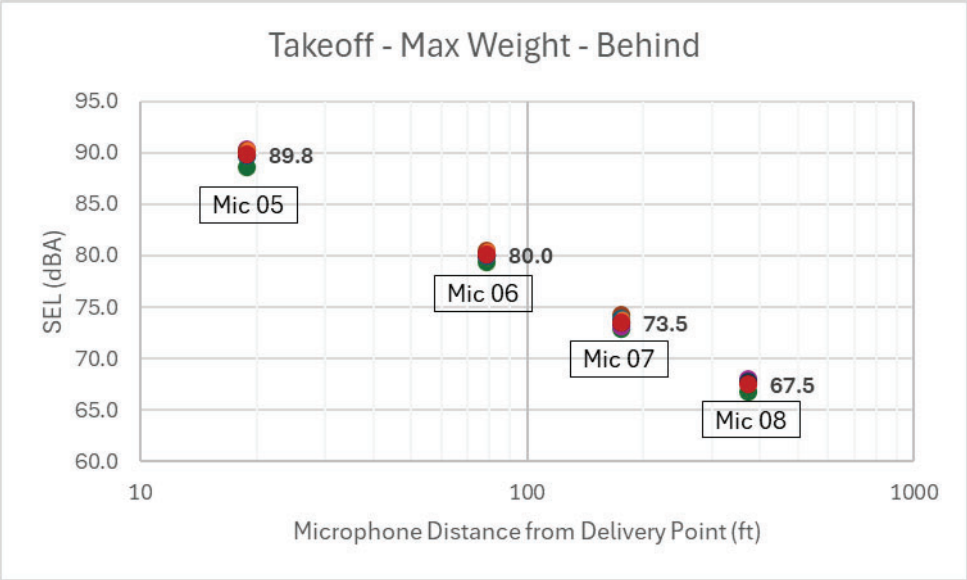


Figure 11. Range of MK30 Averaged A-Weighted SELs from Takeoff at Max Weight – Lateral

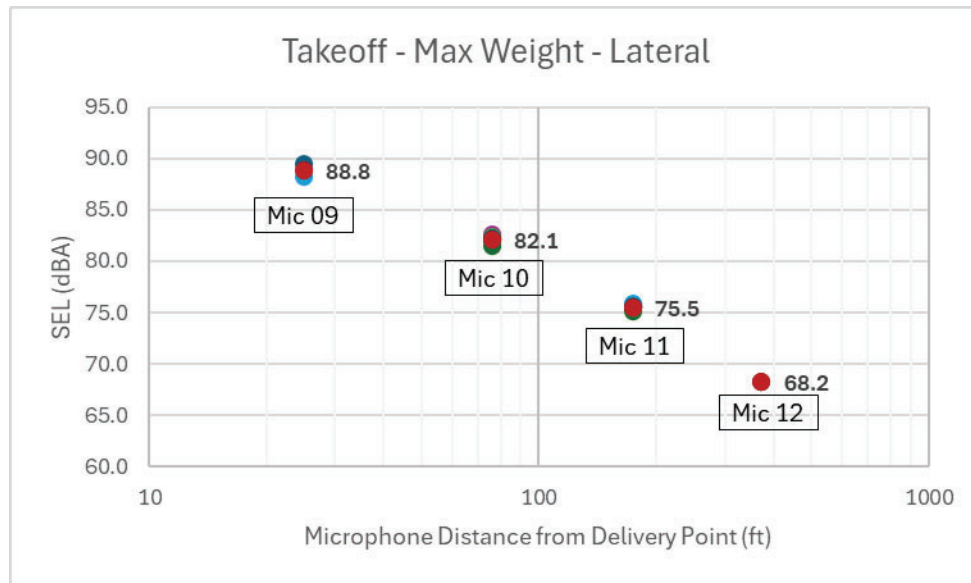


Figure 12. Range of MK30 Averaged A-Weighted SELs from Landing at Empty Weight – Undertrack

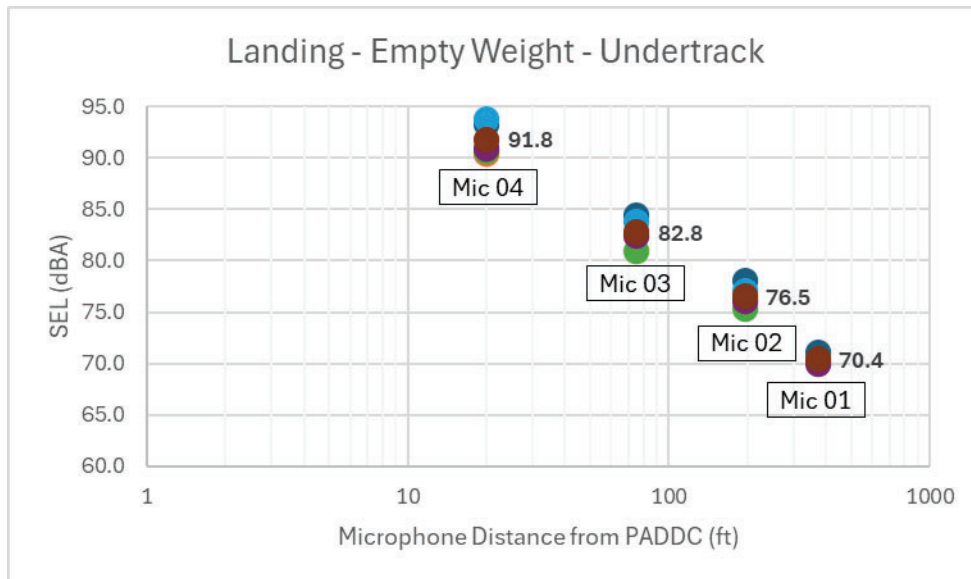


Figure 13. Range of MK30 Averaged A-Weighted SELs from Landing at Empty Weight – Behind

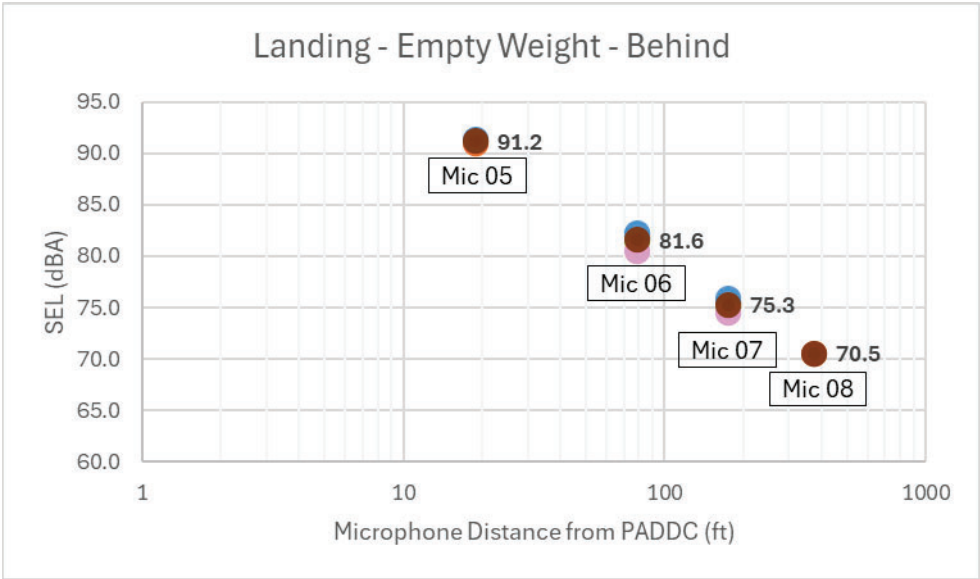


Figure 14. Range of MK30 Averaged A-Weighted SELs from Landing at Empty Weight – Lateral

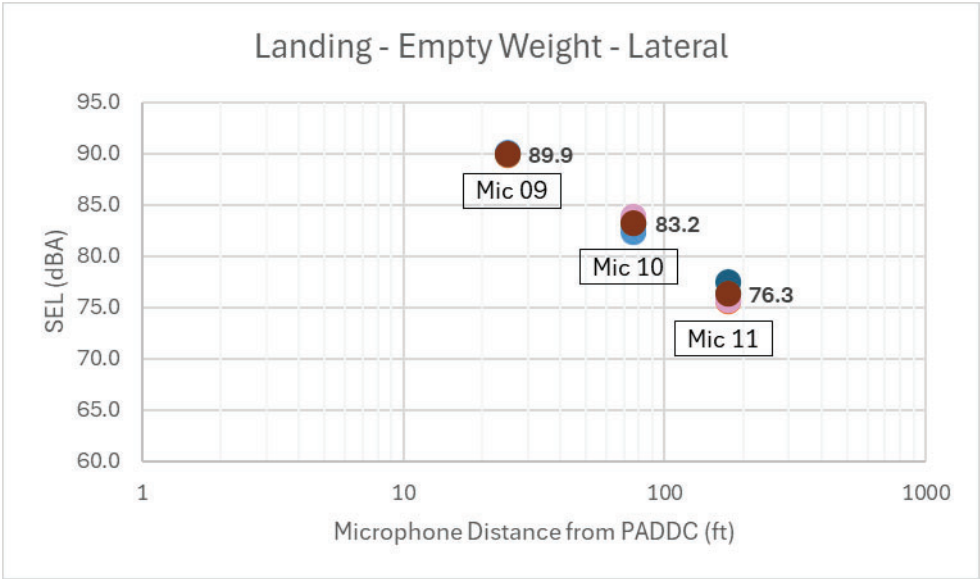


Figure 15. Range of MK30 Averaged A-Weighted SELs from Delivery at Max Weight – Undertrack

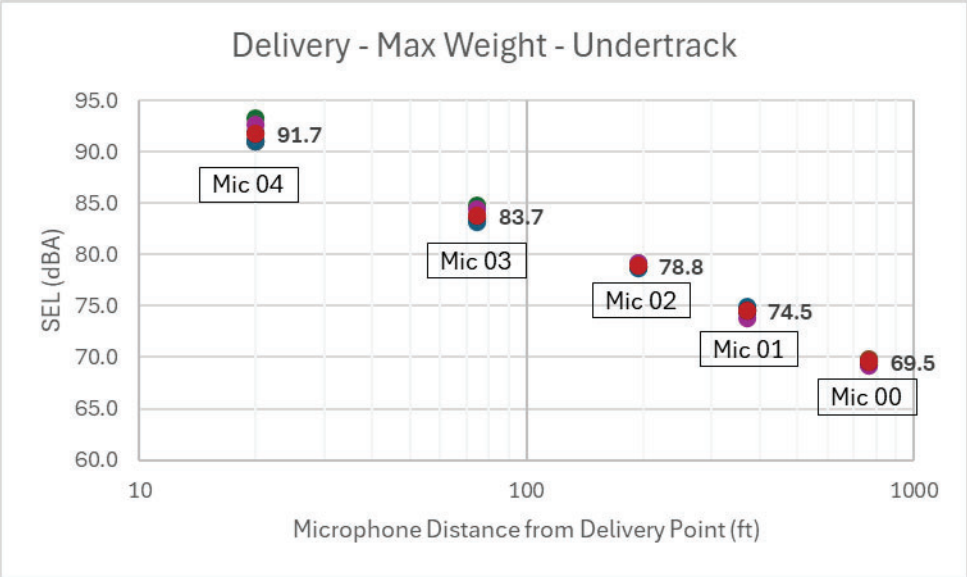


Figure 16. Range of MK30 Averaged A-Weighted SELs from Delivery at Max Weight – Behind

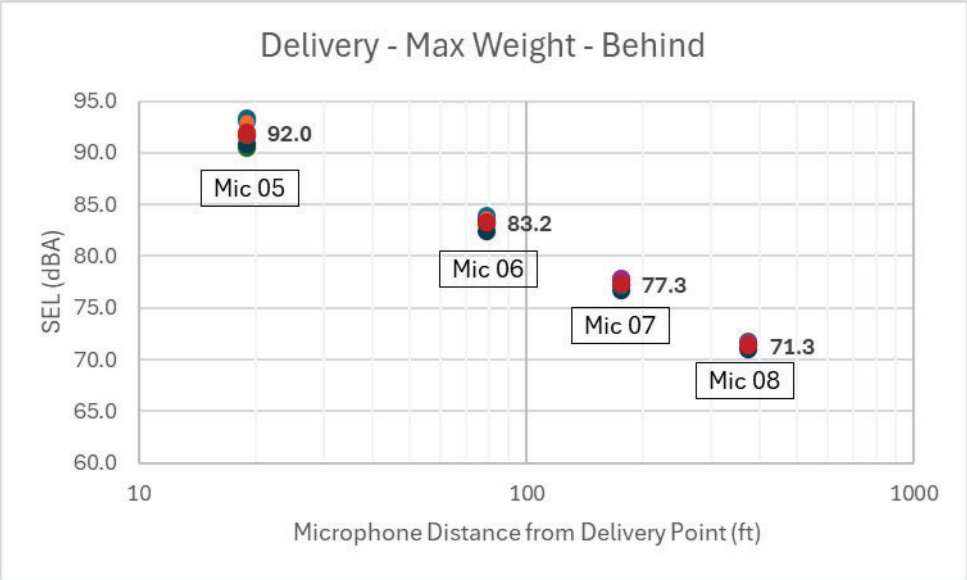
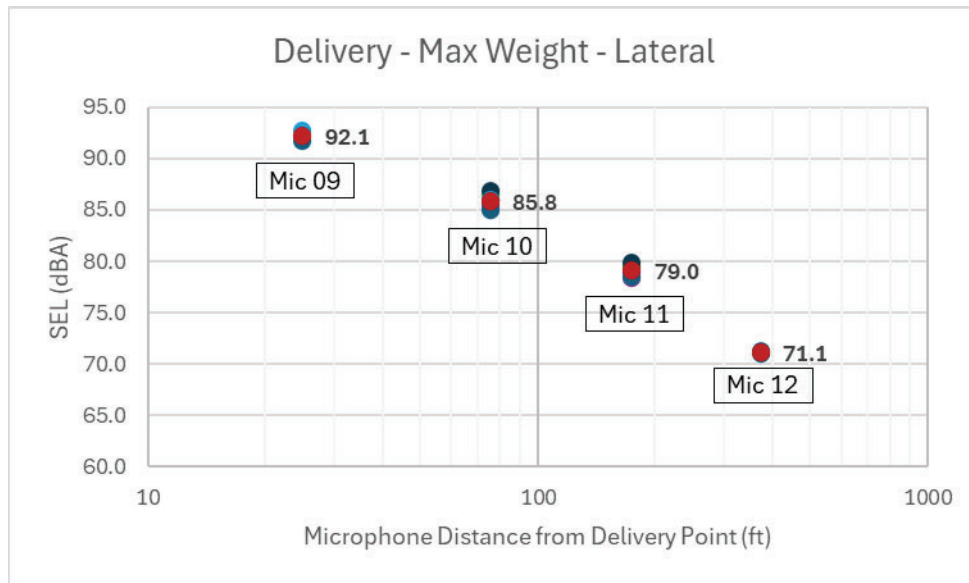


Figure 17. Range of MK30 Averaged A-Weighted SELs from Delivery at Max Weight – Lateral



The maximum SEL values from each test outline in **Table 17** were utilized to determine the composite, maximum A-weight SELs for takeoff, delivery, and landings, as shown in **Table 18** through **Table 20**. Additionally, speed- and altitude-corrected en route noise was factored in to calculate the interpolated distances to the PADDCs. **Figure 18** illustrates the noise levels and corresponding distances associated with takeoff, delivery, and landing.

Table 18. Maximum Takeoff A-Weighted SELs

Distance to PADDC (ft)	Max Weight Delivery
	SEL ¹
20	90.5
76	82.1
195	76.5
372	72.4
772	67.0
1,205 ²	63.7 ²

Source: Prime Air, 2024; ESA, 2025.

Notes:

¹ Maximum SEL derived from Table 17.

² Calculated distanced to the PADDC derived from the altitude and speed corrected max weight enroute measurement.

Table 19. Maximum A-Weighted SELs - Delivery

Distance to PADDC (ft)	Max Weight Delivery
	SEL ¹
25	92.1
76	85.8
175	79.0
372	74.5
772	69.5
1,396 ²	65.5 ²

Source: Prime Air, 2024; ESA, 2025.

Notes:

¹ Maximum SEL derived from Table 17.

² Calculated distanced to the PADDC derived from the altitude and speed corrected max weight and empty wight enroute measurement.

Table 20. Maximum A-Weighted SELs - Landing

Distance to PADDC (ft)	Empty Weight Landing
	SEL ¹
20	91.8
76	83.2
195	76.5
375	70.5
1,074 ²	60.9 ²

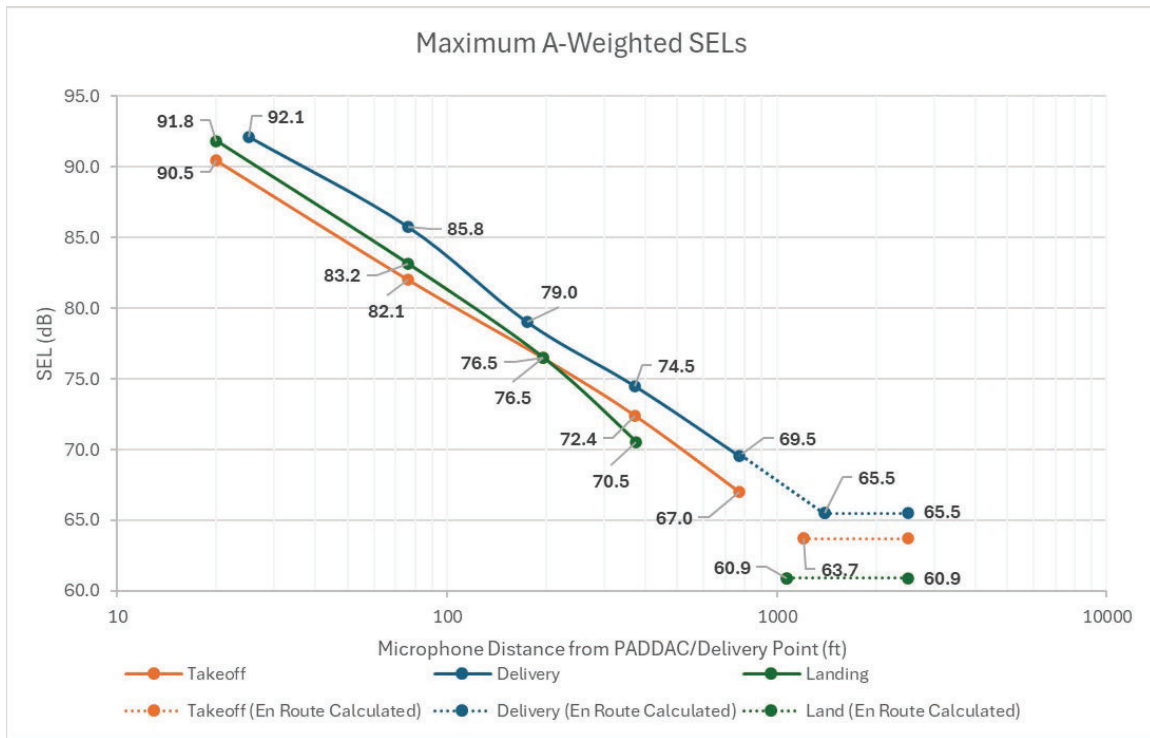
Source: Prime Air, 2024; ESA, 2025.

Notes:

¹ Maximum SEL derived from Table 17.

² Calculated distanced to the PADDC derived from the speed and altitude corrected empty weight enroute measurement.

Figure 18. MK30 Maximum A-Weighted SELs



Using the maximum A-weight SELs from takeoff, delivery, and landing, parameters were determined to estimate SELs as a function of distance from the PADDAC launch pad and delivery location. **Table 21** provides parameters to estimate SELs associated with takeoff as a function of distance from the PADDAC launch pad to the receiver. **Table 22** provides parameters to estimate the SEL associated with delivery, as a function of distance from the delivery point to the receiver. **Table 23** provides parameters to estimate SELs associated with landing as a function of distance from the PADDAC launch pad to the receiver. In these tables, constants “m” and “b” are components of the slope intercept linear equation $y = mx + b$. Constant “m” represents the slope of the line. Constant “b” represents the point at which the slope crosses the y-axis.

Table 21. Parameters for Estimating Sound Exposure Level for Takeoff versus Distance

Range for Distance (feet from launch pad)	m	b
20 to 76	-14.51	109.30
76 to 195	-13.51	107.46
195 to 372	-14.66	110.09
372 to 772	-17.08	116.32
772 to 1,205	-17.05	116.23
1,205 and greater	0.00	63.7

Source: Prime Air, 2024; ESA, 2025.

Notes: Distance is along ground from launch pad to receiver.

Table 22. Parameters for Estimating Sound Exposure Level for Delivery versus Distance

Range for Distance (feet from delivery point)	m	b
25 to 76	-13.18	110.56
76 to 175	-18.65	120.84
175 to 372	-13.86	110.11
372 to 772	-15.63	114.67
772 to 1,396	-15.63	114.66
1,396 and greater	0.00	65.5

Source: Prime Air, 2024; ESA, 2025.

Notes: Distance is along ground from delivery point to receiver.

Table 23. Parameters for Estimating Sound Exposure Level for Landing versus Distance

Range for Distance (feet from launch pad)	m	b
20 to 76	-14.95	111.28
76 to 195	-16.17	113.58
195 to 375	-21.10	124.86
375 to 1,074	-21.10	124.87
1,074 and greater	0.00	60.9

Source: Prime Air, 2024; ESA, 2025.

Notes: Distance is along ground from launch pad to receiver.

Appendix A: Flight Profile Measurements

Phase of Flight	Minimum Altitude (ft AGL)	Maximum Altitude (ft AGL)	Average Altitude (ft AGL)	Minimum Duration (seconds)	Maximum Duration (seconds)	Average Duration (seconds)	Minimum True Airspeed (knots)	Maximum True Airspeed (knots)	Average True Airspeed (knots)
Takeoff and Vertical Ascent	3.2	137.4	64.9	19	24	20	0.7	9.4	5.5
Transition and Outbound Climb	132.1	201.2	160.7	58	63	60	0.8	62.4	42.9
Fixed Wing Outbound Cruise	194.7	205.9	200.5	Variable	Variable	Variable	57.6	62.6	59.7
Delivery Descent and Transition	130.6	202.8	158.1	30	36	34	0.6	60.2	36.9
Backyard Descent	17.7	135.8	77.6	18	22	19	1.5	7.7	5.4
Delivery	14.4	23.0	18.5	2	2	2	2.8	7.2	4.5
Backyard Ascent	16.4	138.6	105.8	24	30	29	1.1	8.9	7.1
Transition and Inbound Climb	133.0	203.3	160.9	57	62	60	1.4	62.5	43.0
Fixed-wing Inbound Cruise	194.8	207.8	201.2	Variable	Variable	Variable	66.0	71.0	68.7
Landing Descent and Transition	133.7	201.9	160.3	32	39	36	1.5	70.5	42.7
Vertical Descent and Landing	1.1	134.6	78.3	33	34	34	0.2	6.7	5.1

Source: Prime Air, 2024; ESA, 2025.

Appendix B: Noise Event Tables

Appendix B: Noise Event Tables

Table B-1. Max Weight Takeoff Measurements

Distance to PADD (ft)	Test#	Ambient (dBA)	LAEQ (dBA)	LMAX (dBA)	SEL (dBA)	Average Altitude (ft)	Average True Air Speed (kts)	Drone Heading (deg.)	Cross Wind (kts)	Wind Speed (kts)	Wind Direction (deg.)	Wind Gust Speed (kts)	Temp (°f)	Relative Humidity (%)	Valid
Mic 00 (Undertrack)															
772	1-1	45.2	50.6	60.1	68.1	200.3	59.7	242	-0.7	4.3	112	6.2	49.3	56.5	Yes
772	2-1	42.3	48.6	57.2	66.2	201.5	59.7	335	-1.4	2.0	173	3.5	55.5	43.9	Yes
772	3-1	42.4	48.4	57.8	66.4	198.7	59.7	332	-1.9	4.1	274	7.4	59.7	36.4	Yes
772	4-1	42.4	48.4	57.7	66.3	202.1	59.8	339	-2.8	3.5	233	7.0	60.1	35.6	Yes
772	5-1	47.3	49.7	59.1	67.2	200.4	59.7	251	0.8	3.4	101	4.3	50.0	52.7	Yes
772	6-1	44.5	50.4	59.6	67.8	202.0	59.7	247	0.2	4.0	90	4.9	45.8	62.5	Yes
772	7-1	46.0	51.6	60.8	69.7	198.4	59.7	246	-0.9	4.0	121	6.2	47.8	60.2	No
Mic 00 Average		44.3	49.7	58.9	67.4	200.5	59.7								
Mic 01 (Undertrack)															
372	1-1	45.5	55.3	64.2	72.8	200.3	59.7	242	-0.7	4.3	112	6.2	49.3	56.5	Yes
372	2-1	43.5	54.0	62.8	71.6	201.5	59.7	335	-1.4	2.0	173	3.5	55.5	43.9	Yes
372	3-1	43.7	54.4	62.5	72.4	198.7	59.7	332	-1.9	4.1	274	7.4	59.7	36.4	Yes
372	4-1	43.6	54.3	63.1	72.1	202.1	59.8	339	-2.8	3.5	233	7.0	60.1	35.6	Yes
372	5-1	48.3	54.8	64.1	72.3	200.4	59.7	251	0.8	3.4	101	4.3	50.0	52.7	Yes
372	6-1	45.7	55.3	64.1	72.7	202.0	59.7	247	0.2	4.0	90	4.9	45.8	62.5	Yes
372	7-1	45.9	54.9	64.4	73.0	198.4	59.7	246	-0.9	4.0	121	6.2	47.8	60.2	Yes
Mic 01 Average		45.2	54.7	63.6	72.4	200.5	59.7								
Mic 02 (Undertrack)															
195	1-1	44.2	59.0	65.2	76.5	200.3	59.7	242	-0.7	4.3	112	6.2	49.3	56.5	Yes
195	2-1	42.0	58.7	65.0	76.3	201.5	59.7	335	-1.4	2.0	173	3.5	55.5	43.9	Yes
195	3-1	42.0	59.2	65.6	77.2	198.7	59.7	332	-1.9	4.1	274	7.4	59.7	36.4	Yes
195	4-1	42.3	58.5	63.9	76.4	202.1	59.8	339	-2.8	3.5	233	7.0	60.1	35.6	Yes
195	5-1	47.8	58.8	64.1	76.3	200.4	59.7	251	0.8	3.4	101	4.3	50.0	52.7	Yes
195	6-1	45.4	59.1	64.4	76.5	202.0	59.7	247	0.2	4.0	90	4.9	45.8	62.5	Yes
195	7-1	44.4	58.4	65.0	76.5	198.4	59.7	246	-0.9	4.0	121	6.2	47.8	60.2	Yes
Mic 02 Average		44.0	58.8	64.7	76.5	200.5	59.7								
Mic 03 (Undertrack)															
75	1-1	43.9	63.7	71.1	81.2	200.3	59.7	242	-0.7	4.3	112	6.2	49.3	56.5	Yes
75	2-1	42.3	63.6	69.1	81.2	201.5	59.7	335	-1.4	2.0	173	3.5	55.5	43.9	Yes
75	3-1	41.7	64.6	70.3	82.6	198.7	59.7	332	-1.9	4.1	274	7.4	59.7	36.4	Yes
75	4-1	43.1	64.3	70.5	82.1	202.1	59.8	339	-2.8	3.5	233	7.0	60.1	35.6	Yes

Distance to PADD (ft)	Test#	Ambient (dBA)	LAEQ (dBA)	LMAX (dBA)	SEL (dBA)	Average Altitude (ft)	Average True Air Speed (kts)	Drone Heading (deg.)	Cross Wind (kts)	Wind Speed (kts)	Wind Direction (deg.)	Wind Gust Speed (kts)	Temp (°F)	Relative Humidity (%)	Valid
75	5-1	48.2	63.6	71.6	81.1	200.4	59.7	251	0.8	3.4	101	4.3	50.0	52.7	Yes
75	6-1	45.3	63.9	71.0	81.3	202.0	59.7	247	0.2	4.0	90	4.9	45.8	62.5	Yes
75	7-1	44.3	63.3	70.6	81.3	198.4	59.7	246	-0.9	4.0	121	6.2	47.8	60.2	Yes
Mic 03 Average		44.1	63.8	70.6	81.6	200.5	59.7								
Mic 04 (Undertrack)															
20	1-1	48.0	72.6	82.1	90.0	200.3	59.7	242	-0.7	4.3	112	6.2	49.3	56.5	Yes
20	2-1	47.0	72.1	81.0	89.8	201.5	59.7	335	-1.4	2.0	173	3.5	55.5	43.9	Yes
20	3-1	45.9	74.4	81.9	92.4	198.7	59.7	332	-1.9	4.1	274	7.4	59.7	36.4	Yes
20	4-1	47.4	73.3	81.8	91.2	202.1	59.8	339	-2.8	3.5	233	7.0	60.1	35.6	Yes
20	5-1	51.3	72.8	82.0	90.3	200.4	59.7	251	0.8	3.4	101	4.3	50.0	52.7	Yes
20	6-1	49.0	71.4	81.9	88.8	202.0	59.7	247	0.2	4.0	90	4.9	45.8	62.5	Yes
20	7-1	47.4	72.7	81.7	90.8	198.4	59.7	246	-0.9	4.0	121	6.2	47.8	60.2	Yes
Mic 04 Average		48.0	72.8	81.8	90.5	200.5	59.7								
Mic 05 (Behind)															
19	1-1	48.1	72.2	81.6	89.7	200.3	59.7	242	-0.7	4.3	112	6.2	49.3	56.5	Yes
19	2-1	47.0	70.9	79.6	88.5	201.5	59.7	335	-1.4	2.0	173	3.5	55.5	43.9	Yes
19	3-1	46.1	72.3	80.1	90.3	198.7	59.7	332	-1.9	4.1	274	7.4	59.7	36.4	Yes
19	4-1	50.8	72.0	79.9	89.9	202.1	59.8	339	-2.8	3.5	233	7.0	60.1	35.6	No
19	5-1	50.5	72.7	81.3	90.2	200.4	59.7	251	0.8	3.4	101	4.3	50.0	52.7	Yes
19	6-1	49.2	72.3	81.3	89.7	202.0	59.7	247	0.2	4.0	90	4.9	45.8	62.5	Yes
19	7-1	47.4	72.3	80.8	90.3	198.4	59.7	246	-0.9	4.0	121	6.2	47.8	60.2	Yes
Mic 05 Average		48.1	72.1	80.8	89.8	200.2	59.7								
Mic 06 (Behind)															
79	1-1	44.7	62.5	70.7	80.0	200.3	59.7	242	-0.7	4.3	112	6.2	49.3	56.5	Yes
79	2-1	43.4	61.7	68.8	79.3	201.5	59.7	335	-1.4	2.0	173	3.5	55.5	43.9	Yes
79	3-1	42.7	61.9	69.1	79.9	198.7	59.7	332	-1.9	4.1	274	7.4	59.7	36.4	Yes
79	4-1	43.3	62.2	69.4	80.0	202.1	59.8	339	-2.8	3.5	233	7.0	60.1	35.6	Yes
79	5-1	48.6	62.9	70.5	80.4	200.4	59.7	251	0.8	3.4	101	4.3	50.0	52.7	Yes
79	6-1	46.0	62.6	70.2	80.0	202.0	59.7	247	0.2	4.0	90	4.9	45.8	62.5	Yes
79	7-1	45.0	62.4	70.4	80.4	198.4	59.7	246	-0.9	4.0	121	6.2	47.8	60.2	Yes
Mic 06 Average		44.8	62.3	69.9	80.0	200.5	59.7								
Mic 07 (Behind)															
176	1-1	43.5	55.9	61.4	73.4	200.3	59.7	242	-0.7	4.3	112	6.2	49.3	56.5	Yes
176	2-1	41.7	55.2	61.1	72.8	201.5	59.7	335	-1.4	2.0	173	3.5	55.5	43.9	Yes
176	3-1	41.2	55.0	60.3	73.0	198.7	59.7	332	-1.9	4.1	274	7.4	59.7	36.4	Yes
176	4-1	45.0	55.6	60.6	73.4	202.1	59.8	339	-2.8	3.5	233	7.0	60.1	35.6	Yes
176	5-1	48.1	56.7	62.5	74.1	200.4	59.7	251	0.8	3.4	101	4.3	50.0	52.7	Yes
176	6-1	44.5	56.5	61.4	73.9	202.0	59.7	247	0.2	4.0	90	4.9	45.8	62.5	Yes
176	7-1	43.9	55.8	62.5	73.9	198.4	59.7	246	-0.9	4.0	121	6.2	47.8	60.2	Yes

Distance to PADDC (ft)	Test#	Ambient (dBA)	LAEQ (dBA)	LMAX (dBA)	SEL (dBA)	Average Altitude (ft)	Average True Air Speed (kts)	Drone Heading (deg.)	Cross Wind (kts)	Wind Speed (kts)	Wind Direction (deg.)	Wind Gust Speed (kts)	Temp (°f)	Relative Humidity (%)	Valid
Mic 07 Average		44.0	55.8	61.4	73.5	200.5	59.7								
Mic 08 (Behind)															
375	1-1	45.0	49.7	53.5	67.1	200.3	59.7	242	-0.7	4.3	112	6.2	49.3	56.5	No
375	2-1	43.7	49.1	53.5	66.7	201.5	59.7	335	-1.4	2.0	173	3.5	55.5	43.9	Yes
375	3-1	45.0	49.9	54.3	67.9	198.7	59.7	332	-1.9	4.1	274	7.4	59.7	36.4	Yes
375	4-1	44.6	49.9	54.1	67.8	202.1	59.8	339	-2.8	3.5	233	7.0	60.1	35.6	Yes
375	5-1	51.3	51.5	55.5	69.0	200.4	59.7	251	0.8	3.4	101	4.3	50.0	52.7	No
375	6-1	47.6	51.5	55.6	68.9	202.0	59.7	247	0.2	4.0	90	4.9	45.8	62.5	No
375	7-1	50.8	54.3	58.1	72.4	198.4	59.7	246	-0.9	4.0	121	6.2	47.8	60.2	No
Mic 08 (Average)		44.4	49.6	54.0	67.5	200.8	59.7								
Mic 09 (Lateral)															
25	1-1	51.4	70.8	80.1	88.3	200.3	59.7	242	-0.7	4.3	112	6.2	49.3	56.5	No
25	2-1	50.6	70.6	78.8	88.3	201.5	59.7	335	-1.4	2.0	173	3.5	55.5	43.9	No
25	3-1	49.8	71.3	79.6	89.3	198.7	59.7	332	-1.9	4.1	274	7.4	59.7	36.4	No
25	4-1	51.4	70.4	79.0	88.2	202.1	59.8	339	-2.8	3.5	233	7.0	60.1	35.6	No
25	5-1	53.5	71.0	79.9	88.5	200.4	59.7	251	0.8	3.4	101	4.3	50.0	52.7	No
25	6-1	52.8	70.7	79.9	88.1	202.0	59.7	247	0.2	4.0	90	4.9	45.8	62.5	Yes
25	7-1	50.4	71.4	80.1	89.4	198.4	59.7	246	-0.9	4.0	121	6.2	47.8	60.2	Yes
Mic 09 (Average)		51.6	71.0	80.0	88.8	200.2	59.7								
Mic 10 (Lateral)															
76	1-1	46.1	64.4	70.3	81.9	200.3	59.7	242	-0.7	4.3	112	6.2	49.3	56.5	Yes
76	2-1	44.5	63.8	71.0	81.4	201.5	59.7	335	-1.4	2.0	173	3.5	55.5	43.9	Yes
76	3-1	43.7	64.5	71.0	82.5	198.7	59.7	332	-1.9	4.1	274	7.4	59.7	36.4	Yes
76	4-1	44.4	64.4	70.2	82.2	202.1	59.8	339	-2.8	3.5	233	7.0	60.1	35.6	Yes
76	5-1	49.6	64.6	70.0	82.1	200.4	59.7	251	0.8	3.4	101	4.3	50.0	52.7	Yes
76	6-1	47.5	64.6	70.7	82.0	202.0	59.7	247	0.2	4.0	90	4.9	45.8	62.5	Yes
76	7-1	45.6	64.2	70.9	82.2	198.4	59.7	246	-0.9	4.0	121	6.2	47.8	60.2	Yes
Mic 10 (Average)		45.9	64.4	70.6	82.1	200.5	59.7								
Mic 11 (Lateral)															
175	1-1	44.9	58.1	63.4	75.5	200.3	59.7	242	-0.7	4.3	112	6.2	49.3	56.5	Yes
175	2-1	43.5	57.4	61.9	75.0	201.5	59.7	335	-1.4	2.0	173	3.5	55.5	43.9	Yes
175	3-1	43.2	57.4	62.6	75.4	198.7	59.7	332	-1.9	4.1	274	7.4	59.7	36.4	Yes
175	4-1	43.5	57.5	62.2	75.4	202.1	59.8	339	-2.8	3.5	233	7.0	60.1	35.6	Yes
175	5-1	48.7	58.0	63.1	75.5	200.4	59.7	251	0.8	3.4	101	4.3	50.0	52.7	Yes
175	6-1	46.6	58.5	64.4	75.9	202.0	59.7	247	0.2	4.0	90	4.9	45.8	62.5	Yes
175	7-1	45.2	57.5	62.5	75.5	198.4	59.7	246	-0.9	4.0	121	6.2	47.8	60.2	Yes
Mic 11 (Average)		45.1	57.8	62.9	75.5	200.5	59.7								
Mic 12 (Lateral)															
375	1-1	45.1	50.7	55.6	68.2	200.3	59.7	242	-0.7	4.3	112	6.2	49.3	56.5	Yes

Distance to PADDC (ft)	Test#	Ambient (dBA)	LAEQ (dBA)	LMAX (dBA)	SEL (dBA)	Average Altitude (ft)	Average True Air Speed (kts)	Drone Heading (deg.)	Cross Wind (kts)	Wind Speed (kts)	Wind Direction (deg.)	Wind Gust Speed (kts)	Temp (°f)	Relative Humidity (%)	Valid
375	2-1	44.8	50.8	54.5	68.4	201.5	59.7	335	-1.4	2.0	173	3.5	55.5	43.9	No
375	3-1	50.0	52.2	55.5	70.2	198.7	59.7	332	-1.9	4.1	274	7.4	59.7	36.4	No
375	4-1	45.3	50.6	53.8	68.5	202.1	59.8	339	-2.8	3.5	233	7.0	60.1	35.6	No
375	5-1	48.7	51.2	55.9	68.6	200.4	59.7	251	0.8	3.4	101	4.3	50.0	52.7	No
375	6-1	47.3	51.7	56.1	69.1	202.0	59.7	247	0.2	4.0	90	4.9	45.8	62.5	No
375	7-1	45.7	50.7	54.4	68.7	198.4	59.7	246	-0.9	4.0	121	6.2	47.8	60.2	No
Mic 12 (Average)		45.1	50.7	55.6	68.2	200.3	59.7								

Source: Prime Air, 2024; ESA, 2025.

Notes: Greyed out cells we determined to not be valid measurements and were not included in SEL calculations.

Table B-2. Max Weight Delivery Measurements

Distance to PADDC (ft)	Test#	Ambient (dBA)	LAeq (dBA)	LMAX (dBA)	SEL (dBA)	Average Altitude (ft)	Average True Air Speed (kts)	Drone Heading (deg.)	Cross Wind (kts)	Wind Speed (kts)	Wind Direction (deg.)	Wind Gust Speed (kts)	Temp (°f)	Relative Humidity (%)	Valid
Mic 00 (Undertrack)															
772	1-1	45.2	49.6	59.3	70.0	96.6	6.0	127	-0.5	4.1	123	6.0	49.1	56.6	Yes
772	2-1	42.3	48.9	59.4	69.7	95.5	5.0	84	0.0	1.2	260	3.7	55.6	43.5	Yes
772	3-1	42.4	49.1	57.4	69.2	96.7	5.6	31	-3.0	5.0	283	7.4	59.8	36.3	Yes
772	4-1	42.4	48.9	57.5	69.1	99.4	7.5	271	-2.6	4.6	222	6.2	60.3	35.2	Yes
772	5-1	47.3	49.3	59.0	69.5	90.3	5.5	115	-0.6	2.9	92	4.3	50.6	52.3	Yes
772	6-1	44.5	49.8	60.2	69.8	89.3	6.1	115	-1.4	4.5	93	4.9	45.8	62.8	Yes
772	7-1	46.0	50.2	60.5	70.4	94.7	7.3	117	-0.2	4.2	112	6.2	47.9	59.7	No
Mic 00 Average		44.0	49.3	58.8	69.5	94.6	6.0								
Mic 01 (Undertrack)															
372	1-1	45.5	54.3	64.0	74.7	96.6	6.0	127	-0.5	4.1	123	6.0	49.1	56.6	Yes
372	2-1	43.5	53.5	62.2	74.3	95.5	5.0	84	0.0	1.2	260	3.7	55.6	43.5	Yes
372	3-1	43.7	54.4	62.8	74.5	96.7	5.6	31	-3.0	5.0	283	7.4	59.8	36.3	Yes
372	4-1	43.6	53.6	62.3	73.8	99.4	7.5	271	-2.6	4.6	222	6.2	60.3	35.2	Yes
372	5-1	48.3	54.4	63.7	74.5	90.3	5.5	115	-0.6	2.9	92	4.3	50.6	52.3	Yes
372	6-1	45.7	54.7	64.2	74.7	89.3	6.1	115	-1.4	4.5	93	4.9	45.8	62.8	Yes
372	7-1	45.9	54.8	64.9	74.9	94.7	7.3	117	-0.2	4.2	112	6.2	47.9	59.7	Yes
Mic 01 Average		45.2	54.2	63.4	74.5	94.6	6.1								
Mic 02 (Undertrack)															
195	1-1	44.2	58.4	64.9	78.7	96.6	6.0	127	-0.5	4.1	123	6.0	49.1	56.6	Yes
195	2-1	42.0	57.9	64.9	78.7	95.5	5.0	84	0.0	1.2	260	3.7	55.6	43.5	Yes
195	3-1	42.0	58.9	64.6	79.1	96.7	5.6	31	-3.0	5.0	283	7.4	59.8	36.3	Yes
195	4-1	42.3	58.9	64.6	79.1	99.4	7.5	271	-2.6	4.6	222	6.2	60.3	35.2	Yes
195	5-1	47.8	58.7	65.0	78.8	90.3	5.5	115	-0.6	2.9	92	4.3	50.6	52.3	Yes
195	6-1	45.4	58.8	65.0	78.8	89.3	6.1	115	-1.4	4.5	93	4.9	45.8	62.8	Yes
195	7-1	44.4	58.5	64.7	78.6	94.7	7.3	117	-0.2	4.2	112	6.2	47.9	59.7	Yes
Mic 02 Average		44.0	58.6	64.8	78.8	94.6	6.1								
Mic 03 (Undertrack)															
75	1-1	43.9	63.2	69.1	83.5	96.6	6.0	127	-0.5	4.1	123	6.0	49.1	56.6	Yes
75	2-1	42.3	62.5	67.9	83.3	95.5	5.0	84	0.0	1.2	260	3.7	55.6	43.5	Yes
75	3-1	41.7	64.6	71.5	84.8	96.7	5.6	31	-3.0	5.0	283	7.4	59.8	36.3	Yes
75	4-1	43.1	64.2	69.5	84.4	99.4	7.5	271	-2.6	4.6	222	6.2	60.3	35.2	Yes
75	5-1	48.2	63.5	68.6	83.6	90.3	5.5	115	-0.6	2.9	92	4.3	50.6	52.3	Yes
75	6-1	45.3	63.2	68.5	83.2	89.3	6.1	115	-1.4	4.5	93	4.9	45.8	62.8	Yes
75	7-1	44.3	62.9	68.8	83.0	94.7	7.3	117	-0.2	4.2	112	6.2	47.9	59.7	Yes
Mic 03 Average		44.1	63.4	69.1	83.7	94.6	6.1								
Mic 04 (Undertrack)															

Distance to PADDCC (ft)	Test#	Ambient (dBA)	LAEQ (dBA)	LMAX (dBA)	SEL (dBA)	Average Altitude (ft)	Average True Air Speed (kts)	Drone Heading (deg.)	Cross Wind (kts)	Wind Speed (kts)	Wind Direction (deg.)	Wind Gust Speed (kts)	Temp (°F)	Relative Humidity (%)	Valid
20	1-1	48.0	71.1	82.9	91.4	96.6	6.0	127	-0.5	4.1	123	6.0	49.1	56.6	Yes
20	2-1	47.0	71.0	80.8	91.8	95.5	5.0	84	0.0	1.2	260	3.7	55.6	43.5	Yes
20	3-1	45.9	73.1	83.7	93.3	96.7	5.6	31	-3.0	5.0	283	7.4	59.8	36.3	Yes
20	4-1	47.4	72.4	83.8	92.6	99.4	7.5	271	-2.6	4.6	222	6.2	60.3	35.2	Yes
20	5-1	51.3	70.8	81.8	90.9	90.3	5.5	115	-0.6	2.9	92	4.3	50.6	52.3	Yes
20	6-1	49.0	71.0	82.0	91.0	89.3	6.1	115	-1.4	4.5	93	4.9	45.8	62.8	Yes
20	7-1	47.4	70.8	81.9	90.9	94.7	7.3	117	-0.2	4.2	112	6.2	47.9	59.7	Yes
Mic 04 Average		48.0	71.5	82.4	91.7	94.6	6.1								
Mic 05 (Behind)															
19	1-1	48.1	72.7	84.1	93.0	96.6	6.0	127	-0.5	4.1	123	6.0	49.1	56.6	Yes
19	2-1	47.0	69.6	80.7	90.4	95.5	5.0	84	0.0	1.2	260	3.7	55.6	43.5	Yes
19	3-1	46.1	71.5	81.7	91.6	96.7	5.6	31	-3.0	5.0	283	7.4	59.8	36.3	Yes
19	4-1	50.8	70.6	81.5	90.8	99.4	7.5	271	-2.6	4.6	222	6.2	60.3	35.2	Yes
19	5-1	50.5	71.6	81.4	91.7	90.3	5.5	115	-0.6	2.9	92	4.3	50.6	52.3	Yes
19	6-1	49.2	73.3	84.2	93.3	89.3	6.1	115	-1.4	4.5	93	4.9	45.8	62.8	Yes
19	7-1	47.4	72.7	84.0	92.9	94.7	7.3	117	-0.2	4.2	112	6.2	47.9	59.7	Yes
Mic 05 Average		48.5	71.7	82.5	92.0	94.6	6.1								
Mic 06 (Behind)															
79	1-1	44.7	63.6	70.4	83.9	96.6	6.0	127	-0.5	4.1	123	6.0	49.1	56.6	Yes
79	2-1	43.4	62.2	68.8	83.0	95.5	5.0	84	0.0	1.2	260	3.7	55.6	43.5	Yes
79	3-1	42.7	63.1	68.9	83.2	96.7	5.6	31	-3.0	5.0	283	7.4	59.8	36.3	Yes
79	4-1	43.3	62.1	67.8	82.3	99.4	7.5	271	-2.6	4.6	222	6.2	60.3	35.2	Yes
79	5-1	48.6	63.0	68.4	83.2	90.3	5.5	115	-0.6	2.9	92	4.3	50.6	52.3	Yes
79	6-1	46.0	63.4	69.1	83.4	89.3	6.1	115	-1.4	4.5	93	4.9	45.8	62.8	Yes
79	7-1	45.0	63.5	69.8	83.6	94.7	7.3	117	-0.2	4.2	112	6.2	47.9	59.7	Yes
Mic 06 Average		44.8	63.0	69.0	83.2	94.6	6.1								
Mic 07 (Behind)															
176	1-1	43.5	57.3	62.5	77.7	96.6	6.0	127	-0.5	4.1	123	6.0	49.1	56.6	Yes
176	2-1	41.7	56.9	61.1	77.7	95.5	5.0	84	0.0	1.2	260	3.7	55.6	43.5	Yes
176	3-1	41.2	57.6	62.0	77.7	96.7	5.6	31	-3.0	5.0	283	7.4	59.8	36.3	Yes
176	4-1	45.0	56.5	62.2	76.7	99.4	7.5	271	-2.6	4.6	222	6.2	60.3	35.2	Yes
176	5-1	48.1	57.0	61.1	77.1	90.3	5.5	115	-0.6	2.9	92	4.3	50.6	52.3	Yes
176	6-1	44.5	57.1	62.0	77.1	89.3	6.1	115	-1.4	4.5	93	4.9	45.8	62.8	Yes
176	7-1	43.9	57.1	62.8	77.3	94.7	7.3	117	-0.2	4.2	112	6.2	47.9	59.7	Yes
Mic 07 Average		44.0	57.1	61.9	77.3	94.6	6.1								
Mic 08 (Behind)															
375	1-1	45.0	50.9	56.9	71.2	96.6	6.0	127	-0.5	4.1	123	6.0	49.1	56.6	Yes
375	2-1	43.7	50.8	55.3	71.6	95.5	5.0	84	0.0	1.2	260	3.7	55.6	43.5	Yes
375	3-1	45.0	51.4	54.4	71.5	96.7	5.6	31	-3.0	5.0	283	7.4	59.8	36.3	Yes

Distance to PADD (ft)	Test#	Ambient (dBA)	LAEQ (dBA)	LMAX (dBA)	SEL (dBA)	Average Altitude (ft)	Average True Air Speed (kts)	Drone Heading (deg.)	Cross Wind (kts)	Wind Speed (kts)	Wind Direction (deg.)	Wind Gust Speed (kts)	Temp (°F)	Relative Humidity (%)	Valid
375	4-1	44.6	50.7	55.0	70.9	99.4	7.5	271	-2.6	4.6	222	6.2	60.3	35.2	Yes
375	5-1	51.3	51.1	56.1	71.3	90.3	5.5	115	-0.6	2.9	92	4.3	50.6	52.3	No
375	6-1	47.6	51.6	56.0	71.6	89.3	6.1	115	-1.4	4.5	93	4.9	45.8	62.8	No
375	7-1	50.8	51.7	55.1	71.8	94.7	7.3	117	-0.2	4.2	112	6.2	47.9	59.7	No
Mic 08 Average		44.6	51.0	55.4	71.3	97.0	6.0								
Mic 09 (Lateral)															
25	1-1	51.4	71.5	83.1	91.8	96.6	6.0	127	-0.5	4.1	123	6.0	49.1	56.6	No
25	2-1	50.6	71.1	82.4	91.9	95.5	5.0	84	0.0	1.2	260	3.7	55.6	43.5	No
25	3-1	49.8	70.8	82.3	90.9	96.7	5.6	31	-3.0	5.0	283	7.4	59.8	36.3	No
25	4-1	51.4	72.7	83.9	92.9	99.4	7.5	271	-2.6	4.6	222	6.2	60.3	35.2	No
25	5-1	53.5	73.5	84.4	93.6	90.3	5.5	115	-0.6	2.9	92	4.3	50.6	52.3	No
25	6-1	52.8	72.7	83.2	92.7	89.3	6.1	115	-1.4	4.5	93	4.9	45.8	62.8	Yes
25	7-1	50.4	71.4	82.4	91.6	94.7	7.3	117	-0.2	4.2	112	6.2	47.9	59.7	Yes
Mic 09 Average		51.6	72.1	82.8	92.1	92.0	6.7								
Mic 10 (Lateral)															
76	1-1	46.1	65.1	71.0	85.4	96.6	6.0	127	-0.5	4.1	123	6.0	49.1	56.6	Yes
76	2-1	44.5	65.1	71.1	86.0	95.5	5.0	84	0.0	1.2	260	3.7	55.6	43.5	Yes
76	3-1	43.7	64.9	71.2	85.0	96.7	5.6	31	-3.0	5.0	283	7.4	59.8	36.3	Yes
76	4-1	44.4	66.3	71.7	86.4	99.4	7.5	271	-2.6	4.6	222	6.2	60.3	35.2	Yes
76	5-1	49.6	66.6	72.6	86.7	90.3	5.5	115	-0.6	2.9	92	4.3	50.6	52.3	Yes
76	6-1	47.5	65.9	70.9	85.9	89.3	6.1	115	-1.4	4.5	93	4.9	45.8	62.8	Yes
76	7-1	45.6	64.8	70.4	85.0	94.7	7.3	117	-0.2	4.2	112	6.2	47.9	59.7	Yes
Mic 10 Average		45.9	65.5	71.3	85.8	94.6	6.1								
Mic 11 (Lateral)															
175	1-1	44.9	58.5	63.9	78.8	96.6	6.0	127	-0.5	4.1	123	6.0	49.1	56.6	Yes
175	2-1	43.5	58.4	64.1	79.2	95.5	5.0	84	0.0	1.2	260	3.7	55.6	43.5	Yes
175	3-1	43.2	58.2	63.2	78.4	96.7	5.6	31	-3.0	5.0	283	7.4	59.8	36.3	Yes
175	4-1	43.5	59.3	63.4	79.5	99.4	7.5	271	-2.6	4.6	222	6.2	60.3	35.2	Yes
175	5-1	48.7	59.7	65.2	79.8	90.3	5.5	115	-0.6	2.9	92	4.3	50.6	52.3	Yes
175	6-1	46.6	59.0	63.2	79.0	89.3	6.1	115	-1.4	4.5	93	4.9	45.8	62.8	Yes
175	7-1	45.2	58.2	62.8	78.4	94.7	7.3	117	-0.2	4.2	112	6.2	47.9	59.7	Yes
Mic 11 Average		45.1	58.8	63.7	79.0	94.6	6.1								
Mic 12 (Lateral)															
375	1-1	45.1	50.9	55.7	71.2	96.6	6.0	127	-0.5	4.1	123	6.0	49.1	56.6	Yes
375	2-1	44.8	53.3	58.9	74.1	95.5	5.0	84	0.0	1.2	260	3.7	55.6	43.5	No
375	3-1	50.0	53.6	57.6	73.7	96.7	5.6	31	-3.0	5.0	283	7.4	59.8	36.3	No
375	4-1	45.3	52.0	57.1	72.2	99.4	7.5	271	-2.6	4.6	222	6.2	60.3	35.2	No
375	5-1	48.7	51.6	57.3	71.7	90.3	5.5	115	-0.6	2.9	92	4.3	50.6	52.3	No
375	6-1	47.3	52.1	56.0	72.1	89.3	6.1	115	-1.4	4.5	93	4.9	45.8	62.8	No

Distance to PADDC (ft)	Test#	Ambient (dBA)	LAEQ (dBA)	LMAX (dBA)	SEL (dBA)	Average Altitude (ft)	Average True Air Speed (kts)	Drone Heading (deg.)	Cross Wind (kts)	Wind Speed (kts)	Wind Direction (deg.)	Wind Gust Speed (kts)	Temp (°f)	Relative Humidity (%)	Valid
375	7-1	45.7	50.8	55.5	70.9	94.7	7.3	117	-0.2	4.2	112	6.2	47.9	59.7	Yes
Mic 12 Average		45.4	50.8	55.6	71.1	95.6	6.6								

Source: Prime Air, 2024; ESA, 2025.

Notes: Greyed out cells we determined to not be valid measurements and were not included in SEL calculations.

Table B-3. Empty Weight Landing Measurements

Distance to PADC (ft)	Test#	Ambient (dBA)	LAeq (dBA)	LMAX (dBA)	SEL (dBA)	Average Altitude (ft)	Average True Air Speed (kts)	Drone Heading (deg.)	Cross Wind (kts)	Wind Speed (kts)	Wind Direction (deg.)	Wind Gust Speed (kts)	Temp (°f)	Relative Humidity (%)	Valid
Mic 00 (Undertrack)															
772	1-1	42.4	48.3	55.7	66.2	202.5	68.7	24	-3.1	3.4	309	6.8	51.5	61.3	No
772	2-1	42.3	46.4	51.9	64.2	200.6	68.7	166	0.3	1.2	298	6.0	62.4	33.0	No
772	3-1	42.3	47.6	55.8	65.8	201.7	68.8	23	-4.1	5.2	321	7.8	61.4	34.7	No
772	4-1	44.3	49.0	55.7	67.2	201.4	68.7	38	-2.4	3.4	271	5.2	59.9	44.6	No
772	5-1	47.6	48.3	53.8	66.2	201.5	68.7	152	-1.2	4.8	118	5.6	42.6	83.0	No
772	6-1	43.3	48.1	55.9	66.0	198.9	68.7	225	-0.3	1.0	108	2.1	56.8	51.1	No
Mic 00 Average		-	-	-	-	-	-								
Mic 01 (Undertrack)															
372	1-1	45.0	53.2	60.4	71.1	202.5	68.7	24	-3.1	3.4	309	6.8	51.5	61.3	Yes
372	2-1	43.6	52.5	59.3	70.3	200.6	68.7	166	0.3	1.2	298	6.0	62.4	33.0	Yes
372	3-1	43.5	52.4	59.8	70.6	201.7	68.8	23	-4.1	5.2	321	7.8	61.4	34.7	No
372	4-1	44.9	52.9	59.5	71.1	201.4	68.7	38	-2.4	3.4	271	5.2	59.9	44.6	No
372	5-1	47.9	52.3	58.4	70.2	201.5	68.7	152	-1.2	4.8	118	5.6	42.6	83.0	No
372	6-1	44.4	52.0	60.0	69.9	198.9	68.7	225	-0.3	1.0	108	2.1	56.8	51.1	Yes
Mic 01 Average		44.3	52.6	59.9	70.4	200.7	68.7								
Mic 02 (Undertrack)															
195	1-1	42.0	60.1	63.1	78.0	202.5	68.7	24	-3.1	3.4	309	6.8	51.5	61.3	Yes
195	2-1	42.1	58.5	62.2	76.3	200.6	68.7	166	0.3	1.2	298	6.0	62.4	33.0	Yes
195	3-1	42.0	58.9	62.4	77.1	201.7	68.8	23	-4.1	5.2	321	7.8	61.4	34.7	No
195	4-1	43.5	58.8	62.9	77.0	201.4	68.7	38	-2.4	3.4	271	5.2	59.9	44.6	Yes
195	5-1	47.0	57.5	62.2	75.3	201.5	68.7	152	-1.2	4.8	118	5.6	42.6	83.0	Yes
195	6-1	43.5	58.1	63.0	76.0	198.9	68.7	225	-0.3	1.0	108	2.1	56.8	51.1	Yes
Mic 02 Average		43.6	58.6	62.7	76.5	201.0	68.7								
Mic 03 (Undertrack)															
75	1-1	41.9	66.5	70.7	84.4	202.5	68.7	24	-3.1	3.4	309	6.8	51.5	61.3	Yes
75	2-1	42.0	64.6	68.7	82.4	200.6	68.7	166	0.3	1.2	298	6.0	62.4	33.0	Yes
75	3-1	43.0	65.7	71.2	83.9	201.7	68.8	23	-4.1	5.2	321	7.8	61.4	34.7	No
75	4-1	43.5	65.7	70.4	83.9	201.4	68.7	38	-2.4	3.4	271	5.2	59.9	44.6	Yes
75	5-1	46.0	63.1	67.9	81.0	201.5	68.7	152	-1.2	4.8	118	5.6	42.6	83.0	Yes
75	6-1	43.4	64.5	69.7	82.4	198.9	68.7	225	-0.3	1.0	108	2.1	56.8	51.1	Yes
Mic 03 Average		43.4	64.9	69.5	82.8	201.0	68.7								
Mic 04 (Undertrack)															
20	1-1	46.1	75.4	83.1	93.3	202.5	68.7	24	-3.1	3.4	309	6.8	51.5	61.3	Yes
20	2-1	46.1	72.7	80.6	90.5	200.6	68.7	166	0.3	1.2	298	6.0	62.4	33.0	Yes
20	3-1	45.7	75.0	83.5	93.2	201.7	68.8	23	-4.1	5.2	321	7.8	61.4	34.7	No
20	4-1	46.5	75.6	84.1	93.8	201.4	68.7	38	-2.4	3.4	271	5.2	59.9	44.6	Yes

Distance to PADDC (ft)	Test#	Ambient (dBA)	LAEQ (dBA)	LMAX (dBA)	SEL (dBA)	Average Altitude (ft)	Average True Air Speed (kts)	Drone Heading (deg.)	Cross Wind (kts)	Wind Speed (kts)	Wind Direction (deg.)	Wind Gust Speed (kts)	Temp (°f)	Relative Humidity (%)	Valid
20	5-1	49.0	72.8	81.0	90.7	201.5	68.7	152	-1.2	4.8	118	5.6	42.6	83.0	Yes
20	6-1	46.7	73.0	80.3	90.9	198.9	68.7	225	-0.3	1.0	108	2.1	56.8	51.1	Yes
Mic 04 Average		46.9	73.9	81.8	91.8	201.0	68.7								
Mic 05 (Behind)															
19	1-1	52.0	72.6	80.1	90.6	202.5	68.7	24	-3.1	3.4	309	6.8	51.5	61.3	No
19	2-1	46.5	73.2	81.3	91.0	200.6	68.7	166	0.3	1.2	298	6.0	62.4	33.0	Yes
19	3-1	45.8	72.3	79.9	90.5	201.7	68.8	23	-4.1	5.2	321	7.8	61.4	34.7	No
19	4-1	51.9	77.4	91.2	95.6	201.4	68.7	38	-2.4	3.4	271	5.2	59.9	44.6	No
19	5-1	49.3	73.5	81.5	91.4	201.5	68.7	152	-1.2	4.8	118	5.6	42.6	83.0	Yes
19	6-1	59.4	72.4	81.7	90.3	198.9	68.7	225	-0.3	1.0	108	2.1	56.8	51.1	No
Mic 05 Average		47.9	73.4	81.4	91.2	201.0	68.7								
Mic 06 (Behind)															
79	1-1	42.8	63.8	67.8	81.7	202.5	68.7	24	-3.1	3.4	309	6.8	51.5	61.3	Yes
79	2-1	43.0	64.2	68.0	82.0	200.6	68.7	166	0.3	1.2	298	6.0	62.4	33.0	Yes
79	3-1	42.7	63.7	69.2	81.9	201.7	68.8	23	-4.1	5.2	321	7.8	61.4	34.7	No
79	4-1	43.7	63.3	68.2	81.5	201.4	68.7	38	-2.4	3.4	271	5.2	59.9	44.6	Yes
79	5-1	47.2	64.4	68.8	82.3	201.5	68.7	152	-1.2	4.8	118	5.6	42.6	83.0	Yes
79	6-1	44.0	62.5	66.8	80.5	198.9	68.7	225	-0.3	1.0	108	2.1	56.8	51.1	Yes
Mic 06 Average		44.1	63.6	67.9	81.6	201.0	68.7								
Mic 07 (Behind)															
176	1-1	41.2	57.5	61.6	75.5	202.5	68.7	24	-3.1	3.4	309	6.8	51.5	61.3	Yes
176	2-1	43.4	57.6	61.4	75.4	200.6	68.7	166	0.3	1.2	298	6.0	62.4	33.0	Yes
176	3-1	41.4	57.4	62.0	75.6	201.7	68.8	23	-4.1	5.2	321	7.8	61.4	34.7	No
176	4-1	43.8	56.9	60.1	75.1	201.4	68.7	38	-2.4	3.4	271	5.2	59.9	44.6	Yes
176	5-1	46.8	58.0	62.4	75.8	201.5	68.7	152	-1.2	4.8	118	5.6	42.6	83.0	Yes
176	6-1	43.2	56.6	60.9	74.5	198.9	68.7	225	-0.3	1.0	108	2.1	56.8	51.1	Yes
Mic 07 Average		43.7	57.3	61.3	75.3	201.0	68.7								
Mic 08 (Behind)															
375	1-1	43.6	50.4	53.6	68.3	202.5	68.7	24	-3.1	3.4	309	6.8	51.5	61.3	No
375	2-1	44.7	52.8	57.4	70.5	200.6	68.7	166	0.3	1.2	298	6.0	62.4	33.0	Yes
375	3-1	46.7	55.7	57.4	73.9	201.7	68.8	23	-4.1	5.2	321	7.8	61.4	34.7	No
375	4-1	46.7	65.6	80.6	83.8	201.4	68.7	38	-2.4	3.4	271	5.2	59.9	44.6	No
375	5-1	52.1	51.2	53.9	69.0	201.5	68.7	152	-1.2	4.8	118	5.6	42.6	83.0	No
375	6-1	48.6	69.8	84.7	87.7	198.9	68.7	225	-0.3	1.0	108	2.1	56.8	51.1	No
Mic 08 Average		44.7	52.8	57.4	70.5	200.6	68.7								
Mic 09 (Lateral)															
25	1-1	48.3	72.2	80.6	90.2	202.5	68.7	24	-3.1	3.4	309	6.8	51.5	61.3	No
25	2-1	50.1	72.0	79.7	89.8	200.6	68.7	166	0.3	1.2	298	6.0	62.4	33.0	Yes
25	3-1	49.7	72.4	80.8	90.6	201.7	68.8	23	-4.1	5.2	321	7.8	61.4	34.7	No

Distance to PADDC (ft)	Test#	Ambient (dBA)	LAEQ (dBA)	LMAX (dBA)	SEL (dBA)	Average Altitude (ft)	Average True Air Speed (kts)	Drone Heading (deg.)	Cross Wind (kts)	Wind Speed (kts)	Wind Direction (deg.)	Wind Gust Speed (kts)	Temp (°f)	Relative Humidity (%)	Valid
25	4-1	50.1	71.7	81.1	89.9	201.4	68.7	38	-2.4	3.4	271	5.2	59.9	44.6	Yes
25	5-1	49.8	72.2	80.2	90.1	201.5	68.7	152	-1.2	4.8	118	5.6	42.6	83.0	Yes
25	6-1	49.7	73.4	81.5	91.4	198.9	68.7	225	-0.3	1.0	108	2.1	56.8	51.1	No
Mic 09 Average		50.0	72.0	80.4	89.9	201.2	68.7								
Mic 10 (Lateral)															
76	1-1	43.6	65.3	70.0	83.2	202.5	68.7	24	-3.1	3.4	309	6.8	51.5	61.3	Yes
76	2-1	44.8	65.1	69.1	82.9	200.6	68.7	166	0.3	1.2	298	6.0	62.4	33.0	No
76	3-1	43.8	65.4	69.7	83.6	201.7	68.8	23	-4.1	5.2	321	7.8	61.4	34.7	No
76	4-1	44.8	65.1	69.2	83.3	201.4	68.7	38	-2.4	3.4	271	5.2	59.9	44.6	Yes
76	5-1	47.5	64.5	70.0	82.4	201.5	68.7	152	-1.2	4.8	118	5.6	42.6	83.0	Yes
76	6-1	44.7	65.9	70.8	83.8	198.9	68.7	225	-0.3	1.0	108	2.1	56.8	51.1	Yes
Mic 10 Average		45.2	65.2	70.0	83.2	201.1	68.7								
Mic 11 (Lateral)															
175	1-1	43.2	59.5	63.3	77.4	202.5	68.7	24	-3.1	3.4	309	6.8	51.5	61.3	Yes
175	2-1	43.4	57.8	62.5	75.6	200.6	68.7	166	0.3	1.2	298	6.0	62.4	33.0	Yes
175	3-1	43.2	58.3	61.2	76.4	201.7	68.8	23	-4.1	5.2	321	7.8	61.4	34.7	No
175	4-1	44.8	58.2	61.1	76.4	201.4	68.7	38	-2.4	3.4	271	5.2	59.9	44.6	Yes
175	5-1	47.5	57.2	60.4	75.1	201.5	68.7	152	-1.2	4.8	118	5.6	42.6	83.0	No
175	6-1	44.2	57.8	61.5	75.8	198.9	68.7	225	-0.3	1.0	108	2.1	56.8	51.1	Yes
Mic 11 Average		43.9	58.3	62.1	76.3	200.9	68.7								
Mic 12 (Lateral)															
375	1-1	44.2	51.1	55.1	69.1	202.5	68.7	24	-3.1	3.4	309	6.8	51.5	61.3	No
375	2-1	47.9	51.9	55.3	69.7	200.6	68.7	166	0.3	1.2	298	6.0	62.4	33.0	No
375	3-1	58.2	54.2	56.9	72.4	201.7	68.8	23	-4.1	5.2	321	7.8	61.4	34.7	No
375	4-1	45.5	50.9	55.1	69.1	201.4	68.7	38	-2.4	3.4	271	5.2	59.9	44.6	No
375	5-1	51.3	58.8	72.3	76.6	201.5	68.7	152	-1.2	4.8	118	5.6	42.6	83.0	No
375	6-1	44.6	50.1	52.8	68.0	198.9	68.7	225	-0.3	1.0	108	2.1	56.8	51.1	No
Mic 12 Average		-	-	-	-	-	-								

Source: Prime Air, 2024; ESA, 2025.

Notes: Greyed out cells we determined to not be valid measurements and were not included in SEL calculations.

Table B-4. Max Weight En Route Measurements

Distance to PADDC (ft)	Test#	Undertrack Distance (ft)	POCA Slant (ft)	Ambient (dBA)	LAEQ (dBA)	LMAX (dBA)	SEL (dBA)	Average Altitude (ft)	Average True Air Speed (kts)	Median Drone Heading (deg.)	Cross Wind (kts)	Wind Speed (kts)	Wind Direction (deg.)	Wind Gust Speed (kts)	Temp (°f)	Relative Humidity (%)	Valid
Mic 09 (Lateral)																	
25	1-1	17.5	117.1	46.7	56.1	60.3	65.7	122.2	60.2	77	0.6	1.6	96.6	4.4	53.4	53.8	Yes
25	1-2	6.1	117.7	46.7	55.9	60.1	65.4	122.9	60.1	255	-0.4	2.9	82.3	4.1	53.2	53.6	Yes
25	2-1	9.5	117.6	45.8	55.7	59.7	65.3	122.4	61.6	77	0.0	3.3	77.3	5.8	48.4	62.8	Yes
25	2-2	33.8	120.4	45.8	56.1	60.1	65.1	121.0	60.9	252	-2.8	3.6	123.5	5.8	49.3	60.9	Yes
25	3-1	43.8	122.8	46.3	55.7	59.7	65.3	121.8	60.1	76	1.3	1.7	132.1	3.5	54.5	52.2	Yes
25	3-2	5.5	115.3	46.3	55.9	60.0	65.4	121.3	60.8	255	1.7	2.2	306.5	3.5	54.9	51.3	Yes
25	4-1	24.8	119.7	47.8	56.0	60.4	66.0	122.3	61.3	74	2.1	2.1	170.8	3.9	56.7	48.7	Yes
25	4-2	13.4	117.6	47.8	55.2	59.5	65.2	125.5	61.7	258	-1.3	1.9	214.0	4.1	56.1	49.2	Yes
25	5-1	17.1	118.2	46.9	55.5	59.7	65.5	123.0	60.8	78	2.0	3.3	116.9	4.7	50.9	59.1	Yes
25	5-2	7.9	116.4	46.9	55.9	60.1	65.4	122.3	60.6	254	-2.2	2.7	131.5	4.7	51.1	58.6	Yes
25	6-1	16.9	117.3	50.9	57.7	61.8	66.8	123.6	61.4	74	1.5	1.6	191.3	4.1	65.5	53.5	Yes
25	6-2	43.2	120.2	50.9	57.5	61.7	67.5	121.5	59.9	256	-0.6	3.7	245.7	7.0	65.3	56.7	Yes
Mic 09 Average		20.0	118.4	47.4	56.1	60.3	65.7	122.5	60.8								
Mic 10 (Lateral)																	
76	1-1	54.2	127.8	50.0	57.0	61.3	66.5	122.2	60.2	77	0.6	1.6	96.6	4.4	53.4	53.8	Yes
76	1-2	50.9	128.1	50.0	56.1	60.2	65.7	122.9	60.1	255	-0.4	2.9	82.3	4.1	53.2	53.6	Yes
76	2-1	52.6	128.5	49.0	56.2	60.1	65.7	122.4	61.6	77	0.0	3.3	77.3	5.8	48.4	62.8	Yes
76	2-2	60.6	130.5	49.0	56.8	60.7	65.8	121.0	60.9	252	-2.8	3.6	123.5	5.8	49.3	60.9	Yes
76	3-1	69.3	134.0	50.2	56.4	60.5	65.9	121.8	60.1	76	1.3	1.7	132.1	3.5	54.5	52.2	Yes
76	3-2	49.6	125.4	50.2	56.2	60.2	65.8	121.3	60.8	255	1.7	2.2	306.5	3.5	54.9	51.3	Yes
76	4-1	57.5	130.5	50.5	56.4	61.2	66.4	122.3	61.3	74	2.1	2.1	170.8	3.9	56.7	48.7	Yes
76	4-2	52.3	128.1	50.5	55.6	59.7	65.6	125.5	61.7	258	-1.3	1.9	214.0	4.1	56.1	49.2	Yes
76	5-1	54.1	128.9	49.9	56.1	60.5	66.1	123.0	60.8	78	2.0	3.3	116.9	4.7	50.9	59.1	Yes
76	5-2	52.7	127.5	49.9	56.7	61.0	66.2	122.3	60.6	254	-2.2	2.7	131.5	4.7	51.1	58.6	Yes
76	6-1	51.1	126.8	47.5	57.4	61.6	66.5	123.6	61.4	74	1.5	1.6	191.3	4.1	65.5	53.5	Yes
76	6-2	66.8	130.5	47.5	57.1	61.2	67.1	121.5	59.9	256	-0.6	3.7	245.7	7.0	65.3	56.7	Yes
Mic 10 Average		56.0	128.9	49.5	56.5	60.7	66.1	122.5	60.8								
Mic 11 (Lateral)																	
175	1-1	152.4	191.4	44.9	53.3	57.1	62.9	122.2	60.2	77	0.6	1.6	96.6	4.4	53.4	53.8	Yes
175	1-2	150.4	190.9	44.9	53.5	57.3	63.0	122.9	60.1	255	-0.4	2.9	82.3	4.1	53.2	53.6	Yes
175	2-1	151.7	191.7	43.7	53.3	57.4	62.8	122.4	61.6	77	0.0	3.3	77.3	5.8	48.4	62.8	Yes
175	2-2	154.5	192.9	43.7	53.8	57.4	62.8	121.0	60.9	252	-2.8	3.6	123.5	5.8	49.3	60.9	Yes
175	3-1	158.9	196.0	43.4	52.8	56.5	62.4	121.8	60.1	76	1.3	1.7	132.1	3.5	54.5	52.2	Yes
175	3-2	149.1	188.4	43.4	53.4	57.2	62.9	121.3	60.8	255	1.7	2.2	306.5	3.5	54.9	51.3	Yes
175	4-1	154.2	193.6	43.3	53.2	57.6	63.2	122.3	61.3	74	2.1	2.1	170.8	3.9	56.7	48.7	Yes

Distance to PADDC (ft)	Test#	Undertrack Distance (ft)	POCA Slant (ft)	Ambient (dBA)	LAEQ (dBA)	LMAX (dBA)	SEL (dBA)	Average Altitude (ft)	Average True Air Speed (kts)	Median Drone Heading (deg.)	Cross Wind (kts)	Wind Speed (kts)	Wind Direction (deg.)	Wind Gust Speed (kts)	Temp (°f)	Relative Humidity (%)	Valid
175	4-2	151.2	191.1	43.3	51.9	55.7	61.9	125.5	61.7	258	-1.3	1.9	214.0	4.1	56.1	49.2	Yes
175	5-1	151.8	191.6	44.3	53.1	57.0	63.1	123.0	60.8	78	2.0	3.3	116.9	4.7	50.9	59.1	Yes
175	5-2	152.0	191.2	44.3	53.0	56.9	62.6	122.3	60.6	254	-2.2	2.7	131.5	4.7	51.1	58.6	Yes
175	6-1	148.7	188.6	46.5	54.5	58.3	63.6	123.6	61.4	74	1.5	1.6	191.3	4.1	65.5	53.5	Yes
175	6-2	157.5	193.4	46.5	54.2	57.8	64.2	121.5	59.9	256	-0.6	3.7	245.7	7.0	65.3	56.7	Yes
Mic 11 Average		152.7	191.7	44.4	53.3	57.2	62.9	122.5	60.8								
Mic 12 (Lateral)																	
375	1-1	351.5	370.1	45.2	48.6	50.0	58.1	122.2	60.2	77	0.6	1.6	96.6	4.4	53.4	53.8	No
375	1-2	349.8	369.0	45.2	48.8	50.3	58.3	122.9	60.1	255	-0.4	2.9	82.3	4.1	53.2	53.6	No
375	2-1	351.0	370.1	44.2	48.2	49.3	57.7	122.4	61.6	77	0.0	3.3	77.3	5.8	48.4	62.8	No
375	2-2	352.2	370.6	44.2	49.2	50.5	58.2	121.0	60.9	252	-2.8	3.6	123.5	5.8	49.3	60.9	No
375	3-1	354.8	372.9	44.4	48.2	49.8	57.7	121.8	60.1	76	1.3	1.7	132.1	3.5	54.5	52.2	No
375	3-2	348.6	367.1	44.4	48.7	49.9	58.3	121.3	60.8	255	1.7	2.2	306.5	3.5	54.9	51.3	No
375	4-1	352.7	371.6	44.3	48.5	50.1	58.5	122.3	61.3	74	2.1	2.1	170.8	3.9	56.7	48.7	No
375	4-2	350.5	369.5	44.3	47.8	48.5	57.8	125.5	61.7	258	-1.3	1.9	214.0	4.1	56.1	49.2	No
375	5-1	350.7	369.7	45.2	50.4	51.5	60.4	123.0	60.8	78	2.0	3.3	116.9	4.7	50.9	59.1	No
375	5-2	351.4	370.0	45.2	52.0	52.9	61.5	122.3	60.6	254	-2.2	2.7	131.5	4.7	51.1	58.6	No
375	6-1	347.6	366.4	49.6	50.2	51.4	59.3	123.6	61.4	74	1.5	1.6	191.3	4.1	65.5	53.5	No
375	6-2	354.0	371.3	49.6	50.5	51.6	60.5	121.5	59.9	256	-0.6	3.7	245.7	7.0	65.3	56.7	No
Mic 12 Average		351.2	369.9	-	-	-	-	-	-								

Source: Prime Air, 2024; ESA, 2025.

Notes: Grayed out cells we determined to not be valid measurements and were not included in SEL calculations.

Table B-5. Empty Weight En Route Measurements

Distance to PADDC (ft)	Test#	Undertrack Distance (ft)	POCA Slant (ft)	Ambient (dBA)	LAEQ (dBA)	LMAX (dBA)	SEL (dBA)	Average Altitude (ft)	Average True Air Speed (kts)	Median Drone Heading (deg.)	Cross Wind (kts)	Wind Speed (kts)	Wind Direction (deg.)	Wind Gust Speed (kts)	Temp (°F)	Relative Humidity (%)	Valid
Mic 09 (Lateral)																	
25	1-1	0.4	101.8	50.8	57.5	62.1	67.1	107.2	59.8	76	1.8	4.0	102.4	4.5	45.3	62.8	Yes
25	1-2	17.6	103.4	50.8	57.0	61.6	66.6	107.6	59.7	254	-1.2	3.8	93.1	4.5	45.5	62.2	Yes
25	2-1	44.8	94.2	50.1	59.3	63.6	68.4	90.4	61.9	76	2.4	2.4	177.4	4.1	65.1	38.7	Yes
25	2-2	5.7	81.4	50.1	58.6	63.3	68.1	90.1	60.4	255	-2.0	3.0	212.8	4.1	65.1	38.4	Yes
25	3-1	36.0	107.7	46.8	56.9	61.2	66.5	110.3	61.5	68	-5.7	5.9	326.2	10.9	62.2	34.6	No
25	3-2	20.1	103.3	46.8	56.1	60.8	66.1	109.7	61.1	261	6.0	7.5	312.6	10.9	62.8	35.6	No
25	4-1	43.9	110.3	62.9	62.9	64.3	73.3	107.0	62.4	68	-3.1	4.3	300.5	11.1	63.3	34.1	No
25	4-2	52.4	112.5	62.9	64.8	65.9	74.3	105.2	60.3	264	6.4	6.4	353.4	10.7	63.9	33.9	No
25	5-1	3.6	96.7	47.0	57.5	61.7	66.5	104.3	60.6	69	-2.0	2.2	319.7	9.9	61.3	37.8	Yes
25	5-2	8.5	94.9	47.0	57.7	62.7	67.7	102.3	60.8	257	3.0	3.0	341.0	9.9	61.7	37.4	Yes
25	6-1	48.9	110.8	47.6	55.6	60.5	66.8	106.5	60.7	71	-2.5	4.4	34.0	9.1	61.3	37.3	Yes
25	6-2	9.2	100.6	47.6	55.2	60.1	65.6	107.7	63.2	258	2.2	2.6	21.8	7.4	61.0	37.0	Yes
25	7-1	22.4	104.3	50.7	57.1	61.5	67.1	107.2	59.6	78	1.7	4.2	102.3	4.7	45.5	61.5	Yes
25	7-2	23.1	105.2	50.7	56.9	61.3	66.4	107.9	59.9	252	-2.1	3.9	104.6	4.7	45.7	61.3	Yes
Mic 09 Average		18.4	99.3	49.2	57.2	61.8	67.0	103.1	60.7								
Mic 10 (Lateral)																	
76	1-1	50.7	113.7	44.9	56.6	61.1	66.1	107.2	59.8	76	1.8	4.0	102.4	4.5	45.3	62.8	Yes
76	1-2	54.7	115.6	44.9	56.1	60.8	65.6	107.6	59.7	254	-1.2	3.8	93.1	4.5	45.5	62.2	Yes
76	2-1	69.0	107.9	44.5	58.3	62.6	67.3	90.4	61.9	76	2.4	2.4	177.4	4.1	65.1	38.7	Yes
76	2-2	51.4	96.1	44.5	57.6	62.4	67.2	90.1	60.4	255	-2.0	3.0	212.8	4.1	65.1	38.4	Yes
76	3-1	63.0	119.5	51.1	58.0	62.3	67.6	110.3	61.5	68	-5.7	5.9	326.2	10.9	62.2	34.6	No
76	3-2	56.0	115.8	51.1	56.9	61.2	66.9	109.7	61.1	261	6.0	7.5	312.6	10.9	62.8	35.6	No
76	4-1	66.9	121.3	49.1	56.4	60.9	66.8	107.0	62.4	68	-3.1	4.3	300.5	11.1	63.3	34.1	Yes
76	4-2	72.9	123.5	49.1	58.0	62.4	67.5	105.2	60.3	264	6.4	6.4	353.4	10.7	63.9	33.9	No
76	5-1	50.5	109.1	50.6	58.6	62.5	67.6	104.3	60.6	69	-2.0	2.2	319.7	9.9	61.3	37.8	Yes
76	5-2	52.4	108.1	50.6	58.6	63.5	68.6	102.3	60.8	257	3.0	3.0	341.0	9.9	61.7	37.4	Yes
76	6-1	70.0	122.6	51.7	56.9	61.6	68.1	106.5	60.7	71	-2.5	4.4	34.0	9.1	61.3	37.3	Yes
76	6-2	53.1	113.4	51.7	56.2	60.7	66.7	107.7	63.2	258	2.2	2.6	21.8	7.4	61.0	37.0	No
76	7-1	56.8	116.6	45.3	56.2	60.7	66.2	107.2	59.6	78	1.7	4.2	102.3	4.7	45.5	61.5	Yes
76	7-2	55.9	116.8	45.3	56.0	60.7	65.6	107.9	59.9	252	-2.1	3.9	104.6	4.7	45.7	61.3	Yes
Mic 10 Average		57.8	112.8	47.1	57.1	61.7	66.9	103.0	60.6								
Mic 11 (Lateral)																	
175	1-1	150.5	181.7	44.5	53.3	57.1	62.8	107.2	59.8	76	1.8	4.0	102.4	4.5	45.3	62.8	Yes
175	1-2	152.3	183.2	44.5	52.6	56.7	62.2	107.6	59.7	254	-1.2	3.8	93.1	4.5	45.5	62.2	Yes
175	2-1	158.0	178.4	43.8	54.4	57.9	63.5	90.4	61.9	76	2.4	2.4	177.4	4.1	65.1	38.7	Yes

Distance to PADDC (ft)	Test#	Undertrack Distance (ft)	POCA Slant (ft)	Ambient (dBA)	LAEQ (dBA)	LMAX (dBA)	SEL (dBA)	Average Altitude (ft)	Average True Air Speed (kts)	Median Drone Heading (deg.)	Cross Wind (kts)	Wind Speed (kts)	Wind Direction (deg.)	Wind Gust Speed (kts)	Temp (°f)	Relative Humidity (%)	Valid	
175	2-2	150.9	171.3	43.8	53.6	57.3	63.2	90.1	60.4	255	-2.0	3.0	212.8	4.1	65.1	38.4	Yes	
175	3-1	155.1	185.4	44.9	53.7	57.4	63.3	110.3	61.5	68	-5.7	5.9	326.2	10.9	62.2	34.6	No	
175	3-2	153.7	184.1	44.9	53.0	56.8	63.0	109.7	61.1	261	6.0	7.5	312.6	10.9	62.8	35.6	No	
175	4-1	155.6	185.7	43.0	52.5	56.6	62.9	107.0	62.4	68	-3.1	4.3	300.5	11.1	63.3	34.1	Yes	
175	4-2	159.4	188.0	43.0	53.8	57.9	63.3	105.2	60.3	264	6.4	6.4	353.4	10.7	63.9	33.9	No	
175	5-1	150.3	178.7	45.7	54.0	57.7	63.1	104.3	60.6	69	-2.0	2.2	319.7	9.9	61.3	37.8	Yes	
175	5-2	151.6	178.6	45.7	54.0	58.3	64.0	102.3	60.8	257	3.0	3.0	341.0	9.9	61.7	37.4	Yes	
175	6-1	158.5	187.6	45.2	53.5	57.5	64.7	106.5	60.7	71	-2.5	4.4	34.0	9.1	61.3	37.3	No	
175	6-2	152.5	182.5	45.2	51.8	55.7	62.2	107.7	63.2	258	2.2	2.6	21.8	7.4	61.0	37.0	Yes	
175	7-1	153.2	184.0	44.7	53.0	56.7	63.0	107.2	59.6	78	1.7	4.2	102.3	4.7	45.5	61.5	Yes	
175	7-2	152.9	184.1	44.7	52.6	56.6	62.2	107.9	59.9	252	-2.1	3.9	104.6	4.7	45.7	61.3	Yes	
Mic 11 Average		152.8	180.8	44.6	53.2	57.1	62.9	103.2	60.8									
Mic 12 (Lateral)																		
375	1-1	350.1	364.5	45.5	48.7	49.9	58.2	107.2	59.8	76	1.8	4.0	102.4	4.5	45.3	62.8	No	
375	1-2	351.1	365.6	45.5	48.4	49.4	57.9	107.6	59.7	254	-1.2	3.8	93.1	4.5	45.5	62.2	No	
375	2-1	353.6	363.2	45.7	49.7	51.1	58.7	90.4	61.9	76	2.4	2.4	177.4	4.1	65.1	38.7	No	
375	2-2	350.3	359.6	45.7	49.5	50.7	59.0	90.1	60.4	255	-2.0	3.0	212.8	4.1	65.1	38.4	No	
375	3-1	352.0	366.4	46.7	49.1	50.2	58.7	110.3	61.5	68	-5.7	5.9	326.2	10.9	62.2	34.6	No	
375	3-2	352.7	366.9	46.7	50.4	51.8	60.4	109.7	61.1	261	6.0	7.5	312.6	10.9	62.8	35.6	No	
375	4-1	351.3	365.6	44.6	49.2	50.2	59.7	107.0	62.4	68	-3.1	4.3	300.5	11.1	63.3	34.1	No	
375	4-2	354.0	367.8	44.6	49.6	51.1	59.2	105.2	60.3	264	6.4	6.4	353.4	10.7	63.9	33.9	No	
375	5-1	349.8	362.9	49.7	49.2	50.4	58.2	104.3	60.6	69	-2.0	2.2	319.7	9.9	61.3	37.8	No	
375	5-2	350.9	363.4	49.7	55.9	56.7	65.9	102.3	60.8	257	3.0	3.0	341.0	9.9	61.7	37.4	No	
375	6-1	354.1	367.7	49.1	51.0	52.4	62.1	106.5	60.7	71	-2.5	4.4	34.0	9.1	61.3	37.3	No	
375	6-2	352.0	366.0	49.1	48.7	49.5	59.2	107.7	63.2	258	2.2	2.6	21.8	7.4	61.0	37.0	No	
375	7-1	351.7	366.1	45.2	49.5	50.5	59.5	107.2	59.6	78	1.7	4.2	102.3	4.7	45.5	61.5	No	
375	7-2	351.6	366.2	45.2	48.3	49.5	57.9	107.9	59.9	252	-2.1	3.9	104.6	4.7	45.7	61.3	No	
Mic 12 Average		-	-	-	-	-	-	-	-									

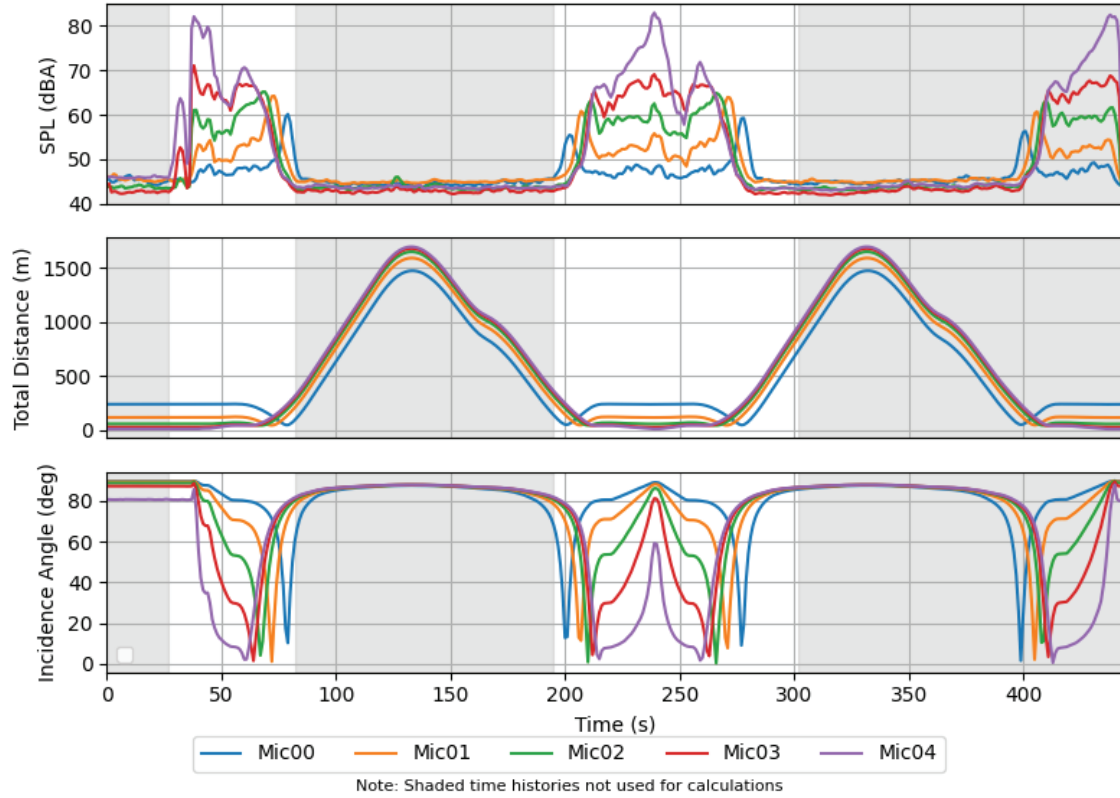
Source: Prime Air, 2024; ESA, 2025.

Notes: Greyed out cells we determined to not be valid measurements and were not included in SEL calculations.

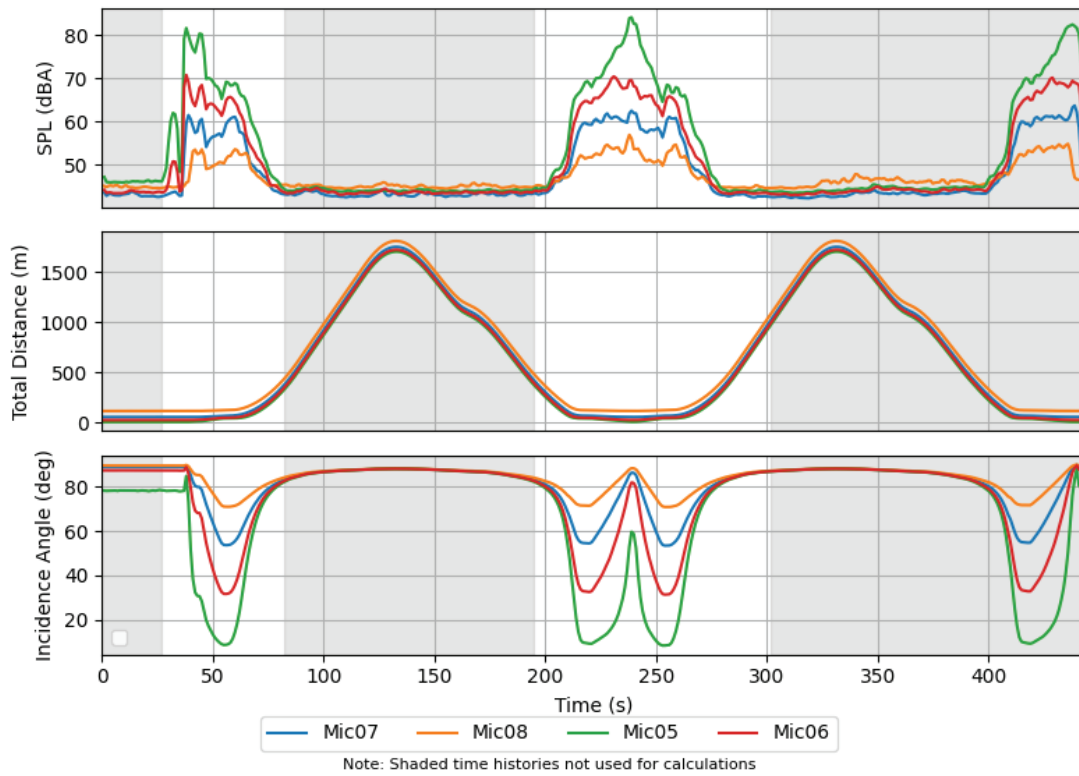
Appendix C: Time History Graphs

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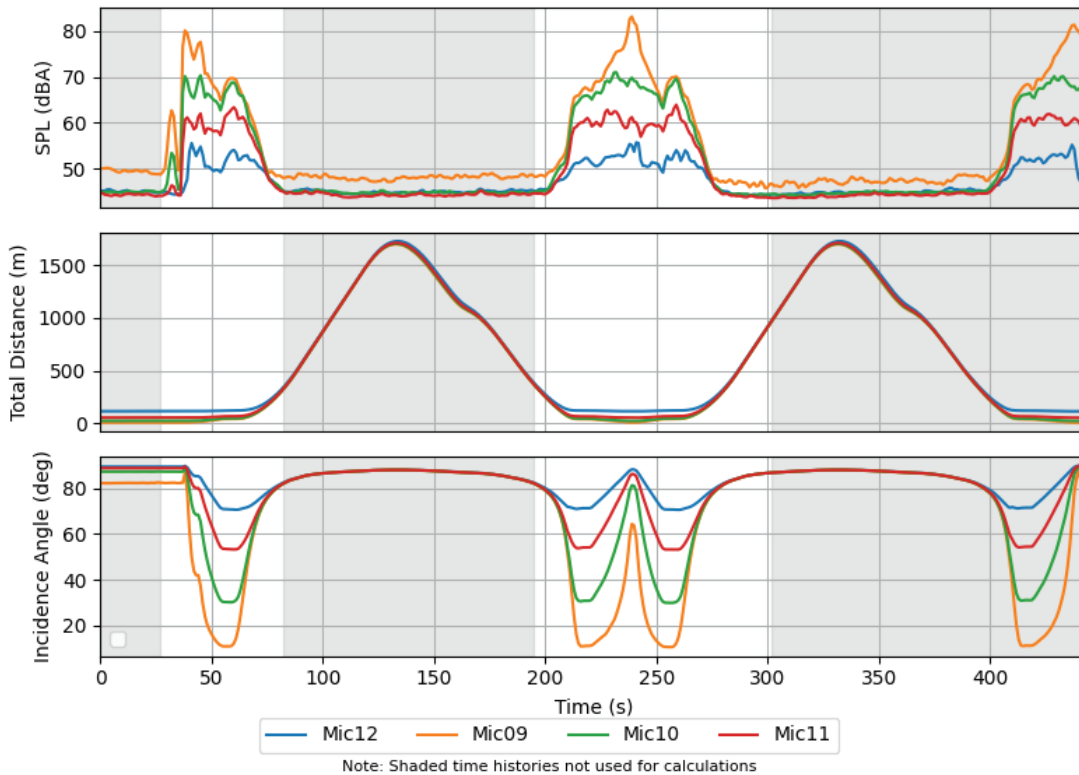
Takeoff and Delivery - MTOW - Test 1 Undertrack



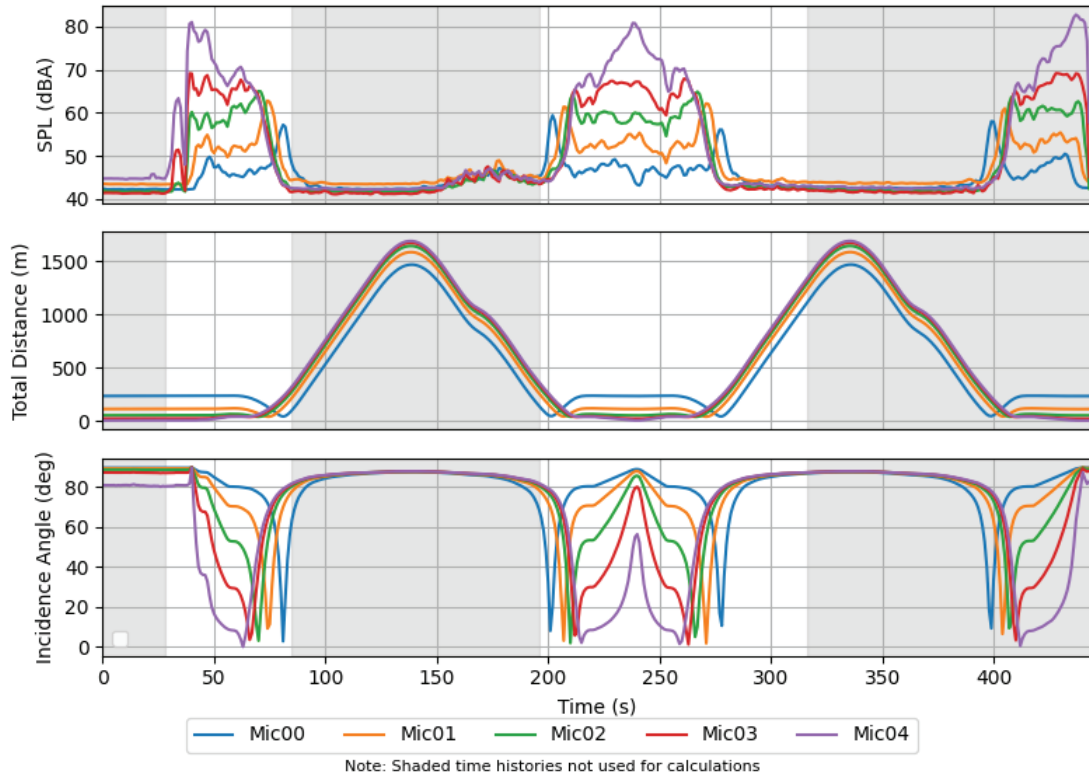
Takeoff and Delivery - MTOW - Test 1 Behind



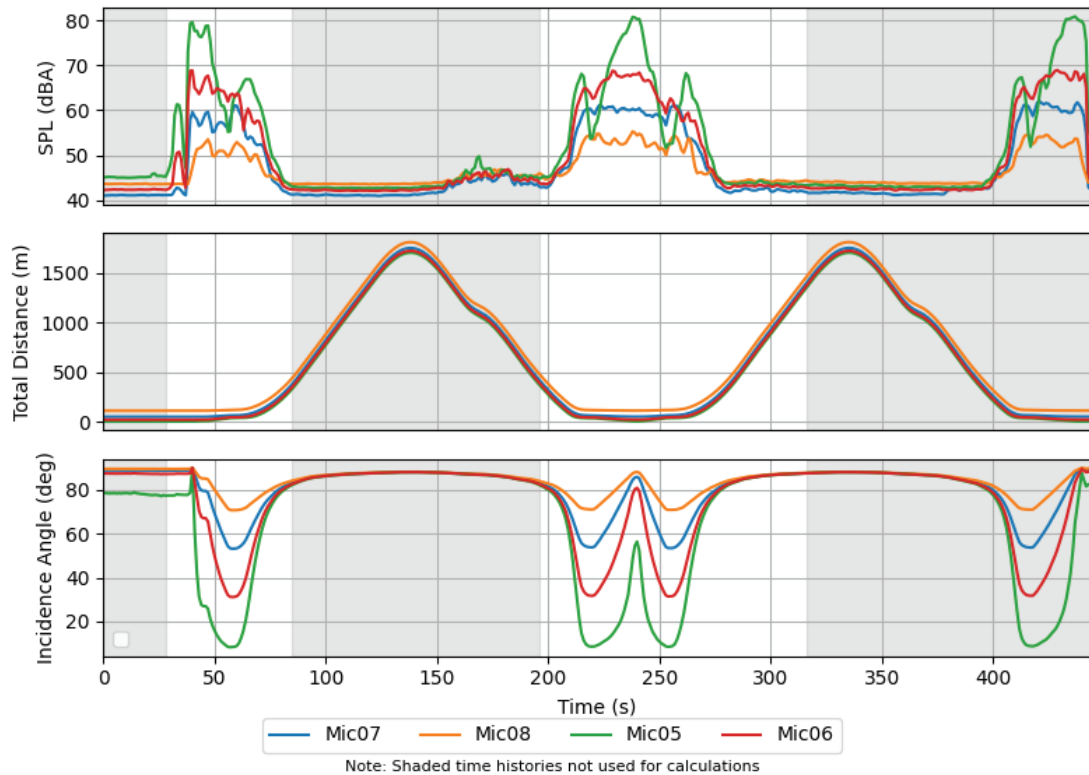
Takeoff and Delivery - MTOW - Test 1 Lateral



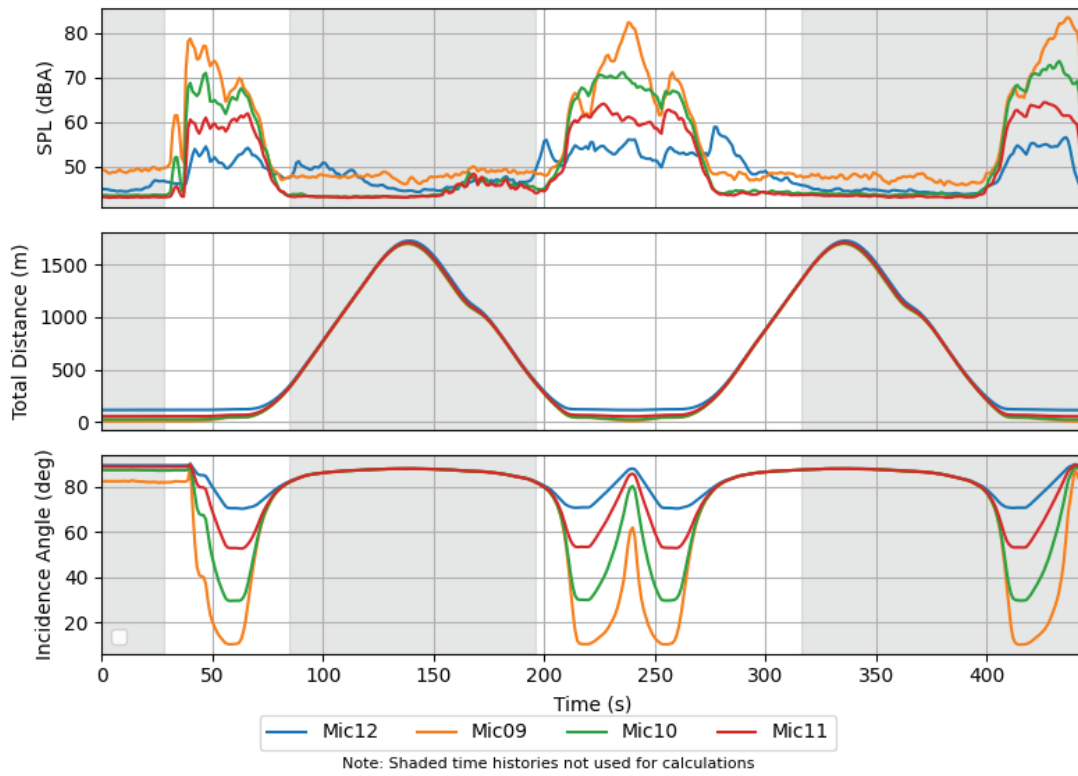
Takeoff and Delivery - MTOW - Test 2 Undertrack



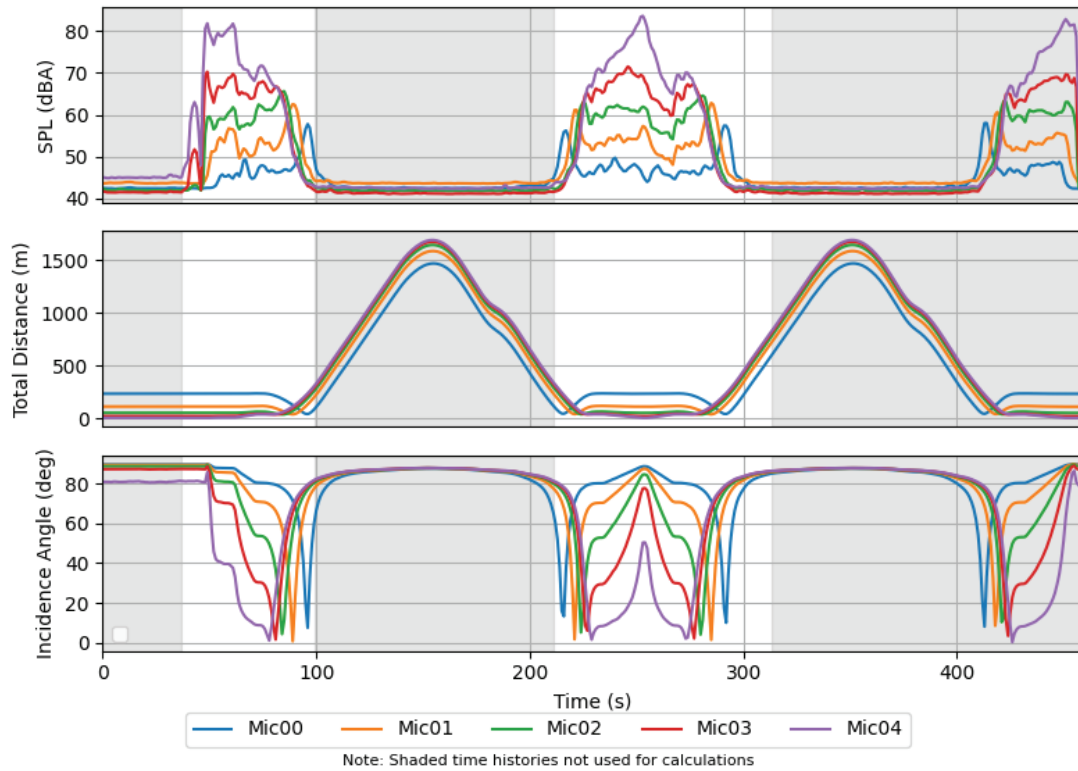
Takeoff and Delivery - MTOW - Test 2 Behind



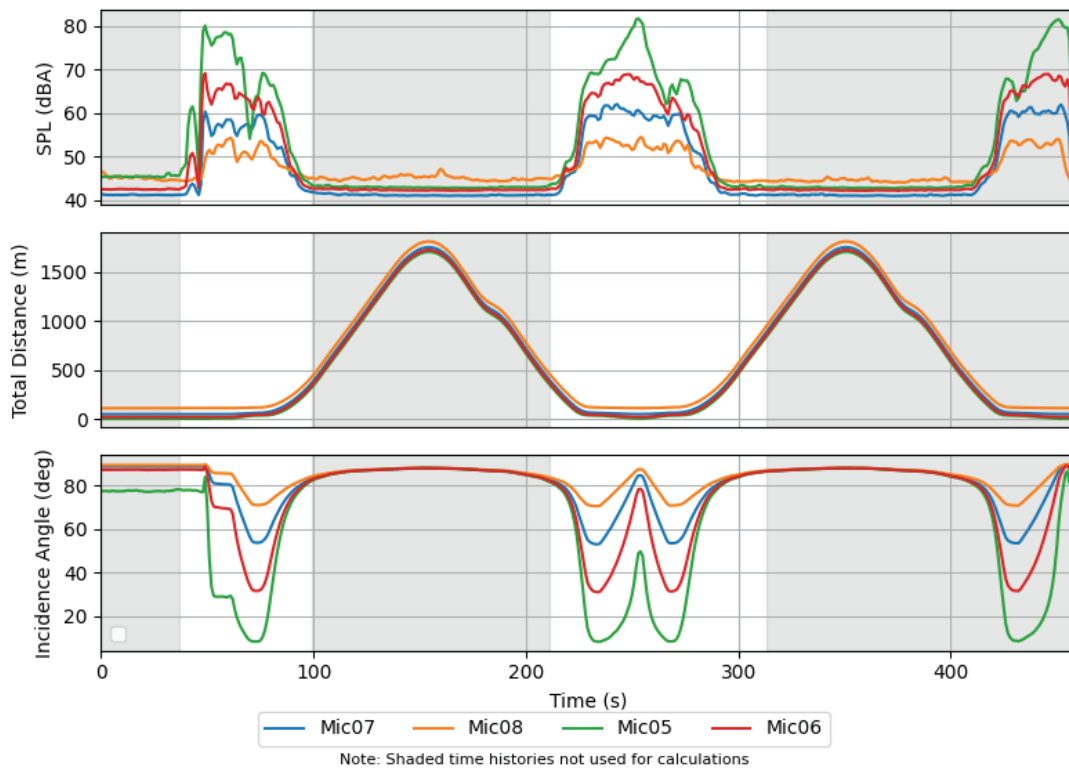
Takeoff and Delivery - MTOW - Test 2 Lateral



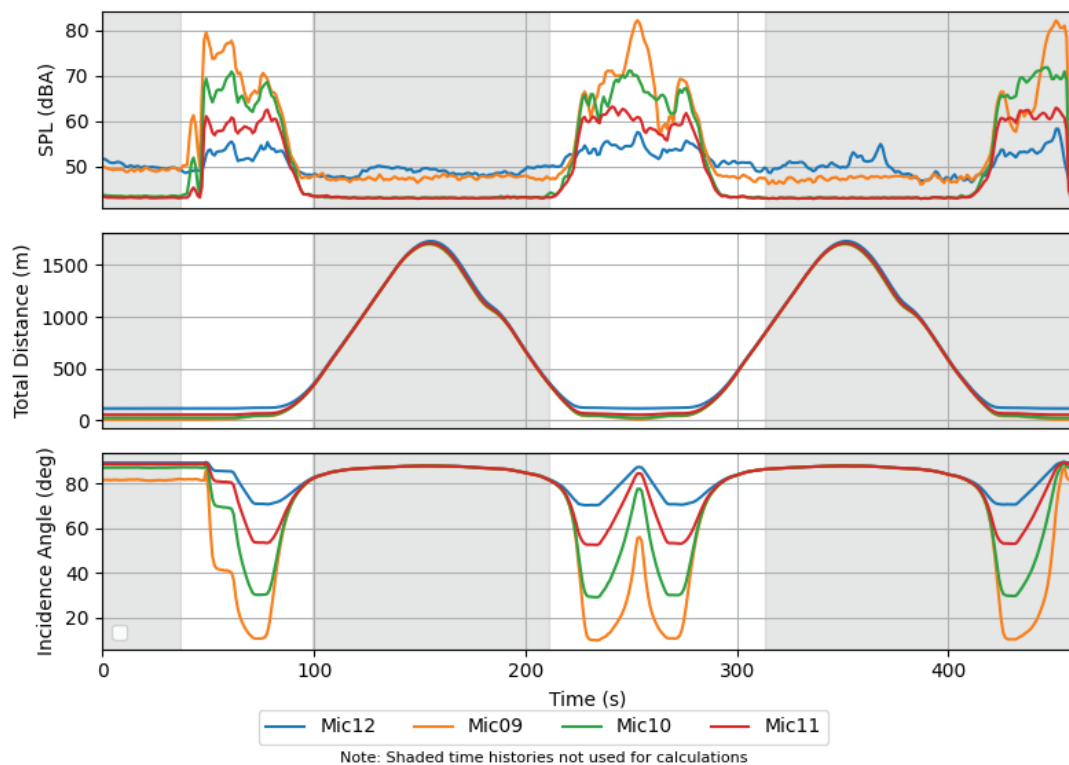
Takeoff and Delivery - MTOW - Test 3 Undertrack



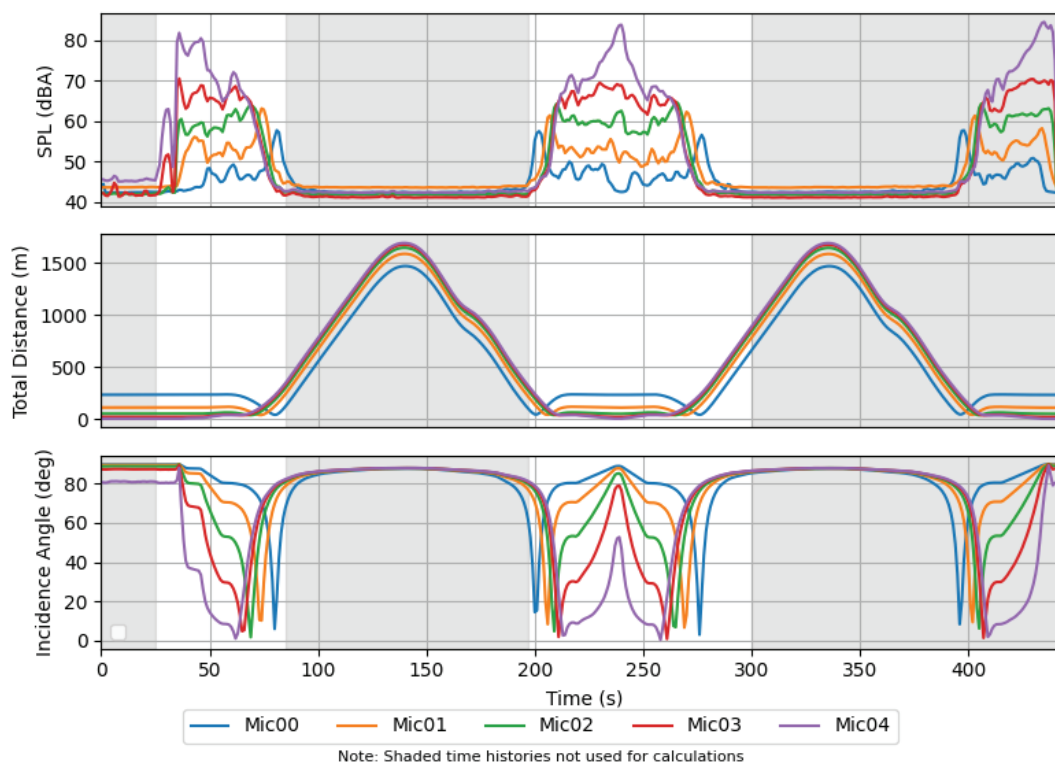
Takeoff and Delivery - MTOW - Test 3 Behind



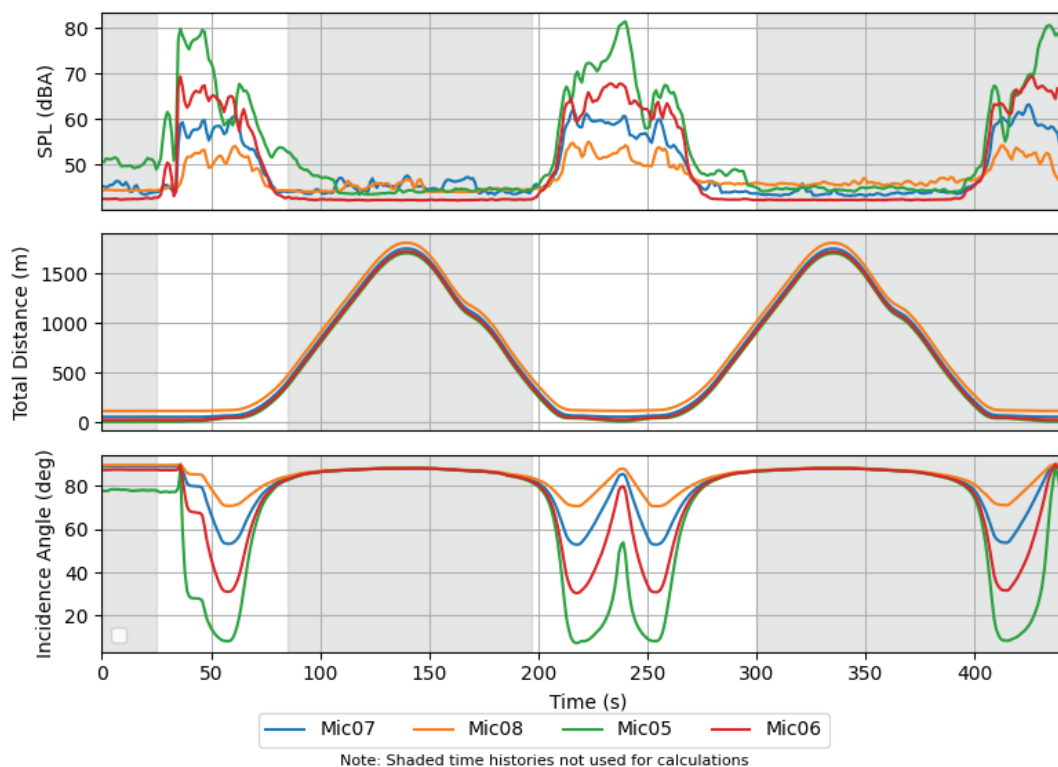
Takeoff and Delivery - MTOW - Test 3 Lateral



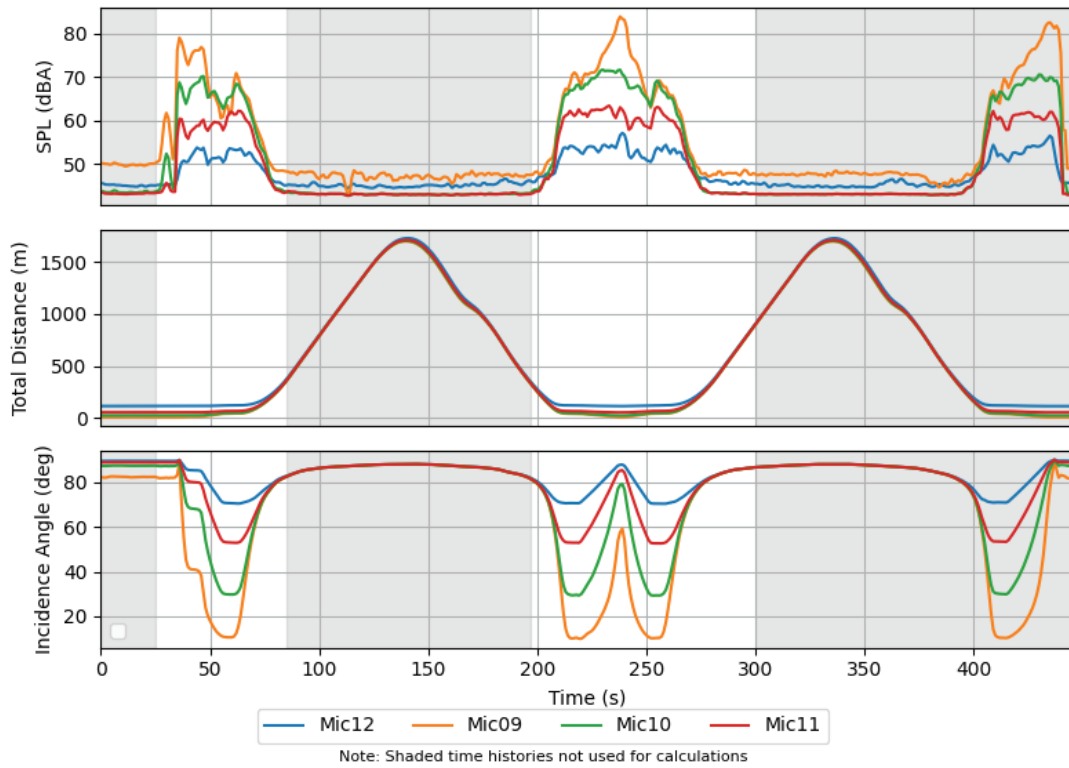
Takeoff and Delivery - MTOW - Test 4 Undertrack



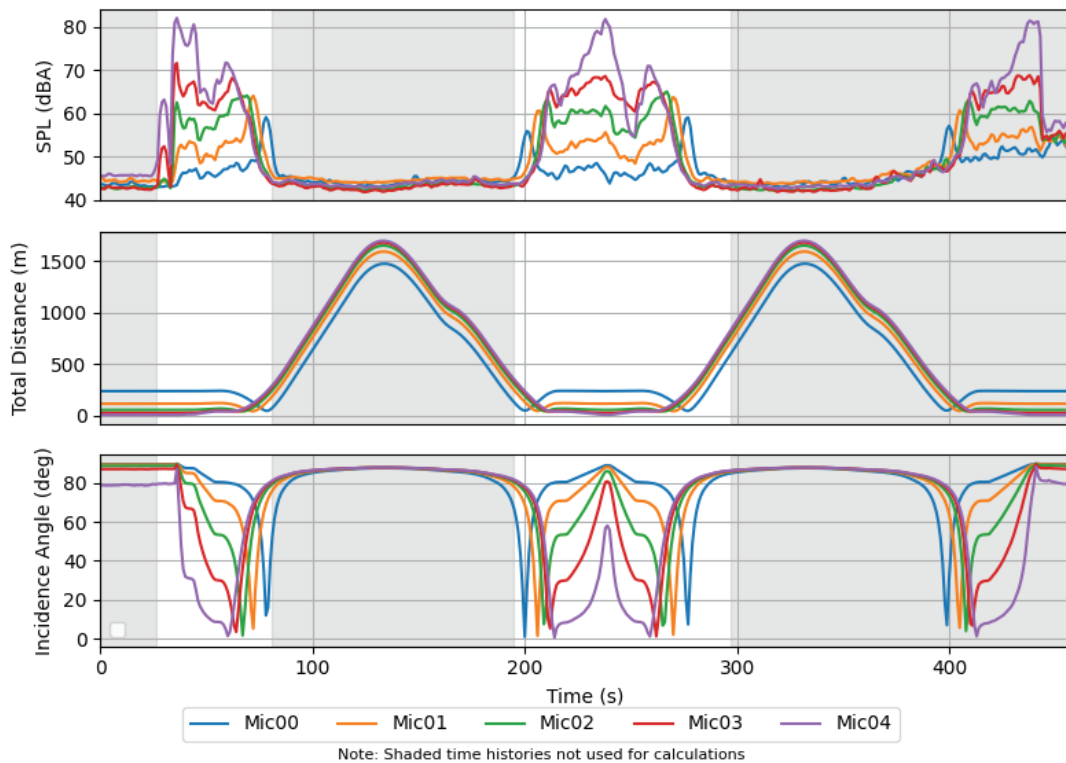
Takeoff and Delivery - MTOW - Test 4 Behind



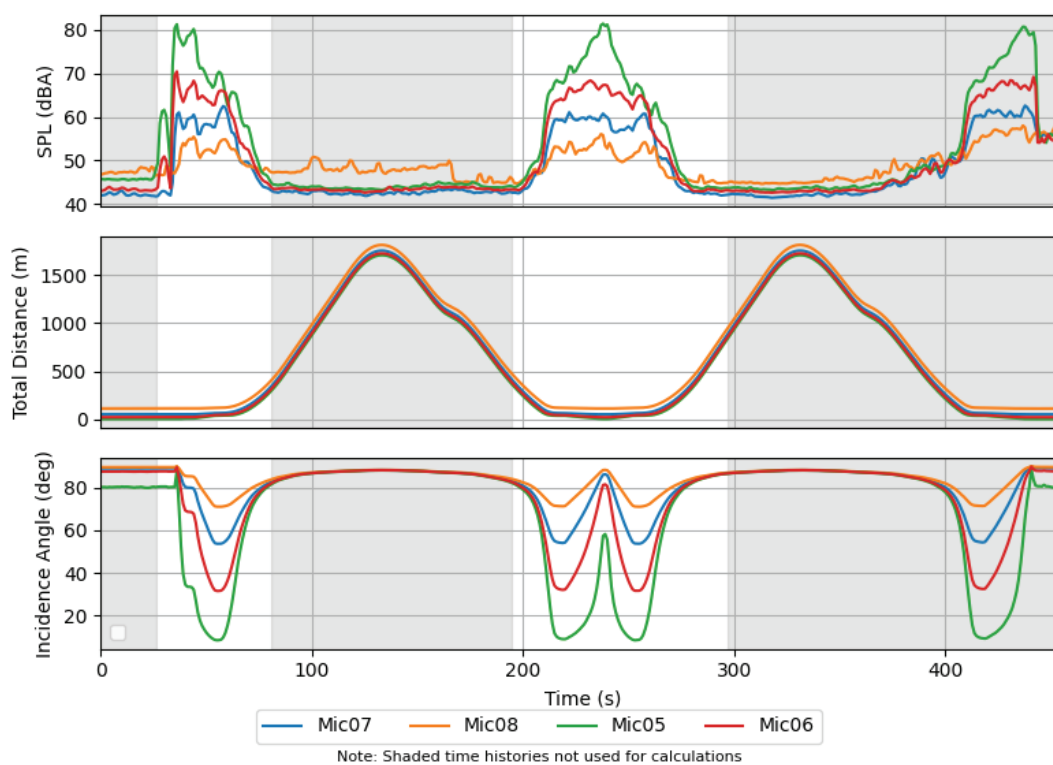
Takeoff and Delivery - MTOW - Test 4 Lateral



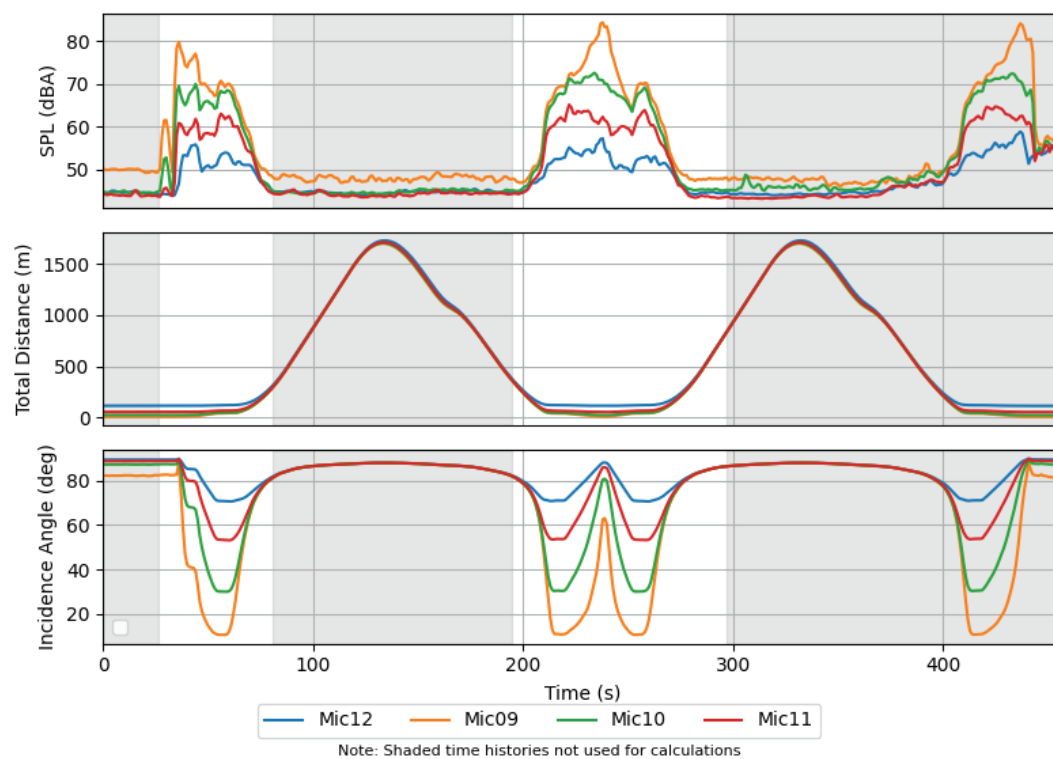
Takeoff and Delivery - MTOW - Test 5 Undertrack



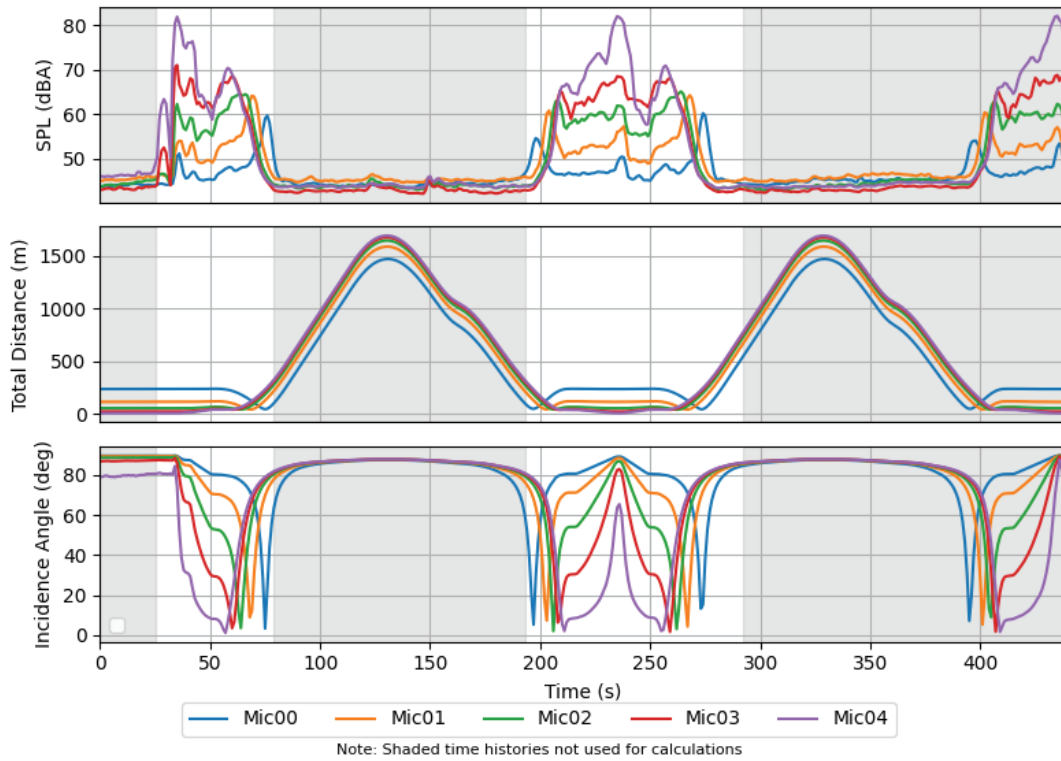
Takeoff and Delivery - MTOW - Test 5 Behind



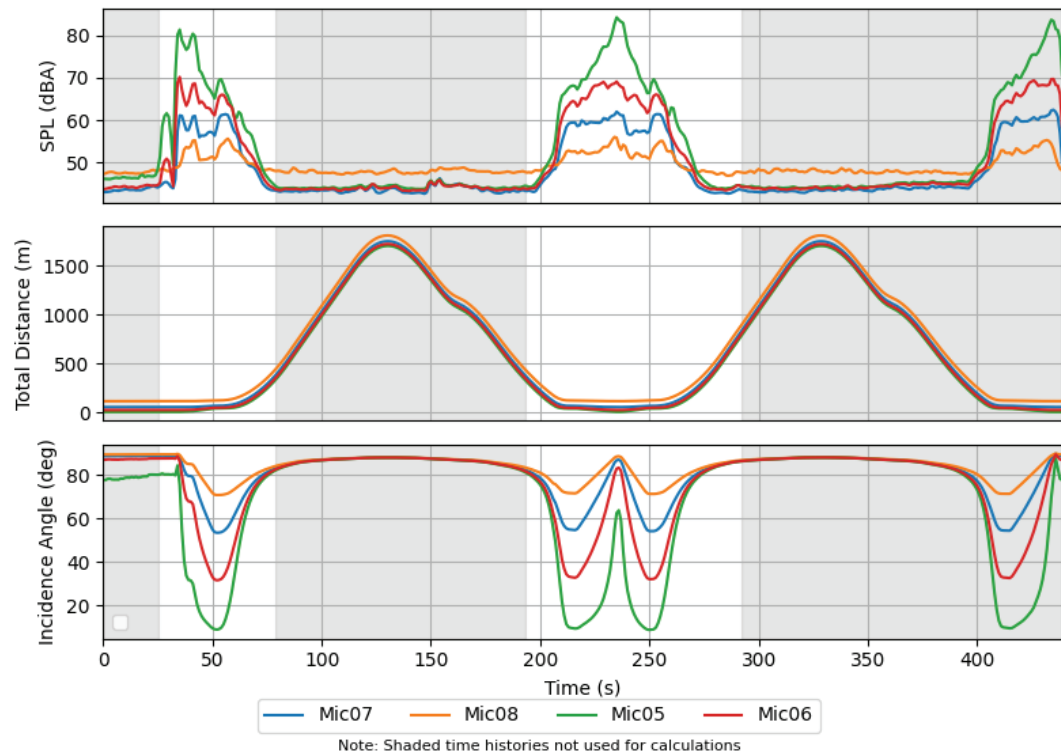
Takeoff and Delivery - MTOW - Test 5 Lateral



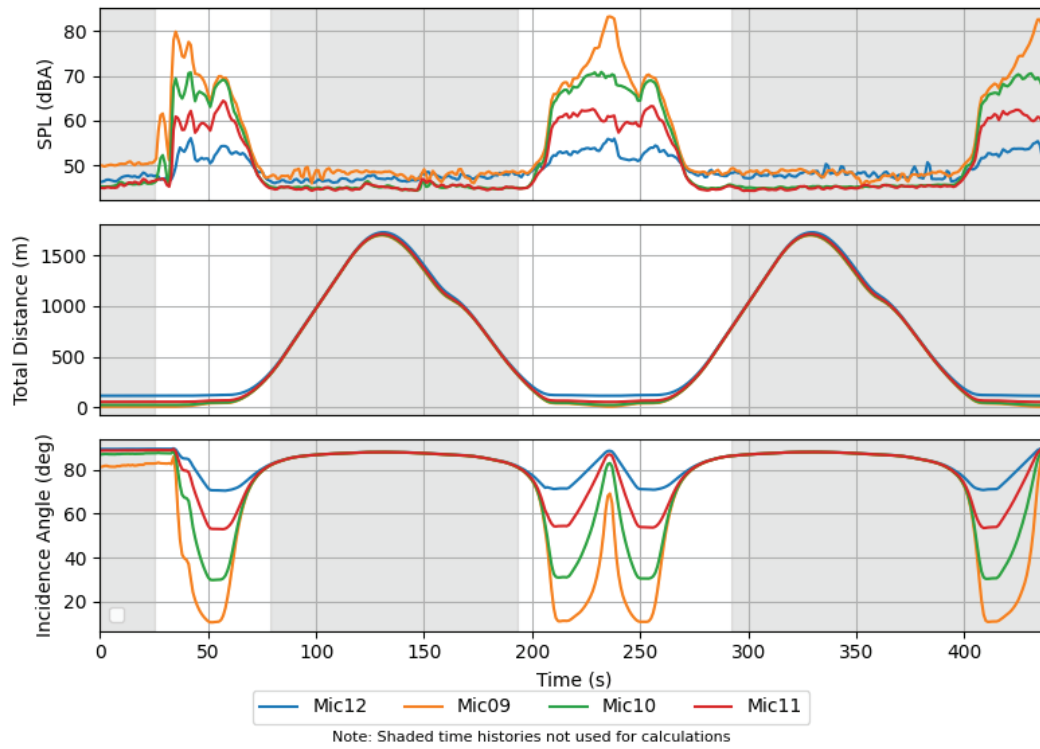
Takeoff and Delivery - MTOW - Test 6 Undertrack



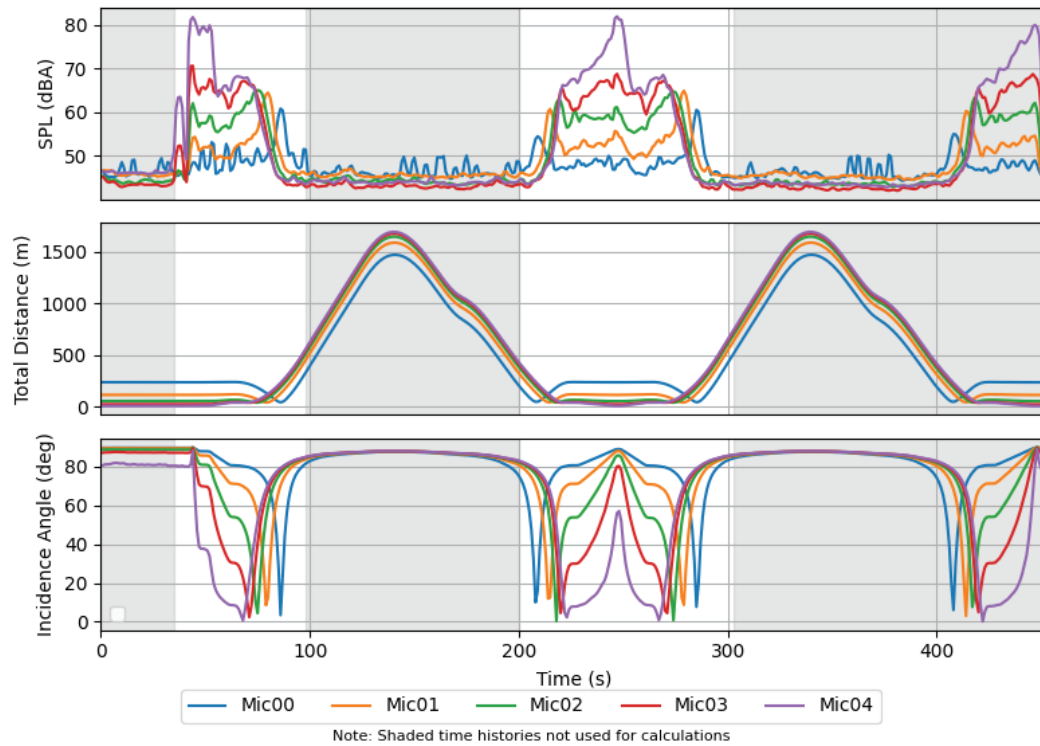
Takeoff and Delivery - MTOW - Test 6 Behind



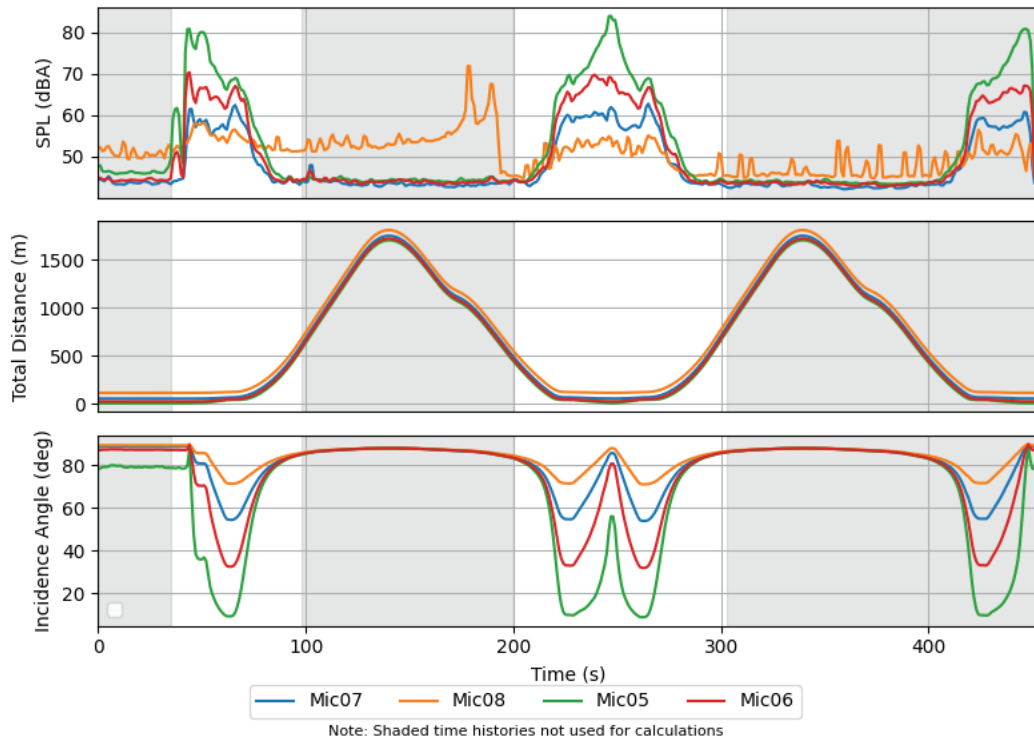
Takeoff and Delivery - MTOW - Test 6 Lateral



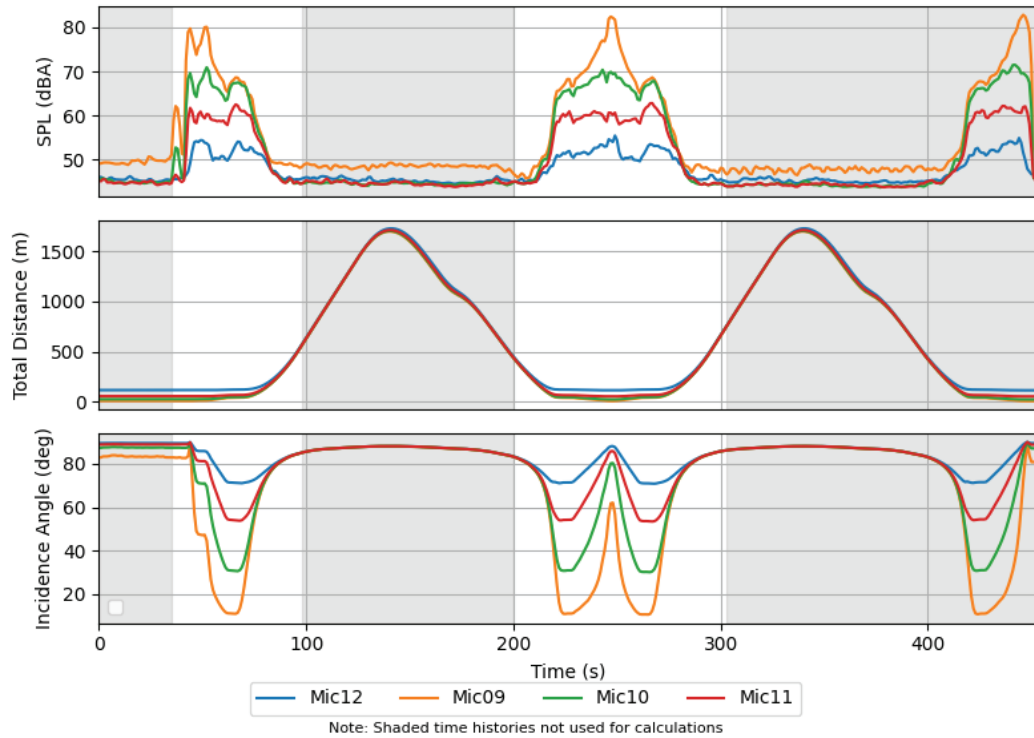
Takeoff and Delivery - MTOW - Test 7 Undertrack



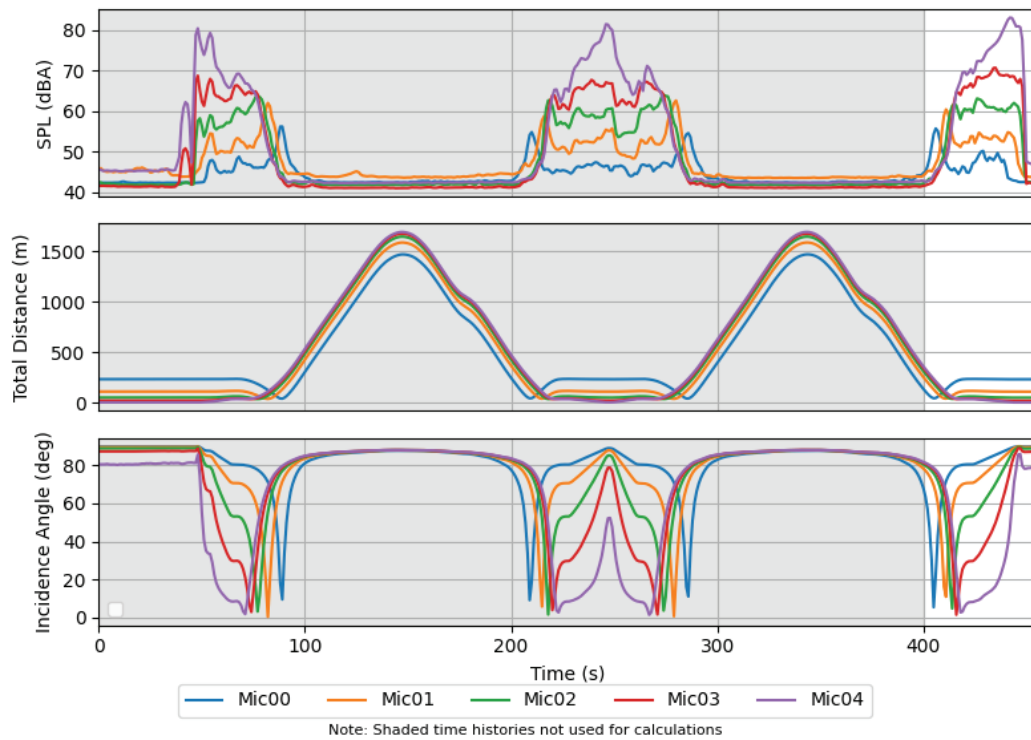
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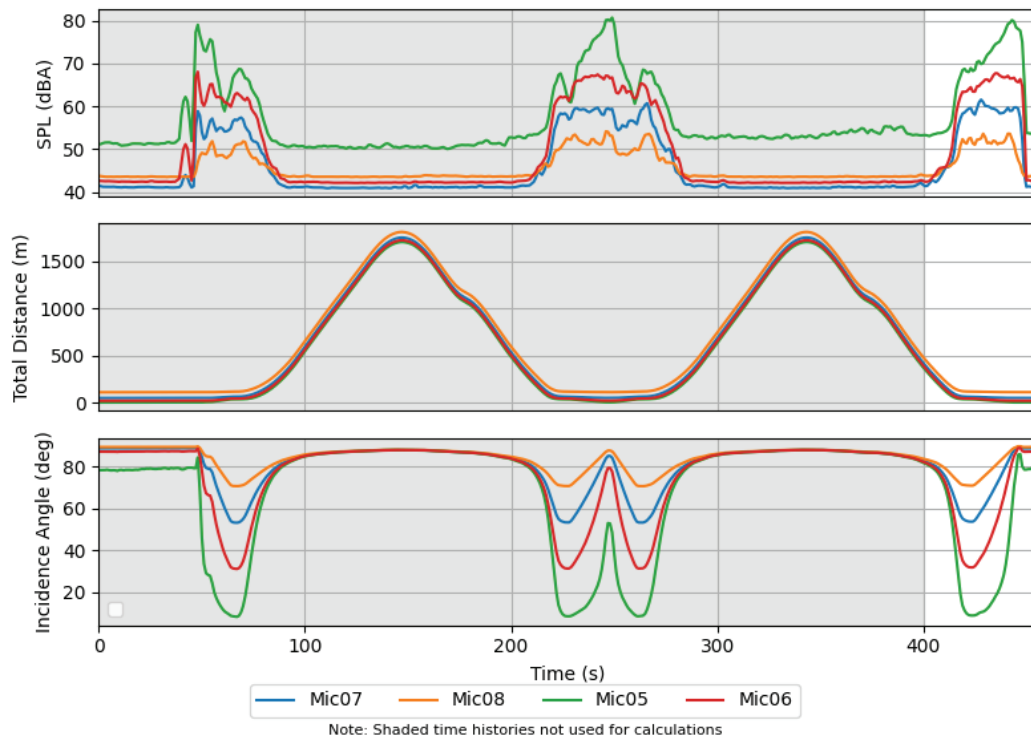
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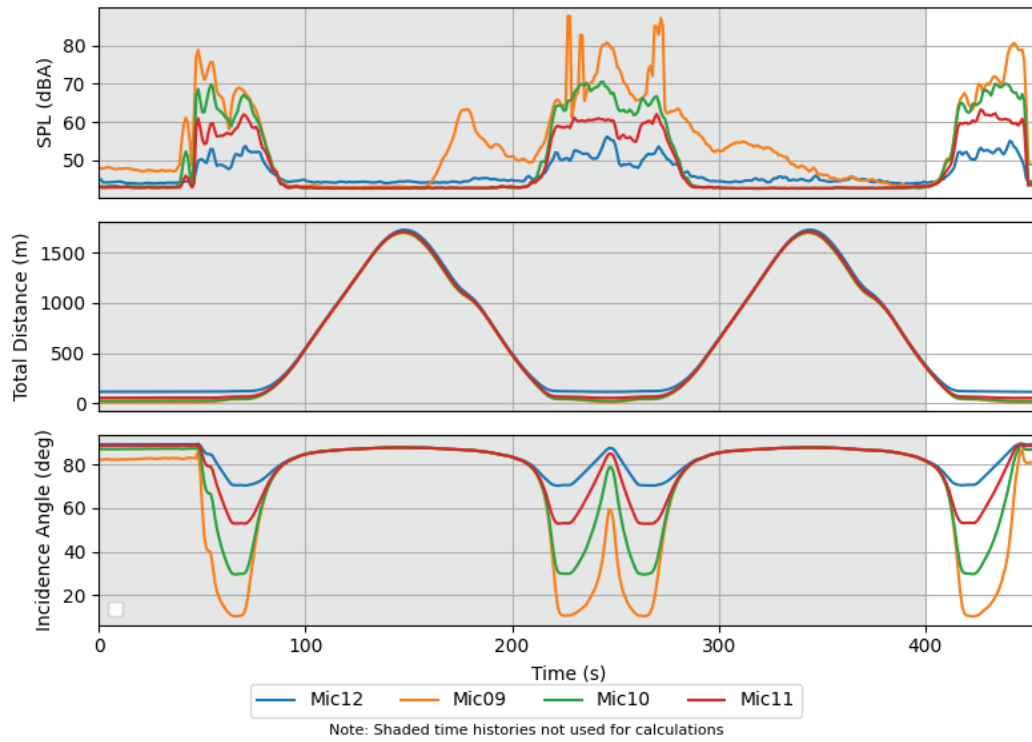
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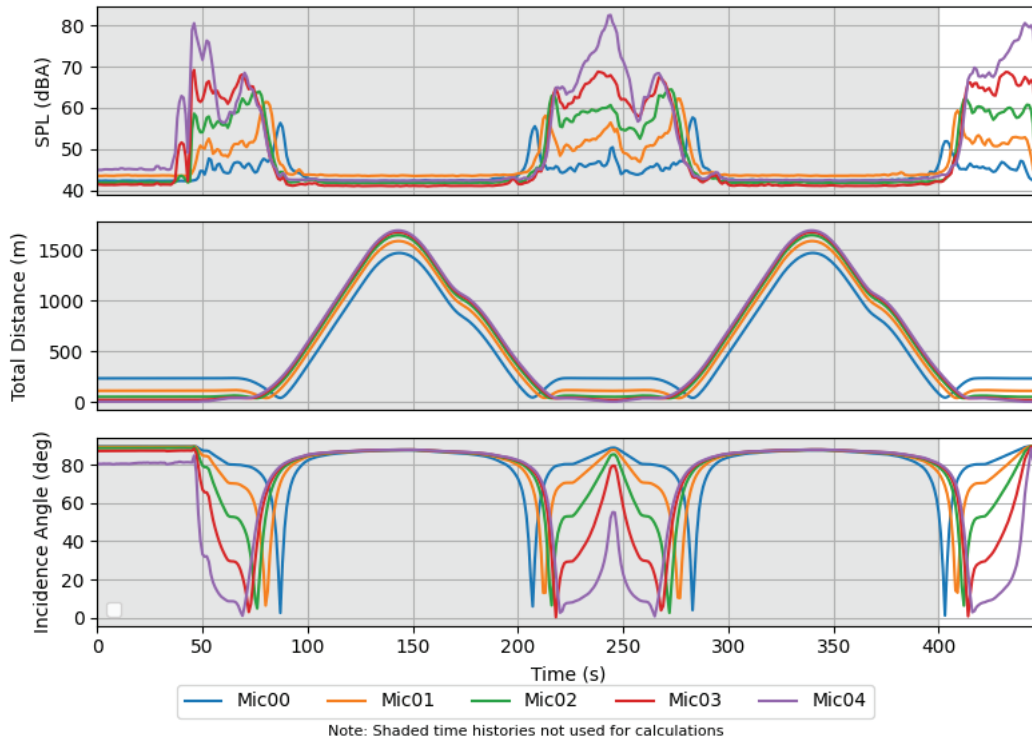
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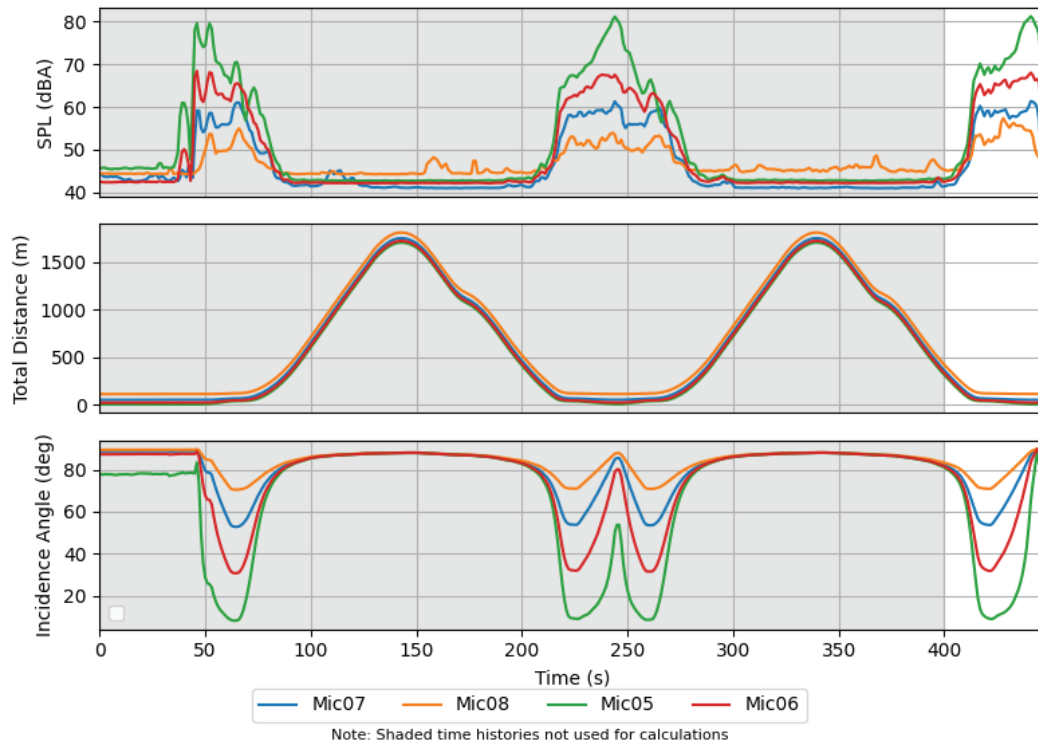
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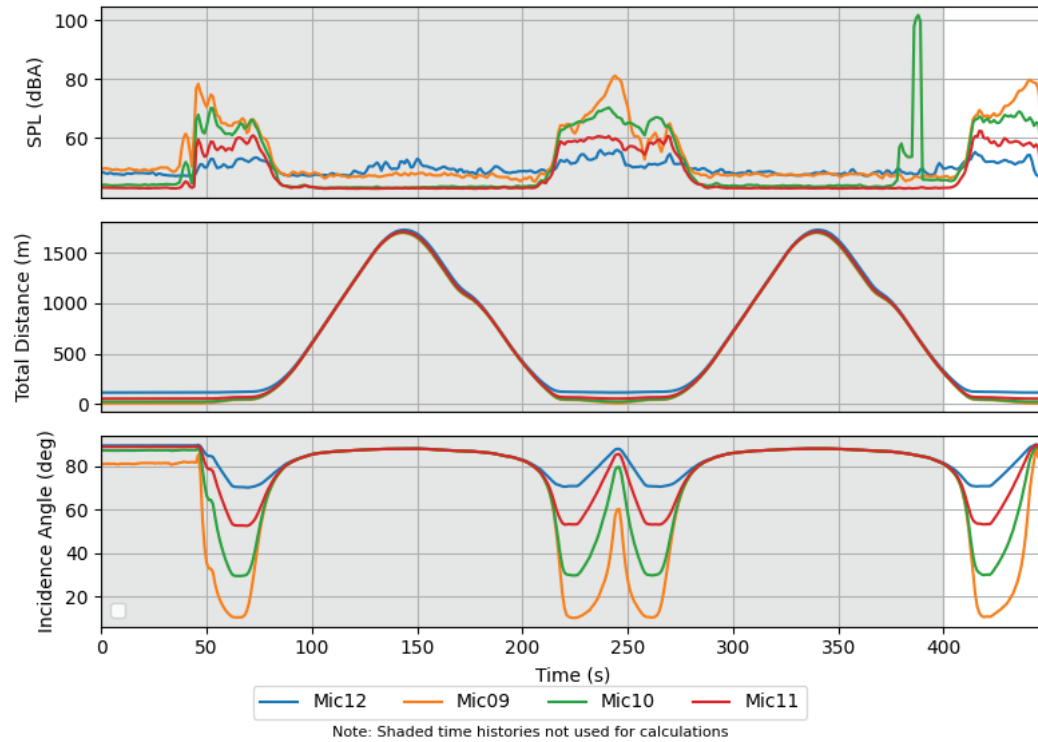
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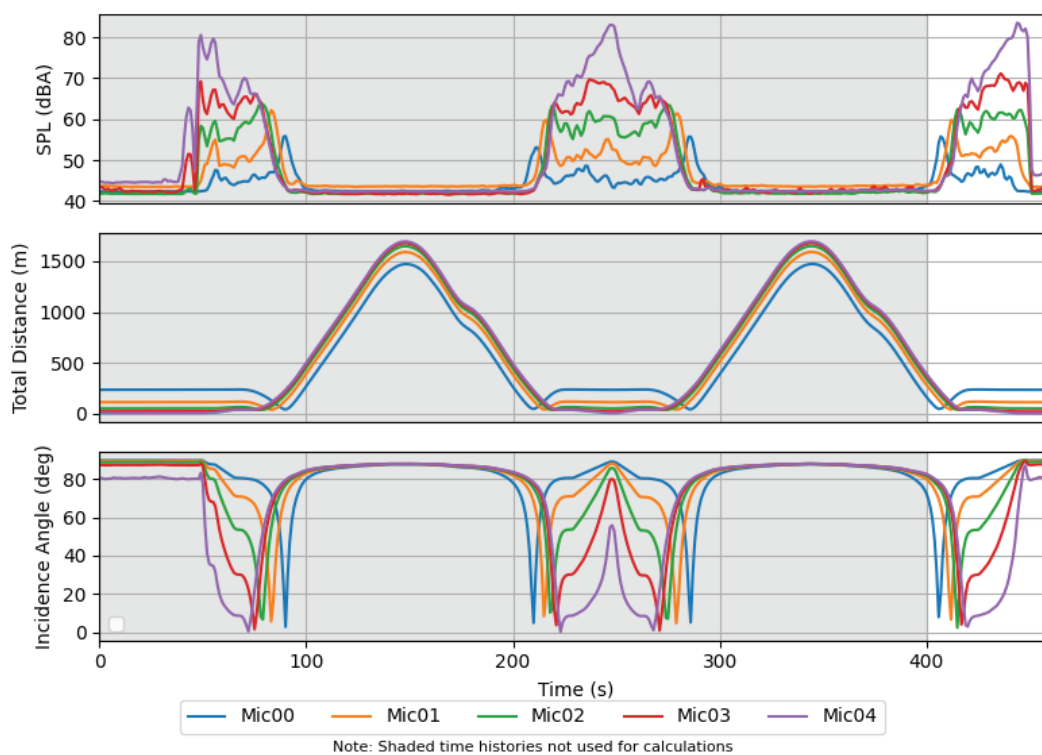
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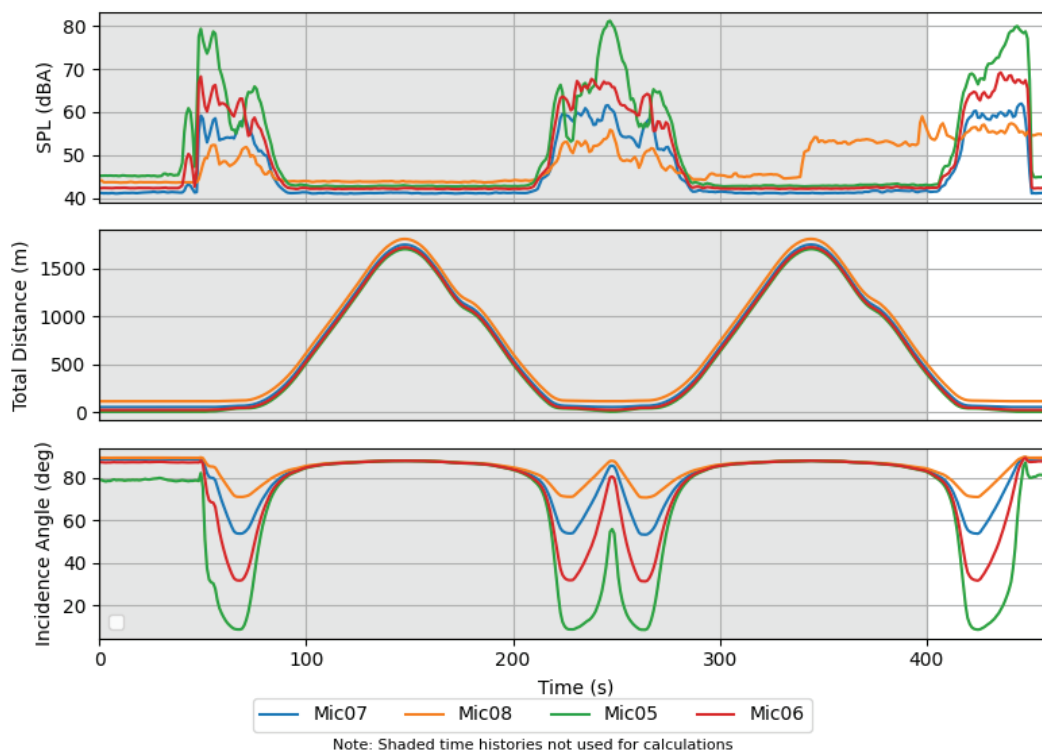
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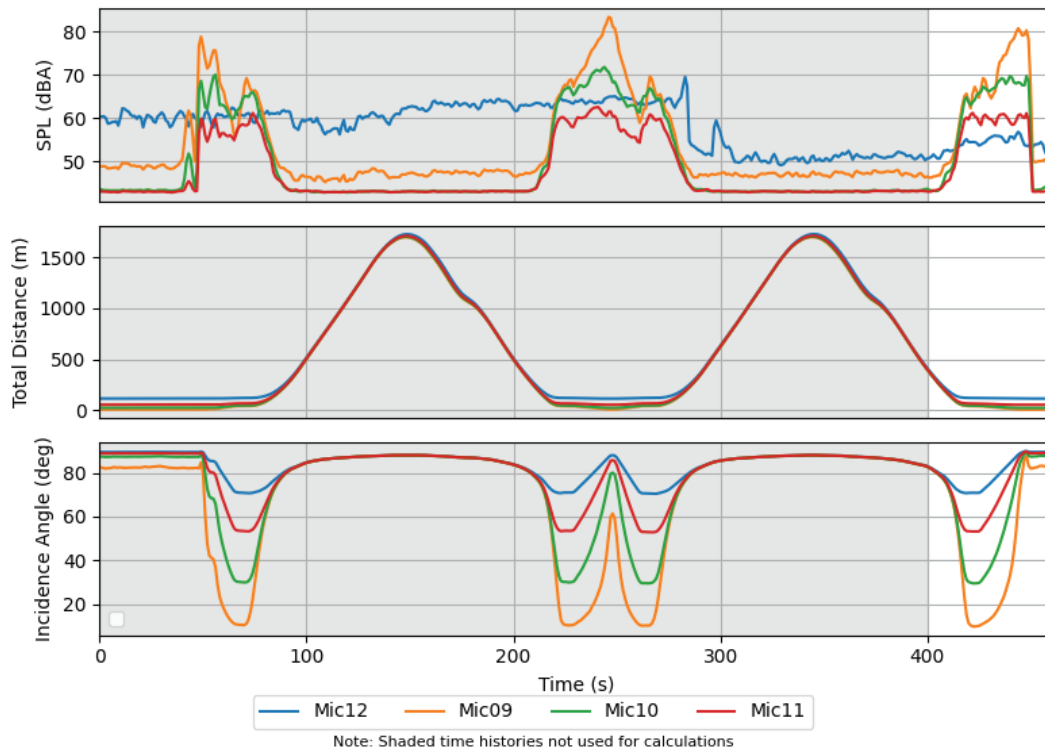
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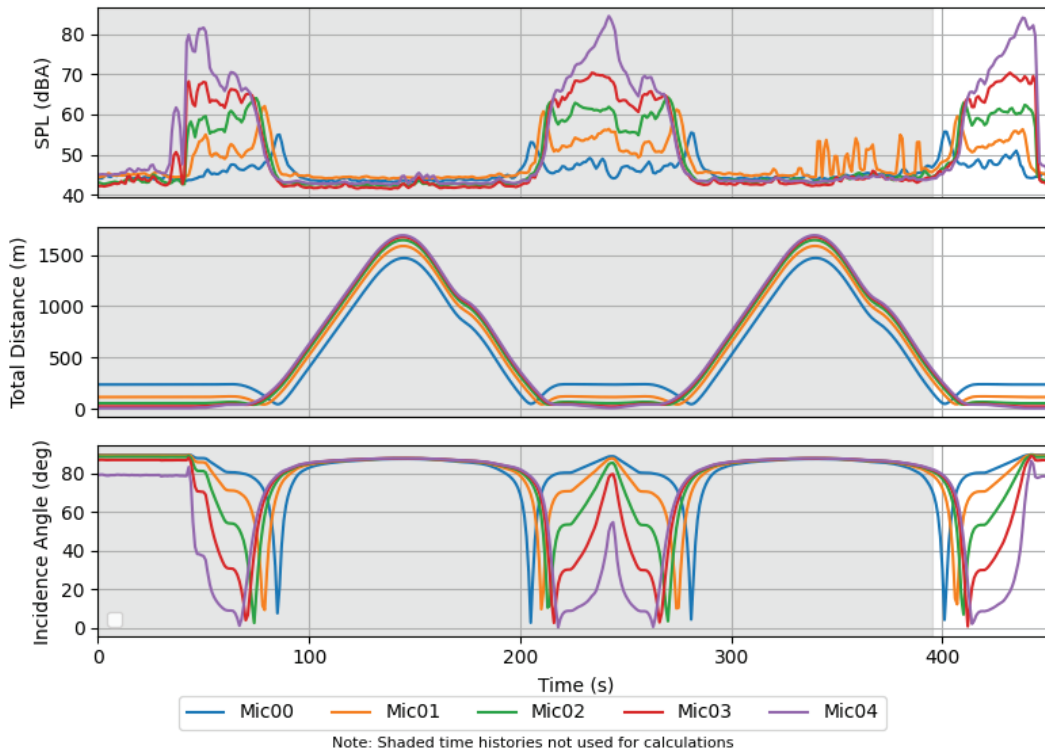
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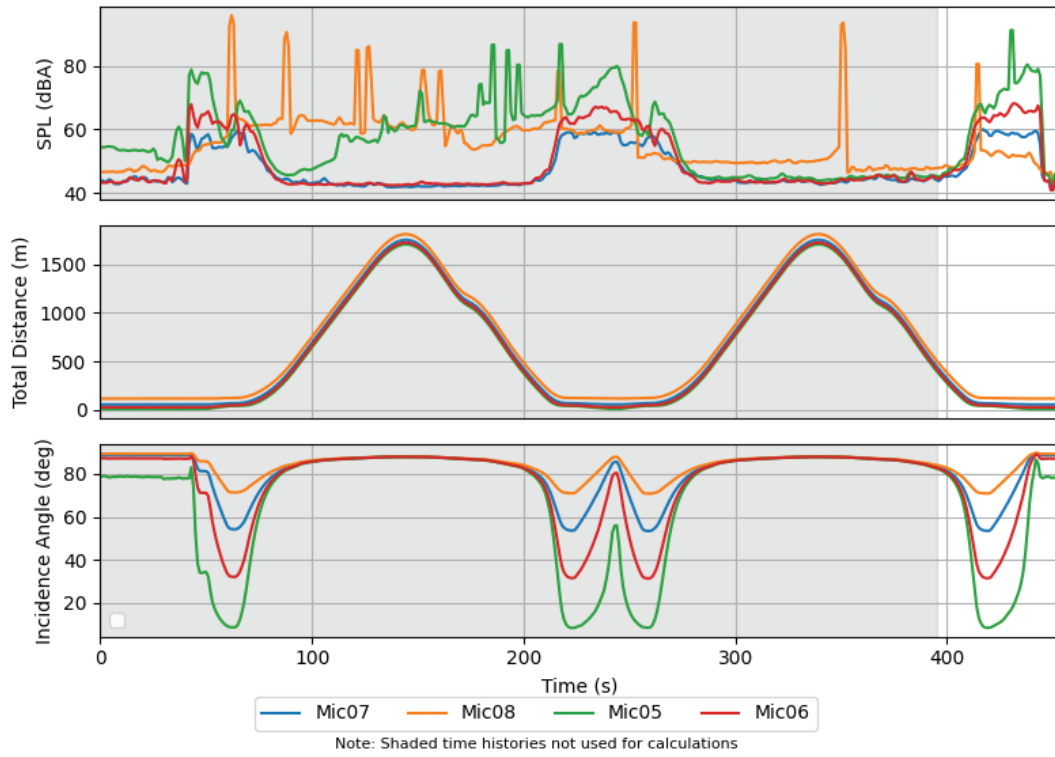
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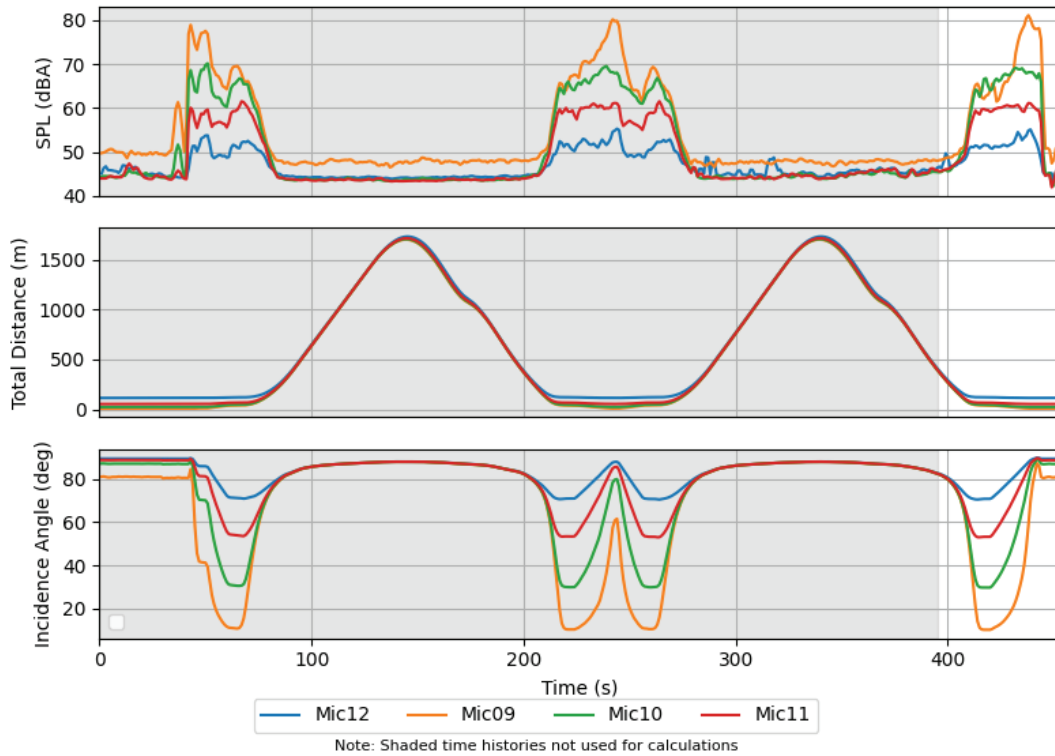
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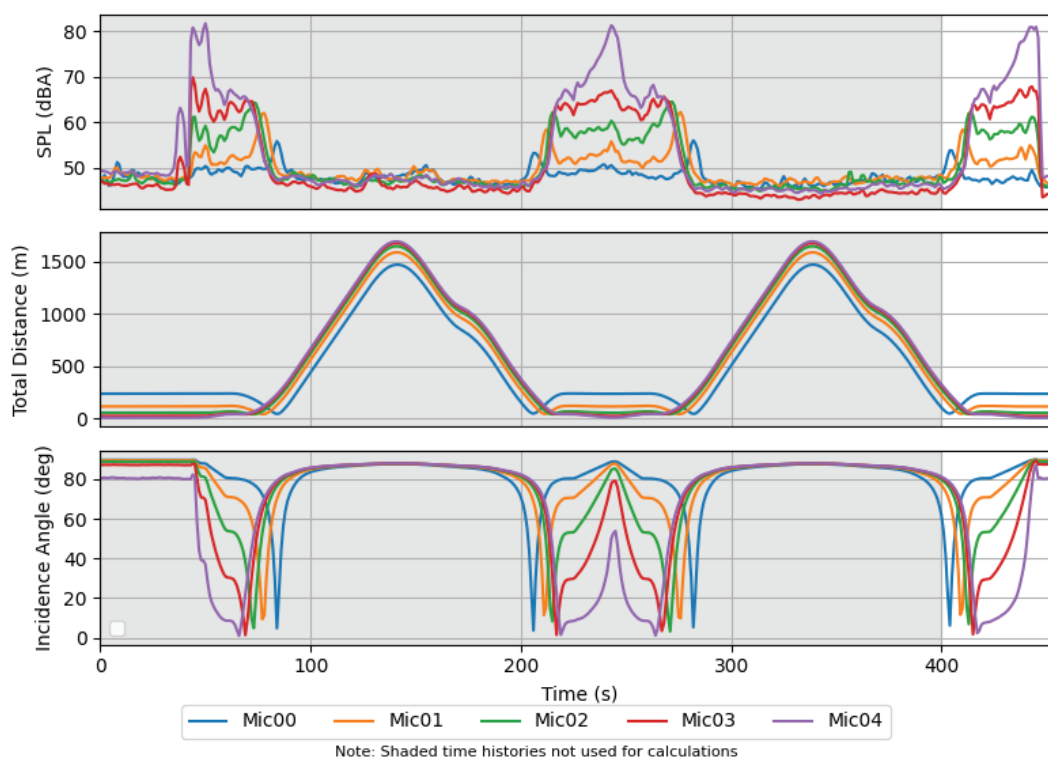
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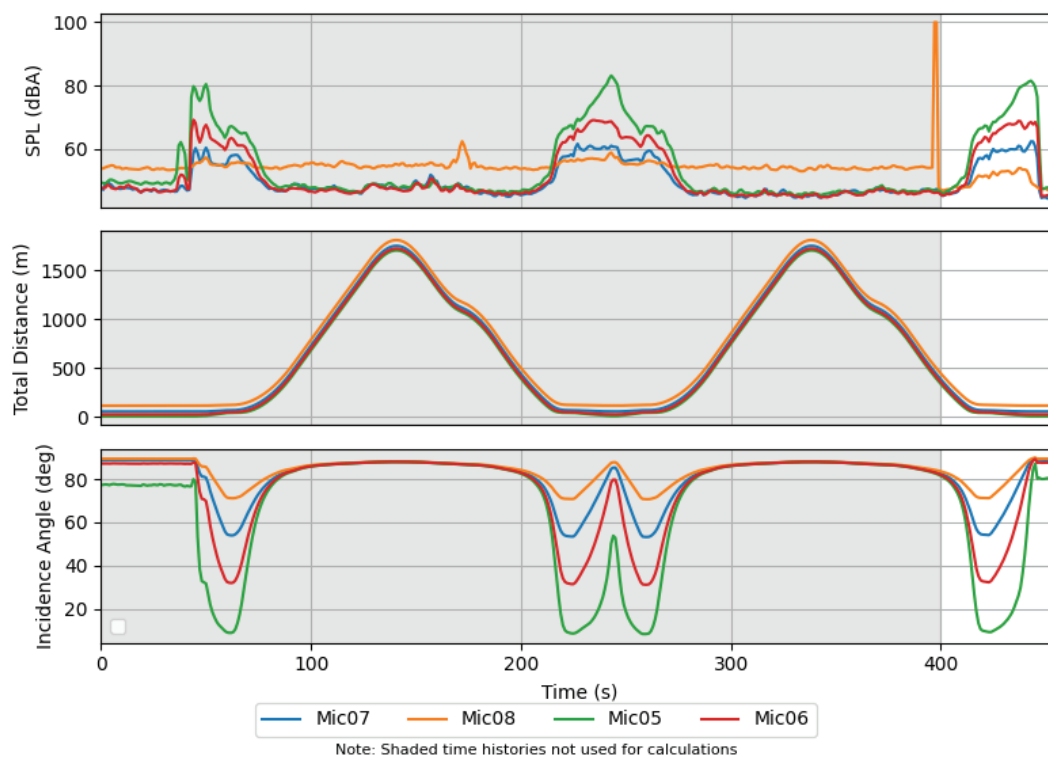
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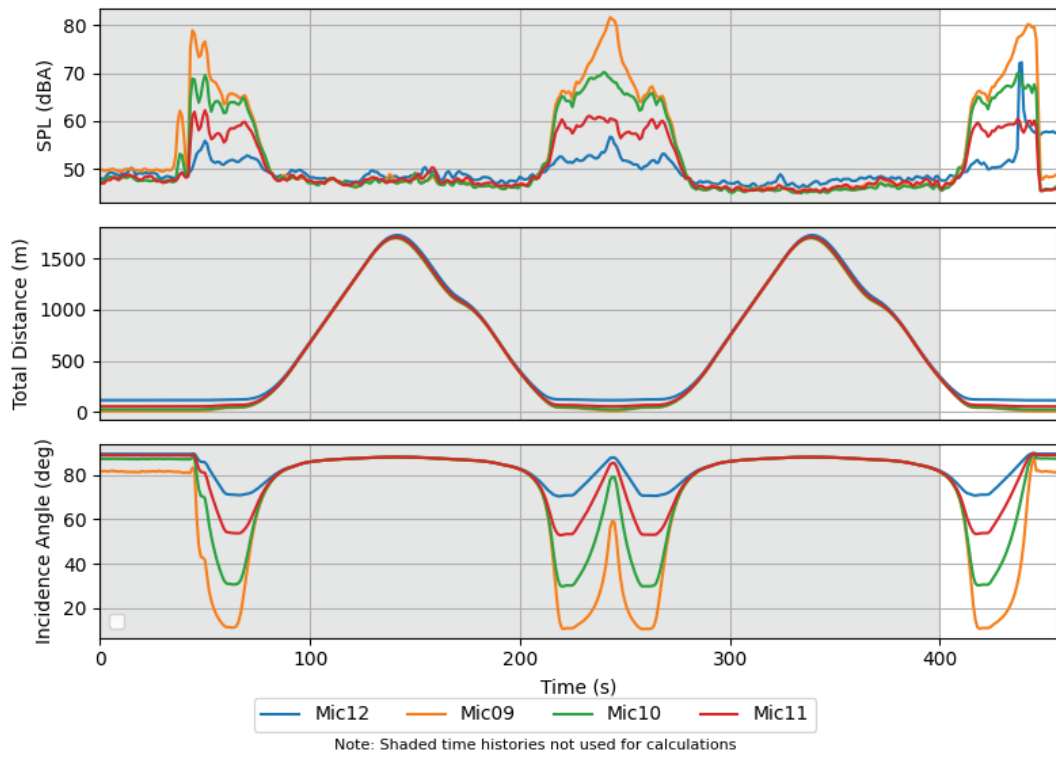
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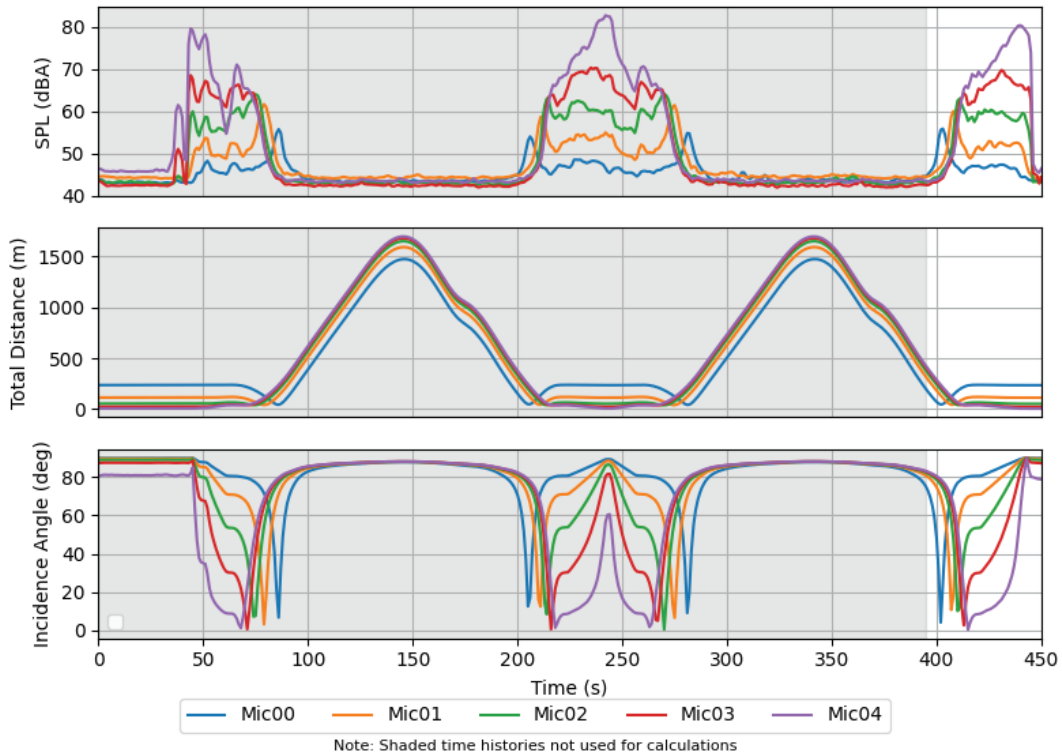
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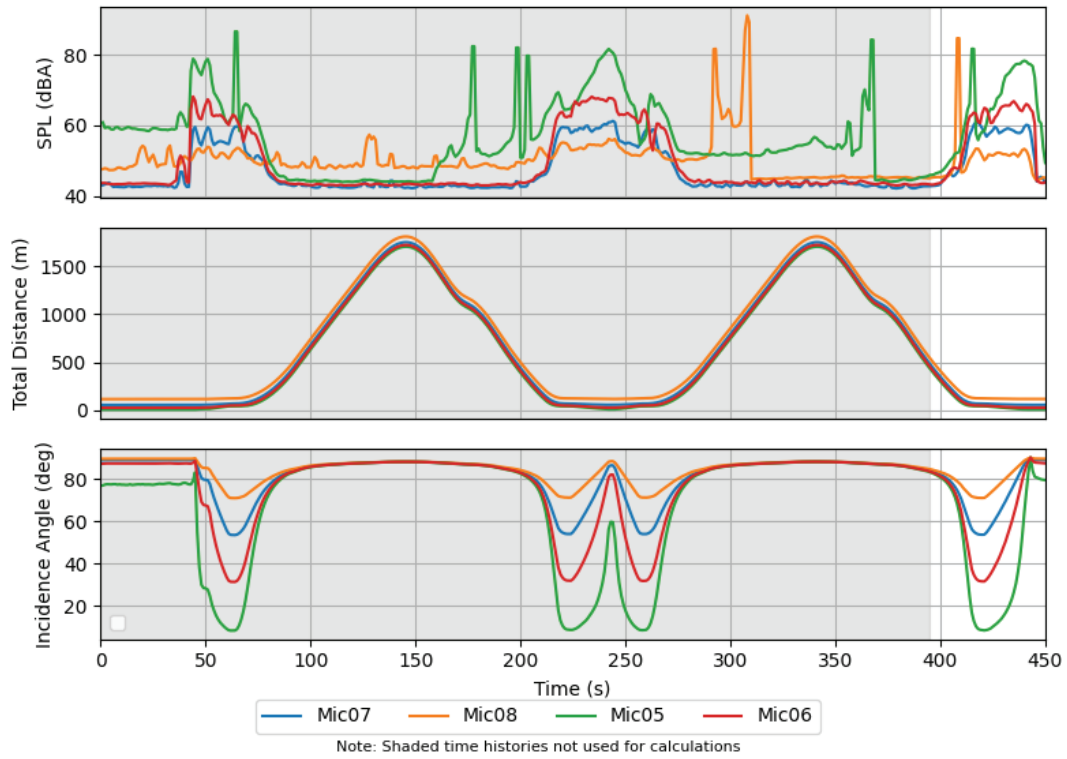
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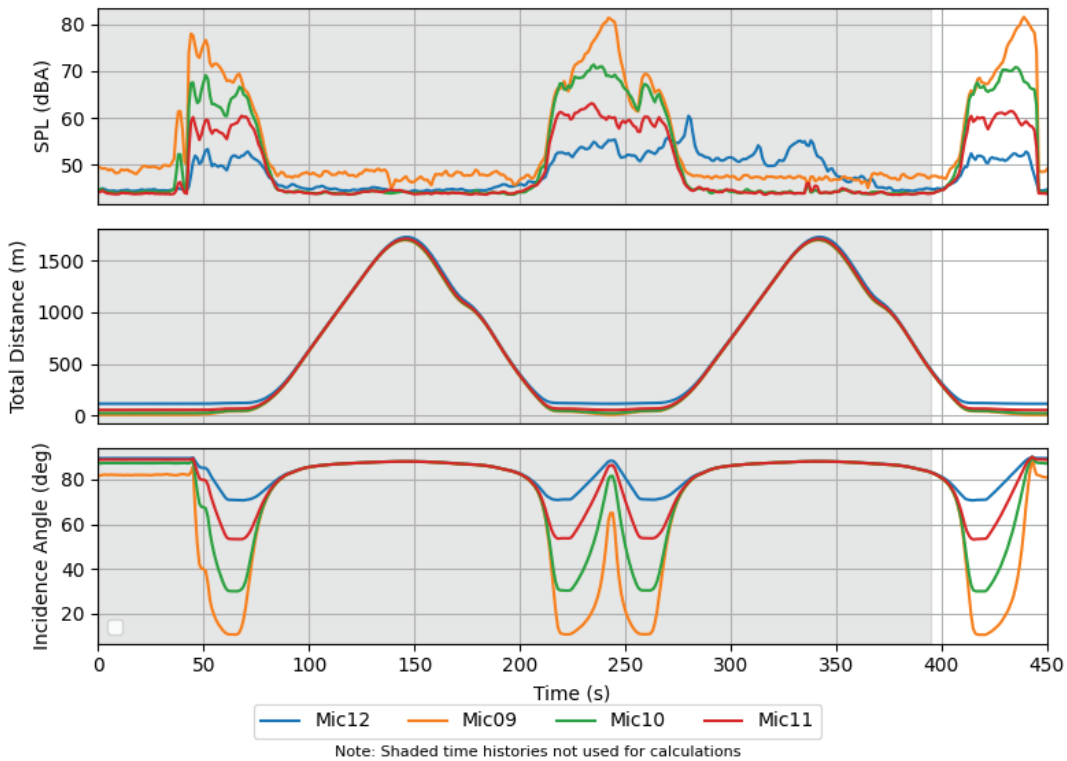
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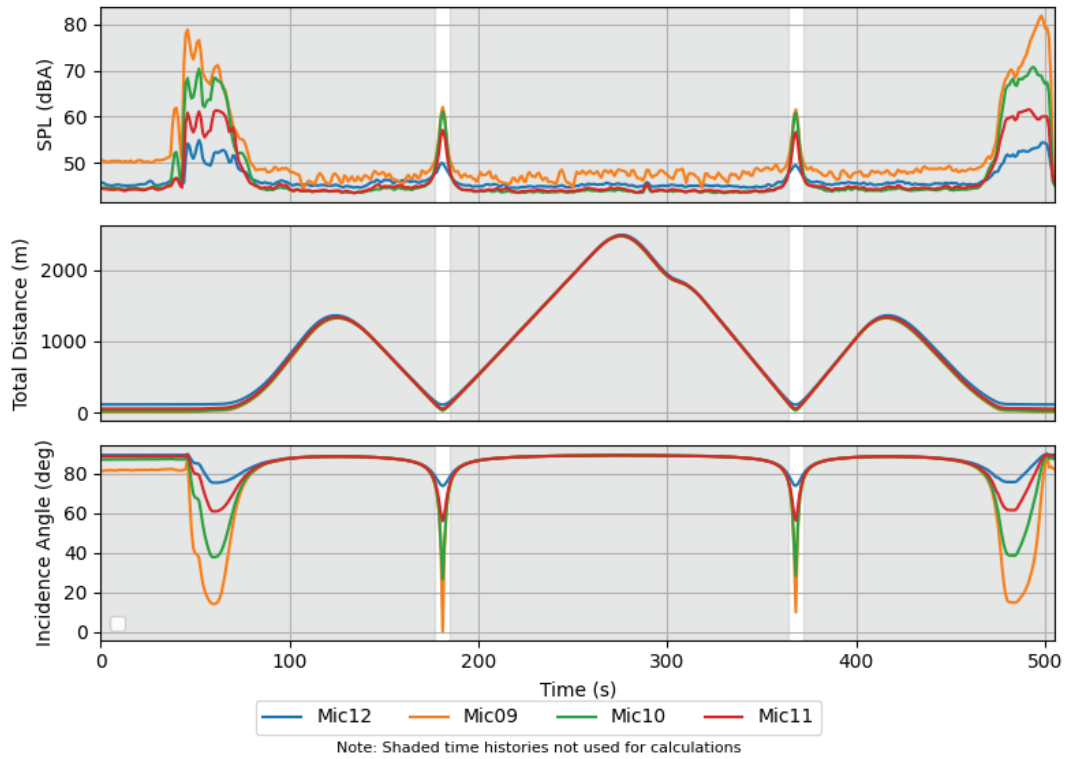
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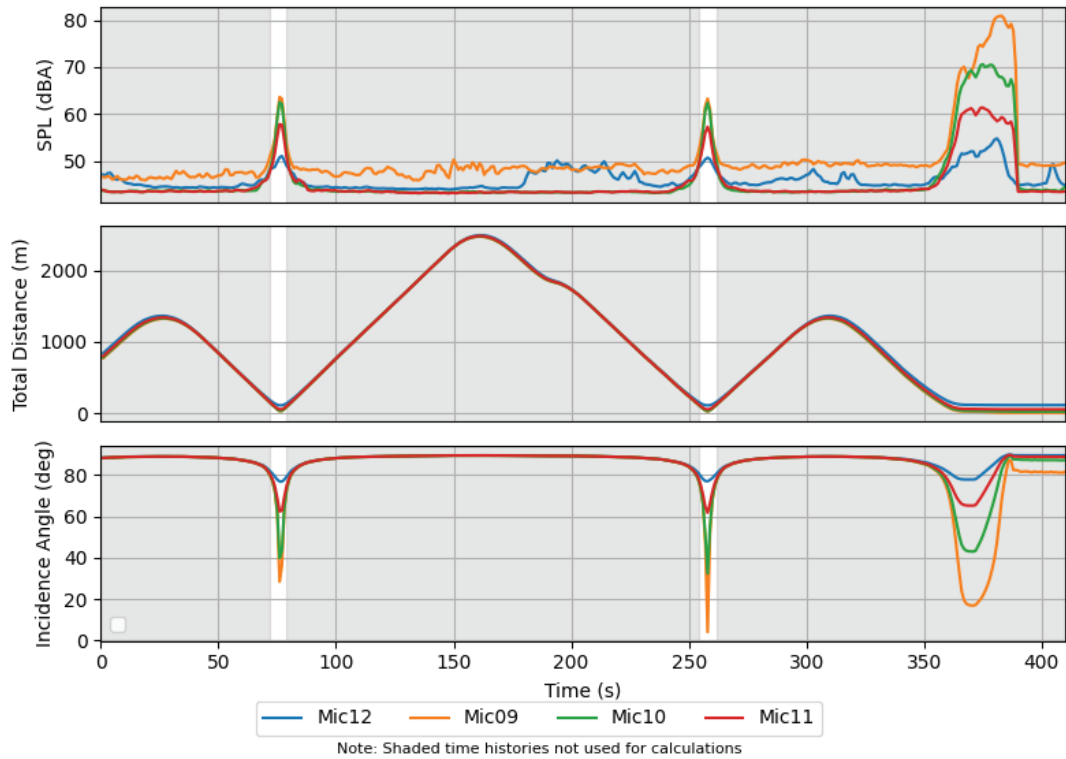
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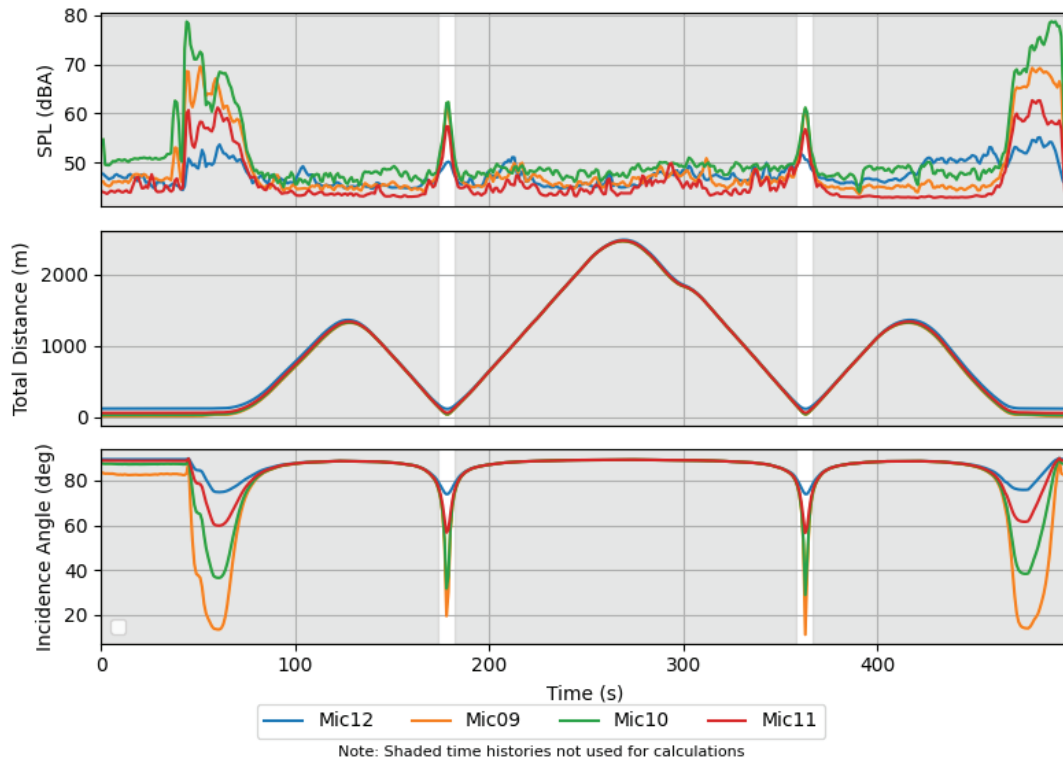
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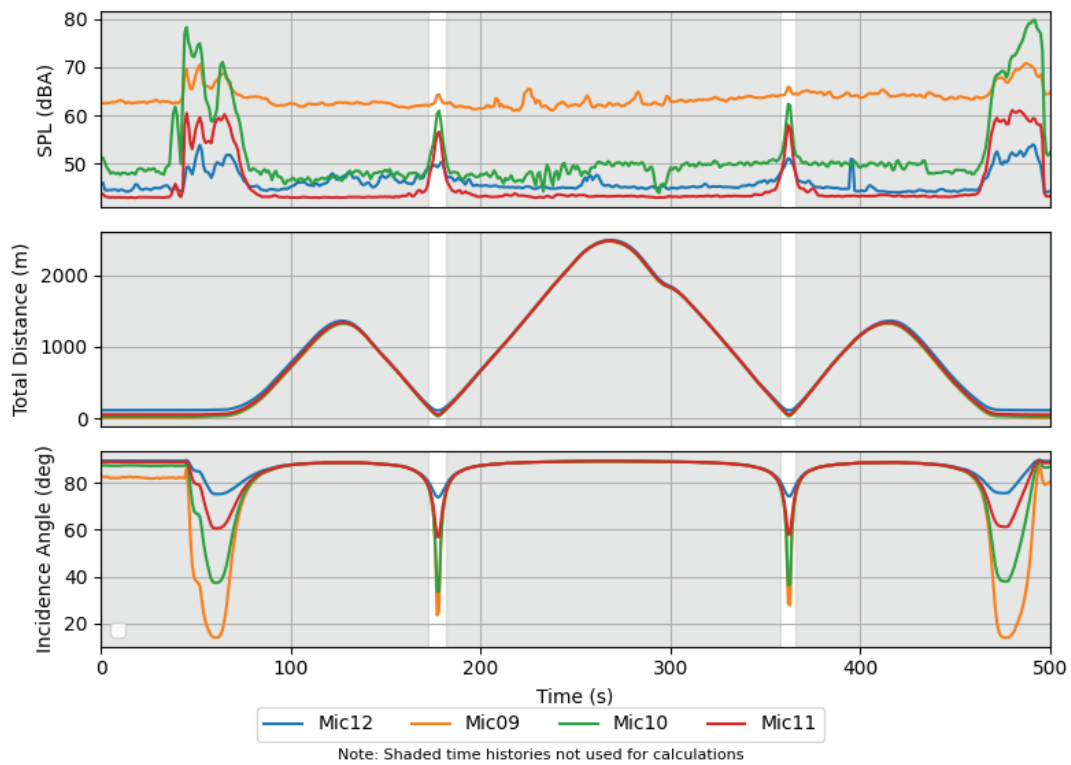
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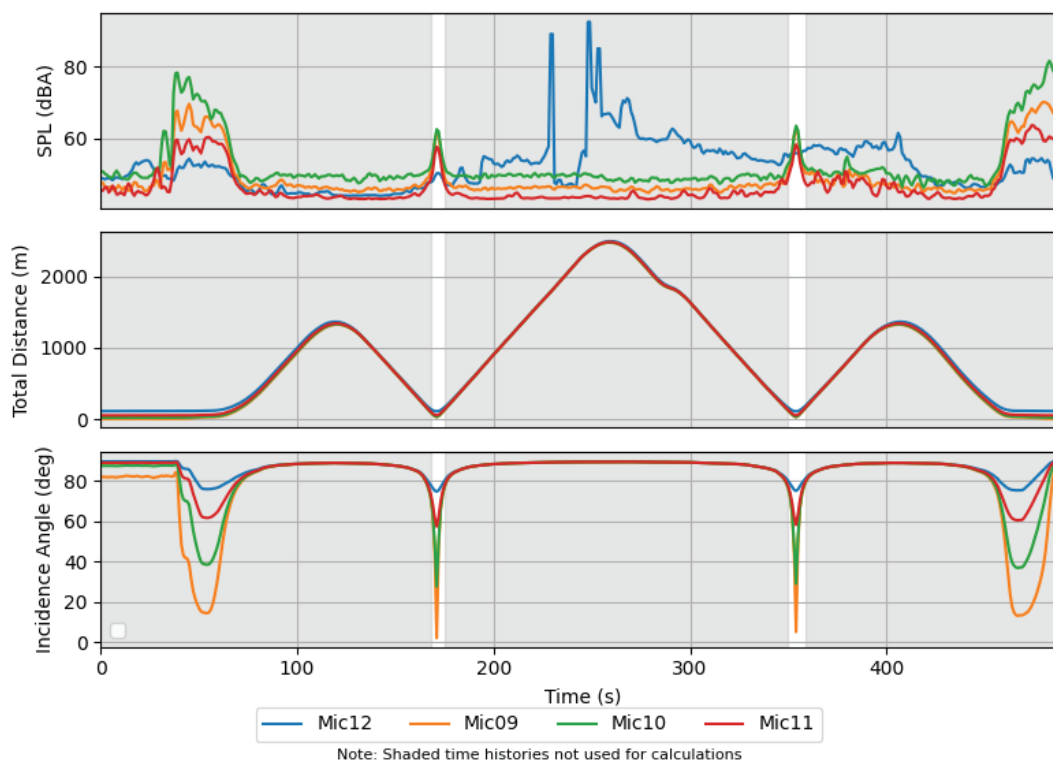
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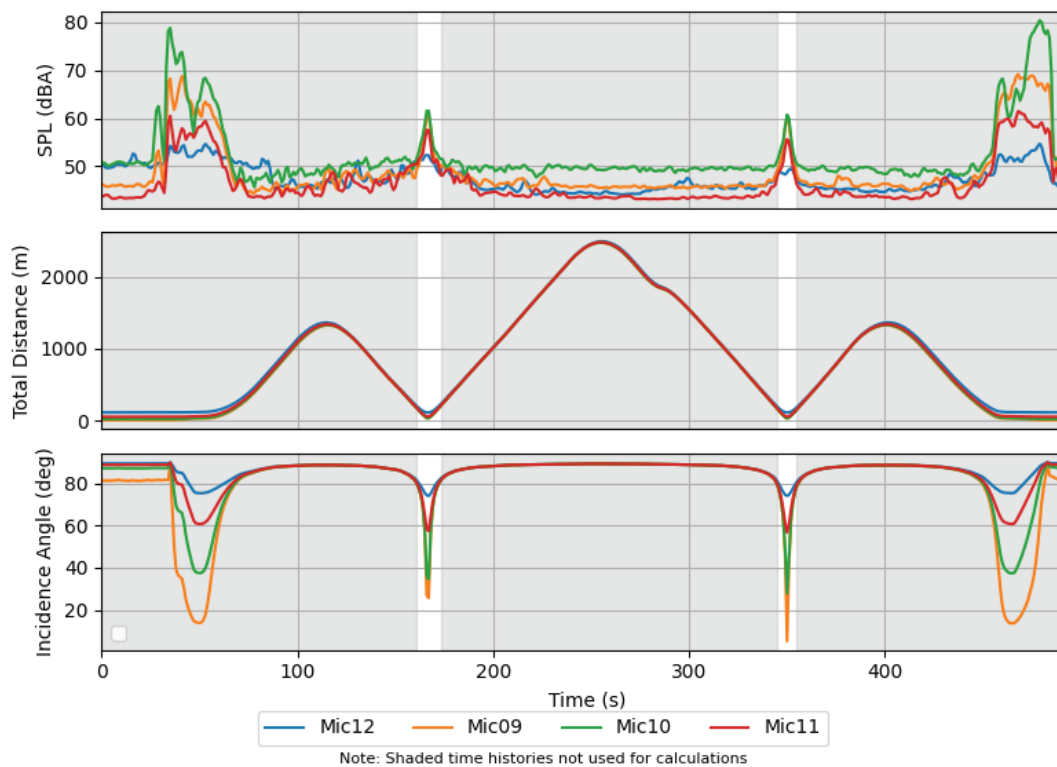
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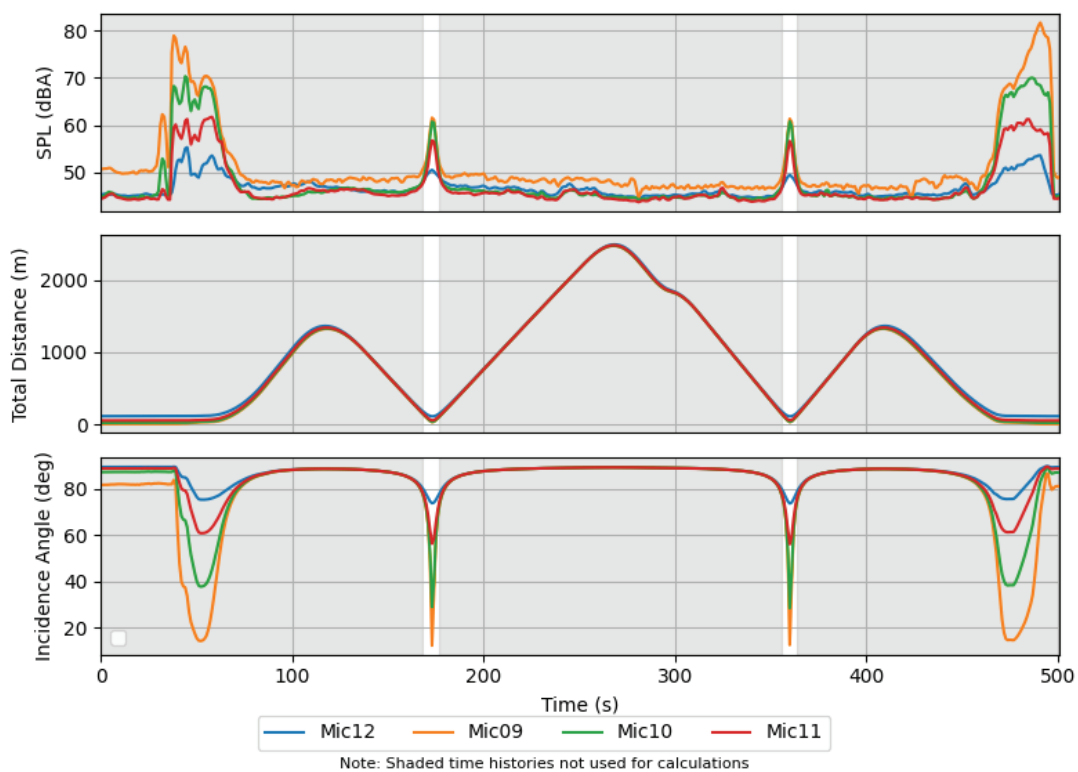
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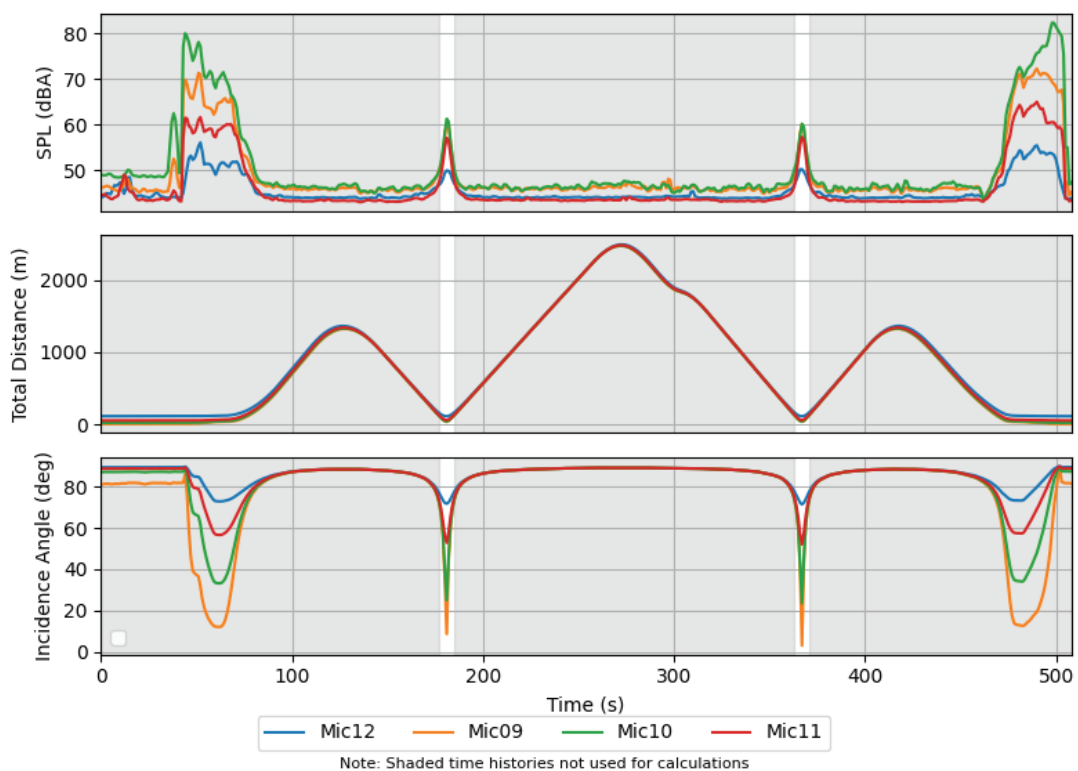
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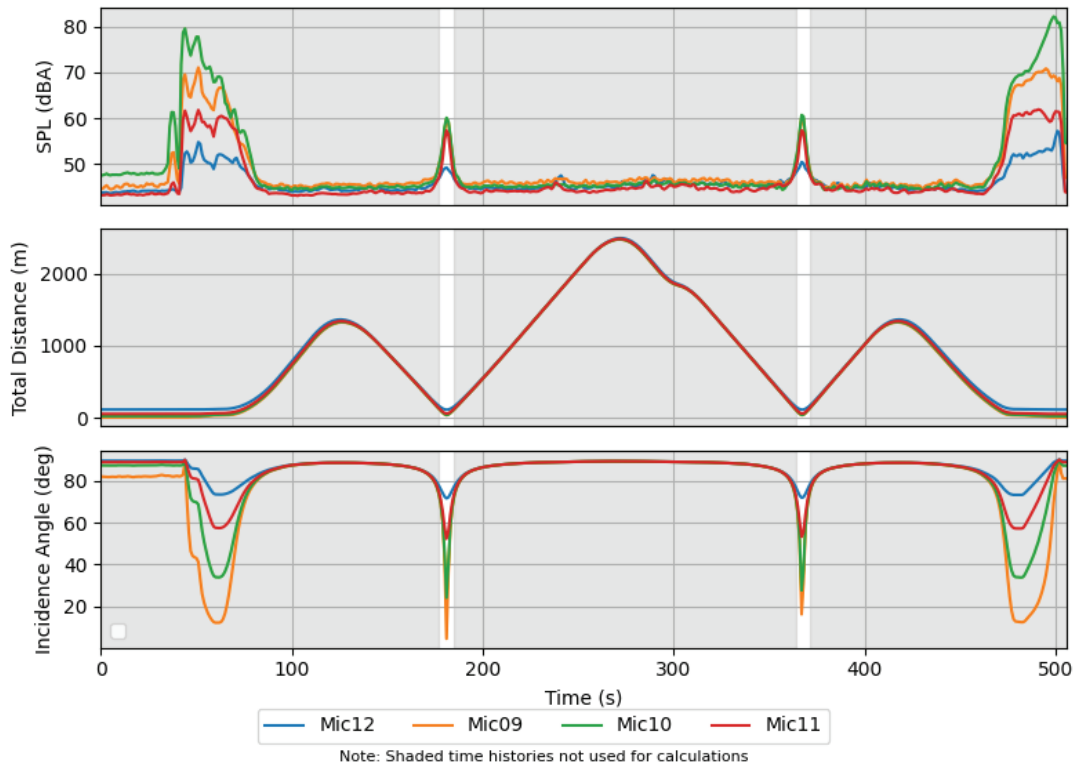
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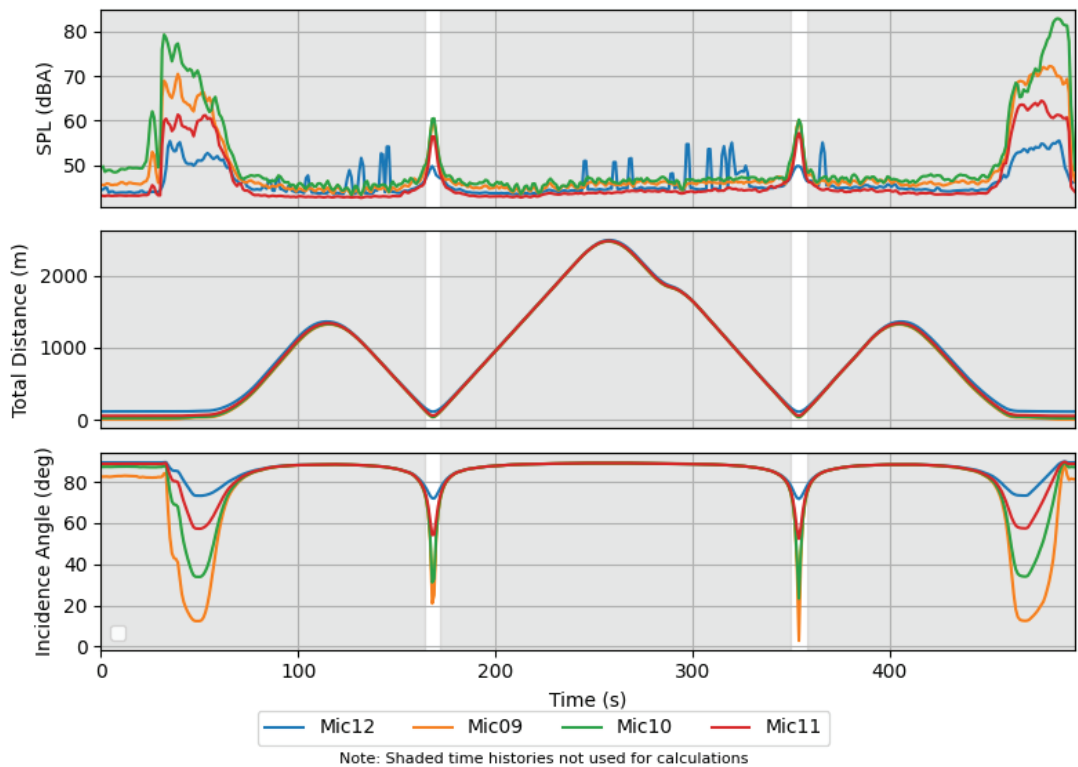
Overflight/En Route - MTOW - Test 1 Lateral



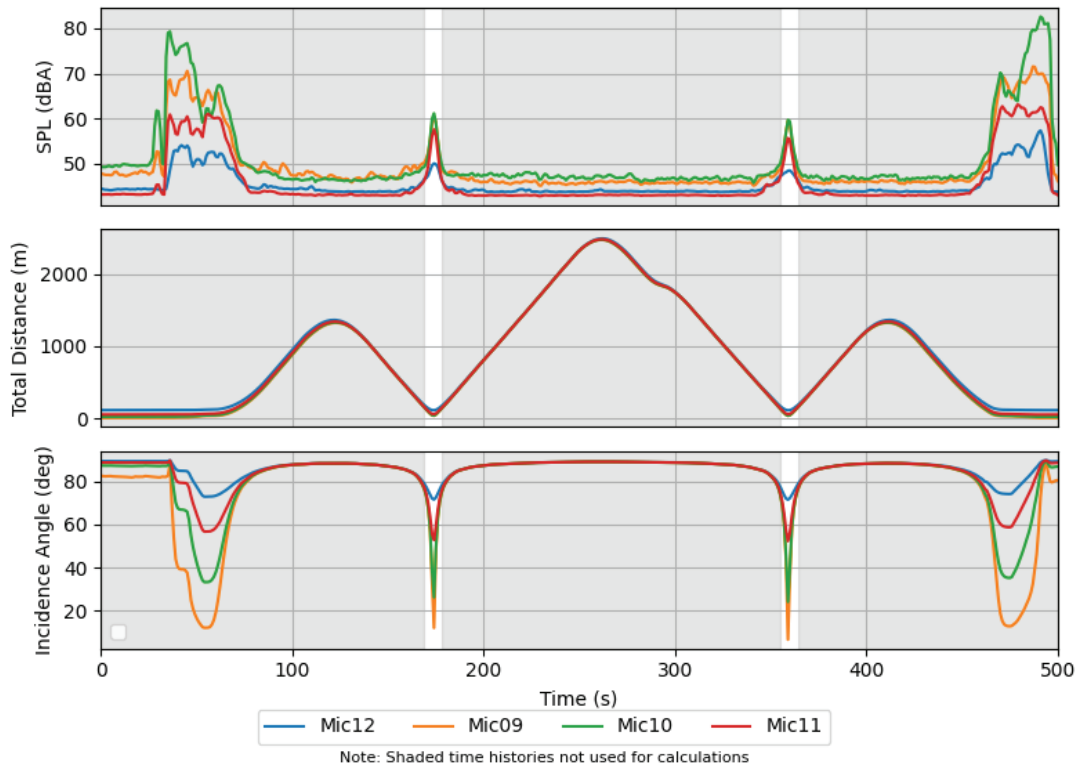
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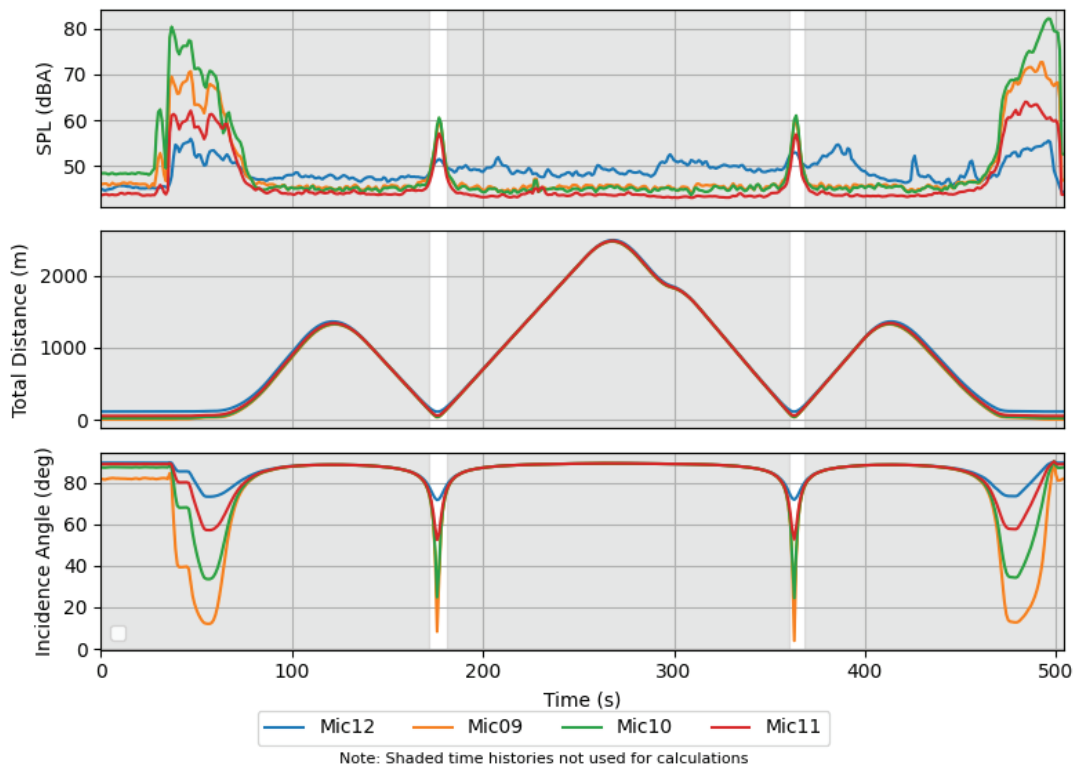
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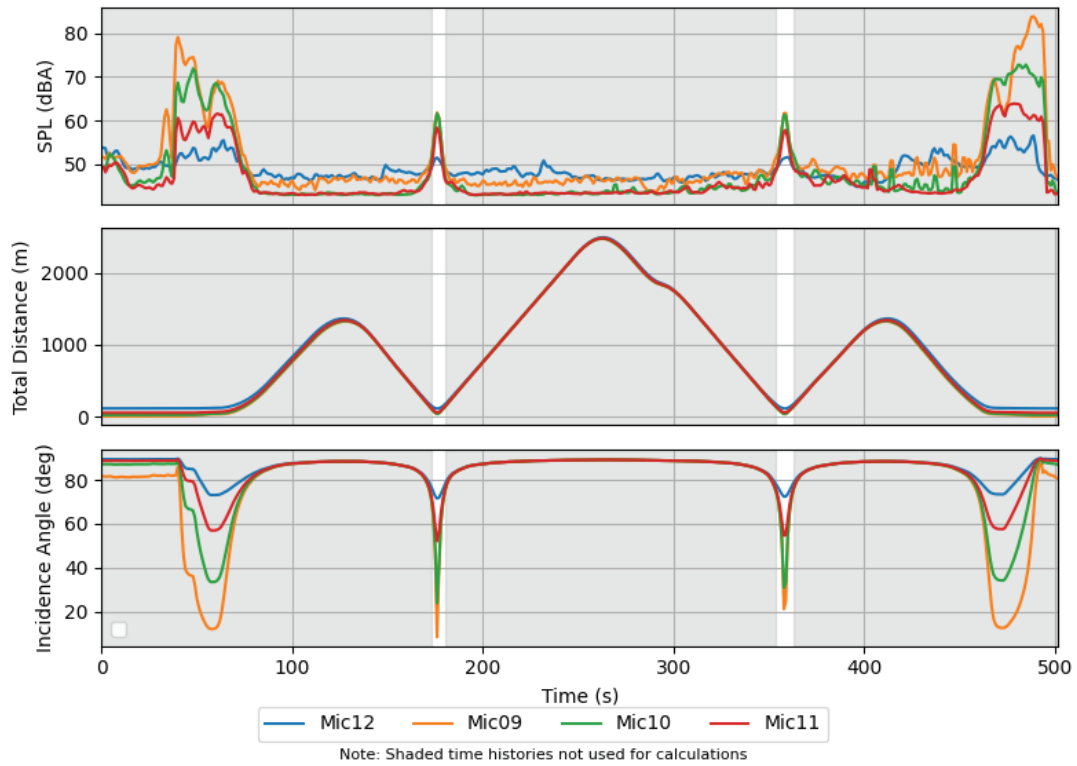
Overflight/En Route - MTOW - Test 4 Lateral



Overflight/En Route - MTOW - Test 5 Lateral



Overflight/En Route - MTOW - Test 6 Lateral



Attachment E
Official Species List



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Nebraska Ecological Services Field Office
9325 B South Alda Rd., Ste B
Wood River, NE 68883-9565
Phone: (308) 382-6468 Fax: (308) 384-8835
<https://fws.gov/office/nebraska-ecological-services>

In Reply Refer To:

03/18/2026 21:00:40 UTC

Project Code: 2026-0064551

Project Name: Amazon Drone Delivery - Omaha OMA2

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the [IPaC website](#) at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may

affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the [Endangered Species Consultation Handbook](#) or at our [Nebraska Ecological Services Field Office - Project Review and Planning webpage](#). **For recommendations to minimize the effects of project actions on federally listed species or designated critical habitat, please view the [Nebraska Ecological Service's Field Office Conservation Measures Technical Assistance Guide](#).**

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Project Consultation Code in the header of this letter (i.e., YEAR-XXXXXXX) with any request for consultation or correspondence about your project that you submit to our office.

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Act, there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts and permitting see <https://www.fws.gov/program/migratory-bird-permit>

It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on threats to birds and recommended conservation measures visit <https://www.fws.gov/library/collections/threats-birds>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit:

<https://www.federalregister.gov/documents/2012/10/03/2012-24433/migratory-bird-conservation-executive-order-13186>

Platte River System: The Platte River, its tributaries, and associated wetland habitats are resources of national importance. Due to the cumulative effect of many water depletion projects

in the Platte River basin, the Service considers any direct or indirect depletion of flows from the Platte River system to be significant and will continue to further deteriorate the already stressed habitat conditions. Federal agencies must consult with the Service under section 7 of the ESA for projects in Nebraska that may lead to water depletions or have the potential to impact water quality in the Platte River system, because these actions may affect threatened and endangered species inhabiting the downstream reaches of these river systems. The federally listed species that could be impacted from Platte River water depletions include the federally endangered Whooping Crane (*Grus americana*), and Pallid Sturgeon (*Scaphirhynchus albus*); the threatened Piping Plover (*Charadrius melodus*) and Western Prairie Fringed Orchid (*Platanthera praeclara*). In general, depletions include evaporative losses and/or consumptive use of surface or groundwater within the affected basin, often characterized as diversions minus return flows. Project elements that could be associated with depletions include, but are not limited to: borrow sites, ponds, lakes, and reservoirs (e.g., for detention, recreating, irrigation, storage, stock watering, municipal storage, and power generation); hydrostatic testing of pipelines; wells; dust abatement; diversion structures; and water treatment facilities. For more information on consultation requirements for the Platte River species, please visit <https://fws.gov/partner/platte-river-recovery-implementation-program>.

Nebraska Nongame and Endangered Species Conservation Act: Federally listed species protected under the Endangered Species Act are also state-listed under the Nebraska statute, the Nebraska Nongame and Endangered Species Conservation Act. There may be state-listed species affected by the proposed project that are not federally listed. To determine if the proposed project may affect state-listed species, the Service recommends that the project proponent contact the Nebraska Game and Parks Commission (NGPC) Planning and Program Division located at 2200 North 33rd Street Lincoln, Nebraska 68503-0370. For more information and to request an environmental review from the NGPC, visit their Environmental Review website at <http://outdoornebraska.gov/environmentalreview/> for instructions and contact information.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Nebraska Ecological Services Field Office

9325 B South Alda Rd., Ste B

Wood River, NE 68883-9565

(308) 382-6468

PROJECT SUMMARY

Project Code: 2026-0064551

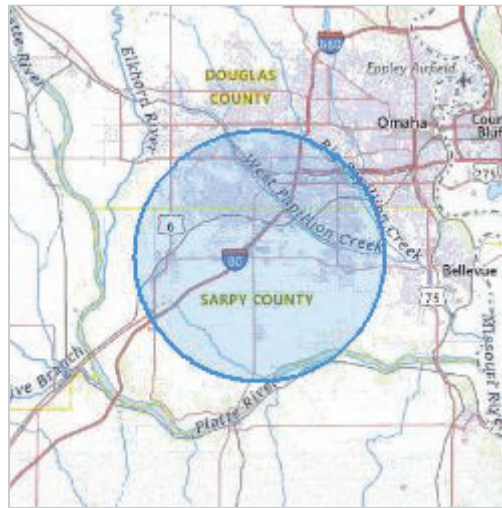
Project Name: Amazon Drone Delivery - Omaha OMA2

Project Type: Drones - Use/Operation of Unmanned Aerial Systems

Project Description: Drone delivery

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@41.14873085,-96.13182903061991,14z>



Counties: Cass , Douglas , and Sarpy counties, Nebraska

ENDANGERED SPECIES ACT SPECIES

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045 General project design guidelines: https://ipac.ecosphere.fws.gov/project/LQUTAWF2GVCZRZKNFPMVBKWDROI/documents/generated/9357.pdf	Endangered
Tricolored Bat <i>Perimyotis subflavus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515 General project design guidelines: https://ipac.ecosphere.fws.gov/project/LQUTAWF2GVCZRZKNFPMVBKWDROI/documents/generated/9357.pdf	Proposed Endangered

BIRDS

NAME	STATUS
Piping Plover <i>Charadrius melodus</i> Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is final critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened

FISHES

NAME	STATUS
Pallid Sturgeon <i>Scaphirhynchus albus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7162 General project design guidelines: https://ipac.ecosphere.fws.gov/project/LQUTAWF2GVCZRZKNFPMVBKWDROI/documents/generated/8697,9357.pdf	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> There is proposed critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743 General project design guidelines: https://ipac.ecosphere.fws.gov/project/LQUTAWF2GVCZRZKNFPMVBKWDROI/documents/generated/8697,9357.pdf	Proposed Threatened
Suckley's Cuckoo Bumble Bee <i>Bombus suckleyi</i> Population:	Proposed Endangered

NAME	STATUS
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10885 General project design guidelines: https://ipac.ecosphere.fws.gov/project/LQUTAWF2GVCRZKNFPMVBKWDROI/documents/generated/9357.pdf	
Western Regal Fritillary <i>Argynnis idalia occidentalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/12017	Proposed Threatened

FLOWERING PLANTS

NAME	STATUS
Western Prairie Fringed Orchid <i>Platanthera praeclara</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1669 General project design guidelines: https://ipac.ecosphere.fws.gov/project/LQUTAWF2GVCRZKNFPMVBKWDROI/documents/generated/8697,9357.pdf	Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act² and the Migratory Bird Treaty Act (MBTA)¹. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

1. The [Bald and Golden Eagle Protection Act](#) of 1940.

2. The [Migratory Birds Treaty Act](#) of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your [project](#) area.

Measures for Proactively Minimizing Eagle Impacts

For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the [National Bald Eagle Management Guidelines](#). You may employ the timing and activity-specific distance recommendations in this document when designing your project/activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to [Bald Eagle Nesting and Sensitivity to Human Activity](#).

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional [Migratory Bird Office](#) or [Ecological Services Field Office](#).

If disturbance or take of eagles cannot be avoided, an [incidental take permit](#) may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the [Do I Need A Permit Tool](#). For assistance making this determination for golden eagles, please consult with the appropriate Regional [Migratory Bird Office](#) or [Ecological Services Field Office](#).

Ensure Your Eagle List is Accurate and Complete

If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the [Supplemental Information on Migratory Birds and Eagles](#), to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read ["Supplemental Information on Migratory Birds and Eagles"](#), specifically the FAQ section titled "Proper

Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)

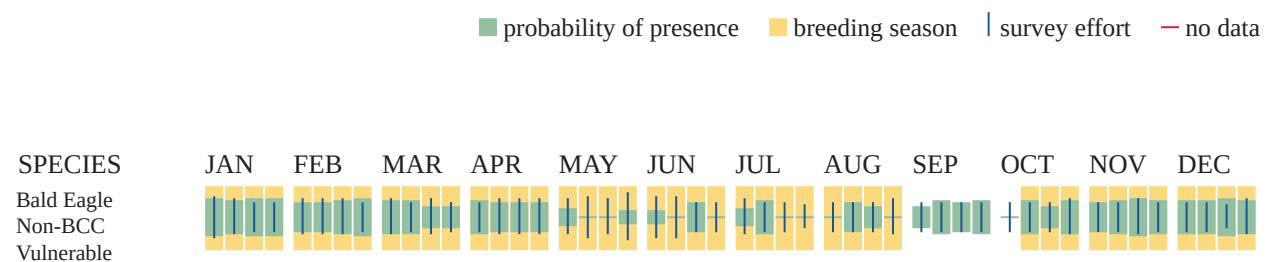
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (I)

Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (—)

A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) ¹ prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Golden-plover <i>Pluvialis dominica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10561	Breeds elsewhere
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink <i>Dolichonyx oryzivorus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9454	Breeds May 20 to Jul 31
Cerulean Warbler <i>Setophaga cerulea</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 21 to Jul 20
Chimney Swift <i>Chaetura pelagica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Eastern Whip-poor-will <i>Antrostomus vociferus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10678	Breeds May 1 to Aug 20
Grasshopper Sparrow <i>Ammodramus savannarum perpallidus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8329	Breeds Jun 1 to Aug 20

NAME	BREEDING SEASON
Hudsonian Godwit <i>Limosa haemastica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9482	Breeds elsewhere
Kentucky Warbler <i>Geothlypis formosa</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9443	Breeds Apr 20 to Aug 20
Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Pectoral Sandpiper <i>Calidris melanotos</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9561	Breeds elsewhere
Prairie Loggerhead Shrike <i>Lanius ludovicianus excubitorides</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8833	Breeds Feb 1 to Jul 31
Prothonotary Warbler <i>Protonotaria citrea</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9439	Breeds Apr 1 to Jul 31
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10
Ruddy Turnstone <i>Arenaria interpres morinella</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/10633	Breeds elsewhere
Rusty Blackbird <i>Euphagus carolinus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9478	Breeds elsewhere
Semipalmated Sandpiper <i>Calidris pusilla</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9603	Breeds elsewhere

NAME	BREEDING SEASON
Short-billed Dowitcher <i>Limnodromus griseus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Upland Sandpiper <i>Bartramia longicauda</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9294	Breeds May 1 to Aug 31
Wood Thrush <i>Hylocichla mustelina</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "[Supplemental Information on Migratory Birds and Eagles](#)", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)

Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)

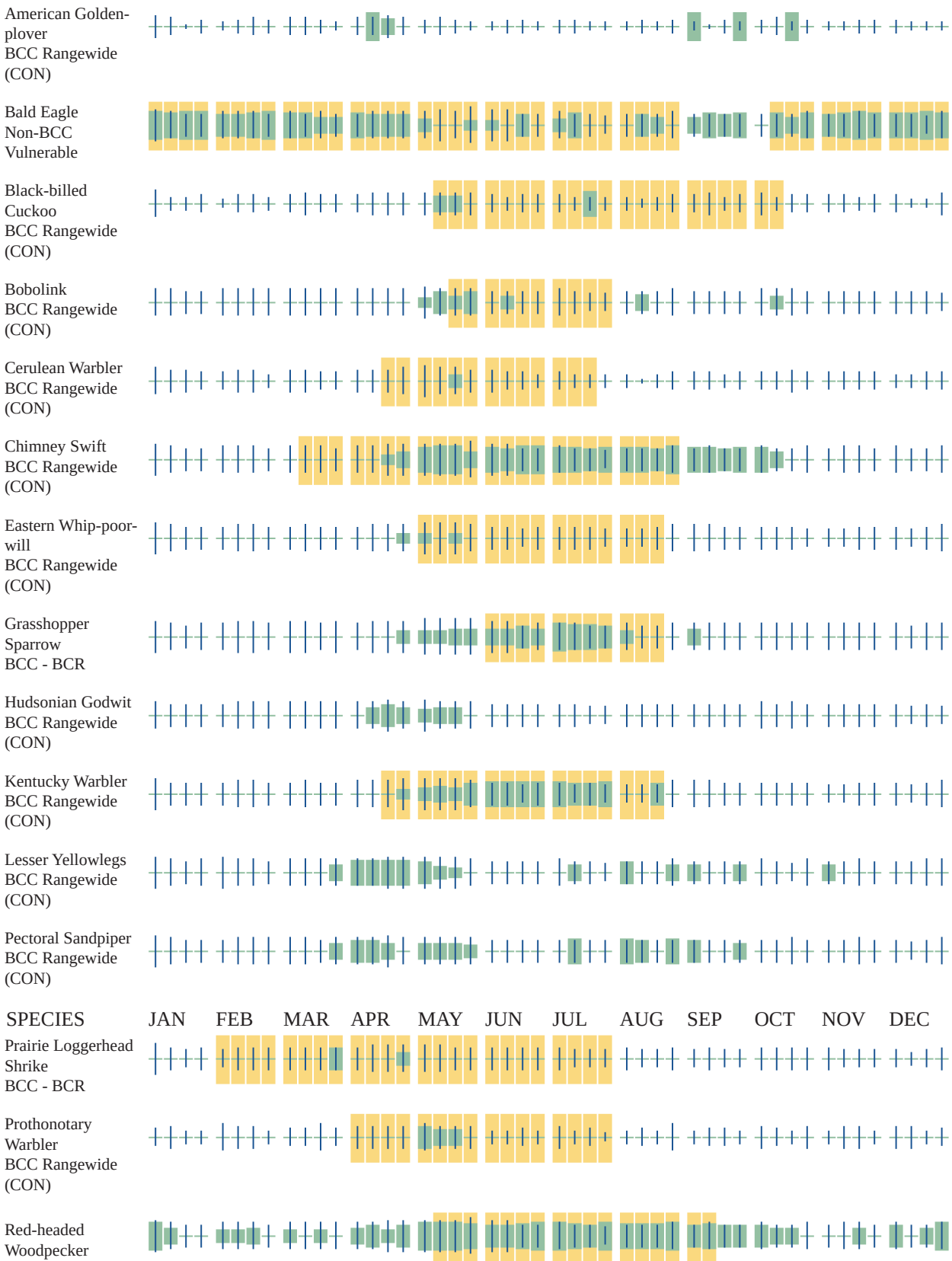
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (—)

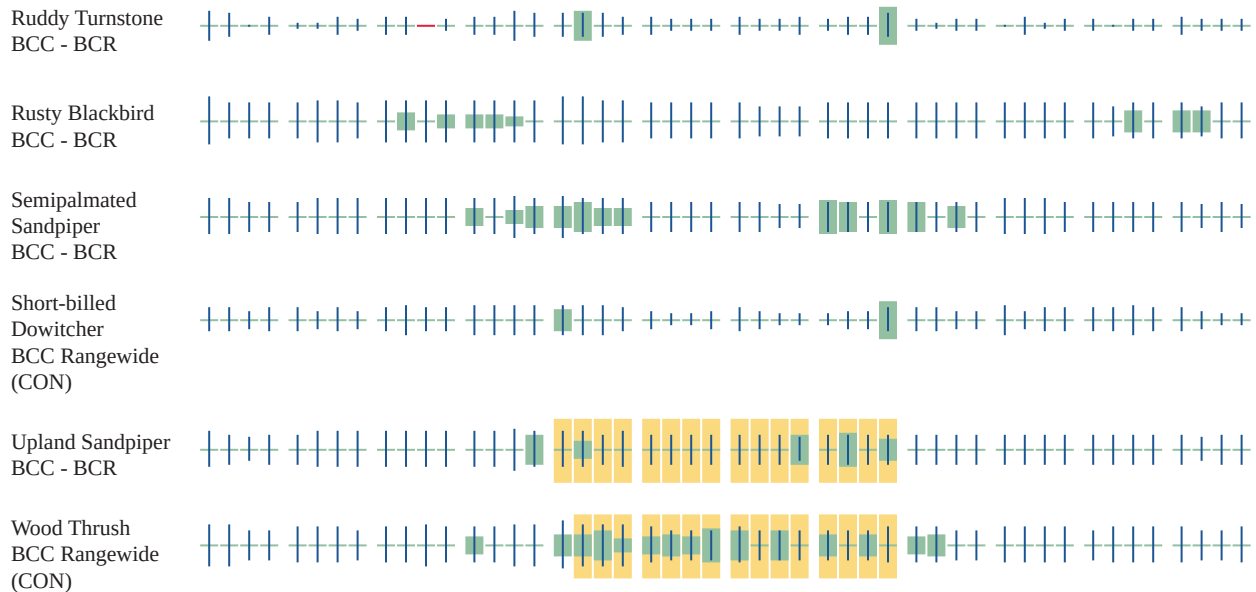
A week is marked as having no data if there were no survey events for that week.

■ probability of presence ■ breeding season | survey effort — no data

SPECIES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC



BCC Rangewide (CON)



Additional information can be found using the following links:

- Eagle Management <https://www.fws.gov/program/eagle-management>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC <https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action>

WETLANDS

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

LAKE

- L1UBHh
- L2USC_x

- L1UBHx

FRESHWATER POND

- PUBFx
- PUSC_x
- PABF
- PABFh
- PUSCh
- PUBG_x
- PUSAh
- PUBFh
- PABFx
- PUSA_x
- PUSC

FRESHWATER EMERGENT WETLAND

- PEM1A
- PEM1C_x
- PEM1Ch
- PEM1Ah
- PEM1A_x
- PEM1C
- PEM1Fh

RIVERINE

- R4SBC
- R2UBH
- R2UBG
- R4SBA
- R4SBC_x
- R2UBG_x
- R5UBH
- R2USA
- R2USC

FRESHWATER FORESTED/SHRUB WETLAND

- PSSA
- PFOAh
- PFOA_x
- PSSA_x

- PFOA

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Alexandra Hipolito
Address: 5404 Cypress Center Drive
Address Line 2: 125
City: Tampa
State: FL
Zip: 33609
Email: ahipolito722@gmail.com
Phone: 7745733623

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Federal Aviation Administration



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Nebraska Ecological Services Field Office
9325 B South Alda Rd., Ste B
Wood River, NE 68883-9565
Phone: (308) 382-6468 Fax: (308) 384-8835
<https://fws.gov/office/nebraska-ecological-services>

In Reply Refer To:

03/18/2026 20:53:59 UTC

Project code: 2026-0064551

Project Name: Amazon Drone Delivery - Omaha OMA2

Federal Nexus: yes

Federal Action Agency (if applicable): Federal Aviation Administration

Subject: Record of project representative's no effect determination for 'Amazon Drone Delivery - Omaha OMA2'

Dear Alexandra Hipolito:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on March 18, 2026, for 'Amazon Drone Delivery - Omaha OMA2' (here forward, Project). This project has been assigned Project Code 2026-0064551 and all future correspondence should clearly reference this number. **Please carefully review this letter.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project.

Failure to accurately represent or implement the Project as detailed in IPaC or the **Northern Long-eared Bat and Tricolored Bat Range-wide Determination Key (Dkey)**, invalidates this letter. ***Answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid.***

Determination for the Northern Long-Eared Bat and/or Tricolored Bat

Based upon your IPaC submission and a standing analysis, your project has reached the following effect determinations:

Species	Listing Status	Determination
---------	----------------	---------------

Northern Long-eared Bat (<i>Myotis septentrionalis</i>)	Endangered	No effect
Tricolored Bat (<i>Perimyotis subflavus</i>)	Proposed	No effect
	Endangered	

Federal agencies must consult with U.S. Fish and Wildlife Service under section 7(a)(2) of the Endangered Species Act (ESA) when an action *may affect* a listed species. Tricolored bat is proposed for listing as endangered under the ESA, but not yet listed. For actions that may affect a proposed species, agencies cannot consult, but they can *confer* under the authority of section 7(a)(4) of the ESA. Such conferences can follow the procedures for a consultation and be adopted as such if and when the proposed species is listed. Should the tricolored bat be listed, agencies must review projects that are not yet complete, or projects with ongoing effects within the tricolored bat range that previously received a NE or NLAA determination from the key to confirm that the determination is still accurate.

To make a no effect determination, the full scope of the proposed project implementation (action) should not have any effects (either positive or negative), to a federally listed species or designated critical habitat. Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (See Section 402.17).

Under Section 7 of the ESA, if a federal action agency makes a no effect determination, no consultation with the Service is required (ESA §7). If a proposed Federal action may affect a listed species or designated critical habitat, formal consultation is required except when the Service concurs, in writing, that a proposed action "is not likely to adversely affect" listed species or designated critical habitat [50 CFR §402.02, 50 CFR§402.13].

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination key for the northern long-eared bat and tricolored bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Monarch Butterfly *Danaus plexippus* Proposed Threatened
- Pallid Sturgeon *Scaphirhynchus albus* Endangered
- Piping Plover *Charadrius melodus* Threatened
- Suckley's Cuckoo Bumble Bee *Bombus suckleyi* Proposed Endangered
- Western Prairie Fringed Orchid *Platanthera praeclara* Threatened
- Western Regal Fritillary *Argynnis idalia occidentalis* Proposed Threatened

You may coordinate with our Office to determine whether the Action may affect the animal species listed above and, if so, how they may be affected.

Next Steps

If there are no updates on listed species, no further consultation/coordination for this project is required with respect to the species covered by this key. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions occurs, additional coordination with the Service should take place to ensure compliance with the Act.

If you have any questions regarding this letter or need further assistance, please contact the Nebraska Ecological Services Field Office and reference Project Code 2026-0064551 associated with this Project.

Compliance with Nebraska Nongame and Endangered Species Conservation Act Federally listed species protected under the Endangered Species Act are also state-listed under the Nebraska state statute, the Nebraska Nongame and Endangered Species Conservation Act. To determine if the proposed project may affect state-listed species, the Service recommends that the project proponent contact the Nebraska Game and Parks Commission (NGPC) Planning and Program Division located at 2200 North 33rd Street Lincoln, Nebraska 68503-0370. To request an environmental review from the NGPC, visit their Environmental Review website at <http://outdoornebraska.gov/environmentalreview/> for instructions.

Action Description

You provided to IPaC the following name and description for the subject Action.

1. Name

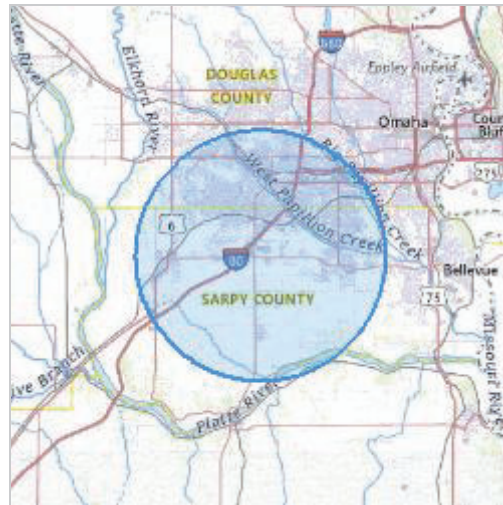
Amazon Drone Delivery - Omaha OMA2

2. Description

The following description was provided for the project 'Amazon Drone Delivery - Omaha OMA2':

Drone delivery

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@41.14873085,-96.13182903061991,14z>



DETERMINATION KEY RESULT

Based on the information you provided, you have determined that the Proposed Action will have no effect on the species covered by this determination key. Therefore, no consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required for those species.

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of listed bats or any other listed species?

Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

No

2. Is the action area wholly within Zone 2 of the year-round active area for northern long-eared bat and/or tricolored bat?

Automatically answered

No

3. Does the action area intersect Zone 1 of the year-round active area for northern long-eared bat and/or tricolored bat?

Automatically answered

No

4. Does any component of the action involve leasing, construction or operation of wind turbines? Answer 'yes' if the activities considered are conducted with the intention of gathering survey information to inform the leasing, construction, or operation of wind turbines.

No

5. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

Note for projects in Pennsylvania: Projects requiring authorization under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act would be considered as having a federal nexus. Since the U.S. Army Corps of Engineers (Corps) has issued the Pennsylvania State Programmatic General Permit (PASPGP), which may be verified by the PA Department of Environmental Protection or certain Conservation Districts, the need to receive a Corps authorization to perform the work under the PASPGP serves as a federal nexus. As such, if proposing to use the PASPGP, you would answer 'yes' to this question.

Yes

6. Is the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), or Federal Transit Administration (FTA) funding or authorizing the proposed action, in whole or in part?

No

7. Are you an employee of the federal action agency or have you been officially designated in writing by the agency as its designated non-federal representative for the purposes of Endangered Species Act Section 7 informal consultation per 50 CFR § 402.08?

Note: This key may be used for federal actions and for non-federal actions to facilitate section 7 consultation and to help determine whether an incidental take permit may be needed, respectively. This question is for information purposes only.

No

8. Is the lead federal action agency the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC)? Is the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC) funding or authorizing the proposed action, in whole or in part?

No

9. Is the lead federal action agency the Federal Energy Regulatory Commission (FERC)?

No

10. [Semantic] Is the action area located within 0.5 miles of a known bat hibernaculum or winter roost? Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your state wildlife agency.

Automatically answered

Yes

11. Does the action area contain any winter roosts or caves (or associated sinkholes, fissures, or other karst features), mines, rocky outcroppings, or tunnels that could provide habitat for hibernating bats?

No

12. Does the action area contain (1) talus or (2) anthropogenic or naturally formed rock shelters or crevices in rocky outcrops, rock faces or cliffs?

No

13. Will the action cause effects to a bridge?

Note: Covered bridges should be considered as bridges in this question.

No

14. Will the action result in effects to a culvert or tunnel at any time of year?

No

15. Are trees present within 1000 feet of the action area?

Note: If there are trees within the action area that are of a sufficient size to be potential roosts for bats answer "Yes". If unsure, additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>.

Yes

16. Does the action include the intentional exclusion of bats from a building or building-like structure? **Note:** Exclusion is conducted to deny bats' entry or reentry into a building. To be effective and to avoid harming bats, it should be done according to established standards. If your action includes bat exclusion and you are unsure whether northern long-eared bats or tricolored bats are present, answer "Yes." Answer "No" if there are no signs of bat use in the building/structure. If unsure, contact your local Ecological Services Field Office to help assess whether northern long-eared bats or tricolored bats may be present. Contact a Nuisance Wildlife Control Operator (NWCO) for help in how to exclude bats from a structure safely without causing harm to the bats (to find a NWCO certified in bat standards, search the Internet using the search term "National Wildlife Control Operators Association bats"). Also see the White-Nose Syndrome Response Team's guide for bat control in structures.

No

17. Does the action involve removal, modification, or maintenance of a human-made building-like structure (barn, house, or other building) **known or suspected to contain roosting bats?**

No

18. Will the action cause construction of one or more new roads open to the public?

For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

No

19. Will the action include or cause any construction or other activity that is reasonably certain to increase average night-time traffic permanently or temporarily on one or more existing roads? **Note:** For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

No

20. Will the action include or cause any construction or other activity that is reasonably certain to increase the number of travel lanes on an existing thoroughfare?

For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

No

21. Will the proposed Action involve the creation of a new water-borne contaminant source (e.g., leachate pond, pits containing chemicals that are not NSF/ANSI 60 compliant)?

Note: For information regarding NSF/ANSI 60 please visit <https://www.nsf.org/knowledge-library/nsf-ansi-standard-60-drinking-water-treatment-chemicals-health-effects>

No

22. Will the proposed action involve the creation of a new point source discharge from a facility other than a water treatment plant or storm water system?

No

23. Will the proposed action involve blasting or drilling?

No

24. Will the action involve military training (e.g., smoke operations, obscurant operations, exploding munitions, artillery fire, range use, helicopter or fixed wing aircraft use at night)?

No

25. Will the proposed action involve the use of herbicides or pesticides (e.g., fungicides, insecticides, or rodenticides)?

No

26. Will the action include or cause activities that are reasonably certain to cause chronic or intense nighttime noise (above current levels of ambient noise in the area) in suitable summer habitat for the northern long-eared bat or tricolored bat during the active season?

Chronic noise is noise that is continuous or occurs repeatedly again and again for a long time. Sources of chronic or intense noise that could cause adverse effects to bats may include, but are not limited to: road traffic; trains; aircraft; industrial activities; gas compressor stations; loud music; crowds; oil and gas extraction; construction; and mining.

Note: Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>.

No

27. Does the action include, or is it reasonably certain to cause, the use of permanent or temporary artificial lighting within 1000 feet of suitable forested northern long-eared bat or tricolored bat roosting habitat? **Note:** Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>.

No

28. Will the action include tree cutting or other means of knocking down or bringing down trees, tree topping, or tree trimming?

No

29. Will the proposed action result in the use of prescribed fire?

Note: If the prescribed fire action includes other activities than application of fire (e.g., tree cutting, fire line preparation) please consider impacts from those activities within the previous representative questions in the key. This set of questions only considers impacts from flame and smoke.

No

30. Does the action area intersect the northern long-eared bat species list area?

Automatically answered

Yes

31. [Semantic] Is the action area located within 0.5 miles of radius of an entrance/opening to any known NLEB hibernacula or winter roost? Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

Automatically answered

Yes

32. Is suitable summer habitat for the northern long-eared bat present within 1000 feet of project activities?

If unsure, answer "Yes."

Note: Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines>.

Yes

33. Has a presence/probable absence summer bat survey targeting the northern long-eared bat following the Service's [Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines](#) been conducted within the project area?

No

34. Does the action area intersect the tricolored bat species list area?

Automatically answered

Yes

35. Is the action area located within 0.5-mile of radius of an entrance/opening to any known tricolored bat hibernacula or winter roost?

Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your state wildlife agency.

Automatically answered

Yes

36. Has a presence/probable absence bat survey targeting the [tricolored bat and following the Service's Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines](#) been conducted within the project area?

No

37. Is suitable summer habitat for the tricolored bat present within 1000 feet of project activities?

(If unsure, answer ""Yes."")

Note: If there are trees within the action area that may provide potential roosts for tricolored bats (e.g., clusters of leaves in live and dead deciduous trees, Spanish moss (*Tillandsia usneoides*), clusters of dead pine needles of large live pines) answer ""Yes."" For a complete definition of suitable summer habitat for the tricolored bat, please see Appendix A in the [Service's Range-wide Indiana Bat and Northern long-eared Bat Survey Guidelines](#).

Yes

38. Do you have any documents that you want to include with this submission?

No

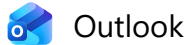
PROJECT QUESTIONNAIRE

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Alexandra Hipolito
Address: 5404 Cypress Center Drive
Address Line 2: 125
City: Tampa
State: FL
Zip: 33609
Email: ahipolito722@gmail.com
Phone: 7745733623

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Federal Aviation Administration



Outlook

Re: [EXTERNAL] FAA: Amazon Application for Package Delivery utilizing Drones in Omaha, NE: ESA Section 7; Project Code: 2026-0064551

From Renteria, Mitchell G <mitchell_renteria@fws.gov>

Date Wed 6/24/2026 11:05 AM

To Neal Wolfe <NWolfe@esassoc.com>; Nebraskaes, FW6 <Nebraskaes@fws.gov>; 9-FAA-Drone-Environmental (FAA) <9-FAA-Drone-Environmental@faa.gov>

Cc Hurst, Christopher A (FAA) <Christopher.A.Hurst@faa.gov>; 'Fitzpatrick, Jim' <fitzpkja@amazon.com>; Gernes, Grace E <grace_germes@fws.gov>; Ted Reese <TReese@esassoc.com>; Sarah McAbee <SMcAbee@esassoc.com>; Sean Burlingame <SBurlingame@esassoc.com>

Good Morning Neal,

Thank you for the provided information. This does address the Service's comments and concerns and will allow us to move forward in finalizing our review.

We appreciate your response and taking the time with us to have a meeting!

Sincerely,

Mitch Renteria

Fish and Wildlife Biologist
Nebraska Field Office
U.S. Fish and Wildlife Service
9325 South Alda Road
Wood River, Nebraska 68883
Cell: 720-930-8734
Office/Teams: 308-251-6848

Duty Station:

Nebraska Department of Transportation
1500 Nebraska Parkway
Lincoln, NE 68502

[FWS Fileshare - Share Files With Me](#)

From: Neal Wolfe <NWolfe@esassoc.com>

Sent: Monday, June 15, 2026 1:42 PM

To: Nebraskaes, FW6 <Nebraskaes@fws.gov>; 9-FAA-Drone-Environmental (FAA) <9-FAA-Drone-Environmental@faa.gov>

Cc: Hurst, Christopher A (FAA) <Christopher.A.Hurst@faa.gov>; 'Fitzpatrick, Jim' <fitzpkja@amazon.com>; Gernes, Grace E <grace_germes@fws.gov>; Renteria, Mitchell G <mitchell_renteria@fws.gov>; Ted Reese <TReese@esassoc.com>; Sarah McAbee <SMcAbee@esassoc.com>; Sean Burlingame <SBurlingame@esassoc.com>

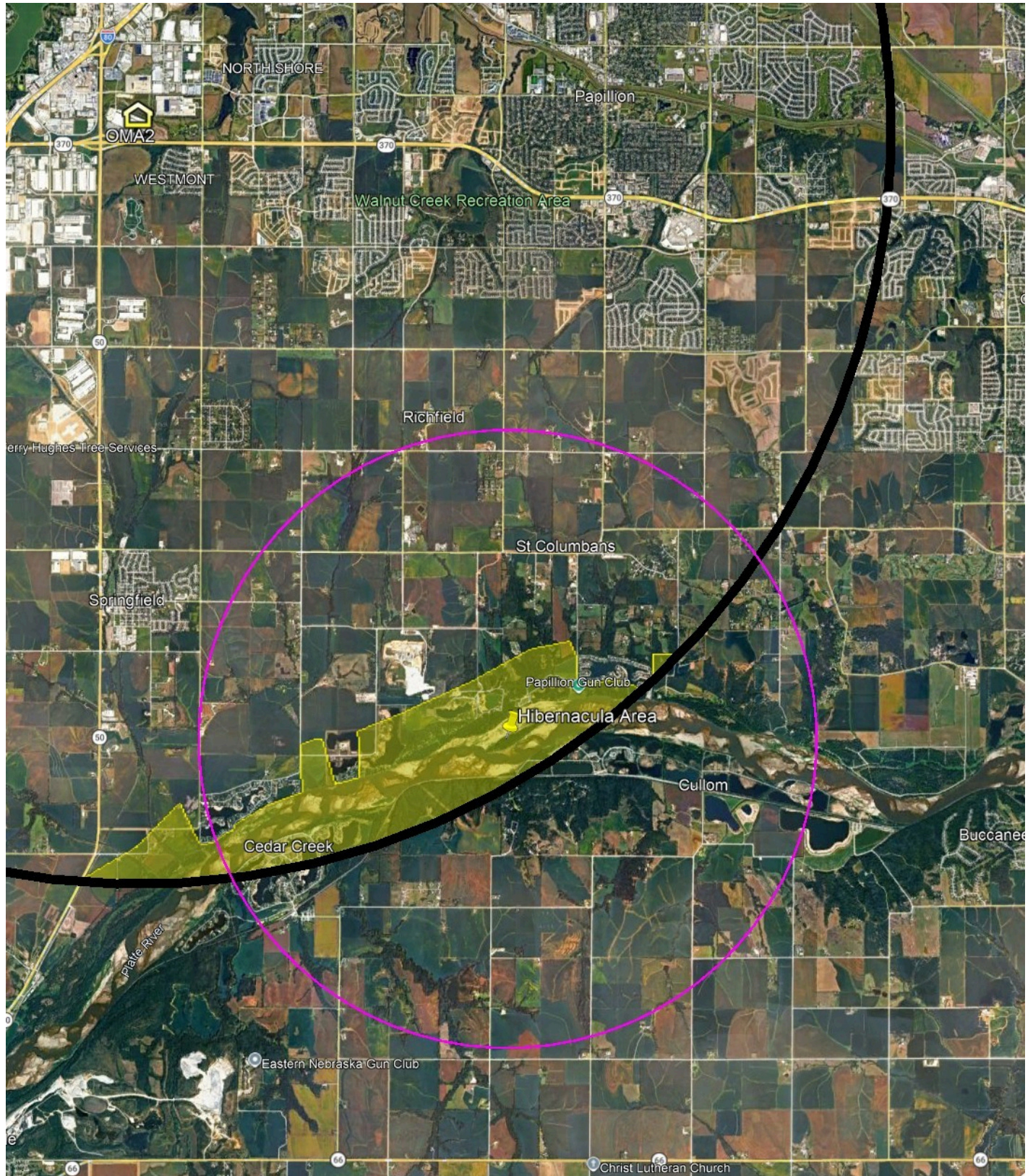
Subject: RE: [EXTERNAL] FAA: Amazon Application for Package Delivery utilizing Drones in Omaha, NE: ESA Section 7; Project Code: 2026-0064551

Hi Mitch and Grace,

Thank you for meeting with the team on 6/11 to discuss the proposed drone delivery project at the OMA2 PADDC in Omaha, NE. I think we concluded the meeting with an agreement that satisfactorily meets everyone's concerns. To summarize our conversation:

Amazon Prime Air would implement a year-round “no fly zone” (NFZ) for its delivery drones to protect bat hibernacula in the immediate vicinity of the Platte River corridor. This permanent NFZ is depicted by dark yellow shading in Figure 1 below and the black line depicts the extent of the drone's delivery radius.

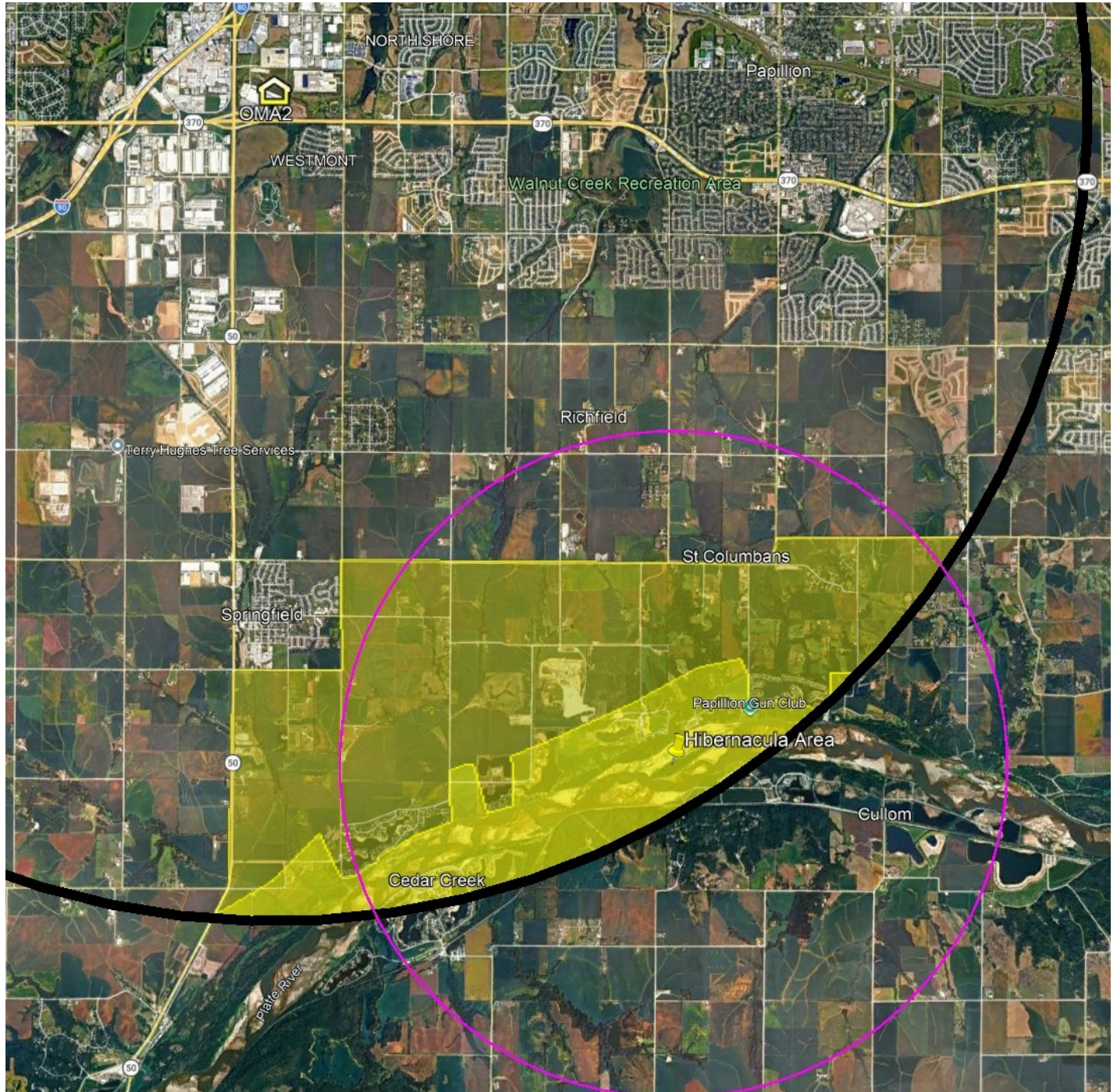
FIGURE 1: OMA2 Permanent NFZ



Amazon Prime Air would implement a seasonal-based NFZ over a larger area, north of the Platte River corridor, to afford additional protection for hibernacula not in the immediate vicinity of the

corridor. This seasonal-based NFZ would restrict drone delivery overflights only during the bat active season (between April 1st to November 15th of each year). Additionally, drone overflights would be restricted (during the active season) to between 30 minutes after sunrise and 30 minutes before sunset. The extent of the seasonal-based NFZ is depicted in the light-yellow shading in Figure 2 below.

FIGURE 2: OMA2 Seasonal-based NFZ



Please let us know the proposed drone operating restrictions addresses the concerns of your USFWS Field Office.

Thanks,

Neal

Neal Wolfe JD, CEM

Director of Aviation Sustainability and Resilience

ESA | Environmental Science Associates859.757.5317 **cell**407-403-6300 **direct**

From: Neal Wolfe**Sent:** Thursday, June 4, 2026 9:48 AM**To:** 'Nebraskaes, FW6' <Nebraskaes@fws.gov>; 9-FAA-Drone-Environmental (FAA) <9-FAA-Drone-Environmental@faa.gov>**Cc:** Hurst, Christopher A (FAA) <Christopher.A.Hurst@faa.gov>; 'Fitzpatrick, Jim' <fitzpkja@amazon.com>; Gernes, Grace E <grace_gernes@fws.gov>; Renteria, Mitchell G <mitchell_renteria@fws.gov>; Ted Reese <TReese@esassoc.com>; Sarah McAbee <SMcAbee@esassoc.com>; Sean Burlingame <SBurlingame@esassoc.com>**Subject:** RE: [EXTERNAL] FAA: Amazon Application for Package Delivery utilizing Drones in Omaha, NE: ESA Section 7; Project Code: 2026-0064551

Good morning, Mitch,

Thank you for your quickly reply. We're certainly open to having a conversation about your proposed avoidance measures. If amenable, perhaps we could set up a call for next week to discuss (I can send out a Doodle poll to lock down date/time)?

Also, if you have any information about known hibernacula or the presence of any species along the river corridor, it'd be great if you could share that ahead of time, so we could take a look at it on the map.

Thanks!

Neal

Neal Wolfe JD, CEM

Director of Aviation Sustainability and Resilience

ESA | Environmental Science Associates859.757.5317 **cell**407-403-6300 **direct**

From: Nebraskaes, FW6 <Nebraskaes@fws.gov>**Sent:** Thursday, May 28, 2026 12:45 PM**To:** 9-FAA-Drone-Environmental (FAA) <9-FAA-Drone-Environmental@faa.gov>**Cc:** Hurst, Christopher A (FAA) <Christopher.A.Hurst@faa.gov>; 'Fitzpatrick, Jim' <fitzpkja@amazon.com>; Neal Wolfe <NWolfe@esassoc.com>; Gernes, Grace E <grace_gernes@fws.gov>; Renteria, Mitchell G <mitchell_renteria@fws.gov>**Subject:** Re: [EXTERNAL] FAA: Amazon Application for Package Delivery utilizing Drones in Omaha, NE: ESA Section 7; Project Code: 2026-0064551

Good Morning Chris,

After review of the attached consultation package and potential resources within or just outside the operational area, the Service is inquiring if FAA/Amazon would be willing to implement the following avoidance measure due to the proximity to known/potential hibernacula for listed bats and potential for interaction with other species utilizing the Platte River corridor (eagles and piping plover). Would the proponent be willing to provide a buffer to the Platte River via removing the following area from the delivery operations area?

The area we would request this consideration would be the area south of a line beginning where the current southern 7.5 mile radius meets Highway N-50, heading North to Pflug Road, East to S 132nd Street, North to Platteview Road, and East to where Platteview Road intersects again with the radius line.

Please let me know if you have any questions or would like to discuss details for this during your consideration.

Sincerely,
Mitch

Nebraska Field Office
U.S. Fish and Wildlife Service
9325 South Alda Road
Wood River, Nebraska 68883
NebraskaES@fws.gov

For a species list, visit <https://ecos.fws.gov/ipac/>
Office information <https://www.fws.gov/office/nebraska-ecological-services>

From: 9-FAA-Drone-Environmental (FAA) <9-FAA-Drone-Environmental@faa.gov>
Sent: Thursday, May 14, 2026 8:17 AM
To: Nebraskaes, FW6 <Nebraskaes@fws.gov>
Cc: Hurst, Christopher A (FAA) <Christopher.A.Hurst@faa.gov>; 'Fitzpatrick, Jim' <fitzpkja@amazon.com>; 'Neal Wolfe' <nwolfe@esassoc.com>; Gernes, Grace E <grace_gernes@fws.gov>
Subject: [EXTERNAL] FAA: Amazon Application for Package Delivery utilizing Drones in Omaha, NE: ESA Section 7; Project Code: 2026-0064551

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Good morning,

My name is Chris Hurst, and I am an environmental specialist with the FAA. I am currently working on a National Environmental Policy Act (NEPA) review (Environmental Assessment (EA)) in which Amazon Prime Air (Amazon) Inc. has submitted an application to FAA to conduct package delivery utilizing drones in Omaha, NE.

In accordance with the National Environmental Policy Act (NEPA), Federal Aviation Administration (FAA) Order 1050.1G, and Section 7 of the Endangered Species Act (ESA), the FAA will be requesting U.S. Fish and Wildlife Service (USFWS) concurrence that the FAA's action of authorizing Amazon Prime Air (Prime Air) to conduct commercial drone package delivery operations from its Prime Air Drone Delivery Center (PADDC) located in Omaha, NE may have potential effects to certain ESA-listed species.

FAA and Amazon met with USFWS on April 10, 2026.

Please see attached ESA Section 7 consultation. Project Code: 2026-0064551

Very respectfully,

Chris Hurst
REM/CEA/CESCO
Environmental Protection Specialist

AFS-752
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Office of Safety Standards, Flight Standards Service
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CST