Applying UAS for Wildlife Hazard Management at Airports

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FAA Challenge
Smart Airport Student Competition

INTRODUCTION

The Federal Aviation Administration (FAA) requires airports operating under the Code of Federal Regulations Part 139 to conduct a wildlife hazard assessment (WHA) when some wildlife-strike events have occurred at or near the airport. The WHA provides the empirical framework for the development of a Wildlife Hazard Management Plan. The safety efforts by airport operators have helped prevent aircraft accidents resulting from wildlife strikes. Notwithstanding, analyses of wildlife strike data have clearly indicated that different strategies to mitigate such risk, including robust research projects and the use of new technologies and/or innovative approaches to current technologies are vital. The purpose of this study was to investigate how UAS technologies could be safely and effectively applied to identify hazardous wildlife species to aviation operations as well as potential wildlife hazard attractants within the airport jurisdiction.

CONCEPT OF OPERATIONS (ConOps)

An exploratory field campaign to identify wildlife hazard attractants was conducted between April and May 2021. Researchers used a DJI Mavic 2 Enterprise Dual with FLIR drone to collect data. The date, time, and ground position system (GPS) location of the videos and images recorded during the data collection process are recorded on GPS timestamping During this study researchers collected data at Coe Field (8FA4), a private use airport. The UAS was flown in two different ways: automatically in a basic grid pattern, and manually. Our team applied different strategies to identify hazards and mitigate the associated risks associated with UAS operations in an airport environment, which included the application of crew resource management principles as well as the use of an automatic detection surveillance broadcast (ADS-B) flight box and ForeFlight to monitor air traffic at and around Coe Field airport. A Qualified Airport Wildlife Biologist (QAWB) assisted our team during the development and execution of this project.

- Information on different habitats and wildlife species could be obtained simultaneously
- Red circle – White Ibis (1)
- Orange circles – Cattle Egrets (9)
- Yellow arrows – Cattle (6)
- Habitats observed – trees, shrubs, and a wetland

- PIC collecting data using the drone with the assistance of a visual observer
- Visual observer ensured aircraft was within line of sight + scanned for the presence of manned aircraft

- The “bird’s eye” view of a drone significantly helped our team to observe the bird’s behaviors in the identified habitats and land uses, and especially their numbers, even from a significant distance from the point where the researchers were standing

AIRBORNE DATA COLLECTION

The test flights were conducted over a plot sample area with an area of approximately 90,000 square meters north of Coe Field airport. Flights were completed using the “DJI’s Go 4 software” through the smart controller. The controller was hooked up via an HDMI cable to a TV set that was placed inside of a trailer where the outside elements would not affect what was being seen. The pilot-in-command collected data outside of a trailer controlling the aircraft while at least one member of the team was inside the trailer monitoring the TV and writing down any necessary observations on a data collection sheet, including the presence of wildlife activities and or habitats with the potential to attract hazardous wildlife species to the airport environment. Moreover, the team member(s) inside the trailer monitored the possible presence of manned aircraft using information obtained with the ADS-B flight box.

- Researcher monitoring the two TV sets in the trailer during data collection for the presence of wildlife / habitats and/or the presence of manned aircraft at and around Coe Field airport (ADS-B Flight Box)

- Hazardous wildlife species
- Habitats / land uses that can attract hazardous wildlife to the airport environment

KEY FINDINGS

The versatility and speed of UAS, including their high-quality cameras and sensors, ensure that data can be collected more thoroughly and faster over large areas, including areas that are inaccessible by ground-based means (e.g., wetlands). Moreover, findings from our study suggest that UAS can facilitate the observations made by a QAWB during a WHA, including the identification and assessment of potential habitats (e.g., wetlands) and land uses (e.g., livestock operations) that could attract hazardous wildlife to the airport environment. Most importantly, findings indicate that UAS can increase the effectiveness of data collection as well as reduce the cost to conduct a WHA by, among other factors, establishing a relationship between identified wildlife species and habitats; obtaining information of different habitats and wildlife species simultaneously; and by reducing the labor, personnel, and time needed to accomplish most WHA tasks.

SELECT SOURCES

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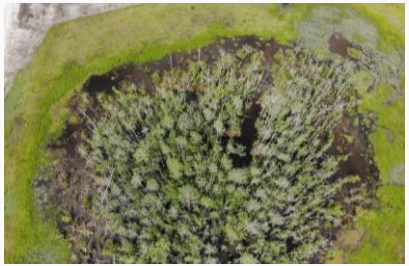

- ✓ The versatility and speed of UAS, including their high-quality cameras and sensors, ensure that data can be collected more thoroughly and faster over large areas, including areas that are inaccessible or difficult to access by ground-based means (e.g., wetlands).