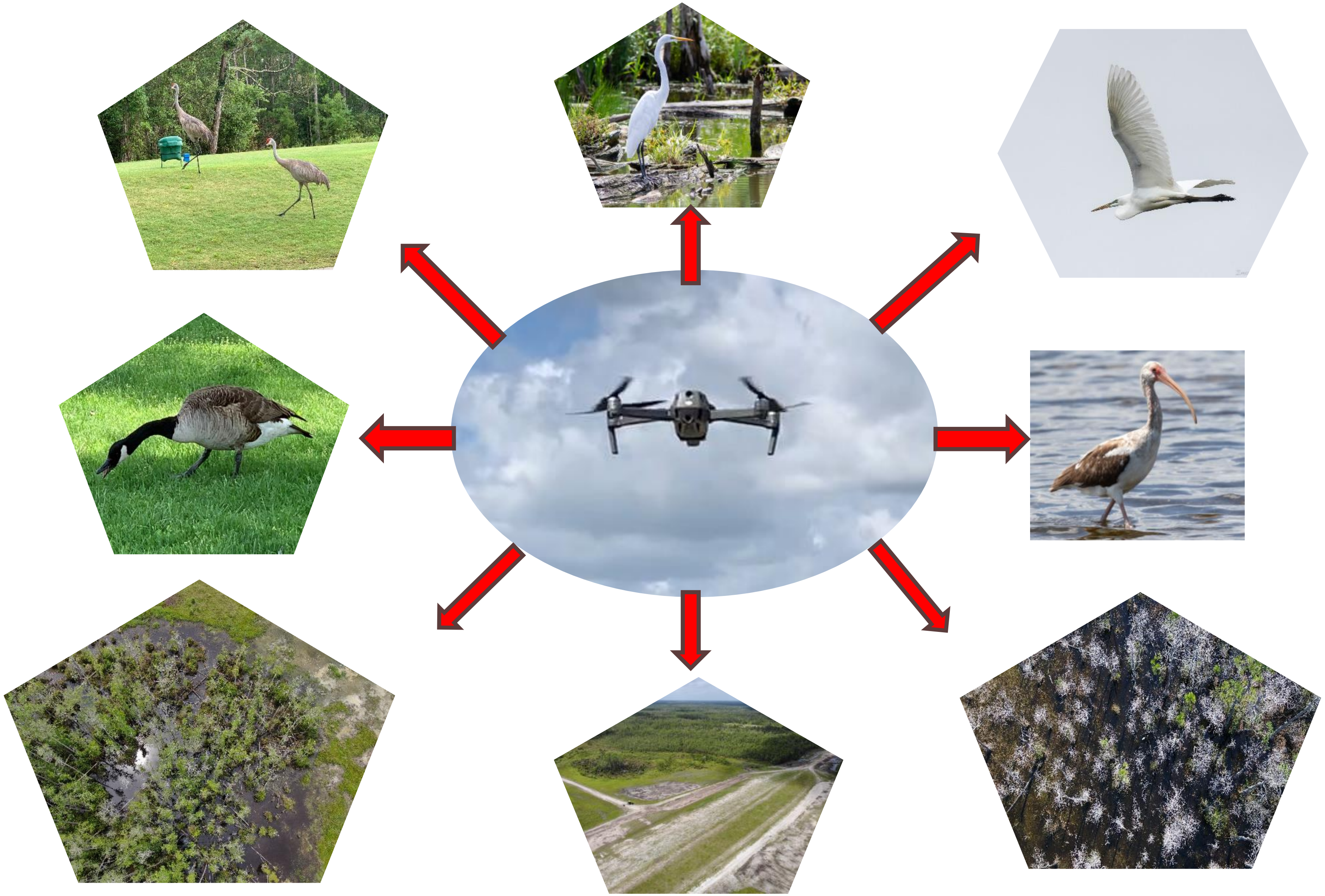
Utilizing UAS to Mitigate Wildlife Strikes to Aviation



Utilizing UAS to Mitigate Wildlife Strikes to Aviation

108th Purdue Road School
Transportation Conference & Expo

- Flavio A. C. Mendonca, Ph.D., MBA - Assistant Professor (**ERAU**)

- Robert Sliwinski, - Qualified Airport Wildlife Biologist (**Christopher B. Burke Engineering, Ltd**.)

- Ryan Wallace, Ed.D. - Associate Professor (**ERAU**)

Utilizing UAS to Mitigate Wildlife Strikes to Aviation

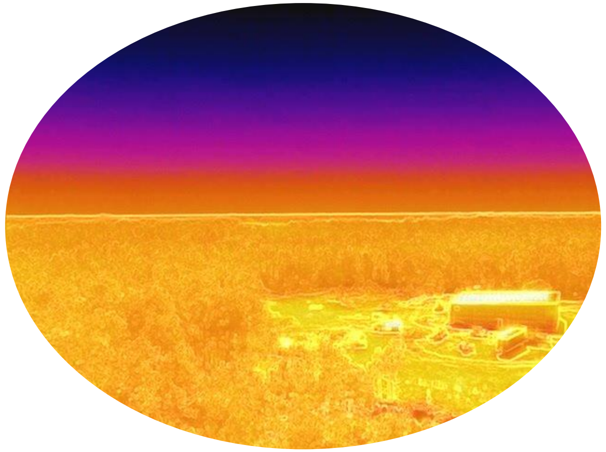
- Background
  - Aircraft accidents resulting from wildlife strikes pose an ever increasing safety and economic concern!
    - From 1990 – 2020 ➡ 238,652 strikes
      - The majority of these strikes occur at the airport environment
      - 97% involved birds
    - Annually 110,034 hours of aircraft downtime and $196 million in direct and indirect costs

Utilizing UAS to Mitigate Wildlife Strikes to Aviation

- Background
  - A certificated airport operating under 14 C.F.R. Part 139 is required to conduct a Wildlife Hazard Assessment (WHA) when certain “wildlife events” occur on or near the airport
  - Provides the scientific basis for the development and implementation of a wildlife hazard management plan
  - A WHA should be conducted by a qualified airport wildlife biologist

Utilizing UAS to Mitigate Wildlife Strikes to Aviation

- Background
  - Unmanned Aircraft Systems (UAS) are becoming common for research, and commercial and private purposes
  - UAS can be used at the airport environment to inspect hazardous wildlife habitats, like ponds and agricultural activity



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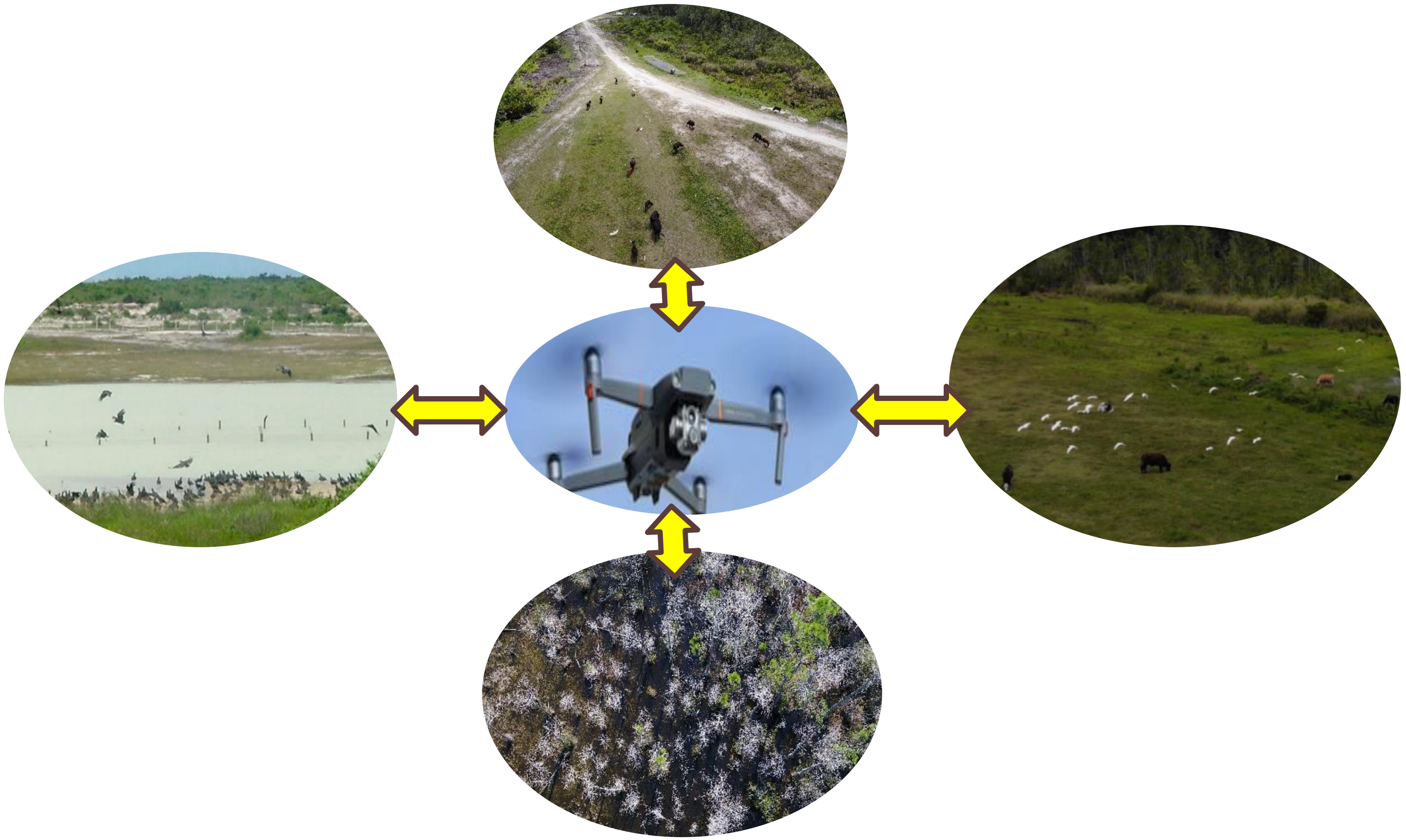
- Purpose of this Ongoing Study
  - To investigate how UAS technologies could be safely and effectively applied to identify hazardous wildlife species to aviation operations as well as potential wildlife hazard attractants within the airport jurisdiction



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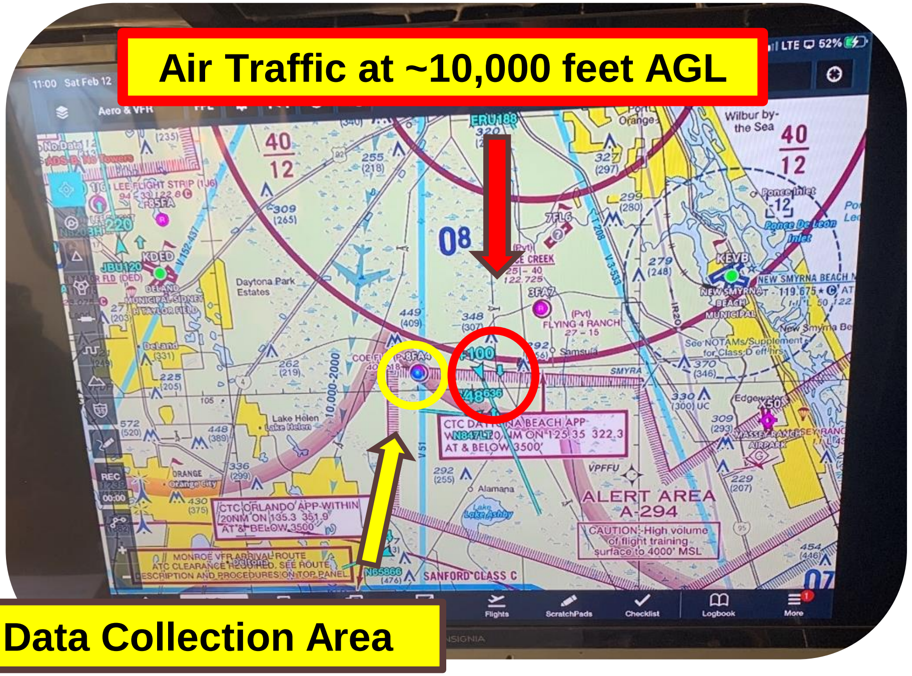
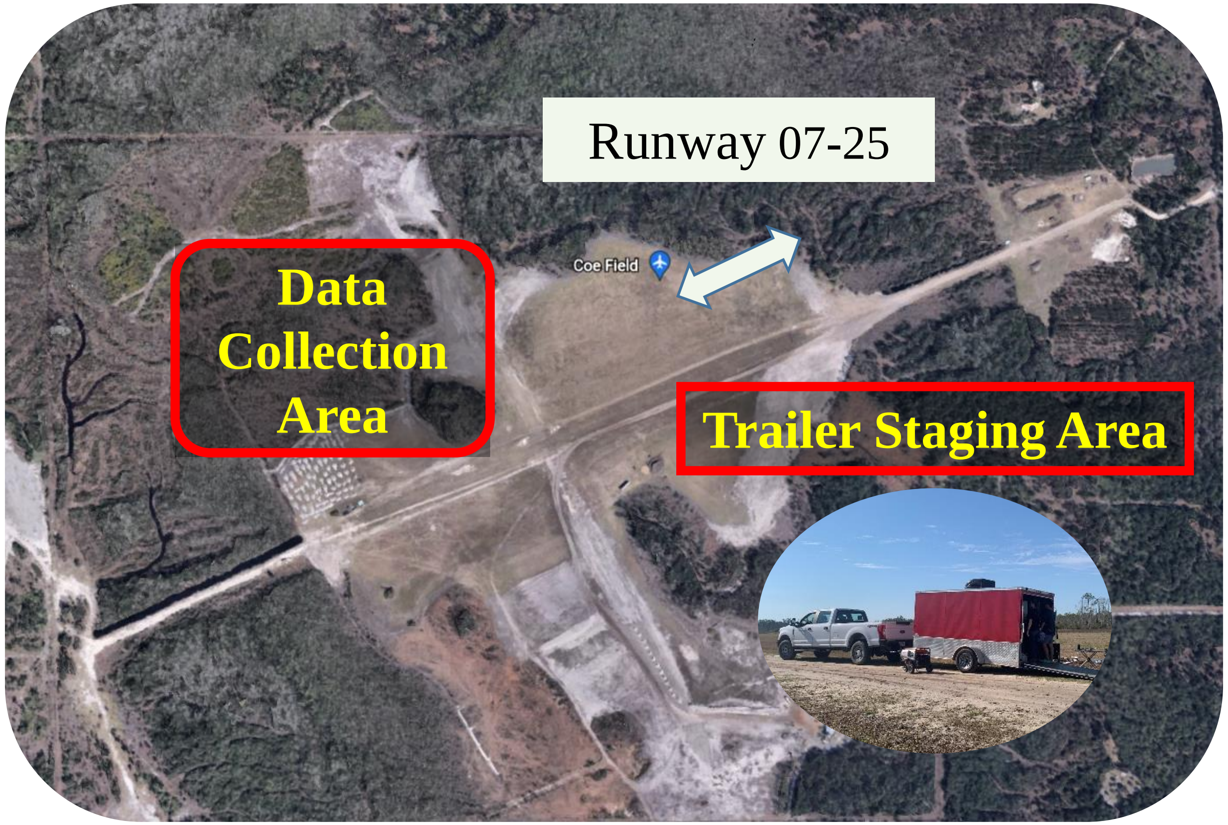
- Concept of Operations
  - Includes methods of operations & risk management
  - Partnership with Christopher B. Burke Engineering – Ltd
  - Our team has utilized a trailer with different pieces of equipment



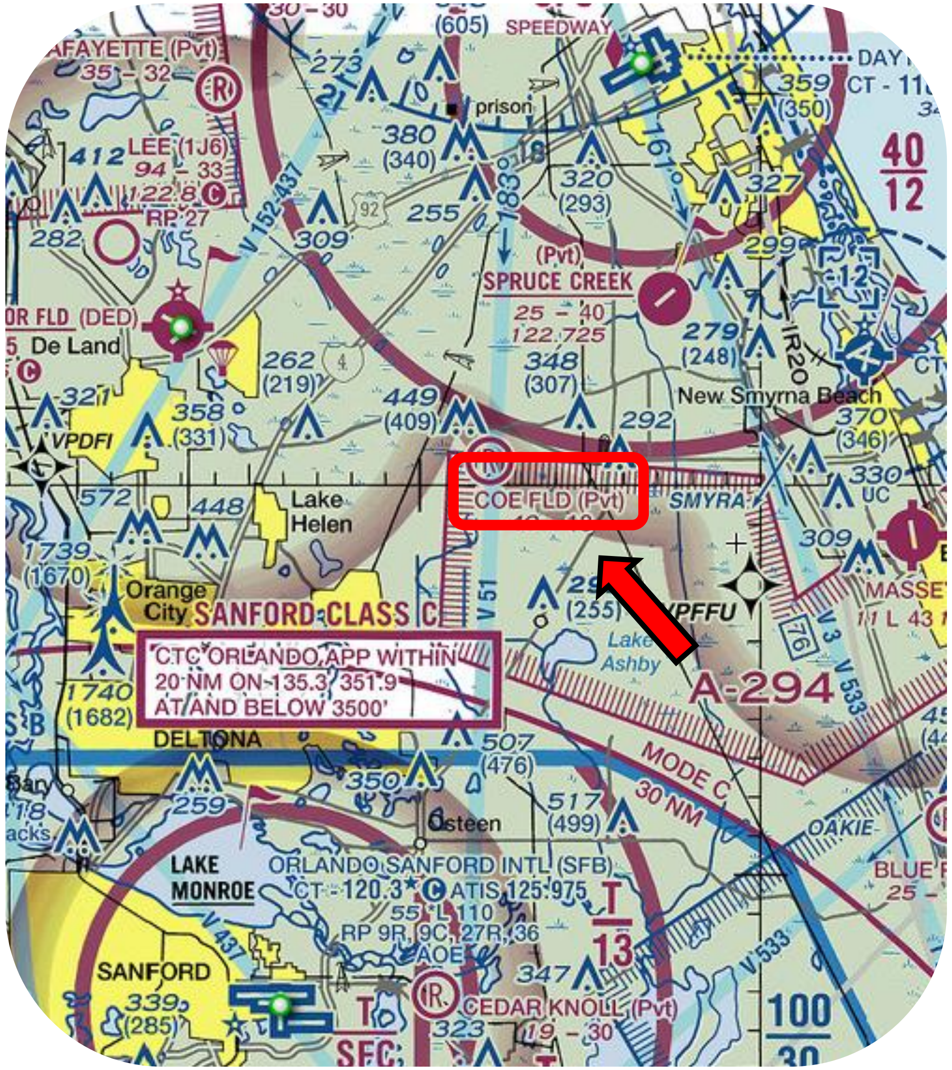
Utilizing UAS to Mitigate Wildlife Strikes to Aviation

- Concept of Operations
  - Data have been collected at Coe Field (8FA4)



Source: Skyvector.com

Source: Google Earth



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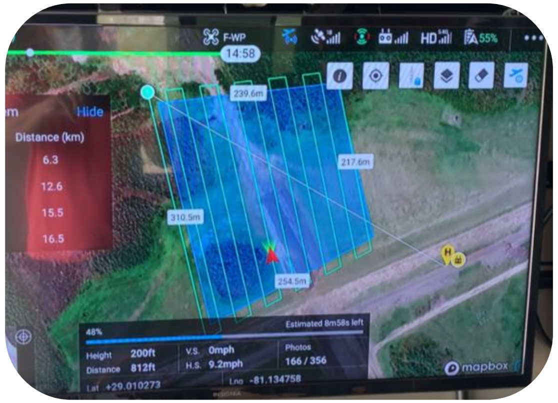
- Airborne Data Collection
  - Automatically in a basic grid pattern
  - Manually
    - DJI Mavic 2 Enterprise (first phase of the project)
    - DJI Matrice 210



Grid Pattern

Manual Flight

- Preliminary Findings
  - Mammals

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- Preliminary Findings
  - Cattle Egrets ➡ 654 strikes (1990-2020)

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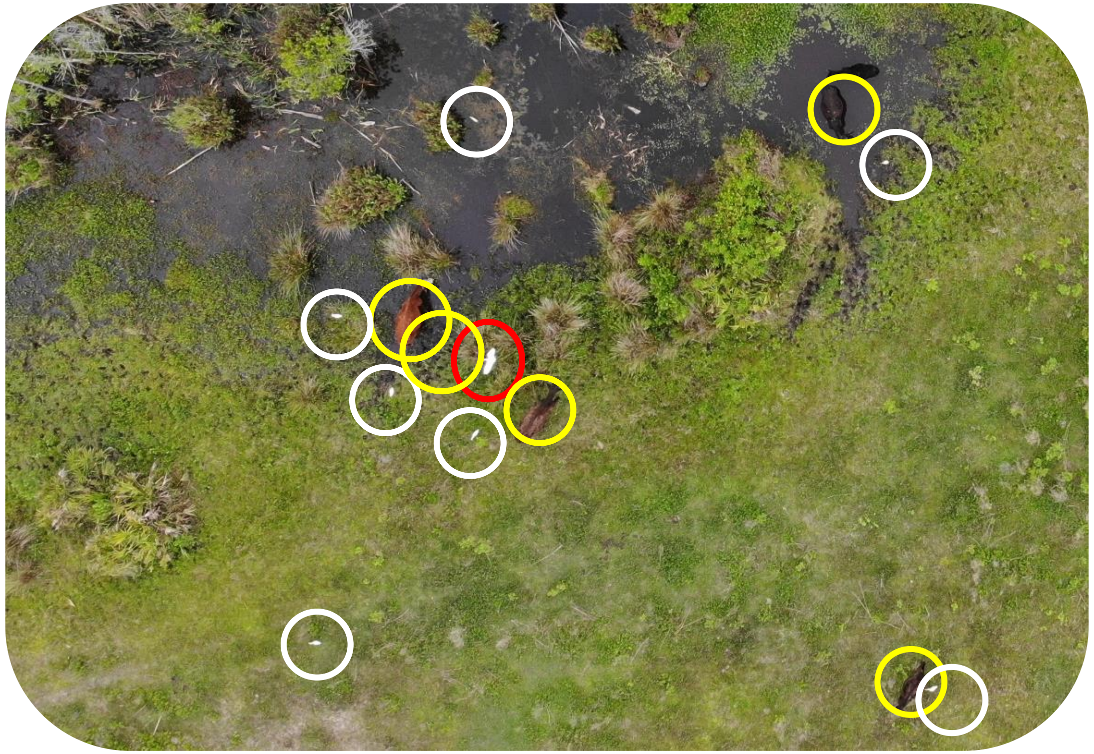
- Preliminary Findings
  - White Ibises → 25 strikes (1990-2020)



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- Preliminary Findings
  - Sandhill Cranes → 654 strikes (1990-2020)

Utilizing UAS to Mitigate Wildlife Strikes to Aviation

- Preliminary Findings
  - Other wildlife species

Vulture

Duck

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- Preliminary Findings

Great Egrets

Wood Storks

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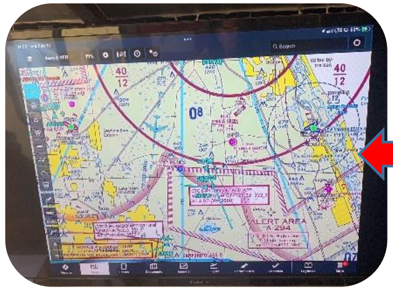
- Preliminary Findings
  - "*Land-use practices and habitats are the key factors determining the wildlife species and the size of wildlife populations that are attracted to airport environments*" (Cleary & Dolbeer, 2005)

Utilizing UAS to Mitigate Wildlife Strikes to Aviation

- Preliminary Findings
  - Practically no aircraft operations at Coe Field airport



Utilizing UAS to Mitigate Wildlife Strikes to Aviation

- Conclusions
  - The safe application of drones during a WHA can help
    - Obtain data and information in areas that are difficult to access by ground-based means
    - Observe wildlife in areas that are distant from the data collection point(s)
    - Identify habitats and land uses affecting the presence and behavior of wildlife
    - Observe wildlife species that do not congregate in group
    - Obtain vital information that could be later analyzed by a QAWB

Utilizing UAS to Mitigate Wildlife Strikes to Aviation

- Limitations
    - Reduced opportunities for data collection
    - The technical expertise of a QAWB during data collection is needed
- Next steps
    - Engage with a QAWB during a WHA
    - Collect data in a more complex airport environment (Class D airspace?)

Utilizing UAS to Mitigate Wildlife Strikes to Aviation

Our Team Includes ERAU-DB Students

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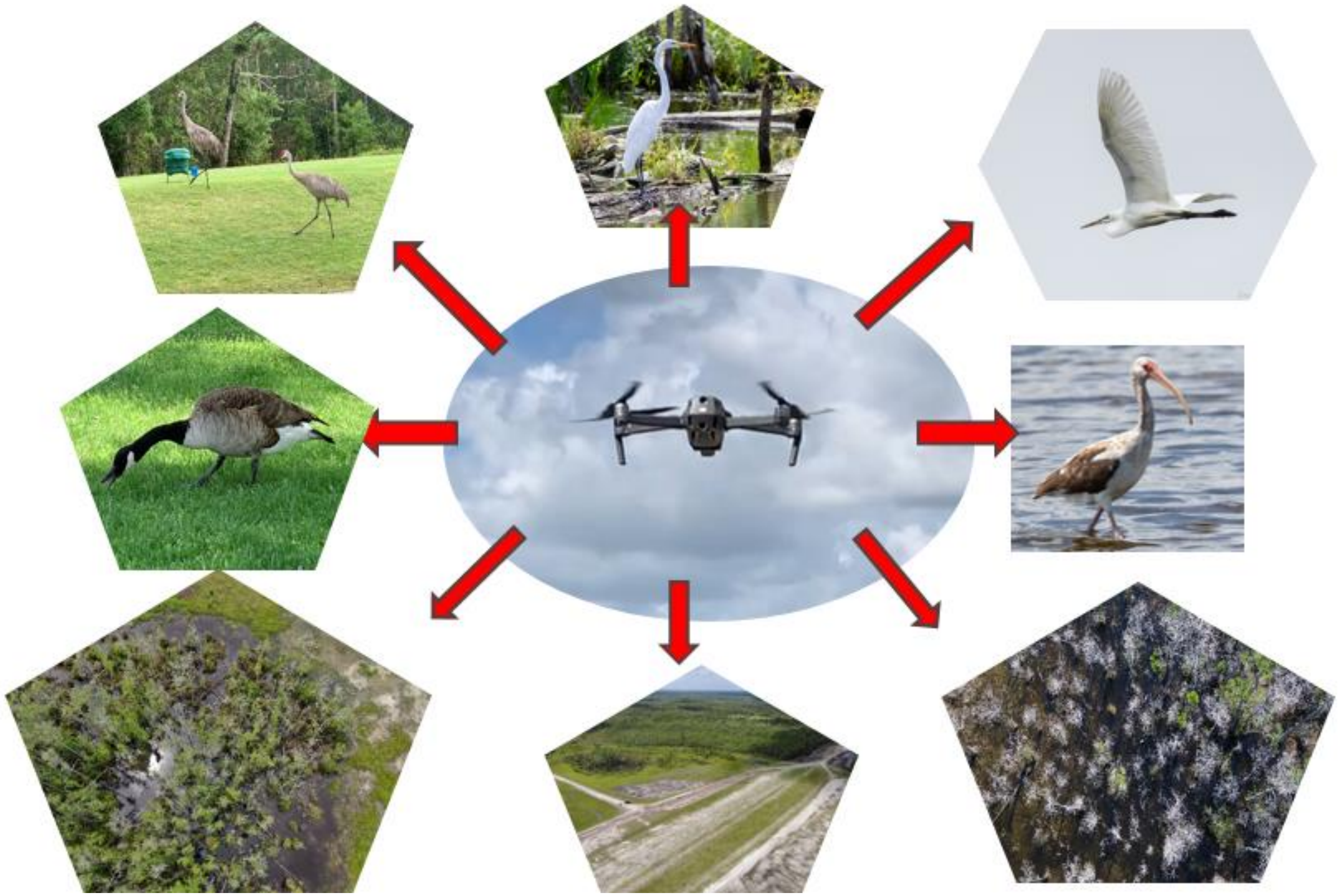

Thank you!

Utilizing UAS to Mitigate Wildlife Strikes to Aviation

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