

# UAS Decision Process: Operations and Cost

Presented by:

Paul Schneider – Georgia Power

Renato Salvaleon - Alabama Power

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1:30-2:45PM Rm 29 A/B



# Scope of Presentation

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- Southern Company's UAS Program
- Comprehensive UAS Transmission Inspection Evaluation (CUTIE)
- UAS Decision Information Tool

# Southern Company's Foray into UAS



*Each BU on their own  
RC airplanes  
Push from EPRI &  
Research*

Pre-2014



**Enterprise Idea  
Contest**  
*Most popular idea  
Rethink, Retool,  
Revolutionize  
CEO's vision*

2014



**Pilot Project**  
*Research tasked  
Lead identified  
\$1.2M Funding  
provided*

2015 - 2016

# Southern Company's UAS Vision

Accelerate the adoption and integration

Executing Integration Strategy

Working with the FAA

Working with Industry

Working with Research Groups

Driving Regulations

Performing Demonstrations

Developing Business Applications



# Mission Types & Flights Flown

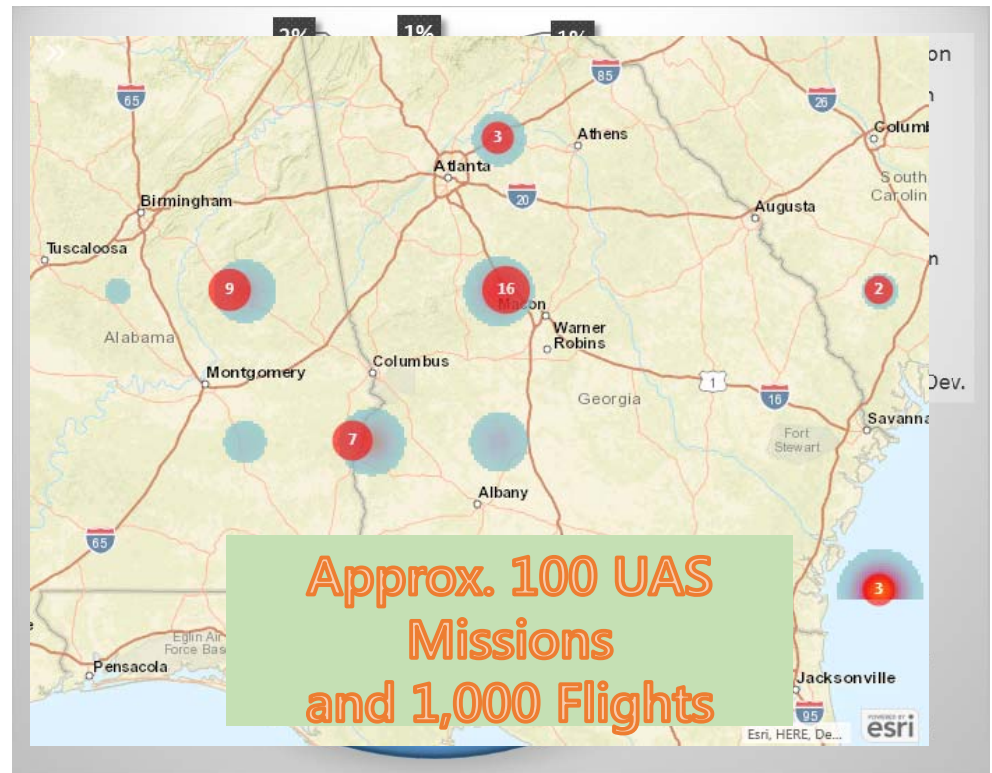
Field Inspections

Patrols

2D & 3D Mapping

Volumetric Analysis

Other Analyses



# Lessons Learned



# As our UAVs Fly; Data is Falling from the Sky

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We have acquired this much data in 12 months

40000 logs  
200 lidar  
1500 videos  
600 GIS  
94000 pictures

**We need to tame this data**



# Doing More with what We Have

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With ArcGIS we have done a lot, but we need a  
**bridge between post-AS processing and delivery**

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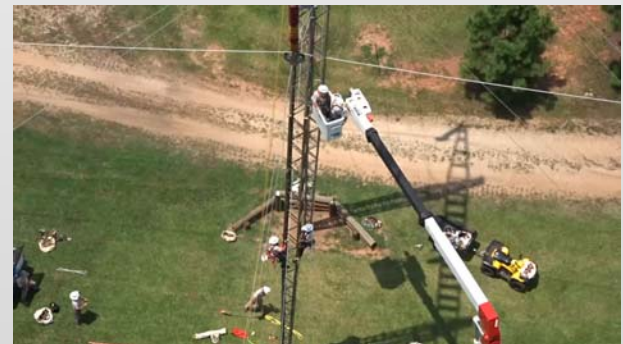
# CUTIE – Contracted UAS Transmission Inspection Evaluation Process

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**Goal: Determine impact of UAS in traditional inspection workflows**



Each crew was given a week each to inspect the same 42mi transmission line right of way in rural south Georgia.



Each crew were escorted by an experienced 3<sup>rd</sup> party vendor

# Data Collected

- Traditional Inspectors
  - Invoiced hours, cost, absit report
- UAS Contractors
  - Invoiced hours, cost, absit report
  - Total time onsite
  - Total UAS flight time
  - Number of flights
  - Number of issues or malfunctions
  - Terrain issues
  - Weather conditions
  - Professionalism (opinion)

## Findings (Cost)

- One UAS Contractor was way out of range between the other three. The cost of this contractor is not included in the analysis below.
- The cost per mile is approximately 2.14 times more expensive than the helicopter CAI, and approximately 2.7 times cheaper than the ground CWI.

## Findings (Speed)

- The average speed between the UAS Contractors was 0.33 miles per hour or approximately 3 hours to inspect one mile of transmission line. This is approximately 5.15 times slower than the helicopter CAI, and approximately 1.74 times faster than the ground CWI.
- While onsite, the UAS Contractors time was recorded in three separate categories. The categories and the average percentage of time spent within each category are below.
  - 38% of total time onsite was spent flying the UAS
  - 17% of total time onsite was spent traveling from location to location
  - 44% of total time onsite was spent “Other,” not flying or traveling.

## Findings (Quality)

- It is not clear if absit reporting by UAS Contractors is more impacted by technical limitations of the unmanned aircraft or by lack of transmission inspection expertise or reporting consistency.
- Large differences in absit reports between all contractors, even CAI and CWI.
- Also major differences in CAI and GPC CWI.

# Conclusions

- There are many variables that should be considered when looking at these numbers. Here are a few.
  - UAS Contractors didn't use TLIS or have an absit list for this line
  - CAIs aren't typically flown for 115kV
  - CWIs usually fix broken items while onsite

# UAS Decision Information tool

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## *Fly using UAS or Not*

- Using comparative data from the CUTIE project, various data sources, variables, and a UAS decision matrix to determine whether aerial type missions will be flown by UAS or other aerial means.
- Some of the variables used include no fly zone, AGL, mission type, UAS type, structure type, ROW conditions, proximity to access roads, etc.
- Developed a workflow decision model using python in ArcMap to produce results that would produce the quantitative results and recommendation based on cost and time – (Go/No Go)
- Develop the solution on a web application with a geoprocessing web service



# Attribution

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- **Some slides adopted from presentation by Dexter Lewis, Engineer Sr. – UAS Lead for Southern Company**



# Questions?

[pschneid@southernco.com](mailto:pschneid@southernco.com)

[rsalvale@southernco.com](mailto:rsalvale@southernco.com)

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