The NC UAS Program Overview

April 2014

Tom Zajkowsk, NGAT Flight Operations Manager
NGAT Center: Introduction

- Organizational Structure
- Staff
- NGAT Center Director- Kyle Snyder
- NGAT Flight Operations Manager- Tom Zajkowski
- NGAT Airspace Consultant- Randy Breedlove

- History: NextGen Air Transportation Center
  - Relaunched in May 2012 with UAS Program focus
  - 2012: Build foundation
  - 2013: Begin UAS flight operations
    - First Flight at Hyde County- March 21, 2013
    - Summer flights for agriculture research at Hyde County
    - First Flight at Caratoke (Moyock)- November 5, 2013
  - 2014: Governance, Research, Integration
NGAT Center: Overview

Mission: to discover, evaluate, implement, and disseminate advanced air transportation technologies at the regional, national, and international level to improve the capacity, safety, and environment surrounding modern air transportation.

Goals:

1. Unify the UAS/RPA community across NC.
2. Develop a complete UAS lifecycle support capability native to NC for statewide integration.
3. Position NC as a NextGen early adopter for FAA evaluations, technology fielding, and user deployment.
4. Serve as a regional Knowledge Center for UAS and air transportation modernization activities.
5. Secure a position on the winning 10-year FAA UAS Center of Excellence team.
The UAS Opportunity

The state is poised to support an emerging private industry that would bring new jobs and related economic development.

FAA estimates that 7,500 commercial UAS will be viable within 5 years.

Annual market sales of $11B in the US.

The Association for Unmanned Vehicle Systems International estimates a UAS industry can create almost 1,200 jobs and $600 million in economic activity in NC by 2025.
Building a UAS Ecosystem in NC

- User Capability Requirements
- Initial Design and Development
- Testing
- Training
- Production Design
- Sustainment / Maintenance
- Manufacturing
- Fielding

Initial Design and Development

Sustainment / Maintenance

Production Design

Manufacturing

Fielding

Testing

Training
Current NC Policy Efforts

Cross-functional workgroup established to research issues and prepare legislative report

- NCSU
- State CIO
- DOT
- DENR
- NC Military Foundation
- Duke University
- Governor’s Policy and Legal offices
- NC Innovation Center (iCenter)
- NC National Guard
- NC Department of Commerce
- Research Triangle Institute

CIO Governance Report

- Governance structure to include the appropriate use at each level of government.
- Guidelines for program implementation to include limitations on unmanned aircraft system use.
- Potential participants.
- Costs associated with establishing a program.
- Potential sources of funding.
- Issues associated with establishing a program to include limitations on entities that may already have purchased UAVs
- Recommendations for legislative proposals.

Due Date 3/1/14
UAS Statewide Integration

- Dept. of Public Safety
  - Emergency Management- preparedness, response
  - GIS- mapping, surveys
  - Search / Search and Rescue
- Dept. of Transportation
  - Small area surveys, Photogrammetry
  - Construction and Structures- Infrastructure inspections
- Dept. of Environment and Natural Resources
  - Wildlife Resources
- Dept. of Agriculture
  - Forestry
- NC National Guard
  - Counterdrug
- State Bureau of Investigations, Highway Patrol
  - Law Enforcement
- Commercial Industries
  - Survey
  - Aerial Photography
  - Contract services

Any state agency operation requires approval from SCIO
NGAT Center: UAS Research

• Operational Safety
  – Airspace Integration- manned and unmanned sharing airspace
  – Communications, procedures, technologies (sense and avoid)

• Training
  – Education requirements
  – Licensing and certification standards
  – K-12 STEM integration

• Policy (collaboration with SCIO)
  – National and state requirements
  – Data management
  – Privacy protection

• Applications
  – Agriculture- aerial imaging (crop health), aerial application
  – Small area surveys- mapping, 3D modeling, remote sensing
  – Wildlife/herd management
  – Public Safety- infrastructure inspections, emergency response
  – Cargo delivery

• Scientific
  – Autonomy development- robot-vehicle collaboration, human-machine collaboration
  – Data (imagery) analytics
Current NC UAS COA Flight Locations

1- Butner
2- Caratoke (Moyock)
3- Hyde County

Future NGAT UAS Flight Locations

NGAT Approved COA Flight Locations
Future NGAT UAS Flight Locations
Current Gull Rock Test Site COA
The Gull Rock Test Site- Hyde County
Vireo™ UAS System

All components shown pack into Rugged Transport Case for transport, storage or shipping.

- GCS
- AV 2
- AV 1
- Additional micro gimbal payloads
- FSK
- Vireo™ air vehicle with battery & payload installed, Carry case
- GCS carry case
- GCS Tablet
- Power/Data Hub
- Battery Charger
- Spare air vehicle batteries

Ground Comms subsystem with antenna, tripod
Current Fleet with COA Locations

- **Vireo (FourthWing Inc)**
  - GRTS
  - Caratoke
  - Butner

- **Super Swiper (Bosh Technologies)**
  - GRTS

- **Condor II (Bosh Technologies / Lepton)**
  - GRTS

- **Lancaster (Precision Hawk)**
  - Butner

- **T-20 (Arcturus)**
  - Caratoke
NGAT 2013 Flying
2014 Research Expansion
UAS for Agriculture Research

- Aerial Surveying/Mapping
  - Terrain modeling
  - Assessments - damage, crop types
  - Ground Sensor data capture - RFID

- Crop Analysis
  - Thermal: Soil/Vegetation Moisture
  - NDVI development
  - Plant height, spacing
  - Stresses
  - Yield prediction

- Aerial Application
  - At night
  - Precision
  - Low altitude = greater penetration, reduced drift

- Herd Management
  - Health Monitoring
  - Tracking
Industry in NC

• Existing Companies
  – Blue Force Technologies
  – Precision Hawk
  – Bird Aerospace
  – Vx Aero
  – Bosh Global Services
  – Academi
  – RTI
  – L-3 STRATIS
  – Carolina Unmanned
  – Aerobot Services
  – Duncan Parnell
  – VetDS
  – HondaJet*

• Interested Companies
  – Bosh Precision Ag
  – Simulyze
  – VTOL Dynamics
  – Leica Geosystems
  – KSI Video
  – Olaeris
  – ESUS Inc
  – Terra Flight
  – Dunan Systems International
  – Adaptive Aerospace Group
  – Raytheon
  – L-3 Unmanned Systems
  – Aerovironment
What’s Next?

• Open Lake Wheeler
• Open Research Stations
• Research Projects
  – University
  – Industry
  – State Agencies
• Program Development
  – GRTS (Hyde County) utilization
  – NGAT Membership Program launch
  – Statewide Emergency Response Program
  – Statewide Ag Research Program (thru Cooperative Extension Program)
What’s Happening

• NC House UAS LRC meeting #4- April 23 1:00pm
• 2014 Spring Reception- May 5 @ NCSU Centennial Campus Lonnie Pool Golf Course Clubhouse 5:00-7:00
  – https://ngatuasspring2014.eventbrite.com
• AUVSI Unmanned Systems North America 2014 (Orlando, FL)- May 10-15
• Concept Development
  – Statewide Emergency Response Program
  – Statewide Ag Research Program (thru Cooperative Extension Program)
• 2014 UAS Demo Day at Butner- 8/23
• 2014 Fall Reception- TBD
• 2014 UAS Demo Day at GRTS- TBD
• 2015 Unmanned Systems Career Day Event- Feb 15
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It is not really necessary to look too far into the future; we see enough already to be certain it will be magnificent. Only let us hurry and open the roads.

- Wilbur Wright
QUESTIONS?