Program Overview

Russ Buchholz, UAS Integration Program Administrator
IPP – National Effort

10 – Lead Participants,
63 – Primary Team Members
24 – Priorities (i.e. Package Delivery, Infrastructure Inspections)
IPP – Federal, State, Tribal, and Private Partnerships

- City of Reno
  Reno, NV
  (16 partners)

- City of San Diego
  San Diego, CA
  (15 partners)

- University of Alaska-Fairbanks
  Fairbanks, AK
  (20 partners)

- Choctaw Nation of Oklahoma
  Durant, OK
  (20 partners)

- North Dakota DOT
  Bismarck, ND
  (29 partners)

- Kansas DOT
  Topeka, KS
  (24 partners)

- Innovation & Entrepreneurship Investment Authority
  Herndon, VA
  (23 partners)

- North Carolina DOT
  Raleigh, NC (13 partners)

- Memphis-Shelby County Airport Authority
  Memphis, TN (13 partners)

- Lee County Mosquito Control District
  Ft. Myers, FL (5 partners)

Note: Some partners are shared across multiple Lead Participants
FAA’s Involvement

• **Five** assigned Program Managers assigned specifically to selected entities

• **An entire program office** dedicated to the IPP

• FAA team of **140 experts** ready to assist
Safety Case Development Process

1. Operational Context Definition
   - Concept of Operations
     - Mission objectives
     - Operational description
     - Requirements definition
   - Risk Assessment
     - Hazard identification
     - Risk mitigation development
     - Identify supporting data needed
   - Repeat until risks are mitigated to acceptable level

2. Data Collection
   - Test Planning
     - Test/data requirements
     - Scope and method of test
     - Schedule and resources

3. Safety Case
   - Testing & Demos
     - Quantitative data collected
     - Verify sufficient data to support mitigations
     - Data validates mitigations
   - Safety case complete when all mitigations are validated with data

4. FAA Approval
   - Safety Case Compilation
     - Final analysis of safety
     - Compilation of all data
     - Completed application package
   - Approval Granted If:
     - All hazards are addressed
     - Acceptable level of safety
     - Data verifies mitigations are effective

Increasing FAA Involvement
IPP Contributions to Repeatable and Scalable Validation of mitigations (ND, Reno)
BVLOS operations (KDOT, AK)
Risk-based approach to safety case for OOP (NCDOT, ND)
Validation of mitigations (ND, Reno)
Leveraging the IPP to support FAA Research in Safety Case/Data Collection Research and BVLOS operations (VA, ND, KDOT, AK)
Leveraging existing partnership waivers for the IPP to accelerate operations (ND, KDOT)
Use of SORA to build a safety case from a previously approved waiver. (ND, KDOT)
Evolution to routine ops (San Diego, Choctaw Nation, Reno, Memphis)
Strong Community Outreach (LCMCD)
Leveraging existing partnership waivers for the IPP to accelerate operations (ND, KDOT)
UAS IPP Research and Analysis Team Initiatives
Accomplishments so far:

- **Multiple** part 107 waivers awarded for Beyond Visual Line of Sight and Operations Over People
- **Many** demonstrations covering:
  - Infrastructure inspections
  - Package delivery
  - Media coverage
- Logged **315** flights into Data Portal
Overview

- Pulling the Research Thread
- Waiver Trend Analysis Framework
- Analyzing Safety Risk Assessments
- Defining Operational Critical Paths

Research + Operations = Rulemaking
The Goal: Enable cross-modal technologies to ensure safe operations in any environment

The skies will in the future be filled with Unmanned Aircraft Vehicles (UAVs, or commonly known as drones) for delivery, inspection, rescue and surveillance purposes. With the increasing density of UAV operations, it is important to have an efficient and safe traffic management system to ensure the urban airspace can be utilised optimally with population's safety. Nanyang Technological University's scientists from Air Traffic Management Research Institute (ATMRI) is aiming to free up the urban airspace for UAV operations, developing technologies such as traffic management control, smart routing and collision avoidance.

SAFE SEPARATION DISTANCE
UAVs should maintain a minimum horizontal and vertical separation to ensure safe operations.

GEOFENCING
Virtual barriers will be set up to prevent access into restricted areas by the UAVs.

AIRSPACE MANAGEMENT
The airspace can be divided into air blocks, whereby the performance of each air block can be evaluated and monitored. This will dictate whether it is safe for the UAVs to fly through the air block.

MONITORING SIGNAL STRENGTHS
The signal strength for command and control between the UAVs and the remote pilots can be established. Red and green regions with poor and good signal strength respectively will be monitored along the route in the TMUAS Control Station.

SOURCE: Nanyang Technology University
NDDOT Integration Pilot Program
Program Overview

- Mission I
  Emergency and Media Response

- Mission II
  Infrastructure Inspections

* Selected by FAA
Mission I

Emergency and Media Response

- Operation over People (OOP)
- Operated in a Controlled Airspace (Class D)
- Parachute used for Risk Mitigation w/ DJI
- 2 UASs flying simultaneously for sustained amount of time
  - Vantage Robotics Snap (mass alone)
  - DJI Phantom 4 (mass + parachute)
- Community Outreach
  - NDSU
  - Public perception
Mission I Highlights

- Safety was and still is our #1 Priority
- Pilots performed in a Sterile Environment
- Media Coverage
- Attended by a lot of Dignitaries
- Community Outreach Booth - Survey and Social Media (Facebook and Snapchat)
- Website dot.nd.gov/UAS

Video by Botlink
Mission II

Infrastructure Inspections
Partners: Xcel Energy, Harris Corporation, Appareo, Echodyne

- Using existing BVLOS and Night Navigation Waivers
- Leveraging PSP, operating currently in a Rural Environment in Colorado
- Upcoming: City Limits of Grand Forks, ND
- Static Routes vs Dynamic Routes
- Concerns / Obstacles
  - Operations of Moving Vehicles
  - Operations over People
- Unmanned Aircraft System
  *Vapor 55 or *TBD
- Timeframe: May 2019
Questions?

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