



Northeast Ohio Flight  
Information Exchange  
-- NEOFIX --

8 March 2023

# Agenda

- Objectives and Background Refresher (5 minutes)
- Cleveland Clinic Discussion of Medical Delivery use Case (Geoff Gates) (20 minutes)
- Introduction to FIX-MVI (10 minutes)
- Guided Tabletop (30 minutes – 10 minutes per use case)
- System Administrative (15 minutes)
- Discussion and Next Steps (10 minutes)

# Background Refresher

<https://bw-centers-tech-partnerships.org/neofix-overview/>

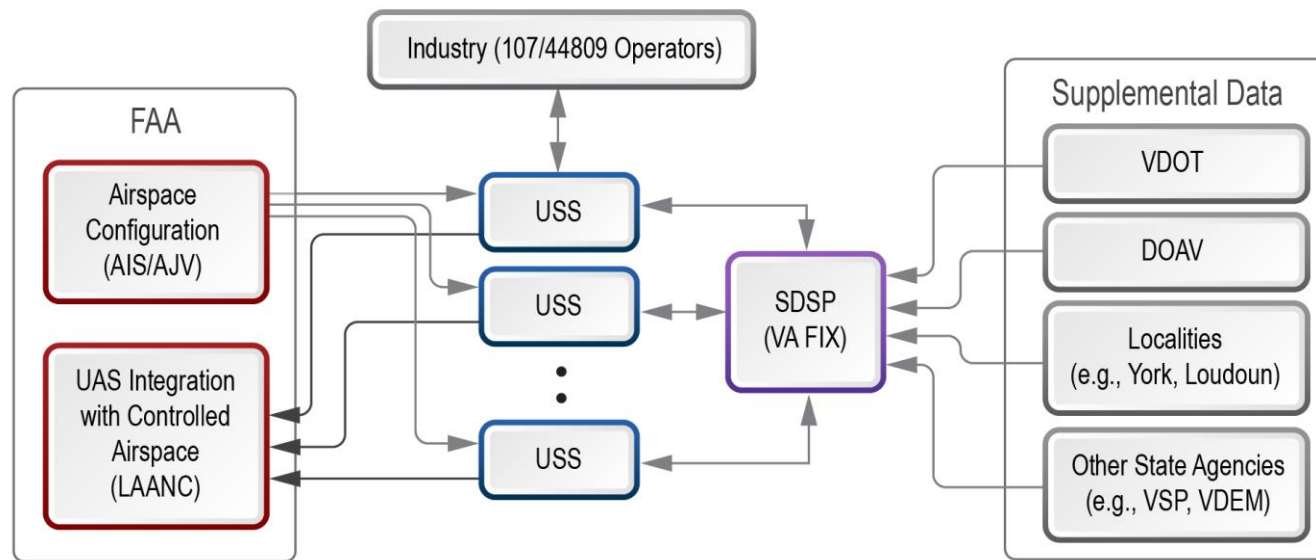


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# Where Does NEOFIX Fit in the FAA Vision?

- FAA already has infrastructure and programs in place to build UTM/UAM infrastructure
- FAA has already created concepts of UAS Service Suppliers (USSes) and Supplemental Data Service Providers (SDSPs) integrating into UTM
- State and Local Governments are the logical authoritative source for governance and provision of Authoritative SDSP (ASDSP) information (since UAS operations are highly local)
- FIX provides a central clearing house for aeronautical information from local government – data is a public asset



# NEOFIX Strategic Goals

1. Identify high priority uses of drones
2. Rapidly (6-12 months) turn up next round of ground based infrastructure to support these use cases
3. Demonstrate “in depth” that including localities, public safety, industry service providers, and manufacturers to show real-world benefit (safety, public benefits, and economic development benefit)
4. Demonstrate affordable infrastructure (e.g., infrastructure that can be maintained and operated by a typical locality with industry support)
5. Maintain data and infrastructure as a PUBLIC asset
6. Use the turn up as a mechanism to engage community and stakeholders and support local consensus on UAS integration

# Cleveland Clinic Use Case

<https://bw-centers-tech-partnerships.org/neofix-overview/>



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# Introduction to FIX-MVI

<https://bw-centers-tech-partnerships.org/neofix-overview/>



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# What is FIX-MVI?

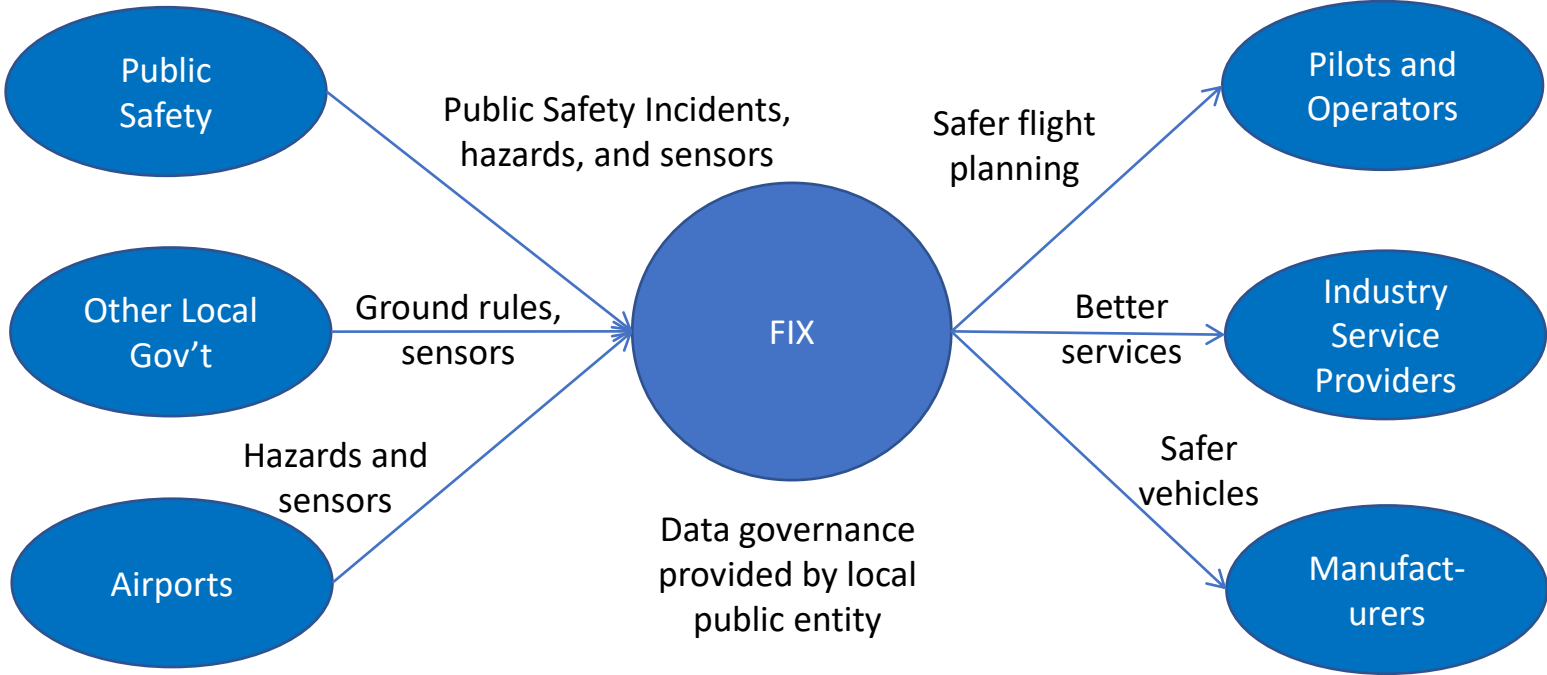
- Enable near-term AAM services and return on investment
  - “Flight Information Exchange” (FIX)
  - “Minimum Viable Infrastructure” (MVI)
- FIX is focused on cost-effective, public, secure mechanisms for data sharing to support Federal Aviation Administration (FAA) requirements for safe AAM integration
- MVI is a risk-based approach to infrastructure resulting in cost-effective deployment of infrastructure enabling immediate next steps in AAM
- Support community integration and give industry a place where they can fly
- Return on investment and a path to financial sustainability within 2-3 years



# What Is FIX

- FIX allows State, Tribal, and Local government to publish key information to UAS Operators and Industry, giving everyone a clear, common picture – in the same way that charts do for traditional aviation
- UAS Operators and Industry use FIX to understand the local environment before and during operations; public safety use FIX to coordinate operations and alert private operators; State, Tribal and Local government use FIX to manage the interaction of UAS and local communities
- FIX fills the gap between FAA information services for controlled airspace and the need for information to support the mostly local nature of UAS operations
  - Can also support other kinds of data sharing and syndication, such as sensors, or other transit or smart cities data
  - Supports ground based sensor syndication into USS/UTM/PSU providers
- FIX provides a secure, access controlled central point of access for industry and a governance model for how State, Tribal, and Local governments publish information so industry doesn't have to deal with a patchwork of conflicting regulations – improving safety and economic growth

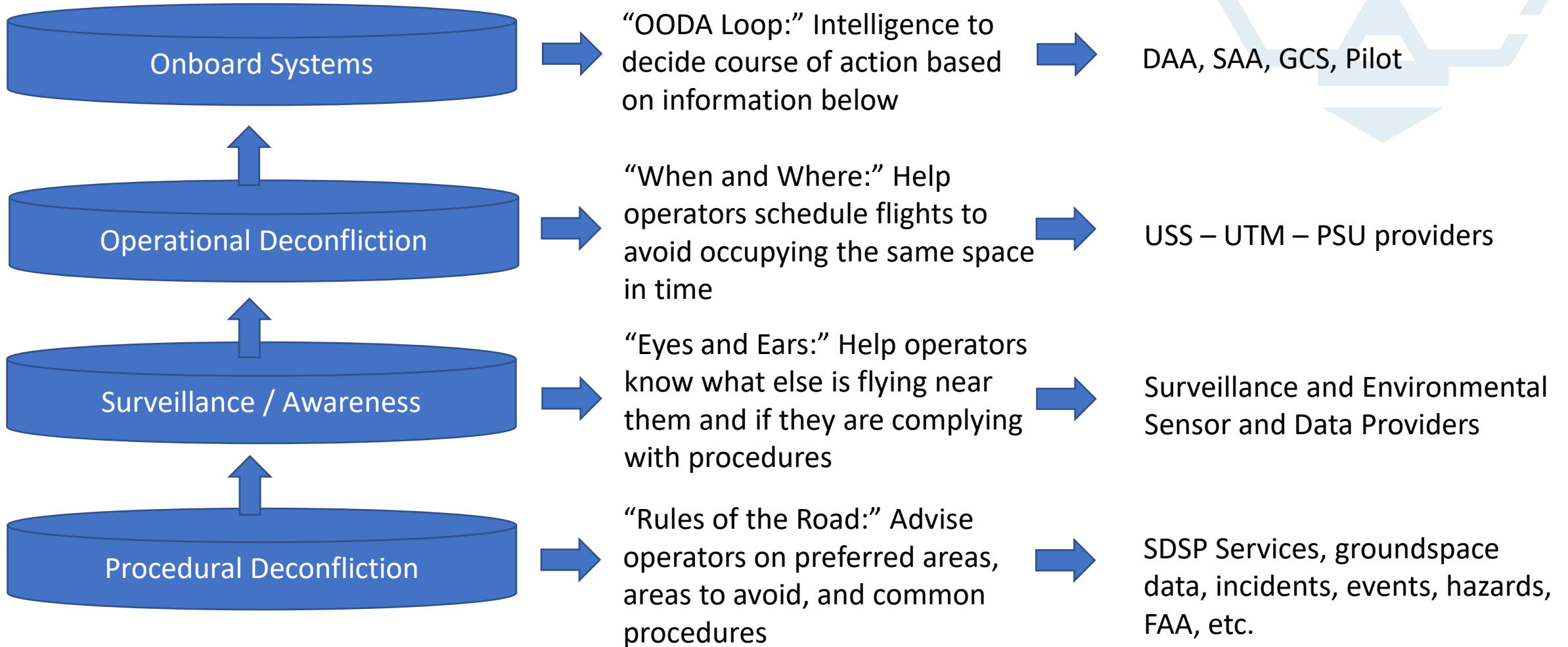
# Basic FIX Concept



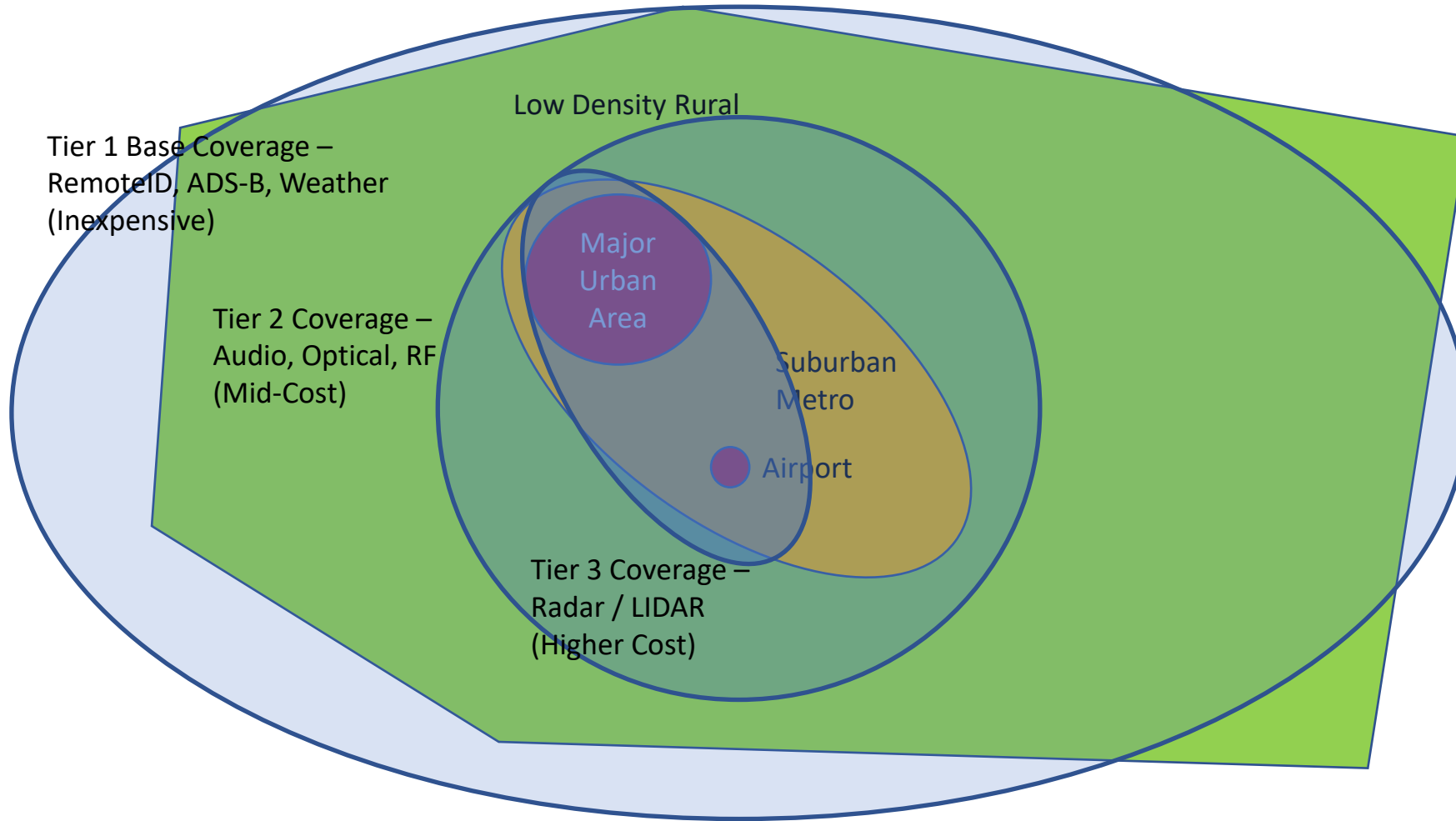
# What is MVI?

- MVI recognizes that AAM requires multiple parties and multiple technologies working together, public and private
- Communications and surveillance, sharing of flight planning and intent data, ground space configuration data from local government, and helping communities prepare for integration
- An organic approach is based on two principles:
  - Build just what you need for targeted operations and risk today while preparing for tomorrow; and
  - Identify performance requirements to support FAA approvals of industry and AAM operations
- Keep operating costs low: <\$5 per covered head
  - Order of magnitude lower enablement costs: \$20,000 - \$50,000 per square mile instead of \$250,000 - \$1,500,000 per square mile
- Focus on essential services based on a comprehensive risk analysis around targeted operations

# How Does this Work? Safety Model



# MVI Model and Cost Model



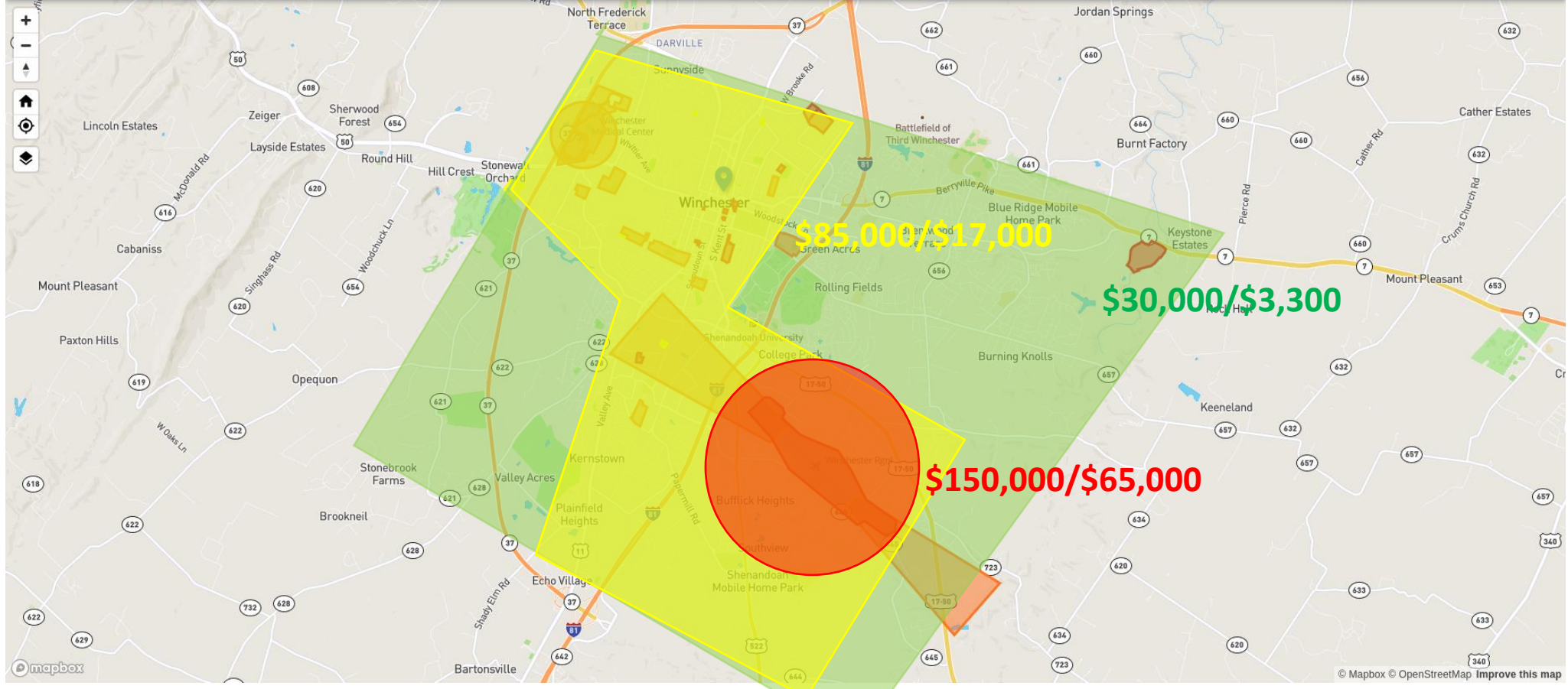
- Tier 1 Cost:
  - Bench: \$5,000
  - Actual: \$4,420
  - Future: \$2,500
- Tier 2 Cost:
  - Bench: \$20,000
  - Actual: \$17,920
  - Future: \$15,000
- Tier 3 Cost:
  - Bench: \$75,000
  - Actual: \$107,920
  - Future: \$50,000

$$0.05^4 = 0.00000625 = 99.9999 = 7 \text{ nines}$$

# Accretive Coverage – Illustrative Example

Numbers are hypothetical based on performance ranges, actual performance based on siting and calibration for summary performance based on 1 “node”

Type	Tier	Cooperative Detection	Non-Cooperative Detection	False Positive Rate	Precision of Position Error	Range (Optimal)	Cost per Square Mile
ADS-B	1	99%+	0%	0%	<3 meters	~ 25 Mi	\$5
RemotelD	1	99%+	0%	0%	<3 meters	~ 2 Mi	\$1875
	<b>1</b>	<b>99%+</b>	<b>0%</b>	<b>0%</b>	<b>&lt;3 meters</b>	<b>~ 2 Mi</b>	<b>\$1875</b>
Decoding	2	99%+	0%	0%	<3 meters	~ 7- 10 Mi	\$6,000
Optical	2	95%+	95%+	>5%	<10 meters	~ 3 Mi	\$2,000
Audio	2	90%+	90%+	>5%	<50 meters	~ 10 Mi	\$500
RF	2	95%+	95%+	<5%	<50 meters	~ 25 Mi	\$40
	<b>2</b>	<b>99%+</b>	<b>95%+</b>	<b>&lt;5%</b>	<b>&lt;10 meters</b>	<b>~ 3 Mi</b>	<b>\$8,000</b>
Radar	3	98%+	98%+	>25%	<3 meters	~ 1.5 Mi	\$65,000
	<b>3</b>	<b>99%+</b>	<b>99%+</b>	<b>&lt;5%</b>	<b>&lt;3 meters</b>	<b>~ 1.5 Mi</b>	<b>\$75,000</b>



# Guided Tabletop

<https://bw-centers-tech-partnerships.org/neofix-overview/>



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# Use Cases – Key Questions

- FIX programs have taught us about what is needed
- In each area, where would UAS flights cause concern?
- What types of ground data assets and integration can support community readiness?
  - Groundspace configuration data such as hazards, obstacles, obstructions, and sensitive areas
  - Public safety data such as operations and public safety sensitive or restricted areas
  - Take-off and landing area rules (preferred, notification required, permission required, and prohibited)
  - Sensitive infrastructure (cell towers / power lines) to assist with safe flight operations and compliance with regulations
- Where is higher awareness needed due to traffic or density?
  - Sensor data to provide situational awareness of environmental conditions
  - Tier 1, 2 or 3 surveillance?
  - Additional navigation and communications assets

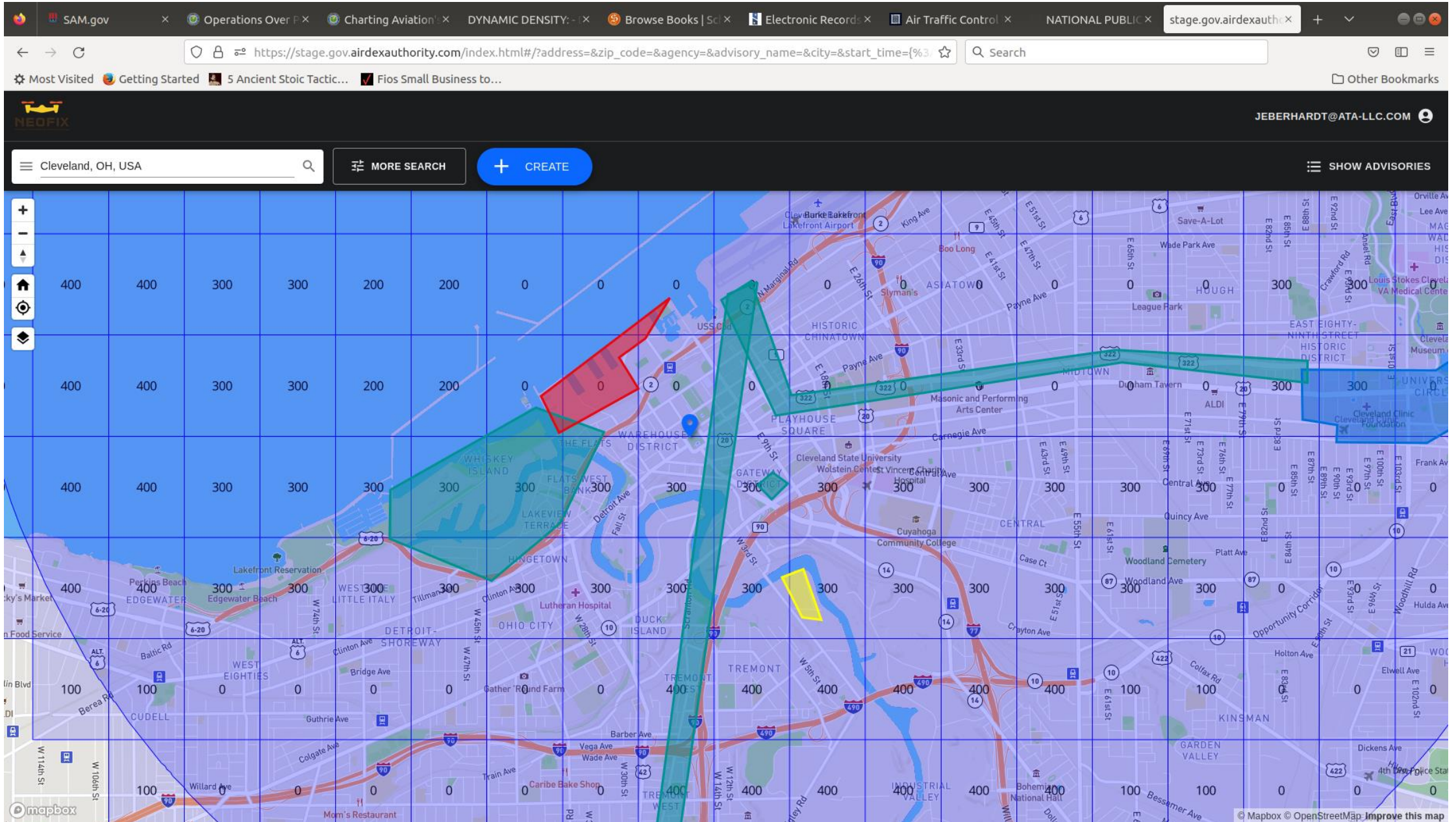
# Use Cases

- Area 1: Cleveland Clinic Administrative Campus Medical Delivery
- Area 2: Downtown Waterfront Drone as a First Responder
- Area 3: Hopkins Infrastructure Inspection/Protection

# Area 1: Cleveland Clinic Administrative Campus Medical Delivery

The image is a screenshot of a web browser displaying a map of Cleveland, Ohio. The browser's address bar shows the URL: `https://stage.gov.airdexamauthority.com/index.html?#address=&zip_code=&agency=&advisory_name=&city=&start_time={%3`. The browser's search bar contains the text: `Cleveland Clinic Administrative Campus Bui...`. The map shows several neighborhoods, including Shaker Heights, Beachwood, Woodmere, Orange, Highland Hills, and Moreland Hills. A blue location pin is placed on the map near the intersection of Shaker Blvd and S Woodland Rd. The map also shows major roads like I-271 and I-422, and various landmarks such as John Carroll University, Beachwood High School, and Cleveland Memorial. The browser's top bar shows several open tabs, including 'SAM.gov', 'Operations Over...', 'Charting Aviation...', 'DYNAMIC DENSITY...', 'Browse Books | Sc...', 'Electronic Record...', 'Air Traffic Control...', 'NATIONAL PUBLIC...', and 'stage.gov.airdexamauth...'. The browser's top right corner shows the email address 'JEBERHARDT@ATA-LLC.COM' and a search icon. The browser's bottom right corner shows the text '© Mapbox © OpenStreetMap Improve this map'.

# Area 2: Downtown Waterfront Drone as a First Responder



# Area 2: Downtown Waterfront Drone as a First Responder

The screenshot displays a web browser window with the URL [https://stage.gov.airdexauthority.com/index.html#?address=&zip\\_code=&agency=&advisory\\_name=&city=&start\\_time={%3.](https://stage.gov.airdexauthority.com/index.html#?address=&zip_code=&agency=&advisory_name=&city=&start_time={%3.) The browser's address bar and search bar are visible at the top. The main content area features a map of Cleveland, OH, USA, with several colored overlays: a red polygon in the Warehouse District, a large teal polygon covering the Flats West Bank and parts of the Warehouse and Gateway Districts, and a blue polygon in the East Eighty-Ninth Street Historic District. The map includes street names, landmarks like Cleveland State University and the Cleveland Clinic, and major roads like I-90 and I-490. Navigation controls (zoom in, zoom out, home, location, full screen) are on the left side. The top navigation bar includes a search bar with 'Cleveland, OH, USA', a 'MORE SEARCH' button, a 'CREATE' button, and a 'SHOW ADVISORIES' button. The user's email 'JEBERHARDT@ATA-LLC.COM' is displayed in the top right corner.

# Area 3: Hopkins Infrastructure Inspection/Protection

SAM.gov | Operations Over P... | Charting Aviation... | DYNAMIC DENSITY: - | Browse Books | Sc | Electronic Records | Air Traffic Control | NATIONAL PUBLIC | stage.gov.airdexauth |

https://stage.gov.airdexauthority.com/index.html?#address=&zip\_code=&agency=&advisory\_name=&city=&start\_time={%3... Search

Most Visited | Getting Started | 5 Ancient Stoic Tactic... | Fios Small Business to... | Other Bookmarks

NEOFIX | JEBERHARDT@ATA-LLC.COM

Cleveland Hopkins International Airport (CL... MORE SEARCH CREATE SHOW ADVISORIES

The map displays a density overlay over the Cleveland Hopkins International Airport and surrounding areas. The density values are represented by a color gradient from blue (low density) to red (high density). The map includes various landmarks such as the airport, Brook Park, Parma Heights, and Berea. Major roads like I-76 and I-49 are also visible. The map is overlaid with a grid and includes a search bar and navigation controls.

Mapbox | OpenStreetMap | Improve this map

# Area 3: Hopkins Infrastructure Inspection/Protection

The image shows a web browser window displaying a map of the Cleveland Hopkins International Airport area. The browser's address bar shows the URL [https://stage.gov.airdexam.com/index.html#/?address=&zip\\_code=&agency=&advisory\\_name=&city=&start\\_time={%3](https://stage.gov.airdexam.com/index.html#/?address=&zip_code=&agency=&advisory_name=&city=&start_time={%3). The browser tabs include SAM.gov, Operations Over F, Charting Aviation, DYNAMIC DENSITY, Browse Books | Sci, Electronic Record, Air Traffic Control, NATIONAL PUBLIC, and stage.gov.airdexam.com. The map interface features a search bar with the text "Cleveland Hopkins International Airport (CL...", a "MORE SEARCH" button, a "CREATE" button, and a "SHOW ADVISORIES" button. The map shows the airport and surrounding areas, including Brook Park, Parma Heights, and Berea. Key roads like I-71, I-271, and I-427 are visible. Landmarks such as the International Exposition Center, Holy Cross Cemetery, and various restaurants and businesses are also shown. The map is powered by Mapbox and OpenStreetMap.

# System Administrative

<https://bw-centers-tech-partnerships.org/neofix-overview/>



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# Dissemination Control Model

Access Restriction Groups	Publish Advisory	Public Search	Internal Search (Government Only)	View Non-Sensitive Advisory	View Sensitive Advisory	View Restricted Advisory	Manage User Roles
	Internal Systematic Access						
Government (ARC GIS)	Yes	Yes	Yes	Yes	Yes	No	No
USS Provider <sup>1</sup>	Operations Only	Yes	Yes	Yes	Yes – no descriptive information	No	No
	Internal Individual User Roles						
	State and Local Government Agencies						
General	Yes	Yes	Yes	Yes	Yes	No	No
Public Safety	Yes	Yes	Yes	Yes	Yes	Yes	No
BW Users	Yes	Yes	Yes	Yes	Yes	No	No
BW Administrators	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Agency Administrators	Yes	Yes	Yes	Yes	Yes	If auth. by BW	Yes
	External User Roles						
Operator via USS <sup>1</sup>	Yes	Yes	No	Yes	Limited – no descriptive information	No	No
Operator via Public Portal	No	Yes	No	Yes	Limited – no descriptive information	No	No
General Public	No	Yes	No	Yes	Limited – no descriptive information	No	No

# Virginia Advisory Types

Advisory Type	Description
State or Local Government Information Advisory	Provide local government a voice for local preferences (e.g., safety in operations over people, privacy, environmental concerns) and provide guidance to industry on conditions that may impact the safety or efficacy of an operation or integration into the community.
Public Safety First Responder Emergency Incident Activity	(e.g., Fire, Police Operations): Inform operators and the public about an area of Public Safety operations so that private operators can avoid interference with public safety operations— manage flight in the air, deconfliction on the ground, and help with creating a temporary flight restriction (TFR) in the context of a Disaster Response.
State or Local Agency Site Data Collection	Make the public and UAS operators aware of operations so that we can reduce operational interference which improves safety while also reducing public concerns about the use of the UAS through transparency.
Public Safety Large Audience Event	Provide needed data to UAS operators and USS providers to assist in compliance with Federal Rules about operations over people.
Public Safety Hazardous Materials Incident	Inform operators and the public about an area of personal hazard or aircraft contamination risk— manage flight in the air and deconfliction on the ground.
Public Safety Disaster Management	(e.g., Emergency Operations, Wildfire, Hurricane): Inform operators and the public about an area of personal hazard, aircraft contamination risk, or risk of catastrophic damage to UAS— manage flight in the air, deconfliction on the ground, and help with creating a temporary flight restriction (TFR) in the context of a Disaster Response.
State or Local Government Supplemental Rule Advisory	Denotes a time and location where a Supplemental Rule may be in effect (such as the requirement to notify an agency prior to use of the land)
Ground Operations Prohibited	Denotes a time and location where take-off and landing of a UAS are prohibited either due to: i) Public Safety requirements, ii) a political subdivision rule under HB 742, or iii) because the site is closed to the public.
Hazard / Obstruction	Denotes air or ground times and locations that may present a hazard to operators, either because of a physical obstruction on the ground or in the air or a hazardous ground condition.

# Virginia Advisory Types

Advisory Type	Description
Hobbyist Take Off and Landing Area	Designated operating area for Hobbyist/Recreational operations under Section 44809 potentially with restricted public access. May be temporary (event) or permanent, public or private property.
Public Safety Take Off and Landing Area	Designated operating area for Public Safety Air Operations operating under Part 107 or COA with restricted public access. May be temporary (event) or permanent.
Commercial Delivery Area	Designated operating area for Commercial operations under Part 107, 135, or waiver potentially with restricted public access. May be temporary (event) or permanent, public or private property.
Commercial Launch Area	Within a Commercial Delivery Area, intended to provide clarity on staging and launch areas.
Commercial Operating Area	Within a Commercial Delivery Area, intended to provide clarity on delivery areas.
Public Safety Flight Operation	Provides notification of a non-emergency (e.g., non-incident) Public Safety Flight Operational Area under Part 107 or COA
Commercial 107 Flight Operation	Provides notification of a Commercial Flight Operation under Part 107 or Part 135
Recreational 44809 Flight Operation	Provides notification of a Recreational Flight Operation under Section 44809

# California Advisory Types

Advisory Type	Description
State or Local Government Information Advisory	Provide local government a voice for local preferences (e.g., safety in operations over people, privacy, environmental concerns) and provide guidance to industry on conditions that may impact the safety or efficacy of an operation or integration into the community.
Public Safety First Responder Emergency Incident Management Response	(e.g., Fire, Police Operations): Inform operators and the public about an area of Public Safety operations so that private operators can avoid interference with public safety operations—manage flight in the air, deconfliction on the ground, and help with creating a temporary flight advisory (TFA) in the context of a Disaster Response.
State or Local Agency Site Data Collection	Make the public and UAS operators aware of operations so that we can reduce operational interference which improves safety while also reducing public concerns about the use of the UAS through transparency.
Public Safety Large Audience Event	Provide needed data to UAS operators and USS providers to assist in compliance with Federal Rules about operations over people.
State or Local Government Supplemental Rule Advisory	Denotes a time and location where a Supplemental Rule may be in effect (such as the requirement to notify an agency prior to use of the land)
Ground Operations Prohibited	Denotes a time and location where take-off and landing of a UAS are prohibited either due to: i) Public Safety requirements, ii) a political subdivision rule under HB 742, or iii) because the site is closed to the public.
Hazard / Obstruction	Denotes air or ground times and locations that may present a hazard to operators, either because of a physical obstruction on the ground or in the air or a hazardous ground condition.

# Proposed NEOFIX Advisory Types

Advisory Type	Description
State or Local Government Information Advisory	Provide local government a voice for local preferences (e.g., safety in operations over people, privacy, environmental concerns) and provide guidance to industry on conditions that may impact the safety or efficacy of an operation or integration into the community.
Public Safety First Responder Emergency Incident Management Response	(e.g., Fire, Police Operations): Inform operators and the public about an area of Public Safety operations so that private operators can avoid interference with public safety operations— manage flight in the air, deconfliction on the ground, and help with creating a temporary flight advisory (TFA) in the context of a Disaster Response.
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Hazard / Obstruction	Denotes air or ground times and locations that may present a hazard to operators, either because of a physical obstruction on the ground or in the air or a hazardous ground condition.
Planned Flight Operation	Provides notification of a planned Flight Operation area
Ongoing Flight Operation	Provides notification of an ongoing Flight Operation area

# Next Steps

<https://bw-centers-tech-partnerships.org/neofix-overview/>



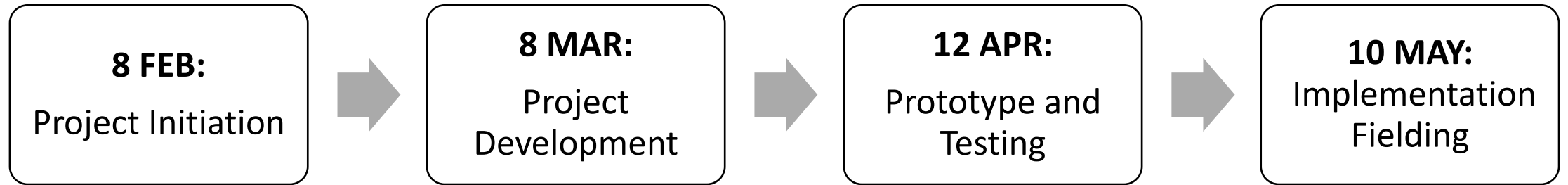
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# Next Steps

- Identify authoritative sources for local data identified in Tabletop by 31 March
- Provision user training / testing accounts for April meeting
- Start loading and mapping data, working with data owners / system users in April
- Approve access control model in April meeting
- Refine advisory types and data in April meeting
- Identify additional data assets and system users
- Target May system deployment

# Next Steps



1. Opt-In
  1. Core Governance Group – provide input, define system parameters and procedures, provide data, use system
  2. Stakeholder / User Group – provide input, provide data, use system
  3. Stakeholder – provide input, use system
2. Register to attend and invite one person to the next event
3. Share information



Q&A



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