NEOFIX
Northeast Ohio Flight Information Exchange

5th quarterly report on the Northeast Ohio Information Exchange: Digital Infrastructure for Drone Services in Cuyahoga County project

Period thru March 31, 2024

Stuart C. Mendel
Project Director

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Website content hyperlinks

Here is a short link for this report if needed: tinyurl.com/neofix-q4report

https://bw-centers-tech-partnerships.org/neofix/
https://bw-centers-tech-partnerships.org/members-supporters/
https://bw-centers-tech-partnerships.org/resources/
www.OH-FIX.com

Questions directed to Stuart C Mendel, Affiliate Professor and NEOFIX Project Director
smendel@bw.edu

April 11, 2024

County's address for notification is:
Cuyahoga County Office of the Council
2079 East 9th Street
Cleveland, Ohio 44115
Attention: Cynthia Mason, Research and Policy Analyst

With a copy to:
Cuyahoga County Department of Law
2079 East 9th Street
Cleveland, Ohio 44115
Attention: Director of Law

Dear Ms. Mason,

This document and attachments comprise the *fifth quarterly* (first quarter of year 2, 2024 calendar year) report on the Northeast Ohio Information Exchange: Digital Infrastructure for Drone Services in Cuyahoga County, abbreviated hereafter as the NEOFIX project.

The format narrative of this document is drawn from the reporting items listed in section 4 of the agreement between Cuyahoga County and Baldwin Wallace University for funding the NEOFIX, cut and pasted as:

> Recipient shall submit quarterly reports to the Clerk of the Cuyahoga County Council. Reports shall be submitted no later than thirty (30) days after the end of each calendar quarter. In each report, recipient shall provide the following:
>
> 1. An itemized list of all expenditures made during the preceding quarter (**see Table I below**).
> 2. An itemized list of project goals achieved during the preceding quarter; (**see Table II below**).
> 3. An itemized list of project goals in progress as of the end of the preceding quarter (**see Table II below).**
> 4. An itemized list of project goals to be completed during the current quarter and an itemized list of project goals to be completed in the next quarter (**see Table III below**).

Swagata Banik, Ph.D.
Dean of Graduate Studies & Research

Stuart C Mendel, Ph.D.
Affiliate Professor and
NEOFIX Project Director

Summary

Briefly, the NEOFIX is a public private partnership, where public sector first-in resources will be amplified well beyond a dollar-for-dollar return for an emerging $10B private industry benefiting residents of the County and the state of Ohio. NEOFIX will provide public safety in Cuyahoga County with a *Common Operating Picture* of drone operations, supporting safe operations and counter-UAS. The NEOFIX puts the County and its airspace within the leading the communities in the nation, applicable as a model program for the state of Ohio.

This fifth quarter report (**TAB 1**) on the progress of the NEOFIX depicts uninterrupted work initially described in the original proposal to the Cuyahoga County District 2 and County Council in Fall 2022. The period covered by this report is January 2024 through March 2024.

To recap year 1 (2023) NEOFIX work outputs:

- Identified and organized the stakeholder community.
- Built the NEOFIX instrument (https://bw-centers-tech-partnerships.org/bw-announces-launch-of-neofix-cuyahoga-countys-new-drone-safety-platform) to stakeholders for their use and refinement;
- Assembled flight and other ground sensor data contributed by private sector corporations with data held by Cuyahoga County GIS and planning programs.
- And focused on public safety and emergency response use-cases as the initial proof of concept.

The NEOFIX project team also performed numerous legislative briefings for Cuyahoga County Administrators and Councilmembers, state of Ohio elected officials and department administrators, and other key public and private actors through December 31, 2023, continuing into year 2 of the NEOFIX project (2024).

Year 2

The work of this past, fifth, quarter continues the strategy to align and leverage Cuyahoga Couty's investment in drone ready critical infrastructure with the similar organizing taking place for the state of Ohio.

Year 2, 2024 calendar year of the NEOFIX work focuses on the financial leverage of Cuyahoga County's investment in the NEOFIX.

To date, the organization Manufacturing Works and the firms CriticalOps, and ATA, LLC and its successor ATA Aviation have contributed in-kind staff time and essential expertise - approximately $350,000 in match to the $450,000 of ARPA Funding provided by Cuyahoga County - which strengthens our case for funding from the state of Ohio via various legislative and administrative sources.

To appeal to the larger concept of Advanced Air Mobility advanced by the state of Ohio, the NEOFIX project team has joined regional stakeholders such as Kent State University's Center for Advanced Air Mobility for joint project development. Our intention is to create the best possible alignment between the NEOFIX with the state of Ohio's DriveOhio Advanced Air Mobility framework (https://drive.ohio.gov/programs/aam/aam-framework).

This *fifth quarter* report can be accessed by visiting: https://oh-fix.com/index.html clicking "About," and then Government sub-tab of the pull-down menu.

Quarterly Narrative on Performance

The *fifth quarter* of the NEOFIX project involved the period January 1, 2024, through March 31, 2024. This time frame reflects the start of the second year of the NEOFIX program development and operation.

Having spent year 1 building the NEOFIX and driving interest in the community for this critical infrastructure, year 2 will proceed with urgency in sharing the NEOFIX concept and design for portability to other Counties of the state of Ohio.

The operational goals for 2024 (year 2 of the NEOFIX project) are:

2024 Goal 1   To establish the NEOFIX and its stakeholders as an authoritative asset and model recognized in the state of Ohio's Fly Ohio programming.

2024 Goal 2   To add data drawn from dedicated Cuyahoga County-placed ground-sensors and reporting purchased by the NEOFIX for charts and made available via the world wide web for public and private local, regional, and Ohio drone stakeholders.

2024 Goal 3   To obtain further funding to advance the NEOFIX as public infrastructure in Cuyahoga County, Northeastern Ohio, throughout the state of Ohio and in cooperating states beyond Ohio.

Past performance - *Fifth quarter*
The work of this past quarter sets in motion a strategy to port the NEOFIX to other Counties in Ohio. We are doing this for two reasons:

- as we seek to align and leverage Cuyahoga Couty's investment in this critical infrastructure with the those coalescing in the state of Ohio and regionally.
- to acknowledge that drone operational friendliness requires the infrastructure be connected uninterruptedly beyond Cuyahoga County.

In the period January 2024 through March 2024, we have continued the process of adding content, scope and engagement with drone stakeholders. We cast this maturation process as a continuing "ripening" and "deepening" of the NEOFIX instrument.

To advance the support of the NEOFIX as critical infrastructure for the Cuyahoga County and beyond, a series of presentations by NEOFIX were made for the purposes of "drone as first responders" (DFR) use cases for broad adoption. See list below:

January 23, 2024   Northeast Ohio Public Safety Unmanned Response Teams (NE0-PSURT) Meeting at TRI-C West https://www.unmannedtacticalgroup.com/

January 25, 2024	Team NEO AAM regional advisory meeting
January 29, 2024	Critical Infrastructure conference in Westlake Ohio
January 31, 2024	JobsOhio convened meeting with ODOT.
February 21, 2024	AAM Multistate Collaborative in Springfield, Ohio
February 23, 2024	Cleveland Metroparks, Flight Policy and GI S
March 1, 2024	Meet with ODOT FlyOhio Director for technical data collaboration specs.
March 7, 2024	TEAM NEO regional AAM meeting – first meeting.
March 18, 2024	Briefing with Max Miller, Congressional Representative District 7 at BW.

Using the concept paper "Northern Ohio Leading Commercial Advanced Air Mobility (CAAM) Critical Infrastructure" (**TAB 3**) as point of departure for the meetings, key takeaways from some of these meetings as listed under **TAB 4** "Briefing Notes and Recap."

In making the case that the NEOFIX is critical public infrastructure meriting funding from the state of Ohio beyond the current grant from Cuyahoga County, the plan to implement the NEOFIX, replicating the Cuyahoga County model is depicted under **TAB 5.** The document entitled "NEOFIX Minium Viable Infrastructure Approach" explains the concept and elements of the plan at the least feasible costs to finish development of the Cuyahoga County model to then be portable to the state of Ohio, for year 3 work of the NEOFIX.

The following introductory paragraphs offer insight:

> The NEOFIX "Minimum Viable Infrastructure" (MVI) approach to Advanced Air Mobility (AAM) Service Enablement (ASE) leverages existing infrastructure combined with new infrastructure investments where needed to reduce total system cost. The design and deployment of NEOFIX MVI (physical, digital, policy, and configuration) is incremental and risk based.

> The NEOFIX MVI approach to AAM recognizes that there is no "one shot" out of the box solution. It requires multiple parties and multiple technologies working together: public and private services for communications and surveillance, sharing of flight planning and intent data, ground space configuration data from local governments, and helping communities prepare for integration.

> The process begins with the discovery of existing infrastructure that can be repurposed for AAM; the hosting of basic public information services by State and Local agencies; and supporting basic, reusable integrations that scale across vehicles and across the different components of the AAM spectrum...

2024 Goal 1 progress
Fifth quarter work continued prior work throughout 2023 with engaged participants from three working groups (Data, design and configuration, sensors integration and planning; and public policy) to deepen the NEOFIX data instrumentation and data collection.

- **Continued** engagement of the County's IT/GIS heads and emergency management staff, including the director of Public Safety & Justice Services under which resides the Office of Emergency Management (CCOEM). This included live demonstration of the NEOFIX was essential at the design, configuration, and sensor integration meetings. Data collection companies shared their data for the January 2024 demonstrations listed above, and the regular February convenings of the stakeholder work groups.
- **Initiated** arrangements for obtaining an NTP (Notice to Proceed) required for the installation of drone detection sensors/equipment at Burke Lakefront Airport, as a location for one of two dedicated sensors at Burke Lakefront Airport with the second at Baldwin Wallace University or the adjacent Cuyahoga County Fairgrounds. This includes installation instructions for the Airport Monitoring Systems and AirSentinel boxes, including mounting requirements, locations, and supplies.
- Technical specs and mounting guides for each of the sensor products are also attached.
- **Crafted** DeDrone / NEOFIX data access agreement for the continued in-kind contribution of data to the NEOFIX by the DeDrone company.
- Briefing meetings were arranged with the state of Ohio House Representatives Sub-Committee Chair Adam Holmes and Co-chair Representative Bernard Willis to link the NEOFIX with the states FlyOhio plan and organizers.
- Briefings were arranged separately with Ohio Senators Dolan, Antonio and Smith for concept familiarity and making the case that the NEOFIX as critical public infrastructure will touch every resident and business of Cuyahoga County.
- February 8, 2024, discussion with Ohio House Representative Brewer related to drone and STEM out-of-school youth programming.
- February 21-2, 2024, NEOFIX panel briefing at the Ohio UAS Center in Springfield Ohio convened by JobsOhio, and ODOT of state directors from Virginia, Texas, Alaska, Oklahoma, Pennsylvania, and California, among others. See **TAB 6**.

2024 Goal 2 progress

Fifth quarter work continued prior work throughout 2023 NEOFIX. Design briefings in January, February and March 2024. These gatherings at BW included:

- Cuyahoga County emergency management, County Planning and GIS staff. Local, regional and national private industry and small and large business drone operators were also included. Among the participants also included Cleveland Airport System, Cleveland Clinic, Cleveland State University, Kent State University, City of Middleburgh Heights Fire Department, Northeast Ohio Public Safety Unmanned Response Teams, Lake County Public Safety Unmanned Response Teams, Team NEO, Aerozone Alliance, Manufacturing Works, Crown Castle Corporation, DRONERESPONDERS.
- Briefings involving the use of NEOFIX integrative data as a model for the state of Ohio emergency response and public safety were convened with Director (ODPS), Director (ODAS) and Assistant Director (ODAS). The second of these meetings was held in January 2024 to position the NEOFIX model as critical infrastructure for use by state of Ohio departments of Administrative Services, Emergency response and public safety,

which had not been participants in the development of the FlyOhio Advanced Air Mobility (AAM) planning held by the Ohio Department of Transportation or JobsOhio.

2024 Goal 3 progress

Fifth quarter work continued prior work throughout 2023. Our overarching goal for 2024 is to receive funding from the grant applications to enable NEOFIX to obtain Cuyahoga County dedicated ground-based sensors.

- The Ohio sources of funding sought are the state's biennial capital bill and the One Time Strategic Investment Fund. The NEOFIX as critical public infrastructure aligns with both these sources. **See TAB 7** "NEOFIX: Enhancing Airspace Awareness to Enable Medical Delivery and Increased Public safety with Drones."
- Outreach has also been made to submit a federal appropriation for a Department of Justice -- State and Local Law Enforcement Assistance - Byrne Justice Assistance Grant (JAG) for $1.1 Million with a focus on "drone as first responder" in northeast Ohio.   See **TAB 8** "Drone as A First Responder Technology Operations Program" (DFR-TOP).
- We have introduced the Cuyahoga County administration to consider allocating program dollars as may be available through Cuyahoga County Emergency management to support the NEOFIX project to enhance drone as a first responder.
- With our partner organization Manufacturing Works, we are seeking to obtain funding from JobsOhio to position the NEOFIX as critical infrastructure leading business development in AAM jobs centered on the Aerozone District of Cuyahoga County.

The NEOFIX will also seek infrastructure project support from multiple State of Ohio (departments of Economic Development and Homeland Security for example) during quarters *six, seven and eight.*

The work of the *fifth* quarter involved NEOFIX goals performance that are reported in the following tables.

Table I   Budgeted and Expense items Fifth Quarter thru 03/31/2024

Line Item	2023 Budget	2023 Actual	2024 Budget	2024 Actual	Notes
Program Development Expenses	$105,000	$107,895	$85,000	$52,500	Salary/fringe
Technical / Software	$ 75,000	$75,000	$75000	$75,000	ATA
Stakeholder Outreach	$ 19,500	$15,000	$15,000	$ 3,750	EHM, Vaux
Data Governance	$ 0	$ 0	$ 5,000	$ 500	contributed
Use Case Development	$ 25,000	$18,750	$ 22,500	$ 15,000	Critical Ops, Food, travel
Total Direct Costs	$224,500	$216,645	$225,000	$146,750	Net 2023 Rollover $7,855 in 2024

Table I Budget narrative

2024 expense allocations for the first quarter include a full payment for program development which includes salary and limited fringe benefits in addition to third party consulting.

The full allocation for subscription to the "Airdex" software necessary to produce the NEOFIX charting and advisories in real time was paid in quarter one.

Rollover funding for year 2023 will be allocated for the purchase of two NEOFIX dedicated sensors. These two pieces of equipment will be installed at Burke Lakefront Airport and a location on the campus of Baldwin Wallace University or the adjacent Cuyahoga County Fairgrounds property sometime during calendar year 2024.

Table II.   <u>An itemized list of project goals to be completed during the third quarter.</u>

Fifth Quarter	
Monthly	Legislative briefings of Cuyahoga County officials - ongoing Legislative Briefings of State of Ohio Officials Draw stakeholders into Public Private Partnership Project proposal for funding of the NEOFIX Public Policy development on user fees
Monthly Thereafter	Monthly User Group Meeting Ongoing Onboarding of USS/UTM Partners Ongoing onboarding of BW partner agency systems Continued collection, mapping, and loading of data assets. Review, extend, updated and maintain data mappings and supplemental language. Funded projects development State of Ohio advocacy to secure infrastructure endorsement and funding
Quarterly Thereafter	Operations System Maintenance and Ongoing Security Compliance Minimum quarterly release of updated application and new features State of Ohio advocacy to secure infrastructure endorsement and funding

TABLE III. <u>Next Quarter goals and activities</u>

Fifth Quarter	
Monthly Thereafter (January 1 – March 31, 2024)	Monthly User Group Meeting Ongoing Onboarding of USS/UTM Partners Ongoing onboarding of BW partner agency systems Continued collection, mapping, and loading of data assets. Review, extend, updated, and maintain data mappings and supplemental language. Funding Proposal development Use Case development and outreach Collaborative projects with regional stakeholders
6th Quarterly and Thereafter (April 1 – June 30, 2024)	Sensor integration Regional Multi-state AAM collaborative System Maintenance and Ongoing Security Compliance Minimum quarterly release of updated application and new features

TAB 2 **January Meetings Notes and Recap.**

I.   Material prepared for the fifth quarter report. Shows the status of the industry (see website below).

https://www.axios.com/2024/01/02/delivery-drones-2024-amazon-zipline-wing

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II.   **Notes from the DAS/DPS meeting are below.**

Agenda

1. Demonstration with Needs
2. Tracking Capabilities (of drones)
3. DOT UAS Center Interaction

Discussion on End-User Pilot Perspective: Pilot consumes the data in native tools + focus of the tool is big three of

1) keeping drones out of places where they should not be present.

2) protecting critical infrastructure,

3) mitigating threats.

Meeting Minutes:

Attendees: Howard Thompson, Stuart Mendel, Andrea Harless, Mark Porter, John Eberhardt, Charles Thomas, Scott Drew, Andy Wilson, Janille Stearmer, Jim Meador, Angie Canepa, Ben Veisbrod, Katrina Flory, and Jason Eiden

1. Keeping drones out of places where they should not be present.
   - pilot consumes the data in whatever their native tools are, such as drone sense (e.g., analogy is that if you are driving in the car, you are having a live feed into your GPS)
   - working within the concept of operation to keep aircraft away from where they shouldn't be (e.g., not overexposing the infrastructure)
2. Tracking Capabilities (for drones)
   - NEOFIX shows static advisory data. Live drone tracking in the production system will be visible in the next deployment using Dedrone via their aeroscope at CLE and the Browns Stadium (connected via a non-fiduciary agreement with Dedrone). The aeroscope does not need a warrant because "agreement to demodulation" is embedded in DJI; sensor only picks up DJI. However, Dedrone works with other manufacturers that can pick up other sensors, including modular radar.
   - Leveraging the scopes, it is good for 10-15 miles. However, realistically, it is good for 5-7 miles over the lake.
   - There was curiosity about performance and testing. Nobody has integrated sensors into pilot testing for performance metrics. An overall performance profile is pending and being built.

- What is the estimate on the number of sensors to pull this off? The capital budget request was 100 RFID, 20-30 optical sensors, 10-15 radar panels, and 10-12 other methods (e.g., audio, RF, etc.). This request will cover 100 square miles.
- In the downtown building area, the radars are useless. The acquisition of radars will be for the airports. The radars in the budget are on a "trial basis." The goal is to integrate different types of sensors for detecting drones - radar (Dedrone), optical (IRIS), audio (SARA), RF triangulation (as a method for identification a signal above the ground)

3. DOT UAS Center interaction
   - as soon as the UAS Center is willing to consume the data, they are able to integrate the data.
   - The work at the UAS Center has a different emphasis. The work under NEOFIX in the county is focused on data as a model that can be replicated throughout the state.
   - Use cases for public safety.
   - Topics of conversation needs to be for the protection of the communities and protection of critical infrastructure. They want emphasis on public safety as the primary focal point.

Andrea's Notes:

Attendees:

Andy Wilson, Director, Ohio Dept of Public Safety

Karen Huey, Assistant Director, Ohio Dept of Public Safety

Katarina Flory, Chief Information Officer/Assistant Director, Ohio Dept of Administrative Services

Janille Stearmer , Assistant Director, Ohio Homeland Security (One duty I have is facilitating our Ohio UAV/UAS Workgroup.)

Ben Weisbrod, Ohio Homeland Security Critical Infrastructure Protection Specialist Northeast Ohio Region

James Meador, Critical Infrastructure and Cyber Protection Program Administrator, Ohio Dept of Public Safety

Charles Thomas - Ohio Homeland Security

Mark Porter, Executive Director, Ohio Homeland Security

Sergeant Jason Eiden, Drone Coordinator, Ohio State Highway Patrol- Highway Patrol Crash Reconstruction — Fly a Mavic 3E

Division of Information Technology

Angela Canepa, Ohio Dept of Administrative Services

Chelsea Treboniak, Scott Drew, Howard Thompson, Stuart Mendel, Andrea Harless

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March 4, 2024

Air Mobility Symposium Examines Policy, Infrastructure Challenges for Forthcoming Aircraft Concepts Held by Ohio State University

Lieutenant Governor Jon Husted (R) mentioned in this story

Discussion at the fourth Ohio Air Mobility Symposium Monday and Tuesday included a focus on policy and infrastructure changes needed to prepare for new aircraft types and their use cases, along with technical conversations about development and certification processes. Speakers included government and military leaders, university officials and industry representatives.

The annual event has been organized by Ohio State University (OSU) students and traditionally held on the OSU campus, though the Monday events took place at the Ohio Statehouse this year.

Symposium Director Cami Herman said the Statehouse location was "a perfect theme" given discussions on policy and that the audience response showed they were "really invested." It also had a number of student attendees, which she said reflects the need for workforce development to support the industry.

Keynote and Individual Remarks

Lt. Gov. Jon Husted said Ohio is on "the leading edge" of advanced air mobility (AAM) development and hosts the National AAM Center of Excellence (NAAMCE) in Springfield, which has helped to attract private sector investment from companies such as Joby Aviation. He also noted Ohio is working with NASA on identifying AAM use cases and added recent events have shown how the new technology can be used for good but is also "troubling in warfare."

Husted additionally discussed the state government's partnerships with federal installations such as the Air Force Research Laboratory (AFRL) and NASA's Glenn Research Center. He also spoke on workforce development efforts, including drone programs, and noted the Monday announcement of $67.7 million in career technical education equipment grants. (See The Hannah Report, 3/4/24.)

House Aviation and Aerospace Committee Chair Adam Holmes (R-Nashport) highlighted the symposium's student-organized nature in his remarks. He emphasized the importance of collaborative efforts between government, industry and academia, and described his committee's mission in regard to the symposium theme of "innovate, elevate, accelerate." Holmes also posed questions about what the future of AAM will look like and discussed how student attendees will play a role in answering them.

Joby Aviation President of Operations Bonny Simi described why the company picked Ohio out of 33 states competing for its manufacturing project (see The Hannah Report, 9/18/23), and gave technical details on the aircraft they plan to build there. They have already conducted a flight over water near New York City, and she said its decibel level when overhead or hovering is quieter than ambient city noise.

Simi further discussed how the aircraft is capable of vertical take off and landing (VTOL) but has no single point of failure as opposed to helicopters. Its flight controls are also easier to learn and use. Safety is one of the company's most important elements, she said as well.

The company's workforce needs in Ohio will include skilled manufacturing technicians, and Simi talked about how they have trained people who had past careers as seamstresses or, in one instance, a butcher. She also said pilots flying Joby aircraft will not face the long time away from families seen in commercial aviation, which could enable them to increase the low rate of female pilots.

Simi additionally discussed the company's acquisition of a building at the Dayton airport for use in its manufacturing operations. (See The Hannah Report, 3/5/24.)

Robert Pearce, associate administrator for NASA's Aeronautics Research Mission Directorate, said Ohio is a "key place" for NASA work on AAM. New AAM aircraft represent a "tremendous number" of use cases, and Pearce added health care support operations excite him the most. He also discussed work on supersonic flight that may be quiet enough for operations over land and hypersonic research.

In response to audience questions, Pearce said NASA has a good relationship with Congress as far as funding and voiced optimism about the U.S. position in regard to international competition on AAM development.

JobsOhio Sector Director for Advanced Manufacturing and Aerospace Tim Sweeney spoke on how Ohio has received recognition from NASA, Aviation Week magazine and the Association for Uncrewed Vehicle Systems International (AUVSI) as a leading state for AAM efforts.

He also discussed potential use cases including health care, efforts specific to each region of the state and how 18 states including Ohio have had collaborative discussions on AAM development. He further noted how Ohio has an end-to-end supply chain for electric VTOL (eVTOL) aircraft.

Chris Caputo, a test pilot for BETA Technologies, described how their Alia electric-charged plane recently finished a three-month evaluation exercise by the U.S. Air Force including simulated casualty evacuation. He also said it can be used for logistics missions and that such aircraft are "efficient and reliable."

Sergio Cecutta, founder and partner at SMG Consulting, discussed the current state of several companies' AAM aircraft development. Those included Joby, BETA, Archer and Volocopter. He also said several other companies including Honda are preparing full-scale demonstrator aircraft this year.

Cecutta additionally cited a poll that found only a quarter of respondents had heard of eVTOL aircraft, AAM or Urban Air Mobility (UAM) concepts. He added it can be even worse when people have the wrong idea of what those represent.

OSU Vice President for Knowledge Enterprise Dorota Grejner-Brzezinska gave remarks on the university's history in aviation research, including for the Apollo program and on stealth technology. She also said it is "very much committed" to AAM in the future.

OSU Center for Aviation Studies Director Blake Stringer described how OSU is "actively participating" in the growth of NAAMCE and detailed a range of university programs related to aviation. He also shared how the OSU airport has seen increased flight education enrollment and annual traffic from 2018 to 2023.

Infrastructure and Safety Panel Discussion

Participants in this panel included Chip Palombini, head of the charging and infrastructure team at BETA; Thomas Mackie, vice president and program director at Woolpert; Rex Alexander, advisor for VTOL infrastructure at the Vertical Flight Society; and Sherry Kish, emerging mobility advisor at HNTB. It was moderated by Fred Judson, director of multimodal technologies and past director of the Ohio Unmanned Aircraft Systems (UAS) Center at the Ohio Department of Transportation (ODOT).

In infrastructure discussions, Mackie and Alexander described how current airports will be useful toward AAM in the short-term rather than new vertiports. There was also discussion on supply chain issues now, and Palombini discussed electric charging infrastructure compared to past aviation fuel needs. The panel also addressed safety and certification issues, including how higher-paced operations carry higher risks.

Kish talked about the issue of local government regulation, particularly when different cities attempt to enact a "patchwork" of laws and some can conflict with Federal Aviation Administration (FAA) jurisdiction. She said the next 20 years will be crucial in terms of policy as well.

After the panel, Kish -- who was previously Columbus Mayor Michael Coleman's deputy chief of staff -- told Hannah News each state needs to understand what its current legislation allows as far as the new aviation concepts and where they want to go in the future.

"I think the biggest focus for Ohio really needs to be how do they educate the local governments so they don't have a big issue later," Kish added. She said that could limit economic development otherwise.

Workforce Development Panel Discussion

This panel included John Sherwood, JobsOhio's director for talent strategy; Marla Perez-Davis, director of the Center for AAM at Kent State University; Emily Thompson, head of talent development, performance and culture at Archer; and Cody Cleverly, workforce development leader at Joby Aviation.

Cleverly and Thompson discussed the shortages of pilots, mechanics and manufacturing workers in the current market. Perez-Davis talked about the need to address that immediately and Sherwood said Ohio holds "a position of strength" in regard to manufacturing education. He further discussed how there has been an increased focus on skilled labor availability when site selection decisions are made.

Other panel topics included how AAM can provide pilots with "9 to 5 stability," according to Thompson, and providing early education that prepares people for the aviation industry. They also discussed how a range of careers are present in aviation, not just pilots and engineers.

Military and Defense Panel Discussion

Elaine Bryant, executive vice president for aerospace and defense at the Dayton Development Coalition and JobsOhio managing director for military and federal installations, hosted this panel. It included Joe Zeis, senior advisor to Gov. Mike DeWine on aerospace and defense; Col. Thomas Meagher, division chief for U.S. Air Force (USAF) Test and Evaluation Programs and Policy; Jacob Wilson, program management team lead for the USAF Agility Prime program; and Sean Calhoun, founder and managing director at CAL Analytics.

Zeis talked about unique AAM use cases, which do not simply replace traditional aircraft or helicopters. He also spoke on how Ohio is fostering a workforce pipeline with universities and other institutions and ways autonomous ground vehicle development can benefit AAM. Meagher, Wilson and Calhoun gave technical details on how these aircraft work and military procurement processes.

Community Engagement Panel Discussion

Community Air Mobility Initiative (CAMI) Executive Director Yolanka Wulff opened by discussing how the term "public acceptance" of AAM assumes there will be pushback. She spoke of fostering "community engagement" instead and said it is important to involve a "broad representation" of people.

Panelists included Clint Harper, AAM infrastructure and community integration advocate at Harper 4D Solutions; Juliet Jordan, managing director of industry affairs and innovation at the National Air Transportation Association; and Joby Aviation East Policy Lead Lydon Sleeper.

Harper talked about how cities can struggle with new transportation technology if there isn't engagement and used scooters as an example. Jordan's comments included that there should be more cooperation between crewed and uncrewed aviation efforts, rather than competition. Sleeper also discussed potential in regional air mobility.

During audience questions, Jordan discussed providing more information about AAM and how not every use case involves passenger transport. Harper concurred with that, but said they do owe a "debt of gratitude" for how that idea has generated initial excitement.

Other Discussions

Whisper Aero CEO and Co-Founder Mark Moore and Robin Riedel, who co-leads the McKinsey Center for Future Mobility, held a "fireside chat" event where they discussed the potential for regional air mobility in depth and how it can use existing airport infrastructure. They also contrasted that to the time required to build out expanded light rail and discussed more environmentally sustainable propulsion methods and the issue of reduced noise to further community acceptance. Moore also talked about venture capital support for smaller aerospace companies and making new aircraft concepts attractive to business customers.

There was also a "working group town hall" event on AAM that included officials from NASA, the FAA, U.S. Department of Transportation and AFWERX. It was moderated by FAA Office of Unmanned Aircraft Systems and Emerging Entrants Security Executive Director Micah Campbell.

NEWS RELEASE   January 31, 2024

NEOFIX takes flight at Critical Infrastructure Modernization Forum in Westlake, Ohio

CIM24 showcases Northeast Ohio Flight Information Exchange (NEOFIX) as a pioneering digital hub for enhancing safe drone operations.

CLEVELAND, OHIO, January 22, 2024 – The Northeast Ohio Flight Information System (NEOFIX), a new data-sharing information system that is enhancing drone safety in the region, will be among the innovative technologies featured at the Critical Infrastructure Modernization Forum (CIM24) at the Westlake Community Services Center on Monday, Jan. 29. John Eberhardt, the president and chief technology officer for ATA Aviation, will discuss the role of NEOFIX in enabling safety, transparency and accountability in the drone industry.

CIM24 will focus on Northeast Ohio's burgeoning Advanced Air Mobility (AAM) industry, which is transforming transportation with revolutionary new aircraft, from small drones for local package delivery and public safety to electric air taxis for regional air cargo and passenger services. AAM systems are quieter, safer and more affordable alternatives to traditional aviation, requiring innovative traffic management for its diverse range of aircraft.

In addition to a session on NEOFIX, there will be panels and workshops on regulatory environments, manufacturing 4.0 pharmaceutical delivery, data management, hybrid threats, and supply chain. Joe Zeis, the Senior Advisor for Aerospace and Defense for Gov. Mike Dewine of Ohio, will deliver the keynote address.

CIM24 is being organized by Critical Ops, LLC, an Ohio-based integration consulting firm, which also among the private industry partners that play a vital role in guiding sustainable operations for NEOFIX. Chelsea Treboniak, the president and CEO of Critical Ops, says CIM24 will include participation by innovators, decision-makers, visionaries and customers who are developing AAM to modernize the transportation infrastructure of Northeast Ohio.

"As we gear up for CIM24, we're not just anticipating an event – we're unlocking the potential of AAM to redefine industries and propel us into a new era of possibilities," Treboniak says. "AAM is more than innovation; it's a transformative force that promises to reshape our world for the better."

A reception following the conference, "Flights after Flight" at Sibling Revelry Brewing in Westlake, will provide an opportunity for speakers and fellow attendees to network and fostering career-transforming connections and valuable industry insights. More information and registration for the CIM24 conference and reception are available at https://criticalops.com/cim-24-registration/

As a collaborative effort between Baldwin Wallace University's Technology Partnerships Initiative, Cuyahoga County, and ATA Aviation, NEOFIX provides real-time awareness for drone operations in Cleveland and Cuyahoga County. During his presentation at CIM24, Eberhardt will discuss the role of NEOFIX in enhancing safety, transparency, and accountability in the drone industry.

"The session on the NEOFIX at CIM24 will show its transformative impact on drone safety and the broader drone industry," Eberhardt says. "By participating in CIM24, we will be contributing to a collective dialogue on critical infrastructure modernization, aligning with our commitment to advancing technology's role in safety and efficiency."

Serving as a publicly owned digital service with data in the public domain, NEOFIX uses an open interface for authorized users to publish key information. A user group comprising of representatives from state and local government, public safety agencies, service suppliers, and critical infrastructure providers will govern the system.

NEOFIX contributes to the safety and efficiency of using drones across various industries, promoting economic growth. Examples include drone use in construction for building inspections, farmland surveys for agriculture, and search and rescue operations by first responders.

In addition to economic benefits, NEOFIX provides environmental advantages by supporting cleaner energy sources for drones, reducing the need for larger ground transportation vehicles, and strengthening the region's resilience against severe weather conditions and climate events. For more information about NEOFIX and public access to the system, please visit the NEOFIX: https://bw-centers-tech-partnerships.org/neofix/.

About NEOFIX:
NEOFIX is administered by Baldwin Wallace University (BW) in Berea, Ohio, on behalf of Cuyahoga County, Ohio. The data in NEOFIX is owned and managed by BWU as a public asset for the people of Cuyahoga County. NEOFIX provides authoritative state and local data sharing for local and state agencies, to UAS Service Suppliers (USS), and to Uncrewed Aerial Systems (UAS) and Advanced Aerial Mobility (AAM) operators. For more information, please visit OH-FIX: https://oh-fix.com.

About Baldwin Wallace University Technology Partnerships Initiative:
Baldwin Wallace University's **Technology Partnerships Initiative** creates the conditions for technology and related businesses development to benefit the education and career opportunities of BW Students, faculty and alumni in the region and Cuyahoga County communities adjacent and nearby to NASA Glenn Research Center and CLE Hopkins. The work

products draw on the notion that BW will incubate social enterprise and engage public private partnership principles as if it were a nonprofit intermediary organization housed in a university setting. For more information, please visit https://bw-centers-tech-partnerships.org/

About Critical Ops:

Critical Ops is an integration consulting company founded in 2012, aimed at assisting organizations with major transformations, merger and acquisition initiatives, and project management. The company offers integration strategy and framework design services, leading functional teams, developing workstreams, and monitoring system transitions. Visit Critical Ops' website for more information at https://criticalops.com/.
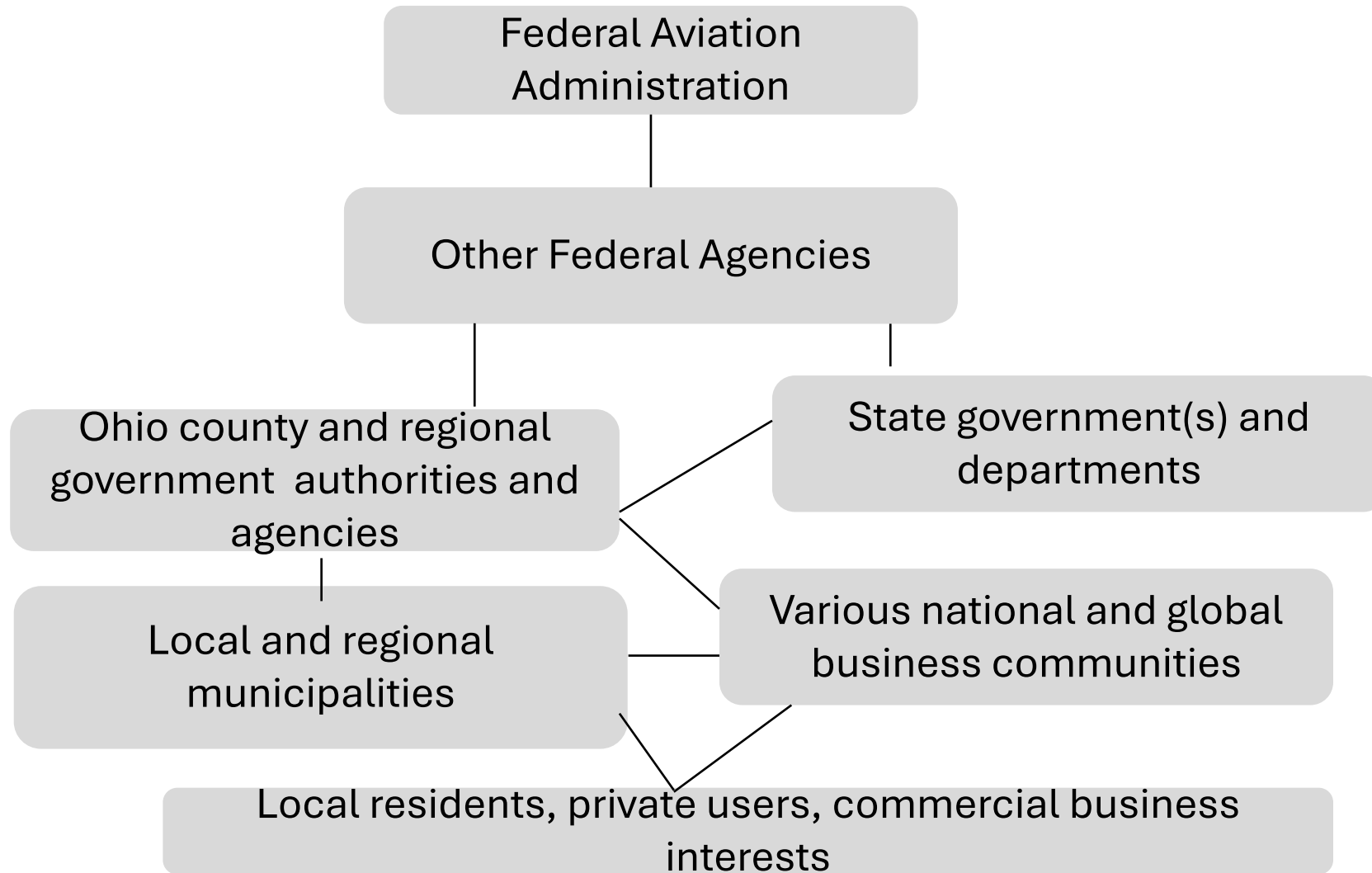
NEOFIX
and the path to a drone ready community

Stuart C Mendel, Affiliate Professor and NEOFIX Project
Director (smendel@bw.edu)

NEOFIX Public Infrastructure Ecosystem & Authority Flow Diagram

Stuart C Mendel, Affiliate Professor and NEOFIX Project Dirextor (smendel@bw.edu)

Programs

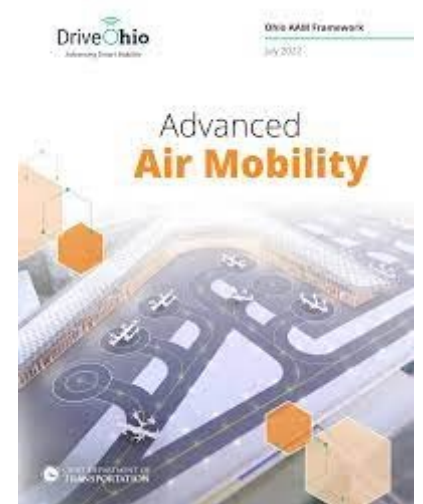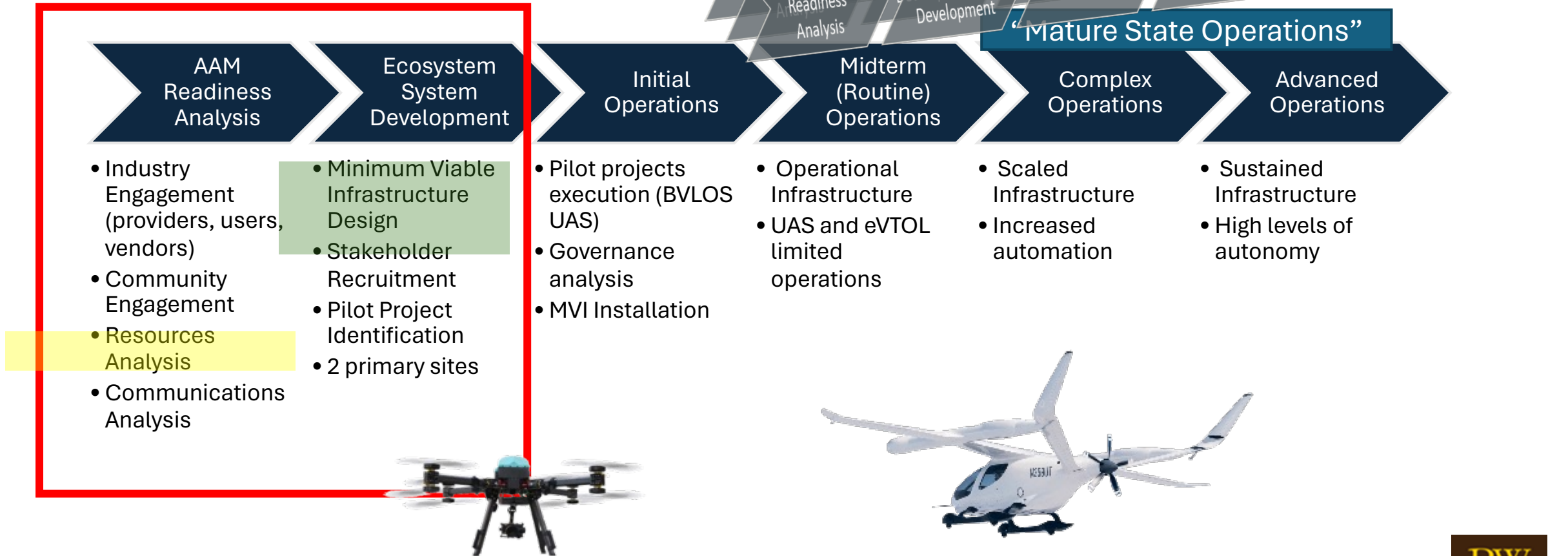| FAA	NASA	Ohio

• Integrate28
• Info-Centric NAS
  • AAM
  • Automation Evolution Strategy
  • Multi-regional Trajectory Based Operations
• UAS Integration
• UAM ConOps v2
	• AAM National Campaign
	• AAM Working Groups
	• Air Traffic Management – eXploration (ATM-X)
	• Extensible Traffic Management (xTM)
	• High Density Vertiplex
		• Ohio AAM Framework
		• SkyVision
		• KSU Center for AAM
		• NEOFIX

Stuart C Mendel, Affiliate Professor and NEOFIX Project Dirextor (smendel@bw.edu)

The Path to AAM

AAM Readiness Analysis	Ecosystem System Development	Initial Operations	Midterm (Routine) Operations	Complex Operations	Advanced Operations

"Mature State Operations"

- Industry Engagement (providers, users, vendors)
- Community Engagement
- Resources Analysis
- Communications Analysis

- Minimum Viable Infrastructure Design
- Stakeholder Recruitment
- Pilot Project Identification
- 2 primary sites

- Pilot projects execution (BVLOS UAS)
- Governance analysis
- MVI Installation

- Operational Infrastructure
- UAS and eVTOL limited operations

- Scaled Infrastructure
- Increased automation

- Sustained Infrastructure
- High levels of autonomy

Stuart C Mendel, Affiliate Professor and NEOFIX Project Dirextor (smendel@bw.edu)

NEOFIX
Northeast Ohio Flight Information Exchange

BW
BALDWIN WALLACE UNIVERSITY

Northern Ohio Governance Advisory Network

The NEO drone ready infrastructure project team

Keri Zipay
Team NEO

Marla Perez-Davis,
Kent State University

Stuart Mendel
Baldwin Wallace University

Ken Patsey
Manufacturing Works

Kyle T. Snyder, Principal
Best Autonomous Insights,
Michael Best Consulting

NEOFIX Minimum Viable Infrastructure Approach

Overview

The NEOFIX "Minimum Viable Infrastructure" (MVI) approach to Advanced Air Mobility (AAM) Service Enablement (ASE) leverages existing infrastructure combined with new infrastructure investments where needed to reduce total system cost. The design and deployment of NEOFIX MVI (physical, digital, policy, and configuration) is incremental and risk based.

The NEOFIX MVI approach to AAM recognizes that there is no "one shot" out of the box solution. It requires multiple parties and multiple technologies working together: public and private services for communications and surveillance, sharing of flight planning and intent data, groundspace configuration data from local governments, and helping communities prepare for integration.

The process begins with the discovery of existing infrastructure that can be repurposed for AAM; the hosting of basic public information services by State and Local agencies; and supporting basic, reusable integrations that scale across vehicles and across the different components of the AAM spectrum. The infrastructure for AAM (excluding vehicles) will likely fall into four key categories:

- **Physical infrastructure**, consisting of both public and private infrastructure, on- and off-airport, such as: take-off and landing areas; Vertiports; Delivery Hubs; transfer facilities; and maintenance and operations facilities.
- **Digital infrastructure** consisting of ground-based sensors for vehicle position and navigation, environmental and weather sensors, navigation and charting services, and vehicle communications.
- **Policy infrastructure** clarifying basic operating rules on the ground, schedules, allowable supplemental rules, and common standards of use.
- **Configuration infrastructure** that supports localities describing how physical infrastructure can be used in a manner consistent with policy infrastructure and provided through digital infrastructure.

Critically, *much of the infrastructure listed above already exists in some form today*. Based on our experience in the Virginia, we are approaching development of the NEOFIX MVI through the following steps:

- **Establish Asset Governance**: Establish a basic, minimum-necessary governance activity that supports state and local agencies in consistently discovering, describing, configuring, and publishing physical and digital assets into the NEOFIX;

- **Asset Discovery and Publication:** Through the Governance activity, work with state and local agencies to discovery AAM assets (e.g., take-off and landing areas, existing sensors) that can be properly and consistently described and published into the NEOFIX;
- **Asset Integration:** Conduct basic data integration and asset publication through digital infrastructure for use by AAM operators and vehicles; and
- **Plan and Pilot Investment:** Identify targeted opportunities to invest in specific physical, digital, policy, and configuration infrastructure through asset integration to demonstrate functionality and performance of the NEOFIX.

NEOFIX Public Infrastructure Ecosystem – Governance Diagram
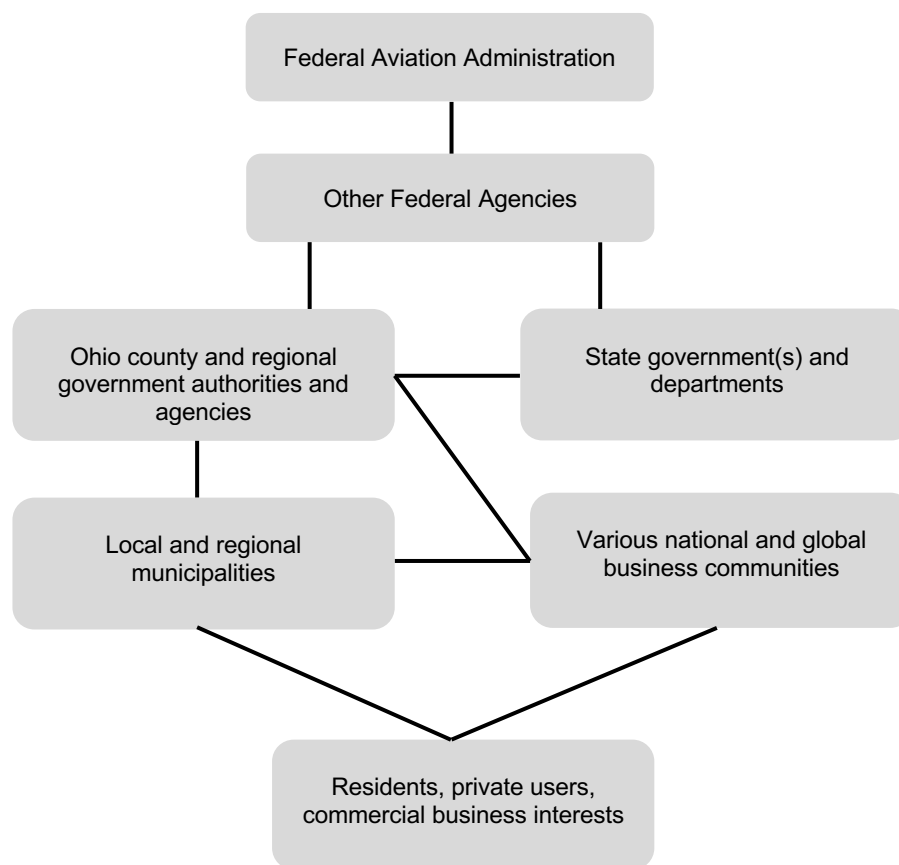
Cost

A key aspect of the NEOFIX MVI is a commitment to infrastructure sustainability as a key driver of an economically viable AAM industry. Current high profile model costs are in the range of $250,000 - $1,500,000 per square mile. ATAA experience with enablement in Virginia and in ongoing work in Alaska and Pennsylvania using the hybrid model suggests initial enablement costs in the range of $25,000 - $50,000 per square mile with long-term costs in the range of $1,500 - $2,000 per square mile by leveraging existing infrastructure and using hybrid public-private services. The lower cost model is made more valuable because it supports the ability to enable services over wider areas (especially for lower income and underserved communities), and results in lower long-term operations and maintenance costs, reducing the risk of under-maintained or abandoned infrastructure.

Risk Assessment

This section provides risk levels assessment details that determine the level of fidelity of surveillance and groundspace description necessary to address the operational-specific risk mitigations. Operational types are based upon specific uncrewed aerial vehicle (UAV) mission objectives:

- Public Safety Drone as a First Responder (DFR);
- Medical Delivery, emergency and non-emergency;
- Retail Delivery, small package;
- Survey / Videography; and
- Recreational Flight.

The initial MVI will support immediately achievable visual line of sight (VLOS) operations focused on public safety and medical delivery:

- Drone as a First Responder; and
- Emergency Medical Delivery.

Operational Descriptions

The following table describes the Operational Types, including equipment specifications, control modes, approximate ranges, examples of Takeoff and Landing areas (ToLa), and examples of payloads. Note the operation type identification number in the left column:

#	Operation Type	Equipment	Control Mode	Range	ToLa Types	Payload
1	Public safety response / overwatch	sUAS <25Lbs	VLOS, EVLOS, BVLOS	3-5 Mi	Public	Imaging sensors

#	Operation Type	Equipment	Control Mode	Range	ToLa Types	Payload
2	Emergency Medical delivery (NARCAN, AED, Epi)	sUAS <55Lbs	VLOS, EVLOS, BVLOS	3-5 Mi	Public, and private	NARCAN, AED, EPI
3	Non-Emergency Medical Delivery	sUAS <55Lbs	VLOS, EVLOS, BVLOS	3-5 Mi	Private	Packages < 5Lbs (HAZMAT, Controlled?)
4	Retail delivery	sUAS <55Lbs	VLOS, EVLOS	1-3 Mi	Private	Packages < 5Lbs
5	Survey / Videography	sUAS <5Lbs	VLOS	<1 Mi	Private and Public	Imaging sensors
6	Recreational	sUAS <10Lbs	VLOS	<1 Mi	Private	Imaging sensors

Table 1: Operational Descriptions

Operational Risks

The summary operational description above is the basis used to develop an operation-specific risk level model. Operations are categorized into four levels of risk, with increasing levels of failure modes, effects, and criticality analysis, referred to as failure mode effects and criticality analysis (FMECA) Risk Tiers:

- Class D: This risk category is never acceptable and must either be engineered out of the system or the operational category must be prohibited.
- Class C: This risk category constitutes outcomes where specific, demonstrable mitigations and redundancies must be engineered into the solution to effectively lower the Class.
- Class B: This risk category consists of those risks for which likelihood or severity are low enough to not warrant specific mitigation but do warrant alerting to the operator.
- Class A: This risk category consists of those risks that do not warrant further action.

The operation specific risk breaks into categories of likelihood and severity per the FMECA matrix below. Based on the assessment of individual operations, the potential severity of the different risk categories can be assessed. This provides the ability to correlate across the proposed operations and the ground assessment to identify the level of service fidelity required for a given operation. The FMECA matrix defines the statistical likelihood of an event cross referenced to the level of risk, and results in the FMECA risk level of the operation:

Table 2: FMECA Characterization

Based on the operational descriptions and the FMECA matrix above, the table below allows for a thoughtful assessment of operational risk that allows us to describe specific risks and mitigations and place each expected operation type into a FMECA category that can then be used to plan the depth and fidelity of enablement coverage.

#	Complexity Elements	Specific Risks	Specific Mitigations	Risk Category
1	Potential for intersecting flight paths; other public safety activity	Loss of separation between UAVs or Manned Aircraft; Vehicle Failure; Exhausted Power Supply	Route/Groundspace design; DAA	Category B
2	Potential for intersecting flight paths; other public safety activity; lowering / delivering goods	Loss of separation between UAVs or Manned Aircraft; Vehicle Failure; Exhausted Power Supply; ensnaring delivery apparatus	Route/Groundspace design; DAA	Category B
3 / 4	Potential for intersecting flight paths; lowering / delivering goods	Same as 2	Route/Groundspace design; DAA	Category B

#	Complexity Elements	Specific Risks	Specific Mitigations	Risk Category
5 / 6	Potential for intersecting flight paths	Same as 1	Route/Groundspace design	Category A

Table 3: Operational Risk Characterization

Ground Risk Tiers

The analysis of ground risk differs from overall operational risk in that we only consider three factors and their interaction with the likelihood and severity of a ground impact: i) population density and exposure on the ground; ii) structures that either contribute to the likelihood of ground impact or mid-air collision or the severity of incident; and iii) topographical features that contribute to the likelihood of ground impact or mid-air collision. Further discussion about how to assess each of these factors follows:

- Population Density and Exposure: This risk considers ground population, population density, population activity, and the nature of structural cover to assess their contribution to the risk of mortality and morbidity in the event of a ground impact incident;
- Air Traffic Density: This risk considers the air traffic density of the specific service volume;
- Structure Risk: This risk considers degree to which ground based structures either contribute to the risk of a mid-air collision (in the case of cranes, towers, or RF interference) or the severity of a ground impact (as in the case of hazardous materials or flimsy cover;
- Climate Risk: This risk considers the region-specific weather patterns and microclimate risks associated with operational type, such as unpredictable winds and visibility due to topographical and structural features; and
- Topographical Risk: This risk considers specific topographical features that may contribute to challenging flight conditions (such as unpredictable winds), loss of communications (such as ridges), or navigational ambiguities (such as inability to assess terrain).

Within these factors, we can assess Low, Medium, or High risk. Because these risks are difficult to quantify, the Low/Medium/High determination for a given factor within a service volume and the overall determination of ground risk for that volume should be narratively derived. That risk can then be matrixed against the operational risk analysis to derive an overall risk pairing, which will then provide a level of requirement enablement fidelity and currency.

In exploring how we segment a particular operational area into enabled volumes, the segmentation can be along topographical lines (because of natural communications barriers that

will be required to treat the volumes separately), operational lines (because of the intended operating areas), or natural "risk" lines that divide a volume based on overall risk.

Integration activities focus on existing, functional systems and sensors that are currently available in the marketplace as the building blocks of NEOFIX MVI. Tiers of sensors are overlaid to provide the right level of fidelity and currency relative to the combined operational / ground profile. The model assumes three Tiers of Performance Based Information provided by the sensor network:

- **Tier 1** provides position, awareness and environmental services at the lowest Performance level, for a combination of lower risk, lower density service volumes and operations
- **Tier 2** provides position, awareness and environmental services at a mid-Tier Performance level, for medium level risk, medium density service volumes and operations or for areas where a medium or high-risk operation occurs in a low-risk service volume
- **Tier 3** provides position, awareness, and environmental services at a high-performance level, commensurate with current General Aviation services, intended to support medium or low risk operations in a high-risk volume, such as adjacent to a General Aviation airport or over an urban core where the risk of injury is greater

Table 4 below provides examples of sensors, costs, and potential coverage areas by Tier.

Tier	Example Sensors	Cost Profile	Example Coverage Area Type(s)
Tier 1	Procedural deconfliction + - RemoteID - ADS-B - Weather - GNSS RTK beacons	Inexpensive <$5,000 / sq mi	Low Density Rural sUAS operations at low weight / altitudes / Part 107 Procedurally deconflicted AAM at higher altitudes
Tier 2	Tier 1+ - Audio - Optical - RF / RDF	Mid-Cost $10,000 - $25,000 / sq mi	Low Density Rural Cargo Suburban Metro sUAS package delivery Group 2 long distance / Group 3 UAS conducting survey activities
Tier 3	Tier 2+ - Radar/LIDAR	Higher Cost > $50,000 / sq mi	Major Urban Area, Airports UAM Vehicle Vertiport Areas sUAS package delivery at high weight

Table 4: Examples of Tiered Sensor Infrastructure

NEOFIX Security

Security is critical to trust in aviation systems and in pursuit of aviation safety. ATA Aviation complies with both National Institute of Standards and Technology (NIST) 800-53 Security and Privacy Controls for Information Systems and Organizations and Virginia Enterprise Cloud Oversight Service (ECOS) Assessments. ATAA incorporates third party assessment findings into development practices and product plans. ATAA approaches security from a Risk Management perspective, identifying and evaluating risk for both the overall scope and severity of potential risk.

ATAA follows a Design Control process that includes rigorous design review, code review, code scanning, integrated automated testing, logging and monitoring, and configuration management. ATAA reviews and assesses systems in compliance with the NIST 800-53 framework. There are many NIST 800-53 controls; ATAA summarizes these using a Confidentiality-Integrity-Availability framework for data security and protection.

Confidentiality

- Access is controlled using dedicated authentication credentials for users and accounts.
- Programmatic access is controlled using authentication credentials, is fully encrypted, and requires all organizations to sign a non-fiduciary interconnect agreement.
- Systems use a three-tiered, role-based access (RBAC) data sharing architecture that divides data into public data, redacted data, and restricted data. Programmatic and public access is logically and physically restricted to public and redacted data.
- Data is encrypted at rest and in transit using Advanced Encryption Standard (AES) 256, Federal Information Processing Standard (FIPS) 140-2 mechanisms at a minimum.
- User access is managed through a programmatic user management function, and password and credential best-practices are enforced.
- The system does not collect personally identifiable information (PII) or payload data.

Integrity

- All data is regularly backed up using a cloud service.
- All data is encrypted, and access is controlled.
- All data must have a data owner who is responsible for quality and integrity.
- When data is added to the system it goes through an automated validation process.
- A regular data management and review process maintains data integrity.

Availability

- Real-time scanning, monitoring, and logging automatically identifies issues.
- ATAA has a detailed incident response policy and adheres to service level agreements.
- ATAA uses deployment automation to correct errors and deploy security patches and updates with design control and configuration management.
- Uptime and latency goals of 99.999% availability and sub-second latency.

EXT: Invitation for NEOFIX to Join AAM Multistate Collaborative in Springfield, Ohio on February 21

John Eberhardt <jeberhardt@ataaviation.com>
Wed 2/7/2024 10:22 AM
To:Stuart Mendel <smendel@bw.edu>
Cc:Tim Sweeney (sweeney@jobsohio.com) <sweeney@jobsohio.com>

Stuart,

We would like to invite you to join the AAM Multistate Collaborative in Springfield, Ohio on February 21 for a roundtable discussion of UAS Traffic Management, to educate our working group on your views on UTM implementation, how this can support AAM at the state level, and what actions states can take to support UTM.

The AAM Multistate Collaborative is a working group focused on harmonizing state and local laws and regulations, infrastructure, and funding that complement FAA policy and advance the AAM industry. It includes representatives of Ohio, Virginia, Pennsylvania, Alaska, Oklahoma, Texas, Utah, Oregon, Maine, California, and others.

We hope that you can join us along with other industry representatives to help us with our thinking and make sure your views are heard.

Please let us know if you can attend, and we will get you travel details.

Best regards,

John

John S. Eberhardt III | Managing Director | ATA Aviation
M: 415.254.7996 | jeberhardt@ataaviation.com
752 Walker Road, Suite D, Great Falls, VA 22066

Northeast Ohio Flight Information Exchange (NEOFIX) — Enhancing Airspace Awareness to Enable Medical Delivery and Increased Public Safety with Drones

General Description:
Funding would support purchase of sensors that detect aviation and drone traffic enabling medical delivery by drones, public safety use of drones for emergency management and law enforcement, and initial safety data for additional commercial aviation uses through the Northeast Ohio Flight Information Exchange (NEOFIX). The results are more effective public safety, growth in good-paying blue-collar technician jobs, and improved services for residents.

Description:
NEOFIX is a transformational regional project. This public private partnership is leading an integrated system allowing for more overall visibility and awareness of the airspace, the ground space, and drones: creating one of the safest and most advanced airspaces in the county. NEOFIX integrates public data to support a common operating picture that public safety can leverage – both to support public safety operations and to identify potential bad actors for counter-UAS (unmanned aircraft system). NEOFIX is digital infrastructure that will accelerate use of drones for public safety while lowering the costs of these operations for commercial and civil operations by allowing State and Local government to publish key information to UAS Operators and Industry, giving everyone engaged in Advanced Air Mobility a clear, common picture – in the same way that charts do for traditional aviation. **Communities with drone ready infrastructure offer strong incentives for manufacturing and testing, business operations, technology development, and workforce training and education. This means having a system like NEOFIX already in place will attract more business to the region that create new high-tech resident services and jobs while empowering public safety and improving resident services. This infrastructure would make Cuyahoga County one of the leading destinations in the country for UAS operations and industry, with one of the largest and best characterized airspaces in the nation covering 75-100 square miles of Cuyahoga County, one of the largest Advanced Air Mobility service areas in the nation.**

Community Engagement:
There are nearly 100 stakeholders engaging in the advisement of NEOFIX. The NEOFIX User Group advises the administrator of NEOFIX on policy and implementation of user governance, information governance, and data governance and supports the activities of the NEOFIX team in working with stakeholders to identify, load, and publish data assets. The NEOFIX User Group includes representatives of state and local government who are users of the system, representatives of local and state Public Safety who may be system users, UAS Service Suppliers who will consume and contribute data from and to NEOFIX, Critical Infrastructure Providers who will exchange data with NEOFIX, and representatives of industry and the public. Each of these stakeholder roles provides input to the data administrator to help reach consensus on how to configure the local and regional ground space for local integration of UAS operations, ensuring each community has a voice.

Additional Information:
The project builds on an existing, operational, successful project to develop initial infrastructure in Northeast Ohio for advanced aviation and funding would complete Phase 1 of this project. The system is currently live and operational in Cuyahoga County and has demonstrated support from national aviation industry members as well as strong support from local entities such as the Cleveland Clinic, Cuyahoga County Office of Emergency Services, Cuyahoga County Planning, City of Middleburg Heights, and others. NEOFIX will support the general public in many ways. There will be a future where drones are the norm for delivery of packages, medicine, food, and other items. This is the next generation of on demand services and it is here:

1) **Overall safer airspace for drone flights** — As more drones take flight, there is an increased number of safety hazards. Drones will be used by companies, hobbyists, professionals, public safety and more. It is imperative we have a way to make sure these drones are able to safely fly free from accidents with each other and buildings or other hazards.

2) **Increased public safety** — For public safety, drones can be particularly useful in situations pertaining to large-area search and rescue of a missing person or suspect; thermal-imaging capabilities for monitoring hotspots during fire

incidents; active-shooter incidents; SWAT standoffs; monitoring hazmat or hostage situations, investigation of fires or car crashes; crowd monitoring at public events; reconstructed 3D models for security planning, and subdivision addressing for 911. In the future, it is anticipated that public safety may be able to use drones for hostage negotiation, bomb investigations, missing persons, and crime-scene analysis. All these situations allow a drone to take the place of human taking the official out of harm's way.

3) **Medical delivery** —There are challenges in rural and urban areas alike with access to medical care including drugs and devices. Medical delivery via drone can reach a person without transportation, with mobility challenges, or far from a medical center. Drones can support regular medical care like delivering a drug or test but also reach a person in an emergency faster than an ambulance with lifesaving medication like NARCAN, and AED, or an Epi pen. With over 100,000 annual emergency medical dispatches in Cuyahoga County, approximately 5,000 calls per year could apply for emergency medical delivery of NARCAN, AED, and Epi pens. **This would reduce harm to over 2,500 people a year, saving over 200 lives annually and potentially saving over $1.5M a year in excess medical costs due to the lack of timely treatment.**

Sensors would be located at:
Burke Lakefront Airport — 1501 N Marginal Rd, Cleveland, OH 44114
Cleveland Clinic Administrative Campus — 26900 Cedar Rd. Beachwood, Ohio 44122
Middleburg Heights Fire Department - 15800 Bagley Rd, Cleveland, OH 44130
Baldwin Wallace University - 275 Eastland Rd, Berea, OH 44017

Funding Breakdown:
Funding for this project supports the development of multiple new residential services. Examples of these services include: 1) uses of drones to support police and firefighter dispatch ("drone as a first responder") that results in reduced dispatches, de-escalation, and lives saved; 2) commercial medical delivery of medications and test kits by the Cleveland Clinic and Metro Health; 3) public emergency medical delivery of items such as NARCAN, AEDs, and Epi pens saving hundreds of lives a year; and 4) commercial retail delivery and logistics services that support industry and job creation. The proposed infrastructure establishes a cost-effective public network with a financial sustainability model developed together with industry that ensures continued access, local financial sustainability, and regional economic development through the best infrastructure in the nation.

Description	Amount
Sensor Acquisition – RTK Navigation Beacons	$12,500.00
Sensor Acquisition – ADS-B Receivers	$30,000.00
Sensor Acquisition – RemoteID Receivers	$475,000.00
Sensor Acquisition – Audio and RF Detection Sensors	$120,000.00
Sensor Acquisition – Radar	$450,000.00
Sensor Acquisition – Optical Sensors	$700,000.00
Sensor Installation and Integration to the NEOFIX Public Network	$599,395.00
Supplies and Consumables for Installation	$113,105.00
Total	$2,500,000.00

Contacts:
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John Eberhardt, ATA Aviation, jeberhardt@ataaviation.com, (415) 254-7996
Andrea Harless, G2G Consulting, aharless@G2Gconsulting.com, (330) 565-2374

April 4, 2024

The Honorable Max Miller
United States House of Representatives
143 Cannon House Office Building
Washington, DC 20515

Dear Congressman Miller:

On behalf of the Greater Cleveland Partnership, Northeast Ohio's leading economic development organization, please accept this letter in support of **Baldwin Wallace University's Drone As A First Responder Technology Operations Program (DFR-TOP)** proposal for Community Project Funding in the amount of $1,200,000 in the FY25 appropriations process. This funding will dramatically expand access of regional public safety departments to "Drone As A First Responder" (DFR) by purchasing and integrating sensors into the Northeast Ohio Flight Information Exchange (NEOFIX) to better track and detect drones and aircraft, providing regional public safety departments with the ability to access shared airspace awareness services in a cost-effective manner to meet FAA requirements for DFR beyond the visual line of sight (BVLOS) programs.

Drone as First Responder (DFR) is a transformational policing method which has demonstrated ability to increase officer and community safety and reduce overall police response times. DFR allows a trained incident commander to "virtually" arrive on scene first before officers are in harm's way. Currently, DFR is limited in its radius and cannot fly beyond the visual line of sight (BVLOS). Because the drone operator cannot see the drone, this increases risk factors such as potentially crashing into objects. For this reason, BVLOS operations are heavily regulated by the Federal Aviation Administration (FAA). The ability to fly drones BVLOS represents the next big opportunity for drone operators in public safety. DFR-TOP, leveraging NEOFIX, makes BVLOS DFR affordable for our regional public safety departments by leveraging shared public infrastructure, resulting in the safety benefits of rapid response DFR and counter-UAS, better efficacy off public safety response through better intelligence, and substantial reduction in waste by avoiding unnecessary or incorrect dispatches due to lack of on-site intelligence.

DFR programs have emerged as a pivotal solution, empowering public safety agencies to meet the challenges of community safety more effectively. By adopting these technological advancements, agencies can strengthen their public safety operations, overcoming obstacles and moving toward a more efficient and responsive model of public safety. The safety of public safety officials, who regularly put themselves in harm's way, should be a top priority for our country. DFR not only enhances safety for our first responders, but it has the added value of increasing the safety of the community and should be available to more public safety entities.

We respectfully ask for your support of the Community Project Funding submission for **Baldwin Wallace University's Drone As A First Responder Technology Operations Program (DFR-TOP)**. Please do not hesitate to reach out with any questions you might have.

Sincerely,

Baiju R. Shah
President & CEO
Greater Cleveland Partnership

Northern Ohio Leading Commercial Advanced Air Mobility (CAAM) Critical Infrastructure Development

Briefing Purpose

Establishing the necessary role of the state legislature and the DeWine Administration in the public private partnership for Ohio's Commercial Advanced Air Mobility (CAAM) critical infrastructure development.

Introduction

The Federal Aviation Administration (FAA) designation of AAM is as an umbrella term for aircraft that are likely highly automated and electric. These aircraft are often referred to as air taxis or electric Vertical Takeoff and Landing (eVTOL) aircraft. They are also more commonly known as drones whose rising usage is fast occurring for commercial and medical delivery, cargo, public safety, emergency response and recreational purposes.

Ohio is a "first-in" adopter of *Commercial* Advanced Air Mobility (CAAM) Critical Infrastructure. One sign for this stature is the investment Cuyahoga County has made in establishing the Northeast Ohio Flight Information Exchange (NEOFIX).

The NEOFIX is a public-private partnership initiative of Baldwin Wallace University with its partner Advanced Technology Applications (ATA, LLC) of Virginia. The NEOFIX is vital technology infrastructure necessary to promote a friendly setting for drone use, repair, manufacturing and assembly industry and jobs development.

Seed-funded by Cuyahoga County District 2 to stimulate business development in the region immediately adjacent to NASA Glenn Research Center, Cleveland Hopkins International Airport and the recently formed Aerozone District, NEOFIX is a program for local government and public safety agencies to post information for each other and drone operators which keep the airspace open, secure, and safe.

The NEOFIX platform allows information sharing in compliance with the Federal Aviation Administration (FAA) and U.S. Homeland Security regulations. Datasets feature critical infrastructure and real-time flight operations while respecting municipal operational security, privacy requirements, public safety, and emergency preparedness practices. Such capabilities empower AAM, ultimately leading to industry adoption and job creation, replicable, throughout Ohio's 88 counties.

The platform may be viewed via: https://bw-centers-tech-partnerships.org/neofix-overview/. The free direct public access site can be found via: https://oh-fix.com/index.html.

Commercial Advanced Air Mobility (CAAM)

Commercial Advanced Air Mobility (CAAM) represents a rapidly growing and transformative market poised to revolutionize various business and public sectors. With its innovative aerial transportation solutions, CAAM has the potential to reshape e-commerce by enabling swift and efficient last-mile deliveries.

Moreover, cargo transport could experience a significant boost, streamlining supply chains and reducing logistical challenges.

In emergency response scenarios, CAAM's agility and speed could save crucial time and lives, enhancing disaster relief efforts. Furthermore, the burgeoning CAAM industry is set to create a plethora of job opportunities, from skilled pilots and technicians to support personnel, fueling economic growth and development. As this promising sector continues to evolve, its far-reaching impacts are anticipated to transcend traditional boundaries, offering society a glimpse of a more interconnected and efficient future.

The NEOFIX is a tangible step in creating commercial AAM with leading North and Northeastern Ohio regional stakeholders that include the nonprofit intermediary Manufacturing Works (MW) and Kent State University.

The potential is driving innovation by companies around the globe and Ohio's CAAM leadership role is also recognized by other states. For example, NEOFIX – the only regional participant among other statewide actors - is a founding participant in the growing collaborative of states that include Virginia, Utah, Pennsylvania, Oklahoma, New Jersey, California and Alaska.

Public Private Partnership (PPP)

Northern Ohio, led by Baldwin Wallace University (BW) and Manufacturing Works (MW), are methodically identifying, and convening private stakeholders and local, state and federal officials to advance publicly owned infrastructure for CAAM. The strategic PPP alliance will guide the future "traffic in the sky," including physical radars, ground based sensors for weather, motion and other necessary drone ready purposes. Safe operations infrastructure accounts for vehicle deconfliction, air traffic data, safety regulations and shared public-data governance.

NEOFIX is public infrastructure - created as a PPP – to set the conditions for "traffic in the sky" which cannot rely on any single company or government action. The coordination of physical radar, vehicle deconfliction, air traffic data, and safety regulations require an ecosystem of partners and stakeholders working together. The NEOFIX is organized to model local infrastructure design to inform and advise the FAA, which looks to each AAM community on how best to organize and implement Federal aviation and airspace policies. The PPP collaboration process started in 2023 stimulated by Cuyahoga County District 2 ARPA funds by defining Northeast Ohio's regionals assets, bringing industry and subject matter experts to the table.

The vision for future CAAM development in Northern Ohio is predicated on these key performance indicators:

- BW and Manufacturing Works (MW) will establish a PPP as a structure for collaboration, cooperation, acquisition, integration, and information sharing. Manufacturing Works will serve as the administrator of the partnership. Partners will be recruited from industry, local communities, state agencies, academia, and national leaders. Invested financial partners currently include Cuyahoga County, Manufacturing Works, Baldwin Wallace University and Kent State University.
- BW and MW will integrate and seek investment from private sector partners that are experts in the field of CAAM. These private sector partners are both new to Ohio and where existing proposing expanded presence as their operations increase. These private companies include Collins Aerospace, OneSky, Crown Castle, Sprite, First Energy, Pierce Aerospace, Cal Analytics, Ecodyne, Michael Best Consultants and Saab.
- NASA Glenn has been integral to the project development offering communication support and potentially the use of Armstrong as a test site.
- **Investment by the State of Ohio over the next five years is seminal to private investment to drive private pay to fiscal sustainability of the CAAM infrastructure.**

Incremental Steps to Achieve CAAM

The *first phase* was the establishment of NEOFIX in 2023, a critical infrastructure platform. Datasets and members are being added daily to advance the platform. This project has advanced under the work of BW's Technology Transfer initiative with its partner ATA, LLC of Virginia.

The *second phase* includes crewed and uncrewed radar and communication testing between Portage, Akron Fulton, and KSU airports. Similar yet smaller demonstrations will then occur at the NASA Armstrong Facility. Partners will provide business services (e.g., inspections, package delivery, etc.) and data services for airspace deconfliction and awareness. These tests engage leaders in CAAM, demonstrating the use case for PPP, data for analysis, and policy recommendations, creating opportunities to open the skies to Electric Vertical Take-Off and Landing (eVTOL) and other scalable energy solutions.

The NEOFIX project is the first step toward CAAM implementation and cargo delivery in Northeast Ohio. Partners will use NEOFIX to provide business services (inspections, package delivery) that accommodate the FAA's regulations referred to by Part 107 UAS operations. Part 107 refers to the FAA rules for small, unmanned aircraft systems (UAS), or "drone," operations concerning a broad spectrum of commercial and government uses for drones weighing less than 55 pounds).

Other partners will provide data services for airspace deconfliction and awareness that will support current flight operations and provide further analysis and advisory for FAA drawing

from local officials responsible for opening the skies to eVTOL and other scalable energy opportunities.

The *third phase* explores air-taxi services and regional connections for supply chain distribution for the polymer industry and medical supplies as just two examples of business chains currently engaged with the NEOFIX. Over time, the network and infrastructure expansion connect to other parts of the state, nearby regions, and the national system. This introduces business models, including user fees and adopted standard operating procedures and policies.

As these development programs are implemented, the NEOFIX PPP will be engaging local, county, state and federal authorities on their impact while working with entities to determine policy considerations for future funding, performance and advancement requirements.

Legislation and public sector support

Achieving the goals for the CAAM infrastructure requires the buy-in of public and private stakeholders. First-in public sector funding is essential to stimulate private investment and the development of a user fee schedule to pay for on-going operations of the NEOFIX and the statewide system.

Additionally, the statewide rollout for commercial AAM, stakeholder training and coordination among the 88 counties, development and coordination of comprehensive state policy on AAM for municipalities and their public safety, emergency preparedness and management, and of course coordination and facilitation with federal agencies such as the FAA, Homeland Security, the national guard just to name a few.

Call to Action

To achieve the vision for the CAAM infrastructure, it is crucial to garner binding support and active involvement from public and private stakeholders, including federal agencies like the FAA, Homeland Security, and the National Guard. Beyond the state legislature and Governor DeWine's office, Ohio actors include DNR, ODOT, JobsOhio, Department of Commerce, EPA, and HAZMAT to name just a few. *The initial focus should be securing public sector funding, as this will catalyze private investment in Ohio*. Moreover, creating a user fees schedule and implementing a collection dissemination system is essential for the sustainable development of NEOFIX and the statewide system.

Furthermore, there is a need for the statewide rollout of Commercial Advanced Air Mobility stakeholder training and coordination among the 88 counties. Target audiences include public and private stakeholders, and content covers public safety, emergency preparedness, and management.

We estimate this investment will require a five-year investment of $2 million per year from public and private support to set the conditions for a sustainable infrastructure necessary to drive the industry described in this briefing. We anticipate long-term sustainability to derive through a user fee system to be designed and implemented during the five-year term.

Drone as a First Responder Technology Operations Program
Enhancing Airspace Awareness for Public Safety to Increase Officer and Community Safety

Request: Baldwin Wallace University seeks $1,100,000 in federal funding through the FY25 Commerce, Justice, Science Appropriations bill within the Department of Justice — Byrne Justice Assistance account for the **Drone as a First Responder Technology Operations Program** to support purchase of sensors which detect aviation and drone traffic enabling public safety use of drones for emergency management and law enforcement, integration of those sensors into the Northeast Ohio Flight Information Exchange (NEOFIX) system, and planning, training, and disbursement of the program to public safety departments in Cuyahoga County.

Issue: Staffing shortages and rising violent crime rates leave public safety officers in a vulnerable position. Drones now have the capacity to assist in active investigations and surveillance, allowing officers to assess potentially dangerous situations quicker, keeping themselves out of harm's way. Drone As A First Responder (DFR) is a pivotal solution, empowering public safety agencies to meet the challenges of community safety more effectively. By adopting these technological advancements, agencies can strengthen their public safety operations, overcoming obstacles and to move toward a more efficient and responsive model of public safety. **Drone as a First Responder Technology Operations Program** will allow more widespread use of DFR for public safety departments in Cuyahoga County.

Problem: There are nearly 800,000 drones registered with the Federal Aviation Administration as of December 2023.[1] There are approximately 1,400 police departments in the United States using drones and that number is expected to skyrocket in the coming years as drones become more accessible and more capable.[2] Policing is a complex job, and staffing shortages and rising violent crime rates make it increasingly more complex. Police drones address these challenges by providing a scalable and effective solution to situations police face.

Drone as First Responder (DFR) is a transformational policing method which has demonstrated ability to increase officer and community safety and reduce overall police response times. DFR allows a trained incident commander to "virtually" arrive on scene first before officers are in harm's way. The drone has a powerful on-board camera which streams HD video back to the department's real-time operations center where a trained critical incident manager (teleoperator) not only controls the drone remotely but communicates with the units in the field to provide information and tactical intelligence. The system can also stream the video feed to the cell phones of the first responders, supervisors, and command staff, so they can see exactly what the drone is seeing. The Chula Vista Police Department has become the nation's model for police departments using drones. According to data from the Chula Vista Police Department, it has sent drones to almost 1,900 calls with an average response time of around 90 seconds. For reference, average response times using officers exceeded 20 minutes in 14 of 15 other departments.[3]

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[1] Federal Aviation Administration: https://www.faa.gov/node/54496
[2] Axon: https://www.axon.com/resources/police-drones
[3] Chula Vista Police Department: https://www.chulavistaca.gov/departments/police-department/programs/uas-drone-program

The safety of public safety officials, who regularly put themselves in harm's way, should be a top priority for our country. DFR not only enhances safety for our first responders, but it has the added value of increasing the safety of the community as it can assist in investigations leading to quicker apprehension of suspects, allow police to better plan for tactical situations where the community may be in danger, and provide critical surveillance at large public events or gatherings where heightened security is necessary. Demonstrating the real-life value of drones in law enforcement, the Grayson County, Kentucky police recently deployed a drone to successfully address a domestic violence case. A women contacted police about a man who was on her property and had threatened her with harm. Because police were not able to see the man on the property, they deployed an infrared-equipped drone. In a short time, the man was located and apprehended, and law enforcement was not forced to get involved in a dangerous situation.[4] In yet another scenario, police in Fremont, California received a 911 call about a man running through a residential area banging on doors with a knife. Officers were rushing to the scene anticipating a potentially dangerous situation. However, the DFR was able to both locate the man first and establish he was only holding a water bottle. This intel helped police officers make appropriate tactical decisions as they responded to the situation putting the officers, community, and the suspects in a position for a better outcome.[5] According to DJI, the world's leader in civilian drones and aerial imaging technology, drones have been directly involved in saving more than 1,000 people from danger around the world.[6]

Of the approximately 1,400 police departments across the country using drones in some fashion, only 15 have obtained waivers from the Federal Aviation Administration to fly their drones beyond the visual line of sight, or BVLOS, of operators. That means the vast majority of departments are still limited in the types of calls they can respond to with drones.

Solution: The Drone As A First Responder Technology Operations Program will use the Northeast Ohio Flight Information Exchange (NEOFIX) technology to enable better airspace awareness. NEOFIX is a public private partnership leading an integrated system allowing for more overall visibility and awareness of the airspace, the groundspace, and drones: creating a safer airspace in Cuyahoga County. The NEOFIX integrates public data to support a common operating picture that public safety can leverage – both to support public safety operations (such as DFR) and to identify potential bad actors for counter-UAS (unmanned aircraft system). NEOFIX is digital infrastructure that will accelerate use of drones for public safety while lowering the costs of these operations, allowing state and local government to publish key information to UAS Operators and Industry, giving everyone engaged in Commercial and Civilian Advanced Air Mobility a clear, common picture – in the same way that charts do for traditional aviation.

Funding for Drone As A First Responder Technology Operations will increase the capacity of NEOFIX by purchasing more sensors to better track and detect drones, integrate those sensors into the systems, and, most importantly, bring on more public safety departments to use the NEOFIX for their DFR programs. The proposed infrastructure establishes a cost-effective public network with a financial sustainability model developed together with industry that ensures continued access, local financial sustainability, and regional economic development through the best infrastructure in the nation.

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[4] WBKO: https://www.wbko.com/2024/01/27/grayson-county-sheriffs-office-drone-finds-suspect-saturday/
[5] IEEE Spectrum: https://spectrum.ieee.org/police-drones
[6] DJI: https://www.dji.com/newsroom/news/dji-records-more-than-1000-people-rescued-by-drones-globally

NEOFIX
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