



The Aircraft are Coming! Where is the Infrastructure?

New CNS physical infrastructure, as well as digital infrastructure, are critical keys to unlocking the promised potential of the AAM industry

Lisa Peterson

VP, Business Development

Aircraft!



Vertiports!



Communications Infrastructure!







CNS Infrastructure for UAS: Tackling Challenges Together... NOW



Communication

> Traditional Aviation

- Most capacity utilized by large air carriers
- Satellite alternatives are emerging but are expensive

> Emerging Aviation

- AURA is only entrant building an aviation-dedicated national network for CNPC or Command and Control (C2) Comms
- But! There are many needs beyond CNPC
- Spectrum issues



Navigation

> GPS is “Gold Standard” but jamming and spoofing are real issues

> Other navigation aids rely on WW2-era technology

> Urban canyon issues



Surveillance

> Lack of available suitable spectrum

> Prohibitive cost of building sites

> Current FAA RADAR

- 2D – No exact positioning
- Private, no access outside of USG

> ADS-B

- 3D awareness but relies on GPS
- Not all aircraft are equipped – bad guys don't use ADS-B!

CNS Enables the UAS and sUAS Markets, BUT...



Regulations

- › The NAS needs a major technology/infrastructure upgrade
- › Lack of procedures for certifying third party service providers – DAA, Comms, data, USS-UTM, etc.
- › Aircraft OEMs must be certified using existing rule basis or Part 11
- › Rules for new infrastructure need to be developed
- › The FAA is relying on industry to figure it all out



Operations

- › CNS Service Providers are developing their own solutions in silos – and assuming away the hard parts
- › Key areas (the hardest parts) are not being focused on holistically



Economics

- › AAM OEMs/Operators are hoping the CNS infrastructure will be completed for them before their EIS
- › They are also praying that the economics won't blow up their business models

So, What is the Industry Doing About It?



Federal

- › Moderate Investment - \$\$\$
- › NASA/FAA UTM CONOPS
- › FAA Test & BEYOND Sites
- › FAA UAM CONOPS / Innovate 28
- › US DOT
- › AAM Interagency Working Group
- › AFRL/AFWERX



State & Local

- › Starting to Invest - \$\$
- › Some state & local gov't's leaning in, developing solutions in silos
- › Most still unclear about the requirements for operational approval and expected role
- › Examples of states funding UAS/AAM initiatives: California, Michigan, North Carolina, North Dakota, Ohio, Oklahoma, Texas, Utah, Virginia



Commercial

- › Significant Investment - \$\$\$\$
- › NASA and FAA are relying on industry to figure it all out
- › sUAS delivery operators took it upon themselves to deploy a “key site”
- › RAM/AAM OEMs and Operators securing funded programs with DoD
- › Reassessing business models and considering Public-Private Partnerships

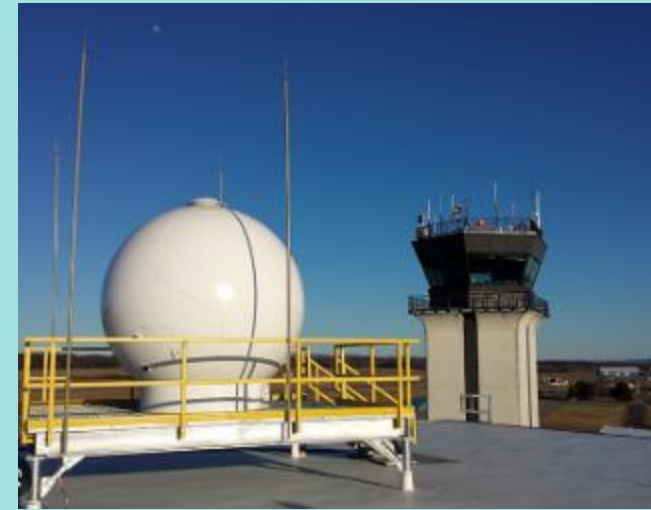
Remember, CNS Infrastructure Planning & Deployment Takes Time!



Sighting, Zoning,
Permitting



Planning & Design Tailored
to CONOPS



Testing, Operational
Approvals

The Take-Aways: AAM Industry Cannot Achieve Safe, Scalable Commercial Operations Without the Infrastructure

- › Plan now so the infrastructure is available
- › Support a solution that scales
- › Reduce deployment costs
- › Present the path to unit economics that work for all members of the ecosystem
- › Empower compliance
- › Demonstrate to regulators that the rules work
- › Positively impact performance
- › Consider Public-Private Partnership models
- › Accelerate time-to-market for each and every one of us



Collaboration is Crucial to Achieving the Industry's Full Potential



NOT



The time is NOW to ensure the enabling infrastructure is in place.

Because divided we fall, together we fly.



AURA's Terrestrial Aviation Network, Purpose Built for UAS

Plan Flights and Reserve Spectrum:
Route Coverage
Postflight Reports



Fleet Manager

Control and Non-Payload Communications (CNPC):
Command & Control Link
ATC Voice / Pilot Voice



Pilot in Command

Airborne Radio:
ATC Voice Relay
Airborne Detect & Avoid
Flight-Critical Telemetry



AURA's focus is on commercial operators who fly in controlled airspace

Digital Voice & Data

Analog Voice



AURA Cell Site

Ground-based ATC Augmentation



Air Traffic Controller

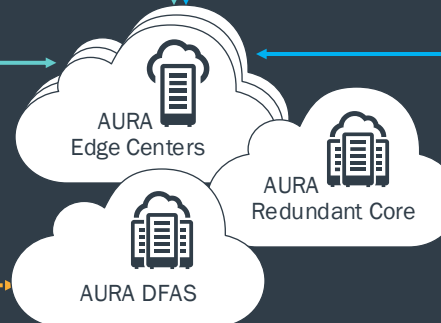
Secured internet or private connection



AURA / Customer Gateway

Private End-to-End Cloud Network
(secure peering / fiber - no internet access)

AURA Services (cloud):
Smart Flight Planning
Spectrum & Link Performance Management



AURA DFAS

AURA Edge Centers

AURA Redundant Core



**Future:
3rd Party Services:**

FAA Data Sets
ADS-B Rebroadcast
Weather & Airspace Hazards Data

KEY:

- ATC Voice
- Dedicated Radio Link
- ← Dedicated Voice & Data Connection
- ← Dedicated Data Connection
- ← Secured internet or private Connection

DFAS = Deterministic Frequency Allocation System

AURA's Dedicated Aviation-Grade Wireless Network – Advantages



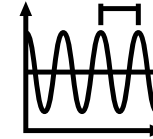
450 MHz FCC Aviation-Licensed Spectrum

AURA's spectrum has the ideal propagation characteristics for aviation and has no altitude restrictions.



Ultra-Reliable Radio Link

Network radio link and spectrum management system enables continuous monitoring and control of UAV for flight operations.



Extremely Low Latency

Network architecture optimized for low latency communication.



Secure, Deterministic Signal

Unlike other service offerings, AURA's network provides point-to-point connectivity for air-to-ground C2 communications.



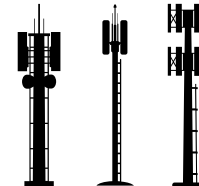
ATC Voice Relay

AURA's network will provide ATC voice solutions essential for UAVs and BVLOS flights in the NAS.



Privacy & Security

The private network avoids connections to the internet, preserving data privacy while securing UAV from hostile actors.



Customer-Led Buildout

Locations of our macro and small sites are driven by customer requirements. Micro sites ("AURA Go Kits") can provide supplemental coverage.



Regulatory Compliance

AURA's regulatory-compliant network will enable certification of next-generation aviation.

INCYMI...

[AURA's Response to the DOT AAM RFI](#)



AURA Message to Regulators: Advanced Air Mobility Depends on Advanced Air Communications

'There can be no AAM industry absent spectrum and communications infrastructure'

McLean, Va. (August 15, 2023) – AURA Network Systems, a Virginia-based startup that seeks licensed spectrum dedicated to use in building the nation's digital aviation communications infrastructure, urges federal regulators and policymakers to create a comprehensive spectrum access plan and continue interagency coordination, while also calling for "a clear FAA approval process for third-party services supporting AAM, including command-and-control."

AURA's comments came in response to a Department of Transportation request for information (RFI) on development of a national strategy for Advanced Air Mobility, or AAM. AURA responded with a 32-page white paper detailing its views.

Bill Topogian, AURA Network Systems founder and CEO, voiced his appreciation for the increased attention given to AAM by lawmakers and regulators, as well as for the call for industry input.

"By passing The Advanced Air Mobility Coordination and Leadership Act last year, Congress got the ball rolling and one of the great things that's come out of this legislation is this Transportation Department request for information on AAM," said Topogian.

"We're at a critical juncture for this nascent industry, and it's a great opportunity for the agency and Congress to hear how we can develop a successful AAM system in the United States. From our view as long-time aviation communications experts, we strongly believe it is in the best interest of federal agencies and industry to formalize the foundation on nature of dedicated aviation spectrum and a capable digital communications infrastructure to the success of any AAM system," added Topogian.

The AURA white paper also details the umbrella concept of Enabling Communications – which encompasses command-and-control (C2), position, navigation and timing (PNT), data link and voice (DVA), vehicle-to-vehicle (V2V), and air traffic control (ATC) voice – as well as the relevant spectrum bands, the standards, and policy considerations for each. As it states, "ultimately, the aircraft, operational plans, and all the enabling technologies and services need to be

ENABLING COMMUNICATIONS
FOR ADVANCED AIR MOBILITY:
TECHNOLOGIES, SERVICES, AND POLICY



[AURA Announces Open for Business in Ohio](#)

AURA Network Systems
4,175 followers
1w · 🌐

The Ohio Department of Transportation's #FlyOhio initiative and AURA today jointly announced that AURA's first commercial network operations purpose-built for autonomous flight will be based at Springfield-Beckley Airport. ...see more

OHIO SELECTED FOR AURA'S
FIRST COMMERCIAL AAM
NETWORK BUILD-OUT

AURA

OHIO DEPARTMENT OF
TRANSPORTATION

flyOhio

AURA — Ohio Welcomes National Leader in Uncrewed Aviation Communications to Springfield
aura.networksystems.com • 4 min read



Thank you.

Lisa Peterson

VP, Business Development

lpeterson@auranetworksystems.com