AAM Ecosystem Community Integration WG: Urban Aviation Weather Testbed
<table>
<thead>
<tr>
<th>Topic</th>
<th>Speaker</th>
<th>Time (EDT)</th>
<th>Description</th>
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<tbody>
<tr>
<td>Introduction</td>
<td>Nancy Mendonca</td>
<td>3:30PM - 3:40PM</td>
<td>Welcome attendees, review the agenda, provide an overview of potential testbed requirements, and introduce speakers</td>
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<tr>
<td>Urban Weather Testbeds / “Living Labs”</td>
<td>Apoorva Bajaj, CASA at UMASS Amherst  Brenda Phillips, CASA at UMASS Amherst</td>
<td>3:40PM – 4:00PM</td>
<td>Provide an overview of their current operations and lessons learned from setting up a “Living Lab”</td>
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<tr>
<td>Weather Sensors</td>
<td>Duer Reeves, Sensar Inc</td>
<td>4:00PM – 4:15PM</td>
<td>Share his work on mobile sensors and experience with the Wyoming Connected Vehicle Pilot</td>
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<tr>
<td>Panelist Discussion</td>
<td>Apoorva Bajaj, CASA at UMASS Amherst  Brenda Phillips, CASA at UMASS Amherst  Duer Reeves, Sensar Inc  Ernest Huffman, NCTCOG  Molly McFadden, NCTOG</td>
<td>4:15PM - 4:50PM</td>
<td>Discussion with Panelists and Active Participants regarding UAM testbeds  If time permits or at the facilitator’s discretion, we will take questions from the Listen Only Participants though <a href="#">Conferences.io</a></td>
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<tr>
<td>Closing</td>
<td>Nancy Mendonca</td>
<td>4:50PM – 5:00PM</td>
<td>Offer a high-level recap of the feedback session and share the Community Integration Working Group next steps</td>
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</tbody>
</table>
Platform and Discussion

• **Active Participants**
  – **Platform:** MS Teams
  – **Discussion:** MS Teams microphone and chat functions
    • Leave your cameras/webcams off to preserve WiFi bandwidth
    • Enter comments/questions in the chat function on the right side of the screen
    • Use your mute/unmute button
    • Type “REQUEST TO SPEAK: [Insert First & Last Name]” in the chat box to notify the emcee that you would like to verbally comment/ask a question
    • Say your name and affiliation before you begin speaking
    • Speak loudly and clearly
      – You will be given up to 90 seconds (1.5 minutes) to verbally comment/ask a question

• **Listen Only Participants**
  – **Platform:** YouTube Live Stream *(go to https://nari.arc.nasa.gov/aamecosystem for the link!)*
  – **Discussion:** Conferences.io
    • Enter [https://arc.cnf.io/](https://arc.cnf.io/) into your browser
    • Select the Community Integration Working Group: Urban Aviation Weather Testbed
    • Questions will be addressed *if time permits or at the facilitator’s discretion*
Aviation Urban Weather Test Data Ecosystem

Urban Infrastructure Weather Living Lab(s)
- Generate data to answer policy & research questions
- Test Sensors
- Test data collection architectures and communication paths
- Determine Data sufficiency

Local & AAM Communities (Not just weather data for aviation)

Greater resolution
- Appropriate sample frequency
- Surface and aloft measurements
- Specialized and non-specialized sensors
- Robust – e.g. aloft data during a hurricane
- Multiple users e.g. bridge icing

AAM Aviation Weather Data
- Weather Data Performance Standards
- Data “quality” checks

Weather Data Interface Standards
- Common Data Formats
- “Common” Weather Data
  - Compacted
  - Translated
  - Real-time
  - Test sets
  - Processed

Aviation Weather Policy
- Research Standards
- FAA

Airspace Simulation Models
- Weather informed Decision Support Tools
- NASA (ATM-X)
- Private Sector

Urban Weather Models
- Models Forecasts

Weather Simulation Testbeds
- Simulate local weather conditions

Weather SDSPs
- Value added services
- Decision support tools
- NASA SBIR
- Private Sector

3rd Party Services Private Sector
- Operations
- Value added services
- PSUs
- NASA (RVLT)
- Vehicle & Vertiport Operators

Performance Modeling Ride Quality
- Vehicle Design

Greater resolution
- Appropriate sample frequency
- Surface and aloft measurements
- Specialized and non-specialized sensors
- Robust – e.g. aloft data during a hurricane
- Multiple users e.g. bridge icing
Related Current Weather Testbeds

• NOAA/NWS Aviation Weather Testbed, Kansas City, MO

• FAA William J. Hughes Technical Center, Atlantic City, NJ

• Center for Collaborative Adaptive Sensing of the Atmosphere (CASA), Dallas/Ft Worth, TX
  • North Central Texas Council of Governments (NCTCOG)
  • University of Massachusetts

• Wyoming Dept of Transportation Connected Vehicle Pilot, WY
  https://wydotcvp.wyoroad.info/
• Out of Scope
• In Scope
• Ground Rules
• Initial Thoughts on Sections
  • Guiding Principles
  • Questions needing to be answered e.g. weather measurement density
  • Sensors
  • Architecture
  • Data

Needs to provide benefit to the community

Modeled on other existing requirements documents

Aviation Weather Infrastructure Test Bed “Requirements” Document
Weather Related Questions

• How do we become involved in the Vertiport Standards Workgroup; Community Building and Interaction Workgroup and Weather Workgroup?

• Weather is one area where collaboration with nontraditional stakeholders can help. For example, working with Connected and Automated Vehicles (CAV) stakeholders to sense weather and feed it to UAM could help improve micro weather understanding.

• How does NWS/NOAA intend to measure micro-weather conditions, in real time, within 1.5 kilometers?

• What efforts are underway to install weather sensors on aircraft to collect and report weather data and are UAS included?
Panelist Presentations
NASA AAM Weather Related SBIR Awards

• Weather Sensor and Data Monitoring (WSDM) Service - ResilienX
• Forecast and Real-time Status of Airspace Closures for Traditional and New Entrant Users – Mosaic ATM
• An Autonomous Severe Weather Trend Monitor for Improved System-Wide TFM Execution – AVMET
• Networked Aviation Urban Climate Stations – Robust Analytics
• Low-Altitude Wind Hazard Alerting and Rerouting Service – ATAC/NCAR
• General Urban Area Microclimate Predictions Tool for Small UAS (Phase II) Intelligent Automation
• 3 Inflight Icing Hazard Mitigation Technology awards – Innovative Dynamics, Inc., CU Aerospace (CUA) and team partner the University of Illinois at Urbana-Champaign (UIUC), and Blue Storm Associates, Inc. with partner PEMDAS Technologies and Innovations
• For specifics, please go to https://sbir.nasa.gov/SBIR/abstracts/20-1.html
Additional Resources

• American Meteorological Society (AMS) – Committee on Open Environmental Information Services:
  
  https://www.ametsoc.org/cwwce/index.cfm/committees/committee-on-open-environmental-information-services/

• University Leadership Initiative Award Announcement
  – Real-time Weather Awareness for Enhanced Safety Assurance in UTMIPI: Jamey Jacob (Oklahoma State University)
  – Co-Is: Sean Bailey (University of Kentucky), Keith Brewster (University of Oklahoma, Norman), Phillip Chilson (University of Oklahoma, Norman), Carrick Detweiler (University of Nebraska, Lincoln), Brian Elbing (Oklahoma State University), Nicoletta Fala (Oklahoma State University), Imraan Faruque (Oklahoma State University), Adam Houston (University of Nebraska, Lincoln), Anders Jensen (NCAR), James Pinto (NCAR), Ryan Sobash (NCAR), Suzanne Smith (University of Kentucky), Craig Woolsey (Virginia Tech), Kraettli Epperson (Vigilant Aerospace Systems)
  – Topic: Real-Time System-Wide Safety Assurance
  – Period of Performance: 4 years, dates TBD
  – Link: TBD
Future Meetings

The Community Integration Working Group will hold their meeting on the first Thursday of every month from 3:00PM -5:00PM EDT (12:00PM -2:00PM PDT).

• Oct 1, 2020: Topic 2: Weather Data Standards
• Nov 5, 2020: Topic 3: Modeling and Forecasting
• Dec 3, 2020: Topic 4: Weather SDSPs
• Jan 7, 2021: Topic 5: Weather Policy and Regulations
• Feb 4, 2021: Topic 6: Vertiport Series Kickoff

POCs: Nancy Mendonca: nancy.mendonca@nasa.gov & Anna Cavolowsky: anna.e.cavolowsky@nasa.gov
Panelist Biographies
Nancy Mendonca, is currently the NASA ARMD portfolio manager overseeing the formulation of new projects within ARMD and a member of the ARMD headquarters office responsible for strategic analysis and resource management. She served 24 years in the Navy flying H-46 helicopters. Between the Navy and NASA she worked at the Missile Defense Agency, on the Marine Corps MRAP Program and at NTIA working on the Federal Strategic Spectrum Plan. She graduated from the U.S. Naval Academy with a B.S. in Aeronautical Engineering and subsequently earned M.S. degrees in Aeronautical Engineering and National Security and Strategic Studies. She is also a Certified Public Accountant and has currently prioritized rescuing Great Danes and riding horses over flying helicopters.
Apoorva Bajaj works as Innovation Manager and Senior Research Fellow at the Center for Collaborative Adaptive Sensing of the Atmosphere (CASA) at the University of Massachusetts, Amherst. He is leading the development of technology to support safe routing of remotely piloted and autonomous aerial vehicles around weather. Apoorva facilitates CASA’s participation in the NASA Systems Integration & Operationalization (SIO) program, NASA Advanced Air Mobility National Campaign and ASTM F38 Weather Standards Working Group. He is a member of the North Central Texas Council of Governments UAS Safety & Integration Taskforce. Apoorva supports CASA’s overall efforts in new product development, marketing and business development for weather radar systems and technologies. His overall focus is on development of new business models for acquisition, deployment and operation of sensor networks for public safety, commerce and defense applications.
Brenda Philips is a Research Professor and Co-Director of CASA, the center for Collaborative Adaptive Sensing of the Atmosphere at UMass-Amherst. CASA creates next-generation environmental sensing warning systems for socio-economic benefit. Her research focuses on severe weather warning as a sociotechnical system; living lab test beds; co-creation with users; and risk perception and response.
Duer Reeves has been building data-driven decision support systems for much of his 30 year career. His current company - Sensar - develops advanced internet of things solutions for a variety of transportation applications. Sensar's road weather sensor systems are deployed by the Alaska Department of Transportation & Public Facilities and the Wyoming Department of Transportation to help guide winter road maintenance decisions. A resident of Boulder Colorado, Duer enjoys hiking and fine wines.
Ernest Huffman was born and raised in Syracuse New York and received his Bachelors in Aeronautical Science from Dowling College and his Master’s in aviation from Florida Institute of Technology. With over 17 years in the industry Mr. Huffman has worked all over the country as an Aviation Consultant. Included in that is his work as an Airline Technical Representative designated with managing the development of the O’Hare Modernization Program on behalf of the airlines previous to moving to the DFW Area. His current role is the Aviation Planning and Education Program Manager for the North Central Texas Council of Governments. There he manages numerous programs including the Aviation Education Initiative, Regional Aviation System plan and the UAS Safety and Integration Task Force.
Molly McFadden is the Director for the North Central Texas Council of Governments’ Department of Emergency Preparedness (NCTCOG EP). EP is responsible for collaborating and coordinating with local, county, regional, state, and federal agencies to implement and enhance regional emergency preparedness and homeland security programs.