Urban Air Mobility Noise Working Group (UNWG) Update

(A Panel Session)

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Brenda Henderson (NASA Glenn)

29 April 2021

AEWG Aircraft Working Group

UAM Noise Exploratory Meeting (April ’18)

- Positive interest in forming a focused working group to define and address noise goals for UAM vehicles.
- Participants should include stakeholders across industry, government agencies, academia, and community groups.
- Focus efforts on reducing or eliminating the barriers associated with community noise.
- Key topics of interest include:
  Tools & Technologies (Subgroup 1 – NASA led)
  Ground & Flight Testing (Subgroup 2 – NASA led)
  Human Response & Metrics (Subgroup 3 – NASA led)
  Regulation & Policy (Subgroup 4 – FAA led)

~ 70 attendees at Exploratory Meeting

UNWG Organization

UNWG Leads: Stephen Rizzi (NASA Langley) and Brenda Henderson (NASA Glenn)

Subgroup 1: Tools and Technologies

Leads: Doug Boyd and Len Lopes (NASA Langley), Jeremy Bain (Joby)

Subgroup 2: Ground and Flight Testing

Leads: Kyle Pascioni (NASA Langley), Devin Boyle (NASA Glenn), Juliet Page (Volpe)

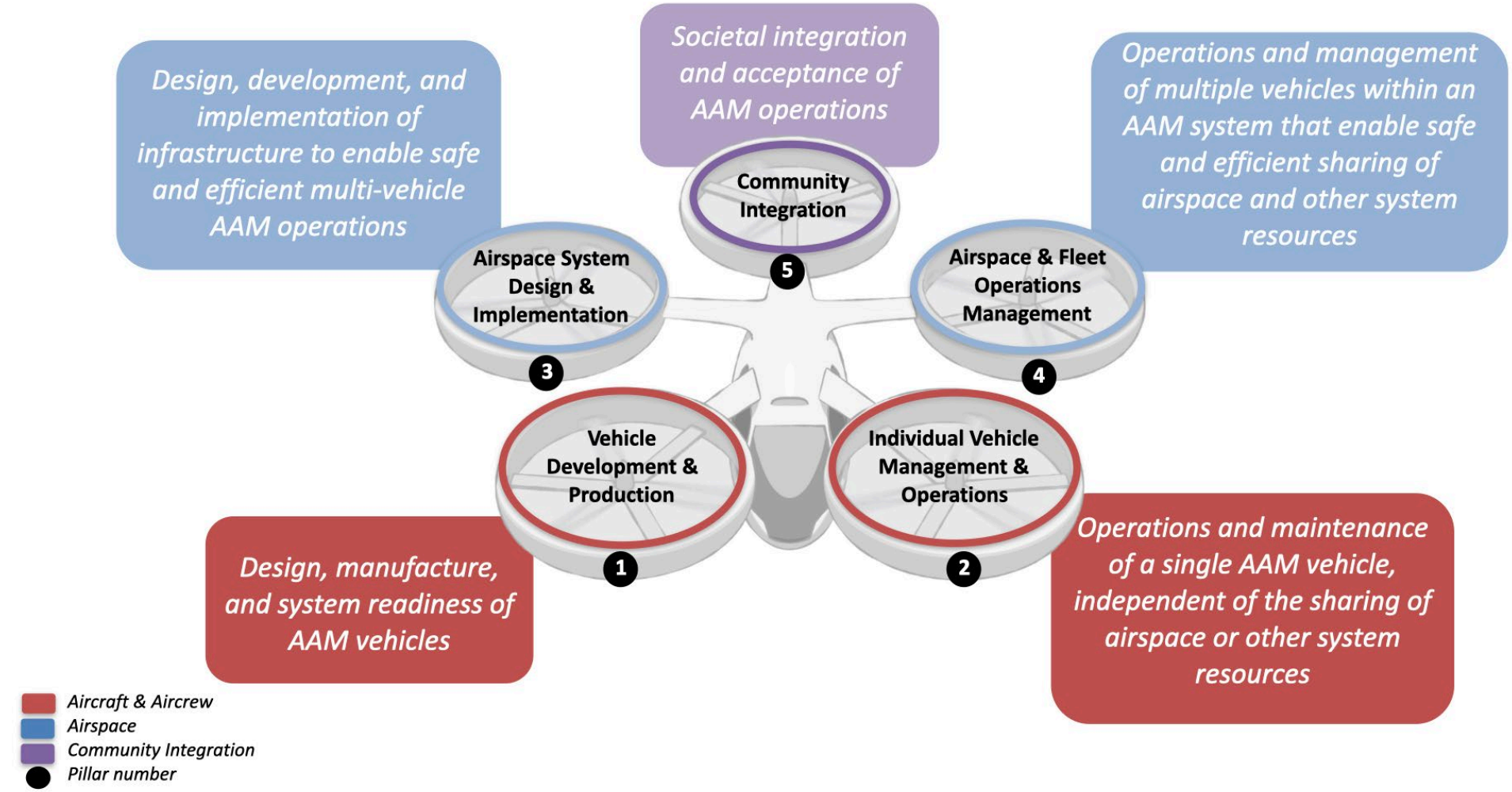
Subgroup 3: Human Response and Metrics

Leads: Siddhartha Krishnamurthy (NASA Langley), David Josephson (Josephson Engineering)

Subgroup 4: Regulation and Policy

Leads: Bill He (FAA Office of Environment and Energy), Royce Snider (Bell Flight)

UNWG Subgroups and the 5 Pillars



UNWG Meeting Recap

- Two face-to-face meetings per year held in conjunction with NASA Acoustics Technical Working Group meeting – Spring (LaRC), Fall (GRC)

- 1st Meeting – Focus on organization, defining the scope and setting of goals
  - October 2018 @ NASA Glenn
  - 95 attendees

- 2nd Meeting – Focus on white paper development
  - April 2019 @ NASA Langley, 125 attendees

- 3rd Meeting – Focus on experimental database and model validation
  - October 2019 @ NASA Glenn
  - 131 attendees

UNWG Meeting Recap

- 4th Meeting – Focus on community outreach
  - April 2020 @ Virtual – hosted by NASA Langley with support from NARI
  - 180 registrants

- 5th Meeting – Focus on human response and metrics
  - Nov 2020 @ Virtual – hosted by NASA Glenn
  - 250 registrants

- 6th Meeting – Focus on ground and flight testing
  - April 15, 2021 @ Virtual – hosted by NASA Langley with support from NARI
  - 340 registrants

Scope of the UNWG

The UNWG is focused on UAM vehicles and operations with attributes that include:

- 6 or fewer passengers (or equivalent cargo),
- a single pilot or autonomous control,
- approximately 100 nautical mile missions flown under 3000 feet above ground level,
- flight speeds of 200 knots or less,
- payloads ranging from 800 to 8000 pounds, and
- eVTOL with either all battery power or hybrid-electric propulsion

UNWG High Level Goals

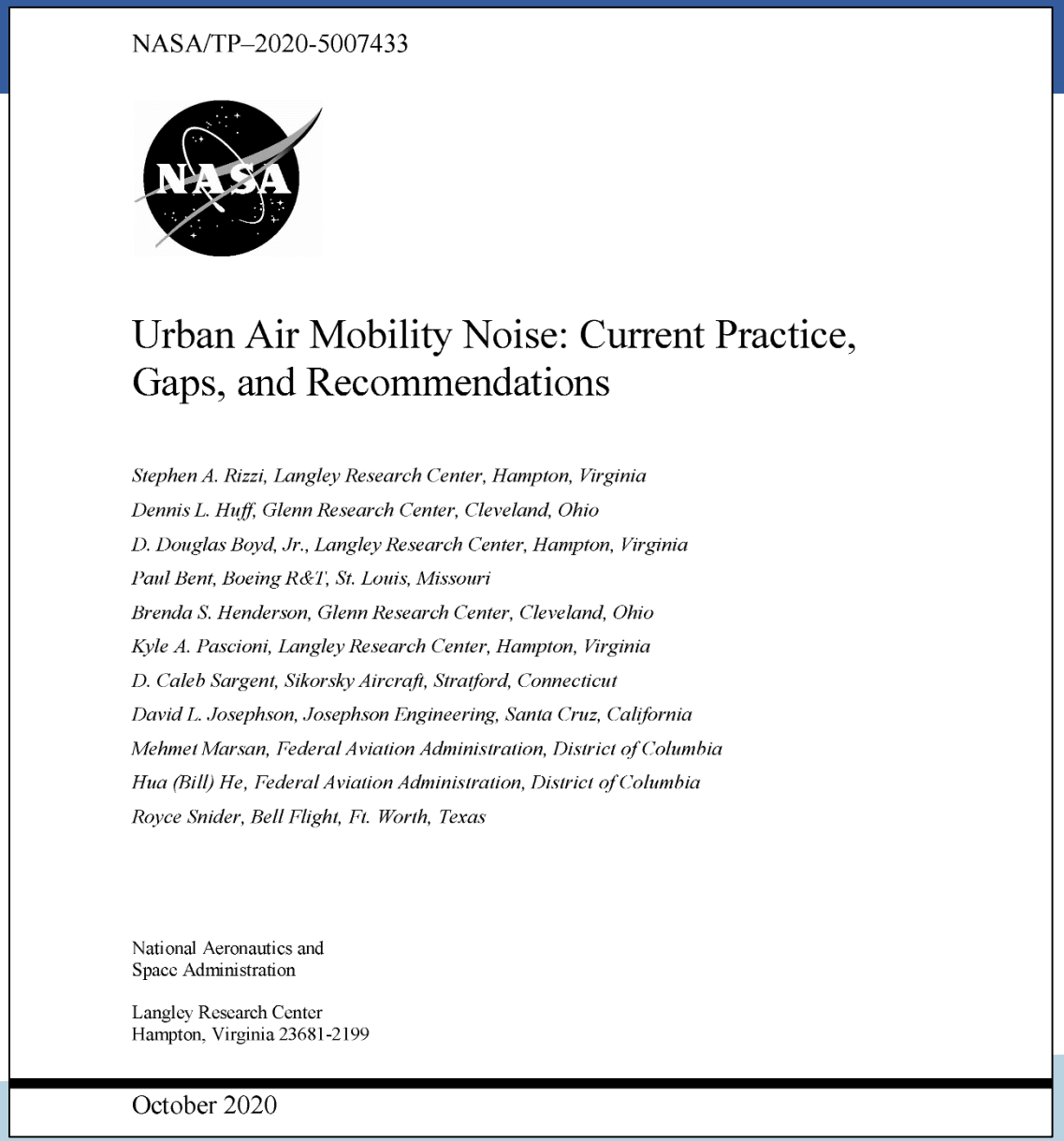
- **Document noise reduction technologies available for UAM and identify knowledge gaps for each of the four areas of interest (UNWG subgroups).**
- Assess prediction capabilities for benchmark problems based on an open set of reference vehicle designs using available data.
- Define measurement methods/procedures to support noise regulations and assessment of community noise impact, and coordinate with UAM vehicle manufacturers on development of low noise approach and takeoff procedures for piloted and automated operations.
- Assess metrics for audibility and annoyance of single-event vehicle operations using available predicted and measured data.
- Examine fleet noise impacts through prediction and measurement, and characterize effectiveness of supplemental metrics for audibility and annoyance.
- Promote UAM integration into communities through mitigation of fleet noise impacts, and engagement with the public.

White Paper

Published as NASA/TP-2020-5007433

Available for download via the NASA Technical Report Server (NTRS):

https://ntrs.nasa.gov/search?q=20205007433



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Urban Air Mobility Noise: Current Practice, Gaps, and Recommendations

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