New York Community Aviation Roundtable (NYCAR)
Meeting: Wednesday, July 26th, 2023

7:00 – 9:00 PM

Online Zoom Meeting

Co-Chairs:
Barbara E. Brown
Maria Becce

Facilitator: *Bill Huisman*

Agenda

1) Welcome/Introductions	7:00
2) Roll Call	7:10
3) Minutes *Lei Zhao*	7:15
4) 2023 FAA Reauthorization Passed by House	7:20
Jaime Banks, Quiet Communities, Inc.	7:25
5) ASCENT Center of Excellence	7:30
Fabio Grande, Office of Environment and Energy (AEE), FAA	
6) EPA Regulations and International Collaboration on Aircraft Emissions Standards & Q&A	7:50
Daniel Birkett, Technology, Transportation and Radiation Branch, EPA Region 2	
7) Noise Policy Review: Member Recommendations for NYCAR Comments	8:30
8) Letter from NYS Dept of Health--Member Recommendations for Response	8:45
9) Public Comment Period	8:55
10) Adjournment	9:00

ASCENT – THE AVIATION SUSTAINABILITY CENTER

The FAA Center of Excellence for Alternative Jet Fuels and Environment

Presented to: New York Community Aviation Roundtable

By: Fabio Grandi
Chief Scientific and Technical Advisor for Environment and Energy (Acting)
Office of Environment and Energy
Federal Aviation Administration

Date: July 26, 2023

Presentation Outline

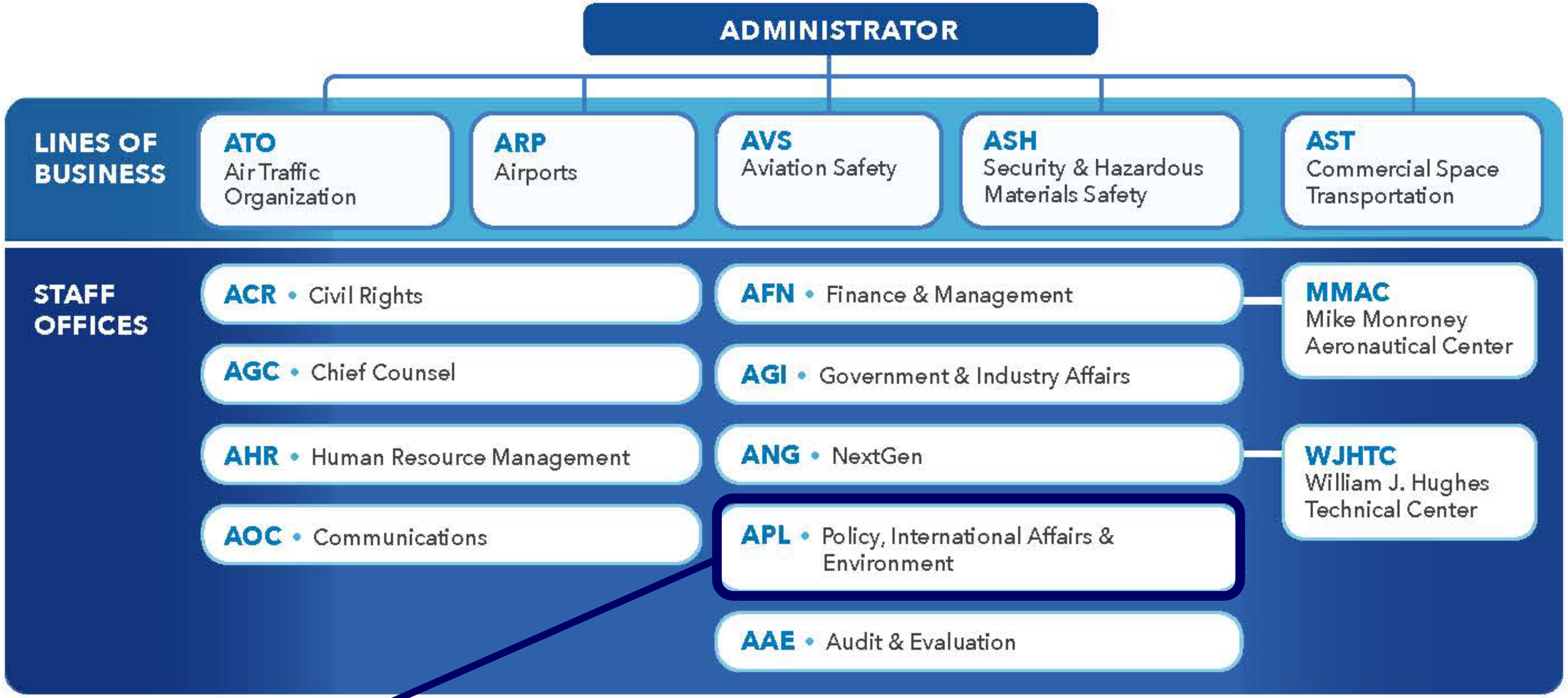
- ASCENT COE Context and Background
- ASCENT COE Highlights

Presentation Outline

- **ASCENT COE Context and Background**
- ASCENT COE Highlights

3

Sponsor’s position within the FAA Organizational Structure



Office of Environment and Energy (AEE)

- Office within APL, responsible for broad range of environmental policies
- Roughly 45 staff members (in process of expanding)
- Responsible for roughly 1/3 of FAA RE&D Budget and I.R.A. Programs

AEE Organizational Structure

- **Executive Director**
  Kevin Welsh
  AEE-1
- **Deputy Director**
  Julie Marks
  AEE-2
  - **Chief Scientific and Technical Advisor for Environment and Energy**
    Fabio Grandi (AEE-3) [1]
    (Acting)
  - **Special Assistant to the Chief Scientific and Technical Advisor**

  - **Senior International Advisor**
    Dan Williams
    AEE-5
  - **Senior Policy Advisor**
    Eric Elmore
    AEE-6
  - **AEE-100**
    Noise Division
    Don Scata
    Manager
  - **AEE-200**
    Technology & Operations Division
    Arthur Orton
    Manager [2]
  - **AEE-300**
    Emissions Division
    Ralph Iovinelli
    Manager
  - **AEE-400**
    Environmental Policy Division
    Shawna Berry
    Manager
  - **AEE-500**
    Energy Division
    Nate Brown
    Manager (Acting)

[1] ASCENT Program Manager, as a subset of his Chief Scientist duties

[2] CLEEN Program Manager, as a subset of his Division Manager duties

FAA Environmental & Energy (E&E) Strategy

E&E Mission: *To understand, manage, and reduce the environmental impacts of global aviation through research, technological innovation, policy, and outreach to benefit the public*

E&E Vision: *Remove environmental constraints on aviation growth by achieving quiet, clean, and efficient air transportation*

E&E Program:

ADVANCE UNDERSTANDING OF NOISE, EMISSIONS, AND THEIR IMPACTS

- Vehicle operation
- Pollutant measurement
- Atmospheric propagation
- Societal impacts

Aviation Environmental Tools Suite and Communication Tools

- Today's Fleet of Aircraft and Helicopters
- Drones and Advanced Air Mobility Vehicles
- Commercial Supersonic Aircraft
- Commercial Space Vehicles

POLICY MAKING AND OUTREACH

- Domestic Environmental Policies
- Aircraft and Engine Standards
- CORSIA
- Long Term Goal Development
- Community Engagement

DEVELOP INNOVATIVE SOLUTIONS TO REDUCE NOISE AND EMISSIONS

- Aircraft and Engine Technology
- Sustainable Aviation Fuels
- Optimized Operations and Procedures

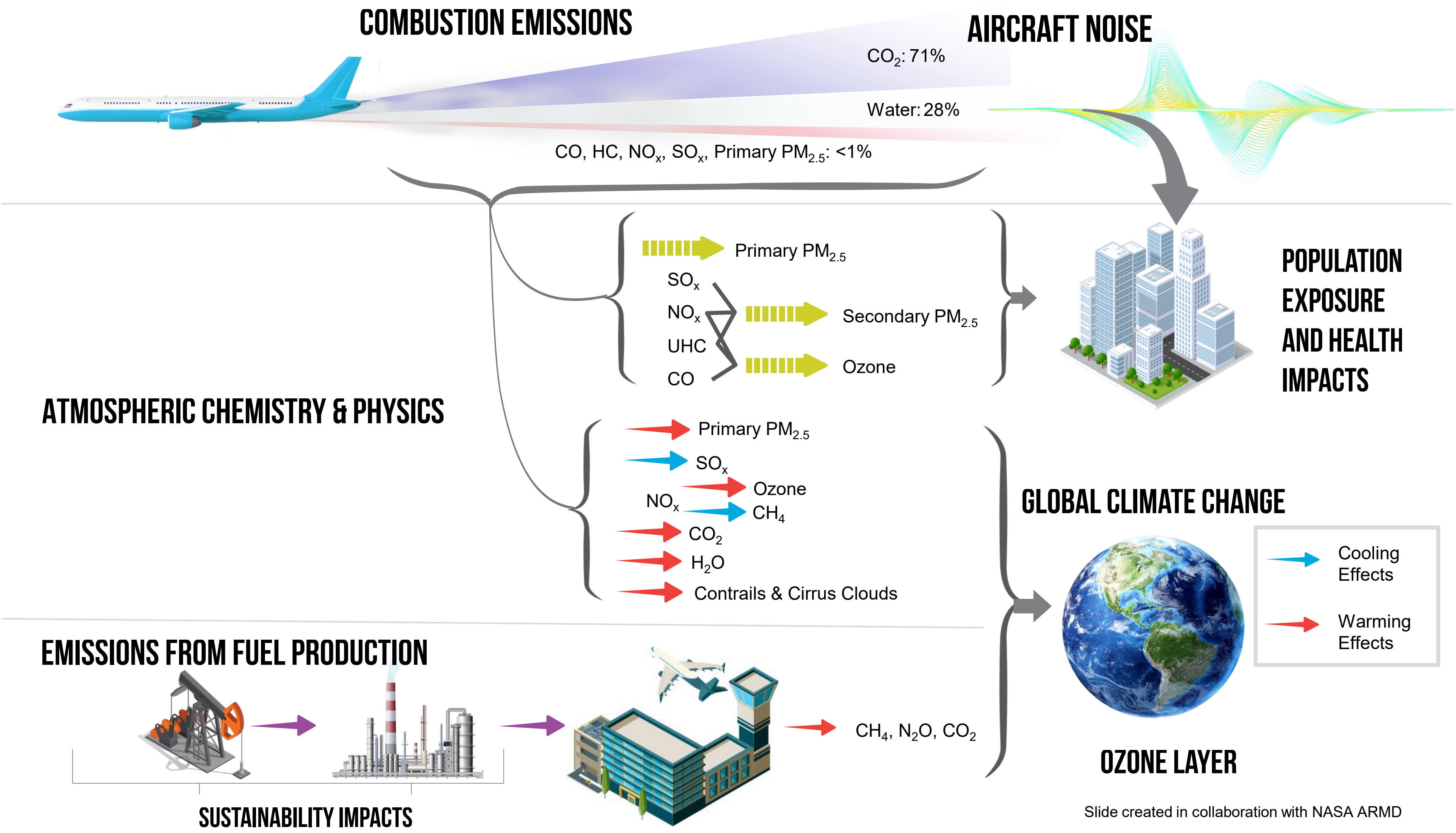
ASCENT Aviation Sustainability Center
www.ascent.aero/

CAAFI®
www.caafi.org/

Continuous Lower Energy, Emissions & Noise — CLEEN — Federal Aviation Administration
www.faa.gov/go/cleen/

the VOLPE center

Environmental Impacts of Aviation



Slide created in collaboration with NASA ARMD

Presentation Outline

- ASCENT COE Context and Background
- ASCENT COE Highlights

ASCENT Center of Excellence*

For 20 years, FAA Office of Environment and Energy has relied on university centers of excellence to:

- Provide knowledge to inform decision making on environment and energy matters;
- Enable the introduction of innovative solutions to cost-effectively mitigate the environmental impacts of aviation; and
- Support the instruction of hundreds of professionals with knowledge of the environmental challenges facing aviation (*674 students supported and counting*).

ASCENT Research Portfolio

- In 2013, FAA established ASCENT to conduct research on environment and alternative jet fuels
- Portfolio covers broad range of topics on Alternative Jet Fuels, Emissions, Noise, Operations, and Analytical Tools
- Currently overseeing a large increase in the COE portfolio

Lead Universities:

Washington State University (WSU)
Massachusetts Institute of Technology (MIT)*

Core Universities:

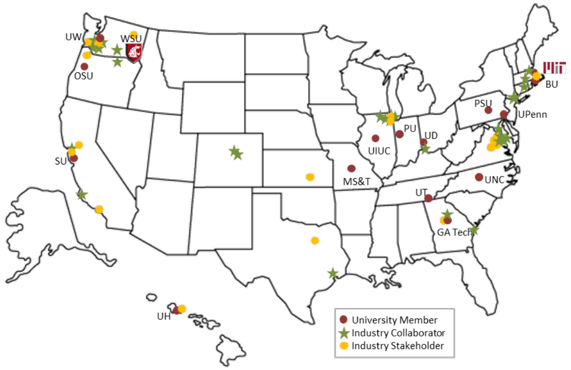
Boston University (BU)*
Georgia Institute of Technology (Ga Tech)*
Missouri University of Science and Technology (MS&T)*
Oregon State University (OSU)
Pennsylvania State University (PSU)*
Purdue University (PU)*
Stanford University (SU)*
University of Dayton (UD)
University of Hawaii (UH)
University of Illinois at Urbana-Champaign (UIUC)*
University of North Carolina at Chapel Hill (UNC)*
University of Pennsylvania (UPenn)*
University of Tennessee (UT)
University of Washington (UW)

Multiple international partners

Advisory Committee (57 orgs)

5 airports
4 airlines
9 NGO/advocacy
8 aviation manufacturers
10 feedstock/fuel manufacturers
21 R&D, service to aviation sector

ASCENT
AVIATION SUSTAINABILITY CENTER



ASCENT Support

Federal Aviation Administration
Transport Canada
NASA
Environmental Protection Agency
Defense Logistics Agency - Energy
U.S. Dept of Energy
U.S. Dept of Agriculture
Air Force Research Laboratory

ASCENT By the Numbers

ASCENT Research Portfolio

Portfolio covers brand range of topics on sustainable aviation fuels, technology, emissions, noise, operations, and analytical tools

Projects listed by topic: https://ascent.aero/projects-by-topic/

ASCENT Leadership

- Mike Wolcott of WSU – Director
- John Hansman of MIT – CO-Director
- Carol Sim of WSU – Assistant Director

ASCENT Annual Technical Report Summaries (https://ascent.aero/general-public-resources/)

	Report 1	Report 2	Report 3	Report 4	Report 5	Report 6	Report 7	Report 8
Time Period	9/2013 - 9/2015	10/2015 - 9/2016	10/2016 - 9/2017	10/2017 - 9/2018	10/2018 - 9/2019	10/2019 - 9/2020	10/2020 - 9/2021	10/2021 - 9/2022
Research Projects	50	54	43	32	30	60	64	64
Publications, Reports, and Presentations	137	119	110	179	166	125	117	181
Students Involved	131	112	105	116	236	186	202	214
Industry Partners	63	70	72	72	76	57	62	75

ASCENT Projects: Alternative Fuels

Alternative Jet Fuel	Univerity
001 - Alternative Jet Fuel Supply Chain Analysis	WSU - MIT- PU - UH - PSU - UT - UIUC
025 - National Jet Fuel Combustion Program	SU
031 - Alternative Jet Fuels Test and Evaluation	UD
033 - Alternative Fuels Test Database Library	UIUC
052 - Comparative Assessment of Electrification Strategies for Aviation	MIT
065 A-B - Fuel Testing Approaches for Rapid Jet Fuel Prescreening	WSU - UIUC
066 - Evaluation of High Thermal Stability Fuels	WSU
067 - Impact of Fuel Heating on Combustion and Emissions	PU
073 - Combustor Durability with Alternative Fuel Use	UD
080 - Hydrogen and Power to Liquid (PtL) Concepts for SAF Production	WSU - MIT
088 - A Method for Rapidly Assessing Jet Fuel Compatibility with non-Metallic Materials	UD
089 - Characterization of Compositional Effects on Dielectric Constant	UD
090 - World Fuel Survey	UD
093 A-B-C - Collaborative Research Network for Global SAF Supply Chain Development	WSU - MIT - UH
095 - Assessment of Fuel Cells for Powering Modern Business Jets	GT
099 - Real-world hydrogen infrastructure evaluation (and solution development)	WSU
100 - Canada-US SAF Supply Chain Development	WSU
101 - Sustainable Aviation Fuel Repository	WSU
103 - Pareto efficient SAF yield and blending	WSU
104 - Climate Smart Ag -- Quantification of Benefits for Policy Development	<TBD>

ASCENT Projects: Technology

Technology	Univerity
010 - Aircraft Technology Modeling and Assessment	GT - PU
037 - CLEEN II System Level Assessment	GT
047 - Clean Sheet Supersonic Aircraft Engine Design and Performance	MIT
050 - Over-Wing Engine Placement Evaluation	GT
051 - Combustion concepts for next-generation aircraft engines to reduce fuel burn and emissions	MIT
052 - Comparative Assessment of Electrification Strategies for Aviation	MIT
055 - Noise Generation and Propagation from Advanced Combustors	GT
056 - Turbine Cooling Through Additive Manufacturing	PSU
064 - Alternative Design Configurations to Meet Future Demand	GT
068 - Combustor Wall Cooling Concepts for Dirt Mitigation	PSU
070 - Reduction of nvPM emissions via innovation in aero-engine fuel injector design	GT
074 - Low Emissions Pre-Mixed Combustion Technology for Supersonic Civil Transport	GT
075 - Improved Engine Fan Broadband Noise Prediction Capabilities	BU
076 - Improved Open Rotor Noise Prediction Capabilities	GT
079 - Novel Noise Liner Development Enabled by Advance Manufacturing	PSU
092 - Advanced Two-Stage Turbine Rig Development	PSU
096 - Future Transportation System Opportunities and Constraints	GT
097 - FAST-Tech System Level Assessment	GT
098 - Low Emissions Lean Pre-Mixed Pre-vaporized Combustion Technology for Subsonic Civil Transport	GT

ASCENT Projects: Emissions

Emissions	Univerity
002 - Understanding Changes in Aviation Emissions due to SAF with New Combustor Engine Technology	MS&T
018 - Community Measurement of Aviation Emission Contribution of Ambient Air Quality	BU
019 - Development of Improved Aviation Emissions Dispersion Capabilities for AEDT	UNC
022 - Evaluation of FAA Climate Tools	UIUC
046 - Surface Analysis to Support AEDT APM development	MIT
058 - Improving Policy Analysis Tools to Evaluate Aircraft Operations in the Stratosphere	MIT
069 - Transitioning a research nvPM mass calibration procedure to operations	MS&T
071 - Predictive Simulation of Soot Emission in Aircraft combustors	GT
078 - Contrail Avoidance Decision Support and Evaluation	MIT
082 A-B - CAEP Stringency Analysis Modeling	MIT - GT
083 - NOx Cruise/Climb Metric System Development	MIT
091 A-B - Environmental Impacts of High Altitude and Space Vehicle Emissions	MIT - UIUC
102 - Assessment of contrail formation via combustion of SAF	UIUC

ASCENT Projects: Noise and Operations

Noise & Operations	Univerity
003 - Cardiovascular Disease and Aircraft Noise Exposure	BU
009 - Geospatially driven noise estimation module	GT
023 - Analytical Approach for Quantifying Noise from Advanced Operational Procedures	MIT
038 - Rotorcraft Noise Abatement Procedures Development	PSU
044 - Aircraft Noise Abatement Procedure Modeling and Validation	MIT
049 - Urban Air Mobility Noise Reduction Modeling	PSU
053 - Validation of Low-Exposure Noise Modeling by Open-Source Data Management and Visualization Systems Integrated with AEDT	SU
054 - AEDT Evaluation and Development Support	GT
057 - Support for Supersonic Aircraft Noise Efforts in ICAO CAEP	PSU
059 A-B-C-D - Jet Noise Modeling to Support Low Noise Supersonic Aircraft Technology Development	GT - UIUC - SU
060 - Analytical Methods for Expanding the AEDT Aircraft Fleet Database	GT
061 - Noise Certification Streamlining	GT
062 - Noise Model Validation for AEDT	GT - PSU
072 - Aircraft noise exposure and market outcomes in the US	MIT
077 - Measurements to Support Noise Certification for UAS/UAM Vehicles and Identify Noise Reduction Opportunities	PSU
082 A-B - CAEP Stringency Analysis Modeling	MIT - GT
084 - Noise Modeling of Advanced Air Mobility Flight Vehicles	MIT
085 - Strategies for Improving En Route Fuel Efficiency	<TBD>
086 - Study on the use of broadband sounds to mitigate sleep disruption due to aircraft noise	UPenn
094 - Probabilistic Unmanned Aircraft Systems (UAS) Trajectory and Noise Estimation Tool	GT

Fabio Grandi

Acting Chief Scientific and Technical Advisor for Environment and Energy

Federal Aviation Administration
Office of Environment and Energy

Update for NYCAR Meeting

Dan Birkett

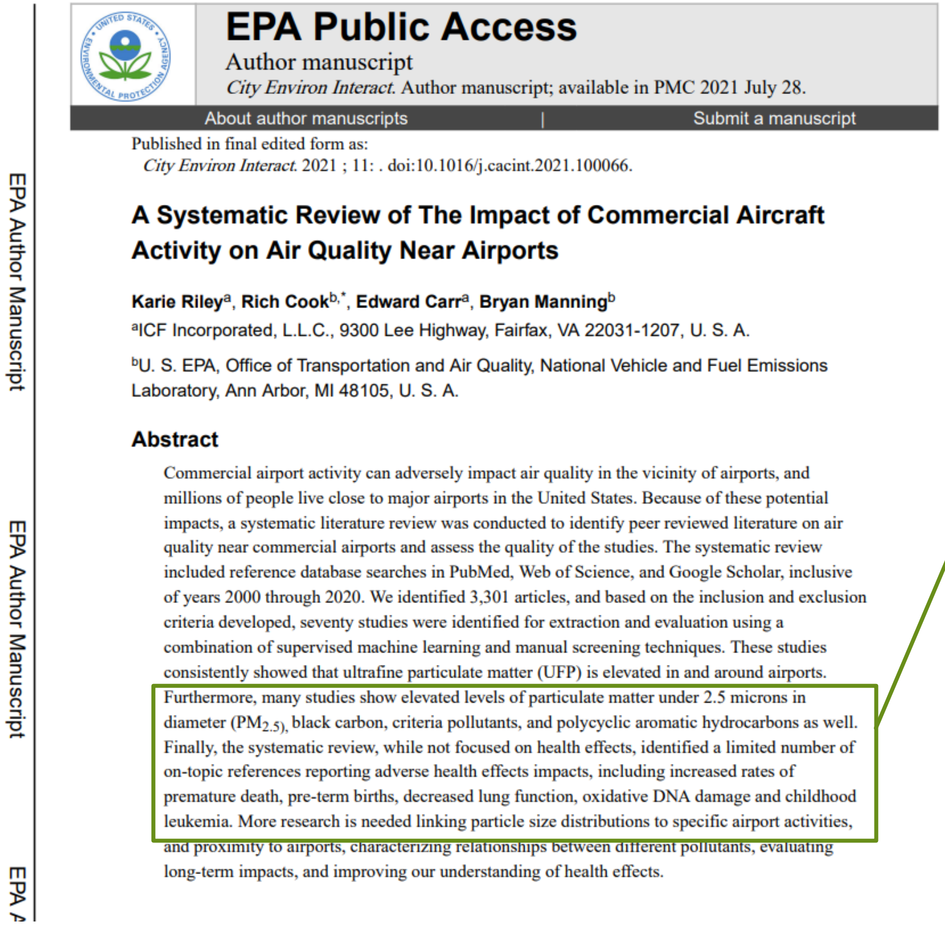
US Environmental Protection Agency – Region 2

birkett.daniel@epa.gov

Contents

- Air quality and airports context
- EPA regulatory activities
- International developments
- Non-regulatory activities

The Impact of Commercial Aircraft Activity on Air Quality Near Airports



EPA Author Manuscript

EPA Public Access

Author manuscript

City Environ Interact. Author manuscript; available in PMC 2021 July 28.

About author manuscripts | Submit a manuscript

Published in final edited form as:
City Environ Interact. 2021 ; 11: . doi:10.1016/j.cacint.2021.100066.

A Systematic Review of The Impact of Commercial Aircraft Activity on Air Quality Near Airports

Karie Riley[a], Rich Cook[b,*], Edward Carr[a], Bryan Manning[b]

[a]ICF Incorporated, L.L.C., 9300 Lee Highway, Fairfax, VA 22031-1207, U. S. A.

[b]U. S. EPA, Office of Transportation and Air Quality, National Vehicle and Fuel Emissions Laboratory, Ann Arbor, MI 48105, U. S. A.

Abstract

Commercial airport activity can adversely impact air quality in the vicinity of airports, and millions of people live close to major airports in the United States. Because of these potential impacts, a systematic literature review was conducted to identify peer reviewed literature on air quality near commercial airports and assess the quality of the studies. The systematic review included reference database searches in PubMed, Web of Science, and Google Scholar, inclusive of years 2000 through 2020. We identified 3,301 articles, and based on the inclusion and exclusion criteria developed, seventy studies were identified for extraction and evaluation using a combination of supervised machine learning and manual screening techniques. These studies consistently showed that ultrafine particulate matter (UFP) is elevated in and around airports. Furthermore, many studies show elevated levels of particulate matter under 2.5 microns in diameter ($PM_{2.5}$), black carbon, criteria pollutants, and polycyclic aromatic hydrocarbons as well. Finally, the systematic review, while not focused on health effects, identified a limited number of on-topic references reporting adverse health effects impacts, including increased rates of premature death, pre-term births, decreased lung function, oxidative DNA damage and childhood leukemia. More research is needed linking particle size distributions to specific airport activities, and proximity to airports, characterizing relationships between different pollutants, evaluating long-term impacts, and improving our understanding of health effects.

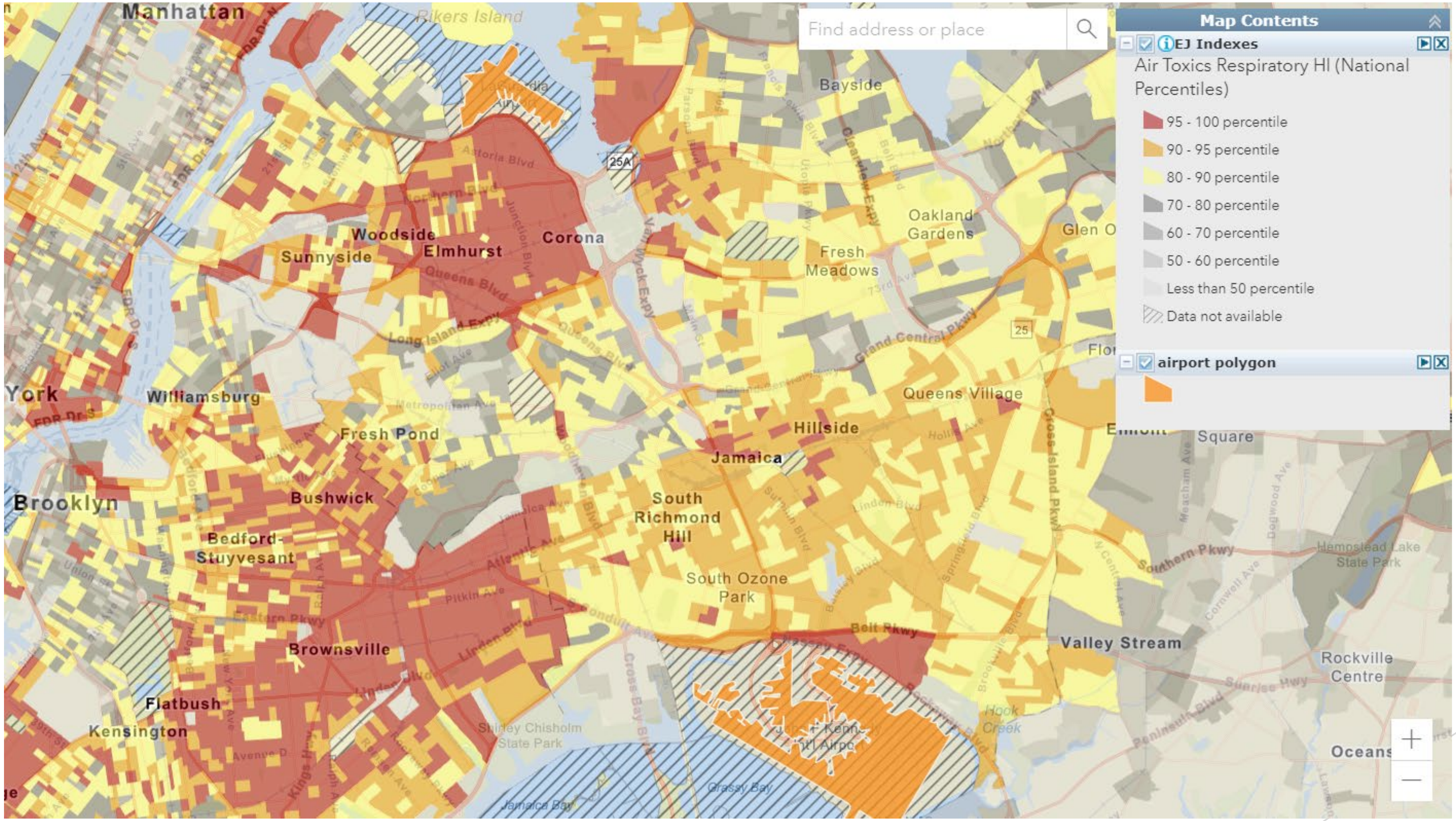
EPA Author Manuscript

"[M]any studies show elevated levels of particulate matter under 2.5 microns in diameter (PM2.5), black carbon, criteria pollutants, and polycyclic aromatic hydrocarbons as well.

"Finally, the systematic review, while not focused on health effects, identified a limited number of on-topic references reporting adverse health effects impacts, including increased rates of premature death, pre-term births, decreased lung function, oxidative DNA damage and childhood leukemia. More research is needed…"

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8318113/

NYC airports and environmental justice



EPA's Environmental Justice Screening and Mapping Tool (Version 2.2): https://ejscreen.epa.gov/mapper/

U.S. Environmental Protection Agency
Region 2

Recent EPA regulatory actions

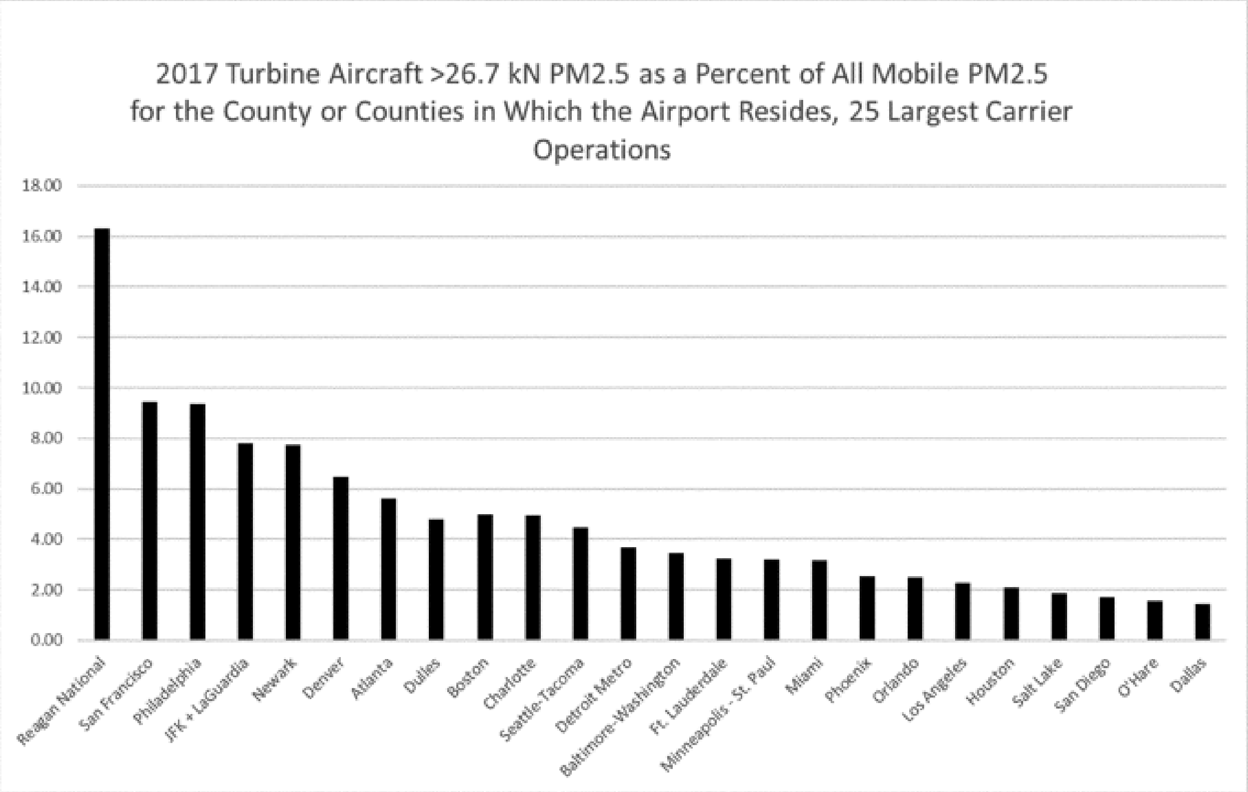
- Commercial aviation
  - Greenhouse gas standards (finalized 2021)
  - Fine particulate matter standards (finalized 2022)
- General aviation
  - Endangerment finding and lead standards (proposed 2022)
- Trucks and buses
  - Heavy-duty on-road vehicle nitrogen oxide standards (finalized 2022)
  - Greenhouse gas standards (proposed 2023)

Commercial aviation Greenhouse gas standards

- Matches the international airplane carbon dioxide standards adopted by the International Civil Aviation Organization in 2017
- GHG standards apply to new type design airplanes when this rule became effective and to in-production airplanes on or after January 1, 2028
- U.S. aircraft covered by the rule (this includes all domestic flights and international flights originating in the U.S.) emit:
  - 10 percent of GHG emissions from the transportation sector in the U.S.
  - 3 percent of total U.S. GHG emissions
- The rule helps ensure that U.S. manufactured airplanes, and airplane engines are accepted by nations and airlines around the world

Commercial aviation
Fine particulate matter standards

- Standards and test procedures align with the aircraft engine standards adopted by the International Civil Aviation Organization in 2017 and 2020
- Fully applies to new-type and in-production engines on or after January 1, 2023
- ICAO emission standards, and the EPA's standards reflecting them, are anti-backsliding standards (i.e., the standards would not reduce aircraft PM emissions below current engine emission levels)



General aviation
Endangerment finding and lead standards

- EPA issued a proposed determination that lead emissions from certain aircraft cause or contribute to lead air pollution which may reasonably be anticipated to endanger public health and welfare.
- Piston-engine aircraft are the largest single source of lead emissions to the air in the U.S., contributing 70% of the lead entering the air annually
  - Jet aircraft used for commercial transport do not operate on a fuel containing lead
- This is the first step toward the application of EPA's and the Federal Aviation Administration's statutory authorities to address lead pollution from aircraft

TABLE 2—LEAD CONCENTRATIONS MONITORED AT 17 AIRPORTS IN THE U.S.

Airport, State	Lead design value,[119] µg/m³
Auburn Municipal Airport, WA ..	0.06
Brookhaven Airport, NY	0.03
Centennial Airport, CO	0.02
Deer Valley Airport, AZ	0.04
Gillespie Field, CA	0.07
Harvey Field, WA	0.02
McClellan-Palomar Airport, CA	0.17
Merrill Field, AK	0.07
Nantucket Memorial Airport, MA	0.01
Oakland County International Airport, MI	0.02
Palo Alto Airport, CA	0.12
Pryor Field Regional Airport, AL	0.01
Reid-Hillview Airport, CA	0.10
Republic Airport, NY	0.01
San Carlos Airport, CA	0.33
Stinson Municipal, TX	0.03
Van Nuys Airport, CA	0.06

EPA Clean Trucks Plan

- Three elements:
  - New ultra-low standards for nitrogen oxide emissions for new heavy-duty trucks manufactured in 2027 and beyond – finalized 2022
  - Greenhouse gas standards for new heavy-duty trucks manufactured in 2027 and beyond – proposed 2023
  - Multipollutant standards for light and medium-duty vehicles manufactured in 2027 and beyond – proposed 2023

Potential pathway for heavy duty vehicles based on 2023 proposal

- 50 percent ZEVs for vocational vehicles in MY 2032, which includes the use of battery electric and fuel cell technologies.
- 34 percent ZEVs for day cab tractors in MY 2032, which includes the use of battery electric and fuel cell technologies.
- 25 percent ZEVs for sleeper cab tractors in MY 2032, which primarily includes the use of fuel cell technologies.

EPA Collaboration on International Air Pollution Standards for Aircraft

- **EPA statement on Airplane Greenhouse Gas Emissions Standards Litigation**

  "In order to effectively address the climate crisis, the Biden Administration recognizes more action is necessary across the transportation sector and in the aviation sector specifically to significantly reduce GHG emissions. That is why the U.S. will press for ambitious new international CO_2 standards at the upcoming round of ICAO negotiations, why in September the Biden Administration announced a series of actions aimed at boosting the development of sustainable aviation fuel, and why earlier this month the Biden Administration released the U.S. Aviation Climate Action Plan at COP26."

- In October 2022 ICAO agreed to a long-term aspirational goal of net-zero CO_2 emissions by 2050

Inflation Reduction Act funding for EPA

- EPA received $41.5 billion in appropriations to support 24 new and existing programs.
- Six new EPA programs account for 98% of this total funding:
  - Greenhouse Gas Reduction Fund ($27 billion) – Provide capital to greenhouse gas mitigation projects not currently able to access private capital, particularly in low-income and disadvantaged communities.
  - Climate Pollution Reduction Grants ($5 billion) – Provide grants at the state, local, and Tribal level to develop plans to reduce greenhouse gas emissions and implement those plans.
  - Environmental and Climate Justice Block Grants ($3 billion) – Fund community-based nonprofit organizations to support a wide range of climate and environmental justice activities.
  - Grants to Reduce Air Pollution at Ports ($3 billion) – Award rebates and grants for ports to purchase and install zero-emission technology and develop climate action plans.
  - Methane Emissions Reduction Program ($1.55 billion) – Fund grants and technical assistance to accelerate emissions reduction from petroleum and natural gas systems
  - Clean Heavy-Duty Vehicles ($1 billion) – Provide grants, rebates, and contract support to replace heavy duty vehicles with zero emission alternatives.

More information

- Regulations for Greenhouse Gas Emissions from Aircraft: https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-greenhouse-gas-emissions-aircraft
- Regulations for PM and NOx Emissions from Aircraft Engines: https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-emissions-aircraft-engines
- Regulations for Lead Emissions from Aircraft https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-lead-emissions-aircraft
- Clean Trucks Plan https://www.epa.gov/regulations-emissions-vehicles-and-engines/clean-trucks-plan
- EPA Collaboration on International Air Pollution Standards for Aircraft https://www.epa.gov/regulations-emissions-vehicles-and-engines/epa-collaboration-international-air-pollution-standards
- Inflation Reduction Act https://www.epa.gov/inflation-reduction-act
- EPA Region 2 contact: Dan Birkett birkett.daniel@epa.gov