ASCENT - FAA Center of Excellence for Alternative Jet Fuels and Environment

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ASCENT
AVIATION SUSTAINABILITY CENTER

Overview of ASCENT and our Partnerships

Discuss our Projects and Focus on AJF

How we fit within the Larger Federal Landscape

Three Project Areas

1. AJF Supply Chain Analysis and Regional Projects
2. AJF Testing to Support Fuel Approval Process
3. National Jet Fuel Combustion Program (NJFCP)

TODAY'S PRESENTATION

Annual Budget $10+ million

Funding 54 Research Projects

Producing 119 Publications, Reports, Presentations

Educating 112 Students

With 70 Industrial Partners

ASCENT OVERVIEW

ASCENT Team

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)*

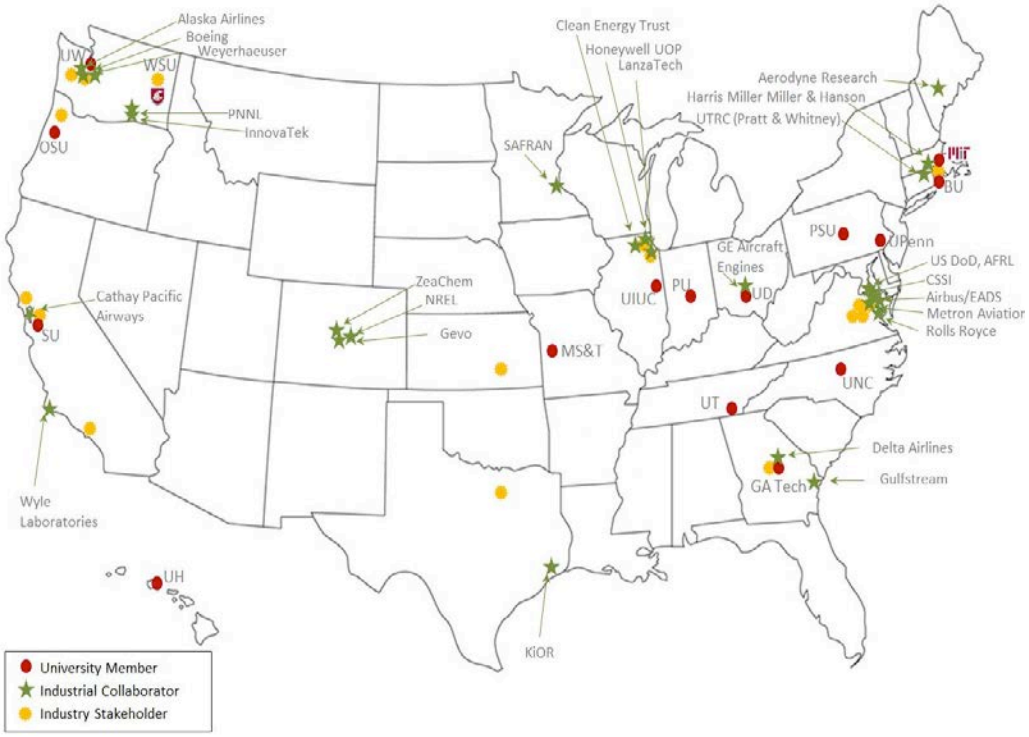
University of Illinois at Urbana-Champaign (UIUC)*

University of North Carolina at Chapel Hill (UNC)

University of Pennsylvania (UPenn)

University of Tennessee (UT)*

University of Washington (UW)*



Advisory Committee - 58 organizations:

5 airports
4 airlines
7 NGO/advocacy
9 aviation manufacturers
11 feedstock/fuel manufacturers
22 R&D, service to aviation sector

*** Denotes USDA NIFA AFRI-CAP Leads and Participants & Sun Grant Schools**

International Partnerships

GARDN Green Aviation Research & Development Network

НАЦІОНАЛЬНИЙ АВІАЦІЙНИЙ УНІВЕРСИТЕТ MCMXXXIII

Itaka

UHASSELT KNOWLEDGE IN ACTION

UNIVERSITY OF TORONTO

RÉSEAU BIOFUELNET CANADA

ASCENT Focus Areas

Alternative Jet Fuels

- Feedstock Development, Processing and Conversion
- Regional Supply and Refining Infrastructure
- Environmental Benefits Analysis
- Aircraft Component Deterioration and Wear
- Fuel Performance Testing

Environment

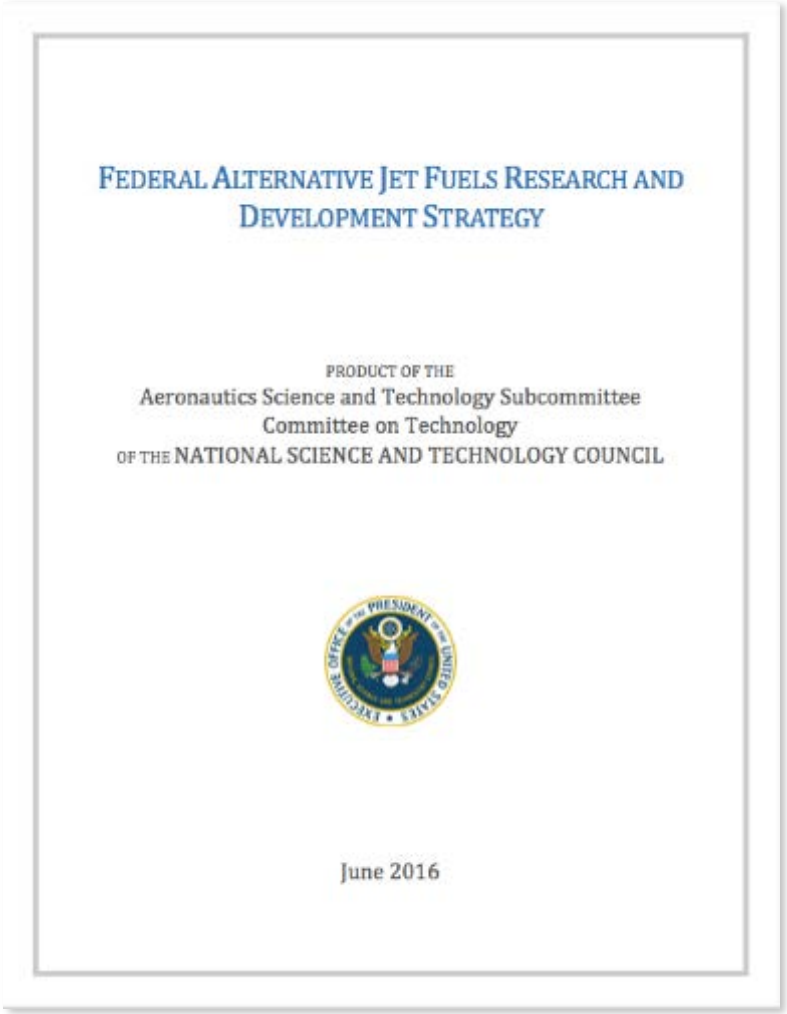
- Aircraft Noise and Impacts
- Aviation Emissions and Impacts
- Aircraft Technology Assessment
- Energy Efficient Gate-to-Gate Aircraft Operations
- Aviation Modeling and Analysis

ASCENT Project

Research Topic Area	ASCENT Project Numbers
Analysis and Tools	10, 11, 12, 36, 37, 45, 46, 48
Operations	15, 16, 23
Noise	3, 4, 5, 6, 7, 8, 17, 23, 35, 38, 40, 41, 42, 43
Emissions	Measurements: 2, 24, 33 Air Quality: 18, 19, 20, 39, 48 Climate: 13, 21, 22 CO2 Standard: 14, 32
Alternative Jet Fuels	AJF Analysis: 1, 13, 21, 24, 32 AJF Testing: 25, 26, 27, 28, 29, 30, 31, 32, 33, 34

For project descriptions and other information see - http://ascent.aero

Coordinated Federal Approach to AJF



FEDERAL ALTERNATIVE JET FUELS RESEARCH AND DEVELOPMENT STRATEGY

PRODUCT OF THE
Aeronautics Science and Technology Subcommittee
Committee on Technology
OF THE NATIONAL SCIENCE AND TECHNOLOGY COUNCIL

June 2016

- Enhance energy security;
- Expand domestic energy sources;
- Facilitate a diverse, secure, and reliable fuel supply;
- Contribute to price and supply stability;
- Reduce emissions that affect air quality and global climate;
- Generate economic and rural development; and
- Promote social welfare.

Alternative Jet Fuel Interagency Working Group






	Feedstock Development & Production	Feedstock Logistics	Fuel Conversion	Fuel Conversion Scale-Up	Fuel Testing & Evaluation	Integrated Challenges
DOC	X					X
DoD			X		X	
DOE	X	X	X			X
DOT					X	X
EPA						X
NASA					X	
NSF	X	X	X			
USDA	X	X	X			X

PROJECTS

alternative jet fuels

ASCENT Focus Areas

Alternative Jet Fuels

Feedstock Development, Processing and Conversion

Regional Supply and Refining Infrastructure

Environmental Benefits Analysis

Aircraft Component Deterioration and Wear

Fuel Performance Testing

ASCENT Project 001 Supply Chain Focus

Advanced Analytical Tools

- Feedstock Production (w/ DOE)
- Feedstock Logistics (w/ Volpe)
- Facility Siting Tools
- Harmonized Conversion Techno-Economic Analysis (TEA)
- Stochastic TEA
- Life Cycle Analysis (LCA) (w/ DOE)
- Systems Dynamic Models for Technology Adoption (w/ DOE)
- Environmental Services
- Supply Chain Risk Assessment

International Efforts

- ICAO CAEP Support
- CORSIA

Tactical Regional Deployment

- CAAFI 50-states Initiative
- USDA Regional Supply Chain Assistance

ASCENT Focus Areas

Alternative Jet Fuels

Feedstock Development, Processing and Conversion

Regional Supply and Refining Infrastructure

Environmental Benefits Analysis

Aircraft Component Deterioration and Wear

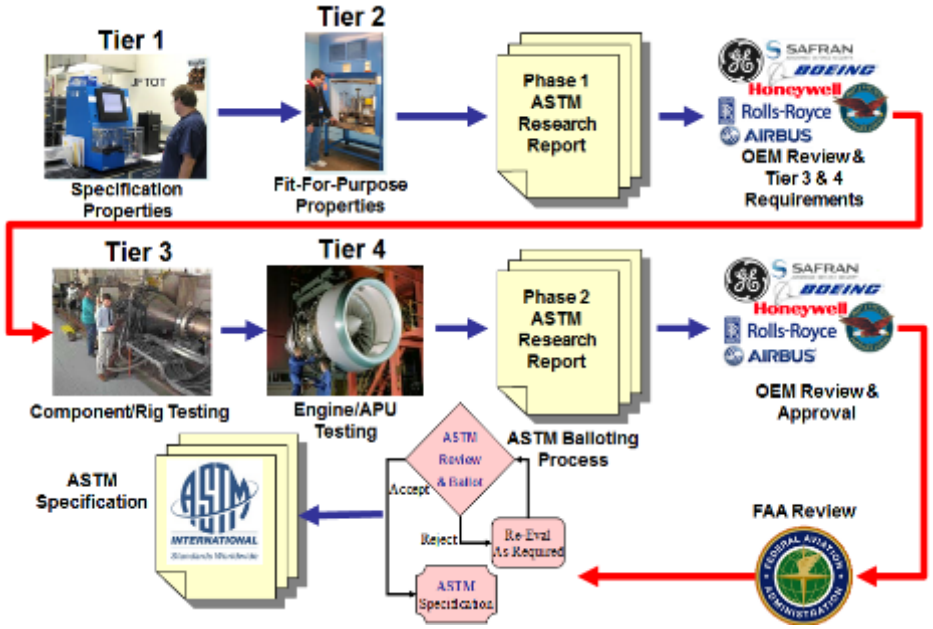
Fuel Performance Testing

Research to support ASTM Intl Approvals

Support ASTM International evaluation of alternative jet fuels and improve evaluation process (ASCENT Projects 31, 33 and NJFCP)

- **Support ASTM certification & qualification testing activities to develop data for new approvals**
- **ASTM Clearinghouse**
- **OEM Review Process**
- **Data Gathering & Library**
- **Streamline approval process via the National Jet Fuels Combustion Program**

D4054 Alternative Jet Fuel Approval Process



NATIONAL JET FUEL COMBUSTION PROGRAM
NJFCP

Joshua Heyne (Dayton), Meredith Colket (UTRC Retired), Jeff Moder (NASA), Cecilia Shaw (FAA), Mohan Gupta (DOE), Tim Edwards (AFRL), Mel Roquemore (AFRL), Chiping Li (AFRL), Mark Rumizen (FAA)

Overview and Potential Impact of NJFCP

Vision

Develop an experimental and analytical capability to facilitate OEM's evaluation of fuel physical and chemical properties on engine operability and to streamline ASTM fuels approval process.

IMPACT

Early fuel screening (Tier 2.5), targeted Tier 3 and 4 tests, and increased OEM confidence

ASCENT Summary

The Aviation Sustainability Center is:

- Focusing on meeting aviation's environmental and energy goals on noise, air quality, climate, and energy efficiency.
- Exploring ways to produce sustainable aviation fuels at scale, creating an industry with potential for large-scale economic development and job creation.
- Discovering science-based solutions to benefit the aviation industry and improve health and quality of life of those living and working around airports.

- Draws upon experts from around the country who collaborate worldwide
- Works within a network of federal and international agencies
- Plays a critical role in implementation of alternative jet fuels to decarbonize the aviation industry and support economic development

QUESTIONS