NATIONAL INSTITUTE OF AEROSPACE

Introduction to NIA and Partnerships

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National Institute of Aerospace

- An Independent Non-profit Research and Graduate Education Institute formed in 2002 by a Consortium of Research Universities and the AIAA Foundation
- Conceived by NASA Langley Research Center and established to serve as LaRC's Collaborative Partner
- Conducts Collaborative ***Research*** in Engineering and Science relevant to Aerospace
- Offers Full- and Part-time Resident ***Graduate Education*** in Engineering and the Sciences from Member Universities
- Leads and Participates in a wide range of ***Outreach*** Programs to enhance the nation's Science and Technology Workforce
- ~$30M Annual Revenues
- ~100 Employees

Member Universities

Georgia Tech

Hampton University

North Carolina A&T State University

North Carolina State University

University of Maryland

University of Virginia

Virginia Tech

The College of William & Mary

Old Dominion University

But worked with 80 different universities over past decade

Current Major NIA Research Partnerships

- NASA Cooperative Agreement and Task Order Contract for innovative aerospace research (~$20M/year)
- NIA manages NASA Advanced Composites Consortium PPP – an element of the overall Advanced Composites Program ($45M over 5 years, 50% industry match).
  - Members: NASA LaRC, FAA, Boeing, United Wide variety of multi-university research teams
  - Technologies (P&W), GE, Lockheed Martin, NIA.
- FAA OTA's in Wake Vortex Research, Human Factors Research, Weather Technology in Cockpit Research (~$4M year)
  - Wide variety of multi-company, multi-university research teams
- Airbus Research Framework Agreement ($9M over 10 years)
  - Wide variety of multi-university research teams in nanomaterials, laminar flow control, wireless communication, intelligent airframe, UQ&M, etc.
- Army Research Labs Cooperative agreement for Rotorcraft/Mobility Research
  - $11M over 6 years, Wide variety of multi-university research teams
- Center for High-Performance Aerospace Computations (HiPAC)
  - 9 university partners, 6 NIA researchers, $1.2M/year
- Center for Planetary Atmospheres
  - 9 university partners, 2 NIA researchers, $500K/year

Chairing Partnership Working Group of AIAA Transformational Flight Program Committee

Charter

1. Support TFPC development of AIAA Conferences program content
2. Share the history of PPPs in aeronautics: Why, who, what, when, how, results, lessons learned, and applicability now
3. Examine potential funding and management approaches for PPPs
4. Energize NASA and industry commitments to and timing for PPP collaboration
5. Develop industry consensus on pre-competitive objectives and technologies
6. Evaluate and propose potential "legacy" products that would be targets from collaboration (Industry Design Guidelines, Industry Standards for Systems and Architectures, Acceptable means for Regulatory compliance and certification standards)
7. Identify homogeneous organizational structures (working groups) that could be candidates for collaboration under PPPs
8. Advocate for definition of ConOps and System Architecture(s) of the future state of personal air mobility, related economics, environmental, infrastructure, and regulatory considerations, for use of government and industry

AIAA TFPC White Paper Outline

Vision and Implementation for Distributed, Democratized Air Mobility

- Introduction and History
  - Past national initiatives aimed at air transportation system solutions
    - AGATE
    - SATS
    - ePATS and SAT (Europe)
    - Others
  - Lessons learned
  - Conclusions reached
- Motivations
  - National industrial leadership
  - Domestic economic opportunity and quality of life through accessibility and safety advancements
  - International markets
- Cultural/Societal Challenges
  - Historical View of Personal Aviation
  - Analogies with Automobiles
  - Ride sharing
  - Privacy
  - Need for Future View

AIAA TFPC White Paper Outline (Cont.)

Vision and Implementation for Distributed, Democratized Air Mobility

- Mission Concepts
  - Commercial Services
  - Personal Mobility
- Enabling Technologies
  - Propulsion
  - Battery and Hybrid Systems Technology
  - Connected Aircraft
  - Airspace Automation and Trajectory Based Optimization of Economics with Safety
  - Vehicle Autonomy
  - Materials and Manufacturing
  - Interdependent Ground-Air Portal Infrastructure
- Environmental Opportunities and Risks
  - Global Energy Considerations/Emissions
  - Noise
  - Contrasts Between Ground and Air Strategies

AIAA TFPC White Paper Outline (Cont.)

Vision and Implementation for Distributed, Democratized Air Mobility

- Regulatory and Policy Considerations
  - Current Regulatory Framework
  - Future Required Regulatory Framework
  - State and Local Considerations
  - Congressional Activities
  - International Harmonization
  - Legal Issues (Insurance/Liability)
- Investment Requirements, Public and Private Sectors
  - Public Private Partnerships
  - Infrastructure Needs
  - State and Local Considerations
- Summary and Recommendations