National Aeronautics and Space Administration

Transformative
Aeronautics Concepts Program

University Leadership Initiative Vendor's Forum

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Vendor's Forum Overview

- Purpose – Provide information on NASA Aeronautics University Leadership Initiative (ULI) and get feedback that may be used to support upcoming solicitation
- Agenda
  - NASA Aeronautics overview – strategic plans and role of ULI
  - ULI overview, interested partners list, next steps
  - Q&A and feedback from university community
- Materials available:
  - Slides, aural recording, written Q&A will be available at ULI vendor's forum site: https://nari.arc.nasa.gov/uli_vendorsforum
  - NRA Proposer's Guidebook available at http://www.hq.nasa.gov/office/procurement/nraguidebook/
- Notice
  - Material presented at this forum reflects best information known to date.
  - In case there are any differences between the eventual solicitation and material presented at this forum, the solicitation will take precedence.
  - This session, including all questions and answers will be recorded and posted.

Global Growth in Aviation: Opportunities and Challenges

Global Air Passengers by Region (% of Total)

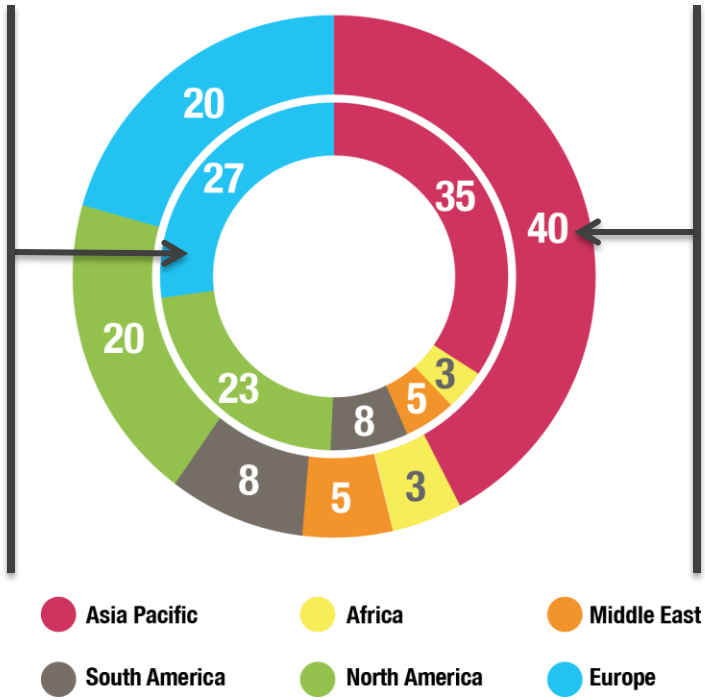
2014 Global Aviation Industry

3.3B Passenger Trips

North America and Europe combined is half of all Passenger Trips

58M Jobs

$2.4T GDP



2034 Global Aviation Industry, est.

7B Passenger Trips

Asia-Pacific Passenger Trips equal to North America and Europe combined

105M Jobs

$6T GDP

Over 36,000 New Aircraft required (replacement and growth) over the 20 year period ($4-$5T value)

Sources: International Air Transport Association, Air Transport Action Group, Boeing

Major Opportunities / Growing Challenges

Competitiveness—New state backed entrants, e.g., COMAC (China); Growing global R&D

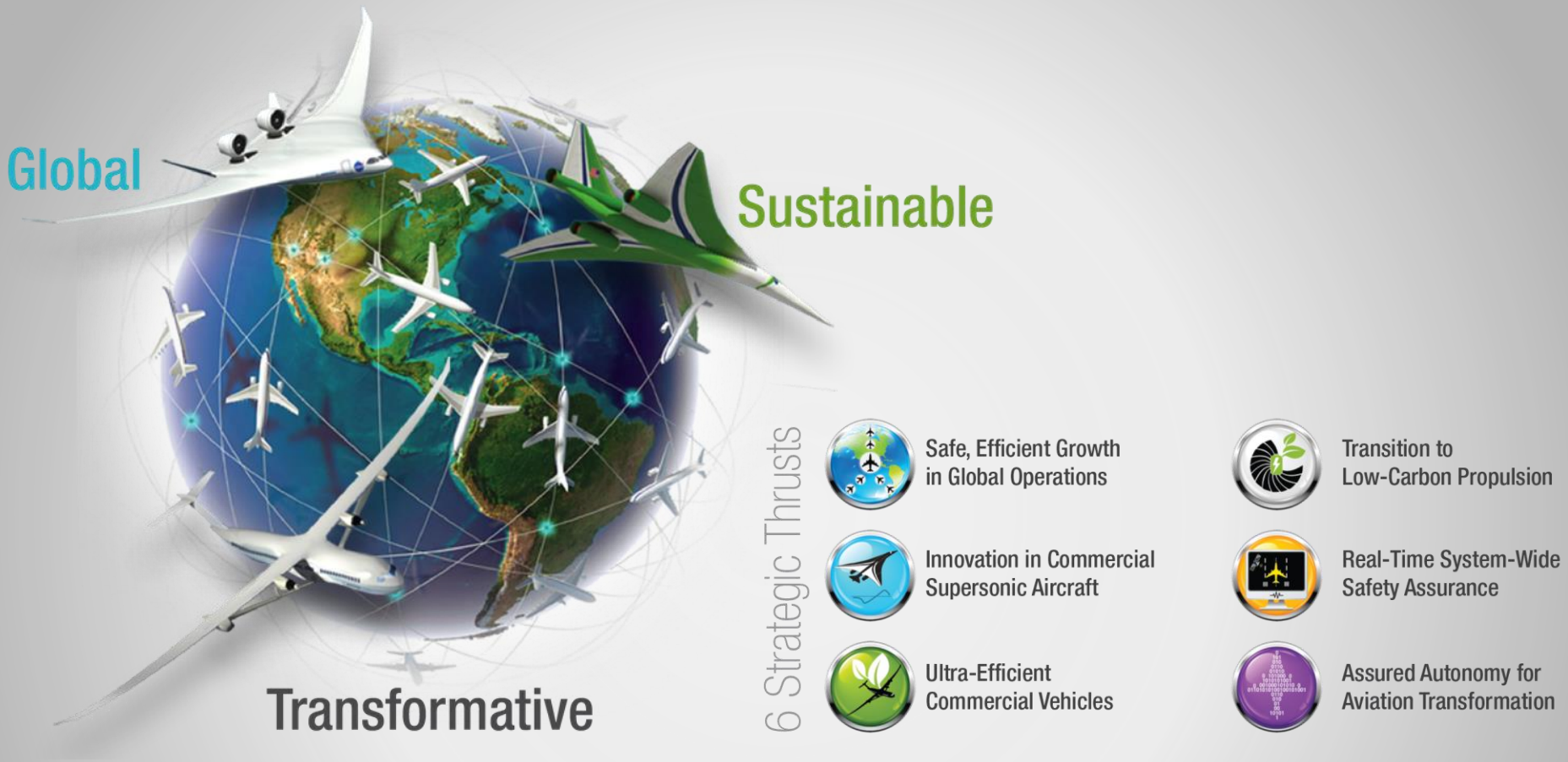
Environment—Very ambitious industry sustainability goals; Large technology advances needed

Mobility—More speed to connect the worlds' major cities; Opportunity for commercial supersonic flight

U.S. Technological Leadership Required!

NASA Aeronautics

NASA Aeronautics Vision for Aviation in the 21st Century



Each thrust leads toward community-based outcomes in three time periods: Near-Term (2015-2025), Mid-Term (2025-2035), Far-Term (Beyond 2035)

NASA Aeronautics Strategic Implementation Plan
http://www.aeronautics.nasa.gov/strategic-plan.htm

ARMD Organization

MISSION PROGRAMS

Airspace Operations and Safety Program

AOSP

Safe, Efficient Growth in Global Operations

Real-Time System-Wide Safety Assurance

Assured Autonomy for Aviation Transformation

Advanced Air Vehicles Program

AAVP

Ultra-Efficient Commercial Vehicles

Innovation in Commercial Supersonic Aircraft

Transition to Low-Carbon Propulsion

Assured Autonomy for Aviation Transformation

Integrated Aviation Systems Program

IASP

Flight research-oriented, integrated, system-level R&T that supports all six thrusts

X-planes/ test environment

SEEDLING PROGRAM

Transformative Aeronautics Concepts Program

TACP

High-risk, leap-frog ideas that support all six thrusts

Critical cross-cutting tools and technologies development

NASA Aeronautics Ready for Flight

Accomplishments and Planning

NASA Aero Vision and Strategy Established

Roadmaps Completed

2008-2013 | 2014/15 | 2016/17 | 2018-2026

N+3 Subsonic & Supersonic Concept/Technology Studies

Ground Testing of N+3 configurations and technologies

LBFD PDR Completed

UEST PDR Completed

N+2 Environmentally Responsible Aviation (ERA) Project Initiated

8 Integrated Tech Demos Completed, Tech transitioned to industry. HWB ready for Flight Dem/Val.

Ready for X-Plane Integration & Demonstration

NASA FAA NextGen Research Transition Teams (RTTs) Initiated

Technology Transitions to FAA: MSP, EDA, PDRC, TSAS

ATD-1 Completed and transferred to FAA

ATD-2, 3 Completed & Transferred to FAA

Ready for NextGen TBO Integration & Demonstration

Ten Year Investment Plan—FY 2017 Budget Accelerates Key Components of NASA Aeronautics Plan

Fund the Next Major Steps to Efficient, Clean and Fast Air Transportation Mobility

ULI-supported area

New Aviation Horizons

Start a continuing series of experimental aircraft to demonstrate and validate high impact concepts and technologies. Five major demonstrations over the next 10+ years in the areas of Ultra-Efficiency, Hybrid-Electric Propulsion, and Low Noise Supersonic Flight

IASP

Enabling Tools & Technologies

Major series of ground experiments to ready key technologies for flight

Research and ground demonstration for an advanced small engine core for very high bypass engines and as a hybrid-electric propulsion enabler

Development of next generation physics-based models needed to design advanced configurations

AAVP and TACP

Revolutionizing Operational Efficiency

Accelerate demonstration of full gate-to-gate Trajectory Based Operations

AOSP

Fostering Advanced Concepts & Future Workforce

Increased investment in new innovation through the NASA workforce and Universities

Leverage Non-Traditional Technology Advances

Pursue challenge prizes in areas such as energy storage, high power electric motors, advanced networking and autonomy

TACP

UAS

Strong continued research leadership in enabling UAS integration into the National Airspace. Extending the UAS in the NAS project for an additional 4 years

Hypersonics

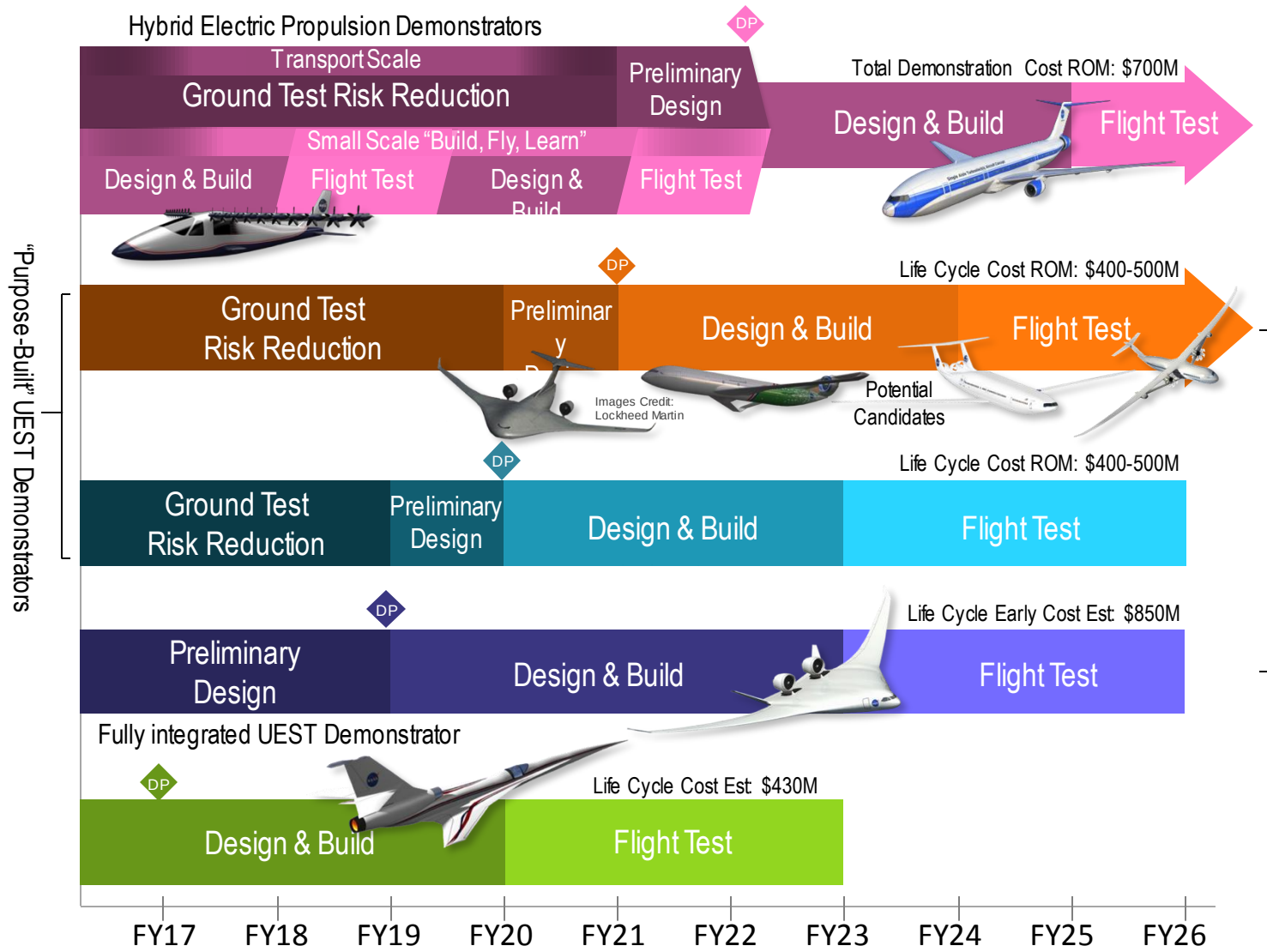
Increased investment to ensure a strong National fundamental research capability

IASP and AAVP

Build off of major current developments and accomplishments

Continue to incentivize new innovation

New Aviation Horizons Flight Demo Plan



Validated HEP Concepts, Technologies And Integration for U.S. Industry to Lead the Clean Propulsion Revolution

Validated ability for U.S. Industry to Build Transformative Aircraft that use 50% less energy and produce over 40dB less noise

Enables Low Boom Regulatory Standard and validated ability for industry to produce and operate commercial low noise supersonic aircraft

University Leadership Initiative

ULI Motivation

- Initiative provides opportunity for universities to exercise leadership and contribute to ARMD in a more strategic manner.
  - Current NASA Research Announcements (NRA) have provided valued contribution toward NASA research goals, but are often tied to specific, pre-defined outputs.
  - Feedback received that some problem statements have been too prescriptive, limiting ability to tap into universities' full capabilities
- ULI serves as additional mechanism for universities to contribute (no change expected to traditional NRAs).

ULI Objectives

- Promote transformative, innovative research that can help advance six aeronautics strategic thrusts.
- Develop parallel research paths that contribute to the same strategic outcomes as those pursued by internal NASA research.
- Create new ideas involving interaction across a wide range of disciplines, including traditional and non-traditional aeronautics (“technology convergence”).
- Invest in the next generation of engineers to enable continued U.S. leadership in aviation.
- Promote broader participation across the university community.

ULI Attributes

Through ULI, universities will:

- Independently define the most critical technical challenges that must be solved to achieve a given strategic thrust
  - Technical challenges represent distinct barriers that must be overcome.
  - Internal NASA teams have developed technical challenges aligned to NASA-defined roadmaps in each thrust. Summaries of these technical challenges will be provided in solicitation.
  - NASA looking for universities to propose different technical challenges – should be based on what proposer believes are important barriers to overcome (not compatibility with existing NASA technical challenges)
- Propose independent, innovative research projects to solve the technical challenges, including developing the success criteria, progress indicators (milestones), and technical approach;
  - Follows similar planning process to that used by internal NASA teams
  - Proposal teams will track progress toward their own technical challenges and apply methods for peer review
- Bring forward system-level, revolutionary ideas:
  - Research products could include technologies, operational concepts, methods, design tools, models, or other technical advancements
  - Capabilities should incorporate multi-disciplinary integration, considering contributions from aero and non-aero disciplines ("technology convergence").
  - Proposal teams encouraged to explore high technical risk approaches that open avenues for accelerated progress.

ULI Teaming

- University leadership is essential to producing graduates with the skills needed to lead U.S. into future.
- To meet this need, lead organizations for ULI proposals must be accredited, degree-granting U.S. colleges or universities.
- Universities asked to develop teams that bring together best and brightest minds from many disciplines and perspectives.
- Lead organizations encouraged to include team members that are less-established or have less prior experience working on NASA Aeronautics projects. Effective integration and mentoring of these team members represents an important part of leadership role.
- Team members may include:
  - Other departments at the principal investigator (PI)'s institution
  - Other colleges or universities
  - Industry members
  - Non-profit organizations
  - Other U.S.-based entities.
- Historically Black Colleges and Universities (HBCU) and other minority-serving institutions strongly encouraged to apply.

Interested Partners List

- To help potential team members connect with each other, NASA has established an “Interested Partners List”.
- Interested partners may send organization name, POC name, POC e-mail, area of research interest, and desired role (lead and/or partner) to hq-univpartnerships@mail.nasa.gov
- NASA will regularly update list as new entries are received. List posted to https://nari.arc.nasa.gov/uli_vendorsforum
- Please be advised that all entries received will be posted on a publicly-accessible website.

Next Steps

- Solicitation expected to be released in early-mid April timeframe.
- Will be released as program-level appendix to 2016 Research Opportunity in Aeronautics
- Will be announced via NSPIRES and FedBizOpps
- Two-step proposal procedure:
  - Step-A abbreviated proposal focusing on proposed objectives and overall approach (due 45 days from solicitation release)
  - Some proposers will be invited to submit Step-B proposal – full proposal with completed technical challenges, research activities, and detailed approach (due 45 days from notification to submit Step-B)

Thanks for participating!

Questions and Feedback