

Solicitation: NNH20ZEA001N-ULI

University Leadership  
Initiative (ULI)  
Applicants Workshop

April 15, 2021



Koushik Datta  
University Innovation  
Project Manager, and  
ULI Technical POC



# Notifications

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- **This workshop is being recorded**
- Slides, Workshop video recording and Q&A from this workshop will be available (~1 week) from links on NSPIRES
- Please post questions in the Q&A platform <https://arc.cnf.io/> for April 15<sup>th</sup> ULI Applicants Workshop, they will be answered after the initial presentation
  - After this workshop, questions should be emailed to [HQ-UnivPartnerships@mail.nasa.gov](mailto:HQ-UnivPartnerships@mail.nasa.gov)
- **Materials available:**
  - Solicitation available from NSPIRES at <https://bit.ly/3d6iF95>
    - ULI-specific Q&A in NSPIRES will be updated regularly as inquiries come in
  - NRA Guidebook for Proposers (Feb 2021) at [https://www.nasa.gov/sites/default/files/atoms/files/2021\\_ed\\_nasa\\_guidebook\\_for\\_proposers.pdf](https://www.nasa.gov/sites/default/files/atoms/files/2021_ed_nasa_guidebook_for_proposers.pdf)
- **Notice:**
  - Material presented at this workshop reflects best known information
  - In case there are any differences between the solicitation and material presented at this workshop, the solicitation will take precedence



Quickest way to resolve questions about this NRA is  
to e-mail: [HQ-UnivPartnerships@mail.nasa.gov](mailto:HQ-UnivPartnerships@mail.nasa.gov)

# ULI Points Of Contact (POC)

***Ken Albright***

Procurement POC

[kenneth.e.albright@nasa.gov](mailto:kenneth.e.albright@nasa.gov) or (228) 813-6127

***Koushik Datta***

Technical POC

[koushik.datta@nasa.gov](mailto:koushik.datta@nasa.gov) or (650) 604-2195

***NSPIRES Help Desk***

[nspires-help@nasaprs.com](mailto:nspires-help@nasaprs.com) or (202) 479-9376

# Agenda

- ULI in NSPIRES
- ULI Overview
- All Topics, including Topic 7
- Number of Awards / Award Amounts / Award type
- Eligibility / Teaming
- Peer Review and Education
- Two Step Proposal Process / Evaluation Criteria
- General Tips for Applicants
- Questions and Answers (Q&A)



# ULI is Appendix D.4 in ROA-2020 on NSPIRES

## D.4 - University Leadership Initiative (ULI)

Number:  
NNH20ZEA001N-ULI

Directorate:  
Aeronautics Research Mission Directorate

Type:  
NASA Research Announcement

Dates

Label	Date	Option
ULI Step-A Proposals Due	Jun 22, 2021	Create
Release	Mar 23, 2021	

- Notices
- The electronic Step-A proposal must be submitted in its entirety by 5:00 p.m. Eastern Time on the proposal due date (June 22, 2021).
  - An Applicant’s Workshop will be held on Thursday April 15, 2021; 1:00-3:00 p.m. ET (<https://uli.arc.nasa.gov/applicants-workshops/workshop5>).
  - This is the fifth solicitation of University Leadership Initiative
  - University Leadership Initiative (ULI) provides the opportunity for university teams to exercise technical and organizational leadership in proposing unique technical challenges in aeronautics, defining multi-disciplinary solutions, establishing peer review mechanisms, and applying innovative teaming strategies to strengthen the research impact. Research proposals are sought in seven ULI topic areas in Appendix D.4. Topic 1: Safe, Efficient Growth in Global Operations (Strategic Thrust 1) Topic 2: Innovation in Commercial Supersonic Aircraft (Strategic Thrust 2) Topic 3: Ultra-Efficient Subsonic Transports (Strategic Thrust 3) Topic 4: Safe, Quiet, and Affordable Vertical Lift Air Vehicles (Strategic Thrust 4) Topic 5: In-Time System-Wide Safety Assurance (Strategic Thrust 5) Topic 6: Assured Autonomy for Aviation Transformation (Strategic Thrust 6) Topic 7: Zero Emission Aviation This NRA will utilize a two-step proposal submission and evaluation process. The initial step is a short mandatory Step-A proposal due June 22, 2021. Those offerors submitting the most highly rated Step-A proposals will be invited to submit a Step-B proposal. All proposals must be submitted electronically through NSPIRES at <https://nspires.nasaprs.com>.

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Documents

Announcement Documents

Title
> <a href="#">ROA 2020 Complete Solicitation as of March 23,2021</a>
> <a href="#">ROA 2020 NRA Main Body as of March 23, 2021</a>
> <a href="#">University Leadership Initiative (ULI)</a>

Other Documents

Title
> <a href="#">Questions and Answers for ULI (Updated 5 April 2021)</a>
> <a href="#">An interested partners list (Lead, Partner) for this ULI</a>
> <a href="#">NASA Aeronautics Strategic Implementation Plan (topics 1-6 correspond to an ARMD strategic thrust described further in this Plan)</a>
> <a href="#">Information on ULI Applicant's Workshop for NNH20ZEA001N-ULI, scheduled for April 15, 2021</a>
> <a href="#">NRA Guidebook for Proposers (Feb 2021)</a>
> <a href="#">Pointers from previous ULI reviewers</a>
> <a href="#">Putting Universities in Charge Yields Early Success for NASA Aeronautics</a>

Webpage: <https://bit.ly/3d6iF95>

Omnibus Information

> [RESEARCH OPPORTUNITIES IN AERONAUTICS 2020 \(ROA-2020\)](#)

# University Leadership Initiative (ULI)

**What:** Introduce NASA-complementary, system-level, multi-disciplinary ideas from the university community and transition the research to aviation stakeholders

## **Why (Goals):**

1. Achieve outcomes in the ARMD Strategic Implementation Plan
2. Transition research for continuation or implementation
3. Provide opportunities for undergraduate and graduate students in aeronautics research
4. Promote diversity in aeronautics with inclusion of MSIs and underrepresented faculties

## **How:**

- University teams propose technical challenges and innovative ARMD complementary ideas
- Define multi-disciplinary solutions, apply innovative teaming strategies and form peer review mechanisms to strengthen the research impact
- Teams actively explore transition opportunities and workforce development
- Funding \$1-2M/year for 3-5 years

**When:** Start of Period of Performance is Fall 2022

# Leadership Aspects of ULI

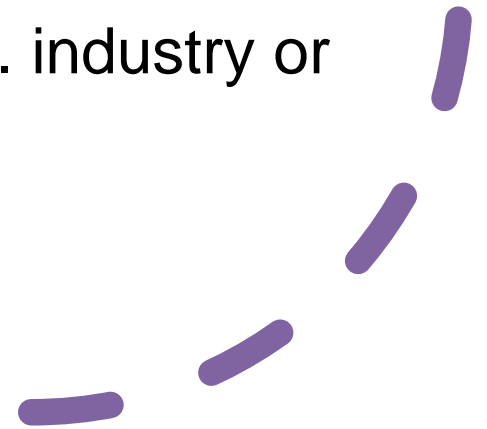
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- Technical
  - Define unique technical challenges to accomplish strategic thrust outcomes, and plan multi-disciplinary research activities to address those challenges
  - Maintain primary responsibility for assessing research progress and quality by establishing peer review mechanisms
- Organizational
  - Build teams that leverage expertise in multiple disciplines
  - Apply innovative teaming strategies to strengthen potential impact
  - Ensure meaningful roles and effective integration across all contributors
  - Promote education of the next generation of engineers
- Entrepreneurial
  - Maintain connections with key stakeholders, understand their needs, and propose necessary course corrections to meet those needs
  - Actively explore technology transition opportunities to U.S. aviation industry and NASA

# ULI Transition Goals

Transition can occur in several ways, including the following:

- ULI findings impact direction of U.S. industry / NASA
- Part of the ULI concept is transitioned to U.S. industry / NASA
- Whole ULI concept is transitioned to U.S. industry / NASA
- Creates a new product line in U.S. industry or a new NASA project



# Technical Challenges and Research

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- Understand the global context surrounding the proposed work, including policy and economic challenges that complement the technical work
- Identify the most critical technical challenges that must be solved to achieve the desired outcomes in the topic area
  - Technical challenges represent distinct barriers that must be overcome
  - Success and progress should be measurable (success criteria and progress indicators)
  - Different from technical challenges developed by NASA-internal teams and other ULI awardees
- Propose innovative research activities to solve the technical challenges
  - Offer novel approaches that open avenues for accelerated progress
  - Research products could include technologies, operational concepts, methods, design tools, models, or other technical advancements

*University Leadership – Remove critical barriers in aviation*

# Proposals Solicited in 7 Topics

Topics described by the Six Thrusts  
in the Strategic Implementation Plan

1. Safe, Efficient Growth in Global Operations (Strategic Thrust 1)
2. Innovation in Commercial Supersonic Aircraft (Strategic Thrust 2)
3. Ultra-Efficient Subsonic Transports (Strategic Thrust 3)
4. Safe, Quiet, and Affordable Vertical Lift Air Vehicles (Strategic Thrust 4)
5. In-Time System-Wide Safety Assurance (Strategic Thrust 5)
6. Assured Autonomy for Aviation Transformation (Strategic Thrust 6)
7. Zero Emission Aviation

Topic 7 described  
in the ULI solicitation



<https://www.nasa.gov/aeroresearch/strategy>

## Topic 7: Zero Emission Aviation

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- This topic seeks to advance key technology that provides a pathway to the eventual adoption of aircraft that do no environmental harm in all its operating modes
  - Focuses only on aviation emissions and not on emissions from energy production
- Desired outcomes
  - A scenario describing the state of 2050s air transportation. Research focus should be on the dominant aircraft and its operations.
  - Transformational aircraft, technologies and operations that meet economic and environmental demands of airlines, the general public and other stakeholders for a zero-emissions future by 2050
  - Produce the next generation scientists and engineers prepared to lead the aviation industry to a zero-emissions future

## Topic 7 is a Hard Problem!

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- The solicitation was written to garner ideas from the university community, develop some technologies and groom the next generation of workforce
- Given the limited resources of an ULI award, you can propose important, limited-scope work on a proposed pathway to zero harmful emissions
  - Think about this from a system level
  - The proposed pathway does not have to fully resolve all issues for your proposal to be competitive
  - If the proposed approach has environmentally harmful emissions do address them

# Projected Distribution of Awards

- Proposals are invited for
  - 3 years duration in Topics 1-6
  - 3-5 years range in Topic 7
- Nominal budgets in the \$1-2M range per award per year
  - Annual budget usage by awardees is important to NASA and so proposed budgets must consider ramp ups within the team
- **NASA anticipates investing in three awards (Cooperative Agreements), nominally two awards with three-year duration and one award in Topic 7**
  - *No guarantee that awards will be allocated as described. Depends on the quality of the proposals received, scope of the proposed work, funding availability, and program needs*
  - *Selecting Official can consider program portfolio priorities, cost sharing and budget constraints when making the final selection*

## Proposals Solicited in 7 Topics

Topics described by the Six Thrusts in the Strategic Implementation Plan

1. Safe, Efficient Growth in Global Operations (Strategic Thrust 1)
2. Innovation in Commercial Supersonic Aircraft (Strategic Thrust 2)
3. Ultra-Efficient Subsonic Transports (Strategic Thrust 3)
4. Safe, Quiet, and Affordable Vertical Lift Air Vehicles (Strategic Thrust 4)
5. In-Time System-Wide Safety Assurance (Strategic Thrust 5)
6. Assured Autonomy for Aviation Transformation (Strategic Thrust 6)
7. Zero Emission Aviation



<https://www.nasa.gov/aeroresearch/strategy>

Topic 7 described in the ULI NRA

# Teaming / Eligibility

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- Lead organization for ULI proposal must be an accredited, degree-granting U.S. college or university
  - Team members may include:
    - Other U.S. colleges or universities
    - U.S. industry members
    - Other departments at the principal investigator's institution
    - Non-profit organizations in the U.S.
    - Federally-Funded Research and Development Centers (FFRDCs)
    - Other U.S.-based entities
  - Historically Black Colleges and Universities (HBCU) and other Minority-Serving Institutions (MSI) strongly encouraged to apply
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- No foreign-owned U.S. subsidiaries and foreign organizations – not as investigators, collaborators, peer reviewers, technology recipients, etc.
  - No NASA/JPL investigators, collaborators or peer reviewers

# Eligibility Questions

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- **Can the same institution be the lead institution for separate proposals responding to different ULI topics?**
  - Yes
- **Are researchers allowed to be members of multiple teams with different lead institutions?**
  - Yes. The researchers must be identified as team members in each proposal they participate in.
- **Can a non-US citizen, studying/working at a university, be included on the team?**
  - Generally, yes. The eligibility requirements of the ROA-2020 apply to the proposing organization and not the individual. However, it is possible that export control requirements must be considered for members of a proposing organization who are not U.S. citizens or do not have permanent resident status.

## Desired Attributes of a ULI Team

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- Universities are asked to build a talented, diverse, and cross-disciplinary team to explore innovative, integrated solutions toward the technical challenges
- Inclusive teaming methods that promote diversity and faculty from HBCU and/or other Minority-Serving Institutions
- Encouraged to include team members that are less-established or have less prior experience working on NASA Aeronautics projects
- Effective integration of these team members and meaningful roles represents an important part of university leadership role
- Inclusion of relevant stakeholders and industrial partners either as team members, collaborators or advisors

*University Leadership - Reach broadly across educational community*



# Interested Partners List - [https://nari.arc.nasa.gov/uli\\_partners](https://nari.arc.nasa.gov/uli_partners)

## University Leadership Initiative Interested Partner List

For ULI, the lead (proposing) organization must be an accredited, degree-granting U.S. college or university. Partners may include other U.S. colleges and universities, U.S. companies, U.S. non-profit organizations, U.S. federally funded research and development centers (FFRDC).

To be listed as an interested lead or partner, please send electronic mail to [hq-univpartnerships@mail.nasa.gov](mailto:hq-univpartnerships@mail.nasa.gov) with "ULI Partnerships" in the subject line and include the information below.

Note: This Partners List webpage is for the Round 5 ULI solicitation ([NNH20ZEA001N-ULI](#))

Organization Name	Organization POC	POC E-mail	Area of Research Interest	Lead/Partner
DEVCOM - Army Research Laboratory,			Strategic Thrust 4: Safe, Quiet, and Affordable Vertical Lift Air Vehicles,	Collaborator

*Last year during the solicitation period (4/30/20) the Partners List webpage was averaging 118 unique hits per day (counting returning users, approximately 162 hits per day)*

# Peer Review and Education

- Establish a strong, non-advocate, peer review process for assessing relevance, technical quality, and performance
  - Teams choose their own peer review process to maximize its effectiveness
  - Identify reviewers from academia, industry, and government. Engage them throughout the year and in annual meetings. In many cases teams choose peer reviewers with an eye towards research transition.
  - No NASA peer reviewers
- Promote next generation of engineers, undergraduates and graduates, with the skills to lead U.S. aviation into the future
  - ULI is looking to engage undergraduate students and stimulate them with meaningful research work
  - Innovative training of student team members to become future leaders

*University Leadership – Develop the workforce of the future*

# NASA Role in ULI

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- Enable and provide support rather than technical oversight
- Provide oversight that relies primarily on input from team's peer review process
- Support ULI team in following areas:
  - Provide additional insight on market trends and offer suggestions to support continued alignment with stakeholder needs
  - Work with PI to explore opportunities for technology transition to ARMD projects and external community
  - Facilitate contacts with NASA subject matter experts and facility owners
- Host ULI technical interchanges and networking opportunities

# Two-Step Proposal Process

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- Step-A proposal due June 22, 2021
  - 5 pages for Scientific/Technical/Management section
  - Focusing on objectives, partially-defined technical challenges, overall approach, teaming and education strategy, etc.
- NASA will review and make selections of Step-A proposals in Topics 1-7 which will be invited to submit a Step-B proposal
  - All proposers will be notified
- Step-B proposal due 60 days from notification
  - 25 pages for Scientific/Technical/Management section
  - Full proposal with completed technical challenges, research activities, and detailed approach, etc.

*Step-A and Step-B proposal content details are in section D.4.6.1 of ULI solicitation*

# Proposal Evaluation Criteria

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- Step-A Proposal
  - Relevance to ULI Objectives (weight 40%)
  - Technical Merit (weight 40%)
  - Innovative Teaming and Education (weight 20%)
- Step-B Proposal
  - Relevance to ULI Objectives (weight 25%)
  - Technical Merit (weight 25%)
  - Innovative Teaming and Education (weight 20%)
  - Effectiveness of the Proposed Work Plan (weight 15%)
  - Cost (weight 15%)

*Details of evaluation criteria are in section D.4.6.2 of ULI solicitation*

# Notes for Step-B Proposals

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- Proposed Budget
  - Emphasis on accurate cost estimates, based on what is needed
- Cost Sharing
  - Proposers may include cost sharing at their own discretion
  - Cost sharing is not an evaluation criteria
  - If cost sharing allows teams to increase the technical merit and impact of their work, then will affect those evaluation criteria and the Value-Cost scoring metric
  - Cost sharing may also be considered by the Selecting Official in the final selection of awards

# General Tips

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- Read the ULI solicitation carefully. Do read the ARMD Strategic Implementation Plan
- Have a question
  - Questions not answered in ULI solicitation may be answered in the ROA-2020
  - ULI-specific Q&A in NSPIRES will be updated regularly as inquiries come in
  - Email questions to: [HQ-UnivPartnerships@mail.nasa.gov](mailto:HQ-UnivPartnerships@mail.nasa.gov)
- NASA proposal preparation and submission instructions:
  - General instructions are in the NRA Guidebook for Proposers (Feb 2021) at [https://www.nasa.gov/sites/default/files/atoms/files/2021\\_ed\\_nasa\\_guidebook\\_for\\_proposers.pdf](https://www.nasa.gov/sites/default/files/atoms/files/2021_ed_nasa_guidebook_for_proposers.pdf)
  - ULI-specific instructions are in the ULI solicitation
  - Pointers from previous ULI reviewers is in NSPIRES
- Deadline for proposal submission in NSPIRES: June 22, 2021 by 5 pm ET

# Previous ULI Awardees

ULI Website: <https://nari.arc.nasa.gov/uli>

- Round 1: <https://nari.arc.nasa.gov/ULIround1>
- Round 2: <https://nari.arc.nasa.gov/ULIround2>
- Round 3: <https://nari.arc.nasa.gov/ULIround3>
- Round 4: <https://nari.arc.nasa.gov/ULIround4>

*Round 1-3 awards are also in NASA TechPort.  
Links available from the Round N webpages*

# ULI Portfolio: Lead Universities and Aviation Outcomes

Thrust 1	Thrust 2	Thrust 3	Thrust 4	Thrust 5	Thrust 6	Aviation Manufacturing	Materials & Structures	Hypersonic
<b>University of South Carolina:</b> Increase communication capabilities in the National Airspace System (NAS)	<b>Texas A&amp;M University:</b> Reduce supersonic noise for various atmospheric conditions	<b>University of Tennessee:</b> Improve aerodynamic efficiency of slotted natural laminar flow aircraft	<b>University of California, San Diego:</b> Design tools to rapidly develop electric vertical takeoff and landing vehicles	<b>Arizona State University:</b> Improve risk prediction NAS-wide with information fusion and prognostics	<b>Stanford University:</b> Develop techniques to enable trusted AI-based aviation systems	<b>Carnegie Mellon University:</b> Improve Additive Manufacturing (AM) certification process and build an AM ecosystem	<b>University of Delaware:</b> Develop a part/process design methodology for TuFF composites for high-rate manufacturing	<b>Purdue University:</b> Optical and laser sensors for hypersonic flight control
<b>University of Texas, Austin:</b> Theory and concept of autonomous cargo operation		<b>Ohio State University:</b> Develop electrical propulsion technologies for a 1-Megawatt aircraft		<b>Oklahoma State University:</b> Prediction of low-level winds in both natural and urban environments	<b>North Carolina A&amp;T University:</b> Integrate secure, coordination and control algorithms for certification of UAS/UAM	<b>University of Wisconsin:</b> Improve safety and efficiency of manufacturing with human-robot teaming	<b>University of South Carolina:</b> Unidirectional tape-based thermoplastic part design and manufacture	<b>University of Texas, Austin:</b> Vehicle as aerodynamic sensor for hypersonic flight control (AFOSR funded)
		<b>University of Illinois:</b> Develop cryogenic & hydrogen technologies for a hydrogen aircraft					<b>Georgia Tech:</b> Advanced materials, tools and processes for UAM vehicles	
		<b>Penn State University:</b> Optimal design of a gas turbine engine for short-haul aircraft						



# Questions and Answers

Please post questions in the  
Q&A platform <https://arc.cnf.io/>  
for April 15<sup>th</sup> ULI Applicants Workshop

# Thank you for attending today's workshop!

Responses to workshop questions will be included in Q&A in NSPIRES  
under “Other Documents” associated with this ULI solicitation