



Transformative Aeronautics Concepts Program (TACP)

Update on University Innovation Project
October 17, 2023





ULI targets Faculty Proposals

- Propose to solve major, system-level technical challenges in aeronautics
- Receive \$1-2M/year for 3-4 years
- Two-step proposal submission and evaluation process
- 1 solicitation per year, typically solicitation opens in March
- Opportunities for undergraduate and graduate students to participate in aeronautics research
- Promote diversity in aeronautics with inclusion of minority-serving institutions and underrepresented university faculties

ULI Round 6 proposers notified March 3. Will release Round 7 solicitation in April.

USRC seeks Student Ideas

- Students propose their novel ideas for aviation
- Receive up to \$80K
- 3-page technical proposal
- 3 proposal cycles per/year, proposals due around February, June, November
- Gain technical and entrepreneurial skills
- Teams use crowdfunding
- Interface with NASA experts
- Open to all majors and interdisciplinary teams

USRC Proposals received Feb 24. In evaluation.

Competitions are for Student Groups

- New competition topic each year
- As a team work on a future aviation concept
- Winning team receives NASA internships
- A 5-to-7-page paper/design study and an infographic
- Top 8 teams present to NASA
- Clean Aviation Energy competition opened July 26
- To increase college students' interest in climate friendly aviation research
- Gain systems-level thinking
- Open to all majors and interdisciplinary teams

Proposals received Feb 28. In evaluation.

ULI Expanding the Aero Research Ecosystem

From 36 states + DC

11 HBCUs (1 Lead) and
16 other Minority Institutions (6 Leads)

\$180M Awarded

27 Awards
with 80 Universities

Attracted 507
proposals

42 Companies are
Team Members

320 Named
Investigators







5 Women Principal
Investigators

Over 426 Students Involved in
Research

15 of 27 PIs are First
Time NASA Awardees



FY23 ULI Portfolio: Lead Universities and Aviation Outcomes

Thrust 1	Thrust 2	Thrust 3	Zero Emissions Aviation	Thrust 4	Materials & Structures (Thrust 4)	Aviation Manufacturing (Thrust 3, 4)	Thrust 5	Thrust 6	Hypersonic
University of Texas, Austin: Theory and concept of autonomous cargo operation	Texas A&M University: Reduce supersonic noise for various atmospheric conditions	University of Tennessee: Improve aerodynamic efficiency of slotted natural laminar flow aircraft	Florida State University: Integrated Zero-Emission Aviation using a Robust Hybrid Architecture	University of California, San Diego: Design tools to rapidly develop electric vertical takeoff and landing vehicles	University of Delaware: Develop a part/process design methodology for TuFF composites for high-rate manufacturing	Carnegie Mellon University: Improve Additive Manufacturing (AM) certification process and build an AM ecosystem	Arizona State University: Improve risk prediction NAS-wide with information fusion and prognostics	Stanford University: Develop techniques to enable trusted AI-based aviation systems	Purdue University: Optical and laser sensors for hypersonic flight control
New Mexico State University: Mobility-Energy-Coordinated Platform for Infrastructure Planning to Support AAM Aircraft Operations	Georgia Tech: Lowering Emissions and Environmental Impact from Civil Supersonic Transport	Ohio State University: Develop electrical propulsion technologies for a 1-Megawatt aircraft	University of Central Florida: Zero-Carbon Engine Core with Supercritical Carbon Dioxide Power Cycle for Onboard Power	Georgia Tech: Advanced materials, tools and processes for UAM vehicles	University of South Carolina: Unidirectional tape-based thermoplastic part design and manufacture	University of Wisconsin: Improve safety and efficiency of manufacturing with human-robot teaming	Oklahoma State University: Prediction of low-level winds in both natural and urban environments	North Carolina A&T University: Integrate secure, coordination and control algorithms for certification of UAS/UAM	University of Texas, Austin: Vehicle as aero-dynamic sensor for hypersonic flight control (AFOSR funded)
		University of Illinois: Develop cryogenic & hydrogen technologies for a hydrogen aircraft	Tennessee Technological University: CarbonLess Electric Aviation (CLEAN)	Boston University: Safe, Low-Noise Operation of UAM in Urban Canyons via Integration of Gust Outcomes and Trim Optimization			University of Notre Dame: A Safety-Aware Ecosystem of Interconnected and Reputable sUAS	University of Illinois: Robust and Resilient Autonomy for Advanced Air Mobility	
Round 1 & 2 to be completed in FY23	Round 6 Awards	Penn State University: Optimal design of a gas turbine engine for short-haul aircraft			<div>6 Strategic Thrusts</div> <div>  Safe, Efficient Growth in Global Operations  Safe, Quiet, and Affordable Vertical Lift Air Vehicles </div> <div>  Innovation in Commercial Supersonic Aircraft  In-Time System-Wide Safety Assurance </div> <div>  Ultra-Efficient Subsonic Transports  Assured Autonomy for Aviation Transformation </div>				

UI Project: Future Plans

- ULI Planning grants for Minority Institutions
 - NASA OSTEM providing funds – 10 six-month grants are in the plans
 - UI and ARMD will provide technical interaction
- Build Minority Institutions' capabilities in Zero Emissions Aviation research
 - Planning with NASA OSTEM for implementing in FY24
 - OSTEM provides funds – multi-year grants
- Include Aviation Maintenance Technical Schools in Aero Ecosystem
 - NRA for unique maintenance issues with new forms of air transportation
 - Exploring a student competition for FY24

