**AMENDMENT NO. 5 TO THE NASA RESEARCH ANNOUNCEMENT (NRA)
ENTITLED "RESEARCH OPPORTUNITIES IN AERONAUTICS – 2023
(ROA-2023)," NNH23ZEA001N, RELEASED May 1, 2023**

Changes are made to the following:
- Updated Table of Contents
- Table 5. Solicited Research Programs (in order of proposal due dates)
- Table 6. Solicited Research Programs (in order of Appendices A-D)
- Appendix D.5 - University Student Research Challenge (USRC)

TABLE 5. SOLICITED RESEARCH PROGRAMS (IN ORDER OF PROPOSAL DUE DATES)

APPENDIX	PROGRAM	NOI DUE DATE	PROPOSAL DUE DATE
D.2	Transformational Tools and Technologies Project (TTT)	December 9, 2022	January 13, 2023, 5PM EST
D.6	Future Aviation Maintenance Technical Challenges	April 21, 2023	May 31, 2023
A.8	Advanced Air Vehicles Program (AAVP) Fellowship Opportunities	N/A	May 31, 2023, 5PM ET
D.4	University Leadership Initiative (ULI)	July 06, 2023 See note 1	See note 2
D.5	University Student Research Challenge (USRC)	n/a	See note 3

Note: It is expected that additional project areas will be added in future amendments.

1. University Leadership Initiative will use a 2-step proposal process. Step-A proposals are required, in place of the Notice of Intent (NOI) and are due 07/06/2023.
2. University Leadership Initiative will use a 2-step proposal process. Step-B proposals will be due 60 days after the notification for Step-B proposals is issued.
3. University Student Research Challenge (USRC) will evaluate all proposals submitted in each of four cycles: Cycle One Due Date is June 22, 2023; Cycle Two Due Date is November 9, 2023; Cycle Three Due Date is February 22, 2024; and Cycle Four Due Date is June 20, 2024.

TABLE 6. SOLICITED RESEARCH PROGRAMS (IN ORDER OF APPENDICES A–D)

APPENDIX	PROGRAM	NOI DUE DATE	PROPOSAL DUE DATE

A.8	Advanced Air Vehicles Program (AAVP) Fellowship Opportunities	N/A	May 31, 2023, 5PM ET
D.2	Transformational Tools and Technologies Project (TTT)	December 9, 2022	January 13, 2023, 5PM EST
D.4	University Leadership Initiative (ULI)	July 06, 2023 See note 1	See note 2
D.5	University Student Research Challenge (USRC)	n/a	See note 3
D.6	Future Aviation Maintenance Technical Challenges	April 21, 2023	May 31, 2023

<u>Note: It is expected that additional project areas will be added in future amendments.</u>

1. University Leadership Initiative will use a 2-step proposal process. Step-A proposals are required, in place of the Notice of Intent (NOI) and are due 07/06/2023.
2. University Leadership Initiative will use a 2-step proposal process. Step-B proposals will be due 60 days after the notification for Step-B proposals is issued.
3. University Student Research Challenge (USRC) will evaluate all proposals submitted to date in four cycles: Cycle One Due Date is June 22, 2023; Cycle Two Due Date is November 9, 2023; Cycle Three Due Date is February 22, 2024; and Cycle Four Due Date is June 20, 2024.

APPENDIX D: Transformative Aeronautics Concepts Program

D.5 University Student Research Challenge (USRC)
The University Student Research Challenge (USRC) is a portfolio item in NASA Aeronautics Research Mission Directorate's (ARMD) University Innovation (UI) Project.

D.5.1 USRC Overview and Goals
USRC seeks to challenge students to propose new aeronautics ideas/concepts that are relevant to ARMD. Apart from this, the students also have the challenge of raising cost share funds through crowdfunding[1] platform. The process of creating and preparing a crowdfunding campaign act as a teaching accelerator - requiring students to act like entrepreneurs. Understanding the market, fundraising and execution are major skills for a future entrepreneur. Crowdfunding also raises awareness in the general public about students' research. Finally, crowdfunding is being used to excite and bring new communities to NASA Aeronautics.

USRC's strategic goals are:
- Provide broad opportunities for students at different levels, including undergraduate and graduate, to participate in aeronautics research.
- Assist in achieving aviation outcomes defined in the ARMD Strategic Implementation Plan [1] through NASA-complementary research.

USRC will provide students from accredited U.S. colleges or universities with grants for their aeronautics projects. It will support cutting-edge research on emerging aviation technologies and the education of new researchers in various fields of study. Additional beneficiaries are members of the aviation community who will receive new technology and concepts from USRC results.

D.5.2 Description of Solicited Research
This challenge seeks students who have an aeronautics-related project idea and have the passion to develop that idea. The project must be relevant to the Aeronautics Research Mission Directorate (ARMD) Strategic Implementation Plan.

The solicitation goal can be accomplished through project ideas such as advancing the design, developing technology or capabilities in support of aviation, by demonstrating a novel concept, or enabling advancement of aeronautics-related technologies. University infrastructure development, even when aeronautics related, should not be the focus of a proposal.

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[1] Crowdfunding is a method for individual citizens to pool their resources, usually via the Internet, to fund efforts initiated by other people or organizations. Crowdfunding campaigns can finance any type of effort, from design, to movies and disaster relief. Typically, the crowdfunding model has a project initiator (in this case, the student) who proposes the idea to be funded; a specified goal or target amount for funds to be raised (in this case, the cost share matching funds); individuals or groups (members of the public) support the project by donating funds; and a crowdfunding platform that brings the project initiator and the public together to launch the funding of the project. The crowdfunding platform may charge a fee for their service. In this manner, crowd funding allows the general public to directly engage in projects that interest them.

Proposers may request a one-on-one virtual meeting with the USRC Technical POC to see if USRC is the right opportunity for their project.

<u>Solicited Research Exclusions</u>
Graduate students should propose entrepreneurial work that is not related to their graduate research. A more appropriate avenue for funding of graduate research is the NASA Fellowship Activities solicited in NSPIRES.

Proposers are welcome to resubmit previously unselected USRC proposals only if there are substantive changes in areas that are critical to the intrinsic merit evaluation, such as the goals, objectives, or methodology. Changes to Principal Investigator, list of Team Members, or the Budget are not considered substantive.

D.5.3 <u>Programmatic Considerations</u>

D.5.3.1 <u>Process and Funding Information</u>

<u>Process Overview</u>
An overview of the process is described here, where each process step includes additional requirements or restrictions as described further in the solicitation.
- Students write their proposal and get a letter of support from a discipline-relevant faculty mentor in their college or university.
- A proposal is submitted to NASA with the budget request and faculty letter of support.
- NASA evaluates all proposals received by cycle due date. NASA will make proposal selections.
- If proposal is selected by NASA, student team is notified. NASA provides half the requested budget as a grant to the student's institution of higher education. The student project can start.
- Student team must develop a crowdfunding/business plan and have it approved by the faculty mentor.
- All materials and information supplied to potential project supporters on the crowdfunding platform must be reviewed and approved by NASA.
- Students post their project on a publicly accessible crowdfunding platform.
- If crowdfunding is fully successful (the team receives a minimum of $2,000 through crowdfunding or industry/organization support), then student submits proof to NASA.
- The student's institution of higher education is awarded the rest of the NASA grant.
- Student executes the project with funding that is the total of the NASA grant and crowdfunded amounts. Successful crowdfunded projects may collect more than the targeted amount (see section D.5.3.4 for more details).

NASA reserves the right to fund a project even if cost sharing goals are not met.

<u>Eligibility</u>
NASA funding is available to all accredited U.S. institutions of higher education (e.g., universities, four-year colleges, community colleges, or other two-year institutions). Students must be currently enrolled (part-time or full-time) at the institution. Student citizenship status is not an eligibility criterion for USRC participation. NASA has no set expectations as to the team

size. The number of students participating in the investigation is to be determined by the scope of the project and the student Team Leader. Faculty can serve as mentors for the project team.

Other eligibility criteria, not superseded by the above, are in Section III of this ROA. Proposals involving bilateral participation, collaboration, or coordination in any way with China or any Chinese-owned company, whether funded or performed under a no- exchange-of-funds basis, shall be ineligible for award.

NASA Funding Information and Projected Distribution of Awards
The NASA funding mechanism is grants with cost sharing, and the award will be made to the accredited U.S. institution (not to the student). The Federal (NASA) share of awards will not exceed $80,000 in total costs. All proposed budgets must be appropriate to achieving the intended research objective, recognizing that there is a requirement for cost sharing. Proposal budget requests must include only the Federal (NASA) share of the project. Proposals with lower budgets may be more competitive for selection.

NASA has a program budget of $800K for all USRC awards under this solicitation. So, NASA will nominally have 10 awards distributed over all three cycles of this USRC solicitation (see Section D.5.4 for proposal due dates for all cycles). The actual number and value of the awards will depend on the proposals received. Note that all awards are contingent on availability of appropriated funds. If the appropriated funds available are less than anticipated, fewer awards may be issued.

NASA grant funds cannot be used to perform crowdfunding, nor can it be used to solicit loans, offer gifts, incentives, equity, or financial returns to individuals or groups who support the project, whether on the crowdfunding platform or elsewhere. Allowable costs are subject to the provisions at 2 CFR 200, 2 CFR 1800 and the *NASA Grant and Cooperative Agreement Manual (GCAM)* [2]. A portion of the budget can be used to support student stipend/tuition.

Awards are made to the proposing institution and not directly to the Student Team or the Student Team Leader.

Student Team Cost Sharing
The USRC solicitation requires crowdfunded cost sharing of $2,000 by grant recipients. Funds raised from industry or professional organizations will count towards the cost sharing total.

D.5.3.2 Proposal and Submission Information

Proposal Submission Site
Proposers must submit electronic proposals in response to this solicitation to the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES [3]; http://nspires.nasaprs.com). The NSPIRES system will guide proposers through submission of all required proposal information. The presentation *NSPIRES Organization Registration*, located in the "Tutorials and User Guides" section of this website, provides information on how to register an organization in NSPIRES. Please work with your institution well in advance of the proposal deadline to ensure a smooth submission process.

In order to be able to submit a proposal, all investigators must be preregistered in NSPIRES and have received a User ID and password. This includes the Principal Investigator, all listed Co-Investigators and Collaborators. NSPIRES registration can be done at the website https://nspires.nasaprs.com/external/aboutRegistration.do. Early registration is advised. A Help Desk is available at (202) 479-9376 or by E-mail at nspires-help@nasaprs.com.

Notice of Intent to Propose
Notices of Intent (NOIs) are not required for this solicitation.

Proposal Format and Contents
The Scientific/ Technical/Management section may not exceed three (3) pages in length, with a minimum 12-point font size and one-inch margins on all sides. This section must cover the following topics:
- Title of proposed project
- Name and organization of Principal Investigator (Student Team Leader) and team members
- Which ARMD strategic thrust are you addressing with your project?
- How will your project align with the ARMD Strategic Implementation Plan?
- What are the goals and objectives of your project?
- What is new in your approach and why do you think it will be successful?
- What is the potential impact of your project?
- What is the project timeline?
- What is the name and URL of the crowdfunding platform that you plan to use?
- What is the timeframe for your crowdfunding campaign?

A letter of support is required from a faculty mentor of the accredited U.S. University or College. The required elements of this letter are:
- Students' commitment to the project's success,
- Innovativeness of the proposed project, and
- The project's potential for acquiring the cost share funds through crowdfunding.

The Student Team Leader should be the Principal Investigator and their résumé must be included with the proposal and it will not be counted toward the Scientific/Technical/ Management section page limit. Although not required, other team member résumés are appreciated.

Budget details and justification should be included in the proposal.

Supporting information such as letters of support, references, personnel résumés and budget will not be counted toward the page limit. Other elements of a proposal from *NASA Proposer's Guide* [4], like data management plan and current and pending support, are not required for USRC.

Notes:
- Resubmitted proposals must be substantially different for consideration.
- The nominal performance period for USRC is one year and so do not propose multi-year projects.

- USRC is seeking student developed ideas and not faculty directed research.

Proposal Submission
If there are specific conflicts with submitting a proposal into the NSPIRES system, then a NSPIRES proposal submission by the faculty mentor is acceptable. However, the student Team Leader should remain as the Principal Investigator for the project.

All USRC proposals must be submitted electronically through NSPIRES by an authorized organizational representative (AOR). See Section IV of this ROA-2023 for additional information on submission procedures.

D.5.3.3 Proposal Evaluation

Evaluation Cycles
NASA will evaluate proposals in three cycles - see Section D.5.4 for proposal due dates for all three cycles. All proposals submitted by Cycle One due date will be evaluated as a group. Then, all proposals submitted after Cycle One due date and by Cycle Two due date will be evaluated in a second group. Finally, all proposals submitted after Cycle Two due date and by Cycle Three due date will be evaluated in the last group.

Proposal Evaluation Criteria
All proposals will be evaluated against the criteria listed below. The evaluation criteria in the *NASA Proposer's Guide* are superseded by the following:

- Relevance and Impact (weight 40%)
  – Evaluation of a proposal's relevance to ARMD research strategic thrusts.
  – Student initiative in developing the project and is not an extension of faculty research.
  – Potential impact on national aeronautics challenges if research is successful.
  – Assess potential for public's interest in the project.
- Technical Merit (weight 40%)
  – Clear description of what is new or creative in the proposed effort.
  – Overall scientific or technical merit of the proposal, including unique and innovative methods, approaches, or concepts.
  – Assess proposal against the state-of-the-art.
- Cost (weight 20%)
  – Appropriateness of proposed costs with those required to accomplish the goals of the investigation.
  – Value of the proposal – cost to NASA relative to the expected impact.
    - Lower cost proposals may be more competitive (higher value/cost)
    - Funding should not go into the upgrade of university facilities
    - Student tuition and fees should not be a large part of the requested budget

Failure of a proposal to be highly rated in any of the evaluation criteria is sufficient cause for the proposal to not be selected.

D.5.3.4 Selection and Initial Award

Selection
Proposals are evaluated by a Review Panel consisting of government subject matter experts. The Selecting Official is the UI Project Manager.

As soon as possible after the proposal evaluations are concluded, NASA will inform each proposer of the non-selection or selection of their proposal via electronic mail from NSPIRES. This typically occurs a month after proposal submission deadline.

Initial Award
For selected proposals, a NASA Grant Officer, who is the only official authorized to obligate the Government, will contact the proposer's university/college business office. Initially, NASA will only provide half the requested budget as a grant to the student's institution of higher education. The student project and crowdfunding campaign can then start with this initial award. The initial grant award typically occurs 2 months after proposal submission.

For more information see Section II (a) of this ROA NRA. Payments will be subject to the provisions of the GCAM.

Student Team
USRC requires the Student Team to be multidisciplinary and include at least one business student. The full team needs to work the market analysis, fund raising and technical aspects to make the project successful.

Pre-Award Costs
Pre-award costs are allowable but at the grantee's own risk. Per 2 CFR § 1800.210, Pre-Award Costs, NASA has waived the requirement for award recipients to obtain written approval prior to incurring project costs up to 90 calendar days before NASA issues an award.

D.5.3.5 Crowdfunding Campaign

Crowdfunding/Business Plan
Prior to crowdfunding, the student team must develop a crowdfunding/business plan and have it approved by the faculty mentor. The plan should identify the potential donors, their expected return from the donations, and how the team can satisfy the donor expectations. The plan may involve communication with industry and academia to refine the student team's research ideas and plans.

Development of the Crowdfunding Communication Material
On the crowdfunding platform the potential recipient must provide a sufficient description of the purpose of the project and intended use of the offered funds so that potential funders can evaluate whether or not to fund the project.

The potential recipient can choose an appropriate crowdfunding platform that otherwise meets the requirements of this solicitation.

<u>NASA Approval of Crowdfunding Campaign</u>
To verify the appropriate use of NASA name, logo, and sponsorship details, the potential recipient is required to share with NASA, prior to its release, the communication materials to be used for crowdfunding.

While posting their project on a crowdfunding platform, whether it is a university sponsored crowdfunding site or another site that is accessible by the general public, the potential recipient is not authorized to use the NASA name, insignia, seal, logo, or UI identifiers in any manner that might mislead the individuals or groups who might contribute towards crowdfunding of the potential recipient's project. Accordingly, it is required that the communication material be submitted to NASA for approval prior to release on the crowdfunding platform.

The following is a typical notice which contains the NASA name that could be used by the potential recipient on the crowdfunding platform:
"This material is based upon a proposal tentatively selected by NASA for a grant award of $__K, subject to successful crowdfunding. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of NASA."

Recipients of NASA grants and cooperative agreements having a need, desire, or purpose for an authorized use of the NASA insignia or UI Project identifiers in connection with their award, shall request and obtain prior written approval from the designated NASA Grant Officer, in conjunction with the NASA Headquarters, Office of Communications. See http://www.nasa.gov/offices/ogc/ip/logo.html and NASA Insignia Guidelines for NASA Grantees (https://www.nasa.gov/sites/default/files/atoms/files/nasa_insignia_guidelines_for_nasa_grantees.pdf) for more details.

Upon NASA approval, the potential recipient proceeds with the crowdfunding campaign.

<u>Crowdfunding</u>
Students can then post their project on a publicly accessible crowdfunding platform. Students can opt to use one or more crowdfunding sites. Advertising on social media should follow the appropriateness criteria of this solicitation. This solicitation does not place a timeline for crowdfunding - a two to three month crowdfunding period is acceptable to NASA.

NASA will only award rest of the grant if the potential recipient reaches the fundraising goal within their proposed timeframe. Successful crowdfunded projects may collect more than the targeted amount. If more than the targeted amount is collected, then the excess funds must be used for the project.

<u>Managing Crowdfunding Receipts</u>
The recipient organization must have a verifiable record of all elements of the crowdfunding including platform name, total amount collected, and evidence of transfer of funds from the crowdfunding platform to the educational institution in their accounting records. The

crowdfunding dollars committed to USRC cannot be used on another project.

D.5.3.6 <u>Final Award and Project Completion</u>

After crowdfunding ends, the proposer has up to two months to notify the NASA Grant Officer about the results – whether fundraising goal was achieved or not achieved. NASA reserves the right to fund a project even if cost sharing goals are not met.

<u>Rest of the Award</u>
If the proposer meets the fundraising goal within their proposed timeframe, then the proposer provides proof to the NASA Grant Officer. NASA will verify this claim and proceed with awarding rest of the grant.

<u>Project Period of Performance</u>
The NASA grants will have a one-year period of performance. In accordance with 2 CFR 1800.903 and the GCAM, the period of performance can be extended up to one year with no additional funding (no cost extension). The period of performance will begin at the time of the initial award by NASA.

The Student Team executes the project with funding that is the total of the NASA grant and crowdfunded amounts.

<u>Award Reporting Requirements</u>
The awardee should post regular updates of their project on their crowdfunding platform through the full execution period of the project. The deliverables to NASA are the progress, financial, and final reports submitted as per the GCAM. The final research report should document the results of the entire effort, along with any recommendations and conclusions. Sensitive information may be provided to NASA in a proprietary appendix.

All information disseminated as a result of USRC funding shall contain a statement that acknowledges NASA's support and identifies the award by number. For example, "These results are based upon work supported by the NASA Aeronautics Research Mission Directorate under award number NNH23ZEA001N-USRC" etc.

<u>Intellectual Property Resulting from Awards</u>
See Section II (d) of this ROA NRA for Intellectual Property Resulting from Awards.

D.5.3.7 <u>References</u>

[1] NASA, "NASA Aeronautics Strategic Implementation Plan, 2019 Update"
https://www.nasa.gov/aeroresearch/strategy, 2019

[2] NASA Grant and Cooperative Agreement Manual
https://www.nasa.gov/sites/default/files/atoms/files/nasa_gcam_-_revised_nov_12_2020.pdf

[3] NASA Solicitation and Proposal Integration Review and Evaluation System (NSPIRES)

https://nspires.nasaprs.com/external/

[4] NASA Proposer's Guide (February 2023)
https://www.nasa.gov/sites/default/files/atoms/files/2023_-_nasa_proposers_guide_-_final.pdf

D.5.4 <u>Summary of Key Information</u>

Expected budget for new awards	Up to a maximum of $80K per award
Number of new awards pending adequate proposals of merit	Around 10 awards
Maximum duration of awards	One year
USRC Q&A Information Sessions	May 8, 2023, at 2 pm ET September 18, 2023, at 2pm ET January 8, 2024, at 2pm ET May 6, 2024, at 2pm ET A link will be provided in the NSPIRES page for USRC under the section Notices.
Due date for Notice of Intent to propose (NOI)	n/a
Due date for proposals	Cycle One: June 22, 2023 Cycle Two: November 9, 2023 Cycle Three: February 22, 2024 Cycle Four: June 20, 2024.
General information and overview of this solicitation	See the *Summary of Solicitation* in the ROA
Detailed instructions for the preparation and submission of proposals	See section D.5.3 and the *NASA Proposer's Guide, Edition: February 2023* at https://www.nasa.gov/sites/default/files/atoms/files/2023_-_nasa_proposers_guide_-_final.pdf https://www.nasa.gov/sites/default/files/atoms/files/nasa_guidebook_for_proposers_-_feb._2022.pdf
Page limit for the central Scientific/Technical/Management section of proposal	3 pages
Submission medium	Electronic proposal submission is required; no hard copy is required. See also Section IV in the *Summary of Solicitation* of the ROA and Chapter 3 of the *NASA Proposer's Guide*.
Web site for submission of proposal via NSPIRES	http://nspires.nasaprs.com/(help desk available at nspires-help@nasaprs.com or (202) 479-9376)
Expected award type	Grant with Cost Sharing

Funding opportunity number	NNH23ZEA001N-USRC
NASA technical point of contact concerning this program	Steven Holz, <steven.m.holz@nasa.gov>, (757) 864-9798
NASA Procurement point of contact concerning this program	DeLunzo Bartee, <delunzo.bartee@nasa.gov>, (228) 688-2781
Questions and Answers (Q&A)	Quickest way to resolve questions about the USRC Appendix is to e-mail questions to: HQ-USRC@mail.nasa.gov. Responses will be provided by e-mail. NASA will also post any general Q&A on-line, in the USRC section of NSPIRES website, so that all proposers will have access to the same information.