



## Universities Space Research Association (USRA)

### Request for Proposal (RFP)



RFP Release Date:

17 April 2023  
(Amended 21 April 2023)

Proposals Due:

NLT 11:59 pm local time, 9 June  
2023



**DISCLAIMER**

The information contained in this Request for Proposal document (RFP) or subsequently provided to Proposers, whether verbally or in documentary or any other form by or on behalf of USRA or any of their employees or advisers, is provided to Proposers on the terms and conditions set out in this RFP and such other terms and conditions subject to which such information is provided.

This RFP is not an agreement and is neither an offer nor invitation by USRA to the prospective Proposers or any other person. The purpose of this RFP is to provide interested parties with information that may be useful to them in the formulation of their Proposals pursuant to this RFP.

USRA also accepts no liability of any nature whether resulting from negligence or otherwise however caused arising from reliance of any Proposer upon the statements contained in this RFP. USRA may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information, assessment or assumption contained in this RFP.

The Proposer shall bear all its costs associated with or relating to the preparation and submission of its Proposal including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by USRA, or any other costs incurred in connection with or relating to its Proposal. All such costs and expenses will remain with the Proposer and USRA shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by an Applicant in preparation or submission of the Proposal, regardless of the conduct or outcome of the Selection Process.



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## Request for Proposal (RFP) Summary

Universities Space Research Association (USRA), in conjunction with the U.S. Space Force (USSF) and the Air Force Research Laboratory (AFRL) solicits proposals for the University Consortium Research Opportunity (UCRO). U.S. accredited colleges and universities are invited to submit a proposal in accordance with this RFP as described in the Statement of Work (SOW), and other enclosures.

The USSF and AFRL are establishing a UCRO to address space science and technology (S&T) challenges through a network of partnered universities. The goal is to facilitate joint applied research with focus on transformational space domain technology breakthroughs and developments that will lead to the advancement of capabilities that can be transitioned and integrated into current and future USSF and other U.S. Government space capabilities.

### Proposal Deadline and Submission

**The proposal due date is no later than 11:59 pm local time on 9 June 2023. Proposals received after the established deadline will not be reviewed.** Proposals shall be signed by an authorized representative of the Offeror and submitted through WizeHive, the designated portal leveraged by USRA.

### Period of Performance

USRA anticipates awarding subagreements for two years (24 months) with one to three additional years for a total of 60 months contingent upon performance and the availability of funds. The period of performance will commence upon subagreement award date.

### Type of Subagreement

USRA anticipates the issuance of a Cost Reimbursable subagreement.

### Funding Amount and Award Size

USRA intends to award one or more subagreements, subject to availability of funding. Proposed efforts may range in size and complexity. Estimated total funding is \$6M.

### Eligibility Requirements

Offerors that meet the following eligibility criteria may submit a proposal in response to this RFP.

- The lead institution must be a U.S. accredited, public, or private institution of higher education only (including community colleges) and University Affiliated Research Centers (UARCs).
- Other partners could include non-profit research institutions, small businesses, industry, and other government agencies and laboratories.
- The nature of this research could result in the need for a security clearance. All research participants must be U.S. citizens. This includes principal investigators (PIs), co-principal investigators (Co PIs), and all students, staff, faculty, consultants, etc., engaged in the project.
  - Dual citizens and naturalized citizens are eligible.
  - Green card holders are ineligible.

### Terms and Conditions

As stated in Enclosure (1) –Draft Subagreement Template, Attachment A.



## Statement of Work (SOW)

### 1.0 Program Summary

USSF established the UCRO to engage students and postdoctoral fellows in space-based research and development to increase the number and diversity of future space professionals. This is a new approach to leverage university research and innovation to solve critical USSF technical problems. In addition, UCRO enables capacity building for space research and innovation at institutes of higher education, including Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Tribal Colleges and Universities (TCUs), and other designated Minority Serving Institutions (MSIs). UCRO will fund university teams committed to developing new and innovative solutions to research problems and/or maturing their existing product or service.

The second cycle of UCRO is aimed at addressing space science and technology (S&T) challenges through a network of partnered universities. The goal is for the UCRO to facilitate joint applied research and focus it on transformational space domain technology breakthroughs and developments that lead to the advancement of capabilities that can be transitioned and integrated into current and future USSF and other U.S. Government space capabilities.

A team of universities with expertise in Beyond Geostationary Earth Orbit (xGEO) Operations and Space Domain Awareness (SDA) are encouraged to collaborate with other universities and industry to address space research, development, and demonstration needs. Other partnerships could include universities, non-profit research institutions, small businesses, industry, and other government agencies and laboratories. Government agencies and laboratories are not eligible to receive funding under this agreement. It is highly desired for the research to lead to testbeds, high fidelity analytical modeling, simulation output, laboratory demonstrations, data packages, engineering drawings, conceptual/preliminary designs, and prototypes. The research is expected to transition technology to higher readiness levels throughout the period of performance. Extensions to the initial period of performance may be awarded based on an evaluation of this ability.

### 2.0 Goals

The USSF and USRA's goals for the UCRO are:

- 1) UCRO will connect USSF with academia through the advancement of university-based research that addresses risks and other areas of scientific interest to secure long-term, productive partnerships.
- 2) To improve research collaboration efforts between USSF and institutions of higher education to contribute and advance meaningful scientific research.
- 3) To provide undergraduate, graduate, and postdoctoral fellows with authentic research opportunities in collaboration with USSF that increase interest in science, technology, engineering, and mathematics (STEM) careers of the future.

### 3.0 Objectives

The objective of this RFP is to establish research performed in the challenge area of xGEO Operations and SDA. A minimum of three collaborators (from academia and/or industry) are required for each effort. Universities are encouraged to collaborate with other universities and industry to address space research, development, and demonstration needs.



The full award will be made to the lead university submitting the joint proposal. This university will manage the research of any xGEO Operations and SDA subtopics. The lead institution is responsible for evenly distributing funds to team member institutions via subawards. It is also permissible for team member institutions to issue further subawards.

Each team is encouraged to include future technology vectors and horizon scanning on emerging and forward leaning technologies through a systematic assessment of potential future threats and technology surprises. It is also recommended that the collaboration includes a multidisciplinary approach, not only across technical disciplines, but also including non-technical aspects and approaches to problems.

In addition to the partner universities, it is strongly encouraged that the UCRO research be conducted in collaboration with AFRL, the Defense Advanced Research Projects Agency (DARPA), or other Department of Defense (DoD) or U.S. Government agencies and laboratories, as well as industry partners, small businesses, and non-profit research institutions. The government laboratories have a deep understanding of the technology needs, end-user requirements, and potential applications of the research outcomes.

#### 4.0 Research Topic

The university teams proposing to the xGEO Operations and SDA UCRO may submit a research proposal that is aligned with their team’s unique research strengths.

#### RESEARCH TOPIC

#### Beyond Geostationary Earth Orbit (xGEO) Operations and Space Domain Awareness (SDA)

##### OVERVIEW:

The past decades have seen increasing global access to and utilization from Low Earth Orbit (LEO) to Geostationary Earth Orbit (GEO) for multiple purposes including commercial applications, such as communications; infrastructure applications, such as position, timing, and navigation; civil applications, such as Earth Science and crewed space stations; and military and intelligence applications. There is also expanding activity beyond GEO to cislunar and interplanetary realms as nation states and commercial industry expand both human and robotic exploration and the search for in situ resources.

The xGEO Operations and SDA UCRO call is focused on technologies needed to ensure continued and enhanced capability across all space areas (including moons and planets) for the U.S. military and civil operation. While many of these technologies are applicable to other orbital regimes or even other domains, priority will be given to proposals specifically addressing challenges related to space object tracking in xGEO. Below are example technologies that are related to xGEO Operations and SDA. These examples are not prioritized, not exhaustive, and are intended to be non-prescriptive. The intent is to provide broad focus area examples that will help proposers understand typical science and technology (S&T) challenges and needs for the call.

- Novel astrodynamics research/methodologies to enable breakthrough operational paradigms in cislunar space and enhance the state-of-the-art for SDA data utilization
  - Multi-objective trajectory design and transfer optimization
  - Quantification of chaotic/non-linear effects, bridging simplified and high-fidelity dynamics models

- Trajectory estimation, trajectory inference, beyond traditional state estimation
- Cislunar state and uncertainty representations and propagation methods, future orbital element sets
- Cislunar space utilization mapping and exploration of requirements for cislunar operations (PNT, power, propulsion)
- Guidance, navigation, control, and timing techniques
- Space weather impacts on astrodynamics, navigation, and trajectory prediction
- Advanced sensing techniques to enable rich data collection of objects in cislunar space
  - Distant object detection and object discrimination (natural vs. manmade)
  - Multi-phenomenology sensing, multi-source data fusion, pattern-of-life understanding
  - Low SNR detection and optimization of sensor tasking
  - Cybersecurity and data trust specific to SDA data
- Unique methods and measures to enable cislunar training, outreach, education
  - Integrated and/or immersive visualization and training concepts
  - Game engines and simulations to build operator intuition and decision making
  - Human machine interfaces and teaming for advanced operations

## 5.0 Principal Investigator (PI) Responsibilities

- Research proposals should include a realistic plan to address the problem statement/research topic area of choice, including the expected results and direction of any future research.
- The proposed approach should demonstrate understanding of the problem statement/research topic area with relevant references included.
- The proposal should also discuss in detail all new and innovative aspects of the research approach.
- PIs should identify all possible risks, both technical and programmatic, and propose a mitigation plan.
- Students and postdoctoral fellows are a focal point of this opportunity. PIs are required to include undergraduate and graduate students, and postdoctoral fellows as part of their research team.
  - PIs are required to serve as mentors to students and postdoctoral fellows. A brief description of the work plan for students and postdoctoral fellows should be included in the proposal. PIs are encouraged to propose new approaches to integrate students in their research.
  - Furthermore, PIs should identify thesis and research topics that align with the research proposed.
- PIs are required to allocate a minimum of five percent of their total annual budget towards student and postdoctoral fellows stipend support and travel associated with program events and/or as requested by USSF.

## 6.0 Place of Performance

Research should be conducted predominately at the PI's university and/or facility. The research may also be conducted virtually, as needed. PIs and students/postdocs may be asked to travel to conduct research.



## 7.0 Reporting and Deliverable Requirements

REPORTING REQUIREMENTS	FREQUENCY
<b>PROJECT MANAGEMENT REPORTING</b>	
Technical Progress Report	Q, A
Federal Financial Report (SF-425)	Q and F
Annual Audit (Financial)	A
Project Management Plan (PMP)	A
<b>SCIENTIFIC/TECHNICAL REPORTING</b>	
Journal Article-Accepted Manuscript (As Applicable)	A
Scientific/Technical Conference Paper/Presentation/Proceeding	A
Scientific/Technical Software & Manual	A
Scientific/Technical Dataset	A
Other (Dissertation/Thesis, etc.)	A
Testbeds	A, F
Analytical Models	A, F
Simulation Output	A, F
Laboratory Demonstrations	A
Data Packages	A, F
Engineering Drawings and Conceptual Designs	Q
Prototypes	A, F
<b>FINAL REPORTING</b>	
Final Scientific / Technical Report (As Applicable)	F
Patent Certification (As Applicable)	F
Software Deliverable Submission (As Applicable)	F
<b>OTHER REPORTING</b>	
Intellectual Property Reporting	A
Invention Utilization Report	A
Annual Indirect Cost Proposal	Y
Invoice and Expense Itemization	M
SAM.gov Annual Financial Assistance Certs and Reps Report	Y
<b>FREQUENCY CODES AND DUE DATES:</b>	
A- As Applicable; Within five (5) calendar days after the event.	
F- Final; within 90 calendar days after expiration or termination of the award.	
M- Monthly; within 15 calendar days after the end of each month.	
Y- Yearly; within 90 calendar days after the end of the annual reporting period.	
Q- Quarterly; within 30 calendar days after the end of the quarterly reporting period.	





## 8.0 USRA Responsibilities

- A USRA Program Specialist will work closely with USSF Program Managers and the Core Technical Competency (CTC) Lead(s) and serve as the primary interface throughout the implementation period with PIs.
- USRA will explore options for students and postdoctoral fellows supported through the UCRO to participate in innovative program events, both virtually and on-site.
- As needed and per the request of USSF Management, USRA will process security clearances for PIs, faculty, students, and postdoctoral fellows, and arrange access to USSF facilities for meetings and other events.
- USRA will manage funding allocation to the lead university.

## Proposal Submission Instructions

USRA seeks submission of proposals from Offerors that meet the RFP eligibility requirements. In response to the RFP, Offerors shall identify and mark proprietary/confidential information where applicable. **Proposals are due no later than 11:59 pm local time on 9 June 2023.** Proposals submitted beyond this deadline will not be reviewed.

Redlines and questions for the drafted subagreement must be submitted with the proposal. The subagreement can be located at the conclusion of this document. The following are acceptable forms of redlines:

- a. Partially executed draft subagreement from the Contracts Officer.
- b. Signed draft subagreement by the Contracts Officer, which indicates acceptance of all terms and conditions.
- c. Redlined draft subagreement with requested exceptions to the terms and conditions.

### Technical Proposal

Proposals shall be signed by an authorized representative of the Offeror and submitted through [https://webportalapp.com/sp/usra\\_ucro-2-0](https://webportalapp.com/sp/usra_ucro-2-0).

Technical proposals should be formatted according to the order listed below and ***should not exceed 15 pages*** excluding certifications, forms, endorsement notices and appendices.

### Technical Proposal Content

- 1) **Cover Page (one page):** The following information shall be submitted with your Cover Notice:
  - a. Company or institution name & address
  - b. Business classification
  - c. Name, title & phone number of Offeror's Technical POC
  - d. Name, title & phone number of Offeror's Administrative POC
  - e. Name, mailing address, telephone number and POC of Offeror's audit agency, if known
  - f. Contractor and Government Entity (CAGE) Code
  - g. New Unique Entity Identifier
  - h. Taxpayer Identification Number (TIN)
  - i. Proposal date
  - j. Proposal validity period (minimum of 120 days)



- 2) **Table of Contents (one page)**
- 3) **Proposal Summary (one page maximum):** Provide a brief description of the proposed effort to include but not limited to:
  - a. Summary of how the proposed effort meets the UCRO goals and objectives as described in the statement of work (SOW).
  - b. Brief rationale for the proposed effort.
  - c. Number of students and postdoctoral fellows involved, academic classification, and qualifications for supporting proposed research.
  - d. Details of how the success of the proposed effort will be achieved, and the recipient's capacities to achieve success in the proposed effort.
- 4) **Proposal Description (8-10 pages):** Provide a detailed description of the proposed activity to include but not limited to:
  - a. Introduction
  - b. Scientific and Technical Relevance
  - c. Goals and Objectives
  - d. Project Plan and Technical Approaches
  - e. Project Timeline and Key Progress Milestones
  - f. Risk Mitigation Plans
  - g. Student Involvement and Work Plans
- 5) **Personnel (one page maximum)**
  - a. Qualification of PI, co-PI, and other key personnel.
  - b. Detailed CV/Resume for all key personnel may be submitted as a separate portion of the application and will not count as part of the page limit.
- 6) **Works Cited: (one page):** If applicable, provide a works cited.
- 7) **Appendices:**
  - a. Appendices are excluded from the page count.
  - b. The appendices should not be extensive, as the proposal should be capable of standing alone.
  - c. The contents of the appendices will not be included in the evaluation, but for the purpose of providing additional information that may be needed.

## Cost Proposal

Offerors must provide a detailed cost break-out to conduct a cost analysis of the proposal that includes a basis of estimate and other supporting documents as stated below:

- 1) Budget shall be broken down by Major Cost Elements which includes Direct Labor (Labor Categories, Labor Hours or Percentage of Time or Full-Time Equivalent (FTE), Labor Hours and Labor Rates), Fringe benefits, Materials, Equipment (with back up quotes), ODC's (Other Direct Costs) with supporting backup information, Travel (number of trips, number of days, number of travelers, departure and arrival information, purpose), Modified Total Direct Costs (MTDC), and Total Costs.

Each of the major cost elements shall be supported by a written narrative and included in the cost proposal templates. Proposers will be required to upload the cost narrative and excel files (.xls, .xlsx) of the Full Cost Proposal and a Redacted Cost Proposal. . The cost



narrative is separate from the Technical Proposal and excluded from the 15-page maximum.

- 2) The University's Facilities and Administrative (F&A) Rate and/or Indirect Rate Agreements or equivalent approved by a government agency.

If travel is applicable, the number and destination for each travel trip, and the breakdown of the airfare, car rental, lodging, and per diem. Refer to Article XIV in the Draft Subagreement for additional information regarding travel.

- 3) Proposal Preparation Expenses

This solicitation does not commit USRA to issue a subagreement. All proposal preparation expenses are the sole responsibility of the Offeror and are not reimbursable. Reference the Disclaimer on page two for additional details.

## Proposal Evaluation

### Evaluation Process

USRA will manage a comprehensive proposal evaluation process that includes multiple phases. An initial review will be conducted by USRA to determine the Offeror's eligibility and submission of all required forms. Proposals passing the initial review will be assessed by external evaluators considered subject matter experts (SMEs) in the proposed research area. Evaluators will assess the proposals based on the merit review criterion detailed below and provide feedback to a government selection panel.

### Evaluation Criteria

All individuals including the external evaluators, the government selection panel, and USRA will evaluate Offeror proposals based on the following criterion:

1. Problem Definition
2. Relevance to USSF Needs
3. Scientific and Engineering Viability
4. Project Plan
5. Student Involvement
6. Value/Cost
7. Proposal Quality

#### **Problem Definition – (5%)**

This criterion takes into consideration the following:

- Problem Being Solved
  - Define the operational problem being addressed for USSF.
  - Demonstrate the depth of understanding of the problem's components and stakeholders.
- Product Summary
  - Provide a clear, concise description of the proposed product or solution. Include a high-level explanation of the product or solution and how it addresses the problem.

**Relevance to USSF Needs – (25%)**

This criterion takes into consideration the following:

- Problem Alignment
  - Degree to which the problem statement aligns with the research topic area.
- Problem Magnitude
  - Degree to which the problem impacts USSF.
- Operational Impact
  - Identification of individuals impacted by proposed solution. Include solution impact for a Guardian, warfighter, or cross domain.
- Scale
  - Once technically mature and actively in use, describe the scale of the impact of the proposed solution within the context of USSF, intelligence community, and/or joint force.
- Degree of Innovation
  - Describe the degree to which the solution proposed is a departure from existing clinical/technical approaches.

**Scientific and Engineering Viability – (25%)**

This criterion takes into consideration the following:

- Scientific Feasibility
  - Describe the soundness of the science and engineering principles behind the solution.
  - Provide the foundational and proven technologies relied upon to deliver the solution assuming an audience without deep expertise in the field.
- Enabling Technologies
  - Detail any introduced risk resulting from required enabling technologies.
  - Describe how using mature or proven underlying technologies and techniques helps to lower technical risk.
- Alternative Technical Approaches
  - Convincingly refute alternative technical approaches.
  - Explain, from a technical perspective, why the proposed approach is desirable and employs a multi-disciplinary approach.
- Technical Personnel
  - List and describe the core and scientific technical team including unique capabilities and multi-disciplinary approaches needed to successfully complete the proposed project.
  - Justify how your team builds the future Space technology ecosystem.

**Project Plan – (25%)**

This criterion takes into consideration the following:

- Project Schedule
  - Provide a proposed project schedule with realistic and thoughtful milestones. Include technology readiness level (TRL) advancement.
- ROM Cost Estimate
  - Provide a rough order of magnitude (ROM) budget for proposed project. Costs should be realistic and thoughtful.
- Hypothesis, Testing, Measurement
  - Succinctly and convincingly outline what the project will prove, how it will be proven, and to whom it will be transitioned.

- Appropriateness of Measurement
  - List the key performance indicators (KPIs) that are the most appropriate to measure progress, why they were selected, and the measure of performance.

### **Student Involvement – (10%)**

This criterion takes into consideration the following:

- Extent to which the PI will ensure undergraduate, graduate, and postdoctoral fellows are engaged with the research team and will obtain a hands-on learning experience.
- Strength of the students' project work plan.
- Degree to which PIs intend to promote student opportunities, such as internships, to increase interest in STEM careers within the USSF.
- New approaches to integrating students in their research.

### **Value/Cost – (5%)**

This criterion takes into consideration the following:

- Benefit to USSF
  - Describe the benefits to USSF if the project is successful. Describe why the approach represents the best value solution (expected pay-off out-weighs the cost).
- Funding Availability
  - Proposed budgets should be realistic and cost effective. Describe preparedness to leverage funding from additional source(s) if the proposed budget exceeds the pre-determined funding allocation.

### **Proposal Quality – (5%)**

This criterion takes into consideration the following:

- Quality of prose
  - All narrative should be clearly articulated and comprehensive.
- Data Quality and Attribution
  - Arguments should be supported with relevant, properly attributed data to enhance credibility.

## **Other Information**

### **RFP Amendments**

USRA reserves the right to issue any Request for Proposal Amendment(s) to the documents. Offerors will be required to acknowledge the receipt of Amendments, if issued and submit with their proposal.

### **Waivers, Acceptance or Rejection**

USRA, notwithstanding any other provision of this Solicitation (including all attached documents), expressly reserves the right to:

- Waive any minor informality or irregularity in the solicitation procedures or proposals if the objectives of this solicitation are indeed met.
- Reject any and/or all proposals,
- Reissue a solicitation, or
- Not issue any subagreement.



## Questions

All questions regarding this solicitation shall be submitted using the [Inquiry Form](#) by 1 May 2023. Answers to questions will be anonymously published online at <https://afri/scholars.usra.edu/urep/ucro-2-0/> on or before **8 May 2023**.

## Attachments

The following enclosures are included with this RFP.

- Enclosure (1) Budget Proposal Template
- Enclosure (2) Draft Subagreement Template:
  - Attachment A – Prime Contract Flow-Down Provisions
- Enclosure (3) B. Procurement Representations and Certification