University Corporation for Atmospheric Research

Request for Proposal R15-19374

NCAR’s Next Generation System - NWSC-2

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# REQUEST

The [University Corporation for Atmospheric Research](http://www.ucar.edu/) (UCAR), on behalf of the [Computational Information Systems Laboratory](https://www.cisl.ucar.edu/) (CISL) at the [National Center for Atmospheric Research](http://ncar.ucar.edu/) (NCAR), is issuing this Request for Proposal (RFP) for the next-generation high-performance computing (HPC) system and parallel file system (PFS) to be installed at the [NCAR-Wyoming Supercomputer Center](http://nwsc.ucar.edu/) (NWSC). This new system, herein referred to as NWSC-2, is expected to be delivered in the second half of CY2016 for production use in January 2017.

The NWSC-2 system will be housed in the NCAR-Wyoming Supercomputer Center, in Cheyenne, WY, and is expected to run for four years, with options to extend up to two years beyond that. The system must support integration with NCAR’s existing GPFS-based Globally Accessible Data Environment (GLADE) and HPSS-based data archive.

The available funding for this procurement is US$33.0 million. This is the not-to-exceed funding amount for all **Required** and exercised **Optional** elements listed in §1.1 and includes all equipment, software, support, and maintenance for four (4) years of operation. Final quantities and delivery dates for **Required** and **Optional** elements shall be determined during subcontract negotiations. It is possible for an Offeror proposal to exceed the available funding since the total of all options will exceed this amount and not all options will be exercised.

This is a best-value procurement. Proposal evaluation and award factors are described in Section 3, below.

Specifications of the NWSC-2 system and its software, support and maintenance services, acceptance testing and criteria, project management criteria, and desirable options are provided in the attachments to this RFP.

Proposals must be submitted in accordance with the Instructions to Offerors below. Failure to comply with these instructions or submission of an incomplete proposal may result in the rejection of the proposal.

This RFP is comprised of the following items:

1. NWSC-2 Request for Proposal R15-19374 (this document)
2. Attachment 1: NWSC-2 Technical Specifications
3. Attachment 2: NWSC-2 Benchmark Instructions
4. Attachment 3: NWSC-2 Benchmark Results Spreadsheet
5. Attachment 4: UCAR Representations and Certifications
6. Attachment 5: Sample Subcontract Terms & Conditions
7. Attachment 5A: Sample Subcontract Schedule A, NSF Flow Downs
8. Attachment 5B: Sample Subcontract Schedule B, placeholder (Statement of Work)
9. Attachment 5C: Sample Subcontract Schedule C, Contact Information
10. Attachment 5D: Sample Subcontract Schedule D, placeholder (Subcontractor Proposal)
11. Attachment 5E: Sample Subcontract Schedule E, Deliverable Requirements
12. Attachment 5F: Sample Subcontract Schedule F, Acceptance Criteria and Testing
13. Attachment 5G: Sample Subcontract Schedule G, Project Management Requirements
14. Attachment 5H: Sample Subcontract Schedule H, placeholder (NWSC-2 Technical Specifications, Benchmark Instructions, [Subcontractor’s] Benchmark Results Spreadsheet)
15. NCAR Benchmarks (available from <https://www2.cisl.ucar.edu/hpc_benchmarking>)

## Scope of the NWSC-2 Procurement

NCAR requires a production HPC system to support the rapidly increasing computational demands of the atmospheric science community. The system must provide a significant upgrade in computational capabilities, with a target increase of at least 2 times greater than the sustained performance of NCAR’s current Yellowstone system [1].

The NWSC-2 procurement includes the following **Required** and **Optional** components (see Attachment 1: NWSC-2 Technical Specifications for a complete list and description of the Required and Optional components):

* High-performance computing system (**Required**)
* High-performance storage system that is integrated with the HPC system (**Required**)
* Support for access to NCAR’s existing GPFS-based Globally Accessible Data Environment file system (**Required**)
* Support for access to NCAR’s existing HPSS mass storage system (**Required**)
* Many-core nodes which reside on the HPC interconnect (**Optional**)
* General Purpose GPU nodes which reside on the HPC interconnect **(Optional)**
* Data analysis, visualization, and post-processing nodes which reside on the HPC interconnect (**Optional**)
* Innovative Storage and Memory Technologies **(Optional)**
* AMPS System **(Optional)**

The scientific and strategic drivers for Yellowstone and the NWSC supercomputing center were set forth in the NWSC Science Justification [2]. Though published in 2009, it remains highly relevant for this procurement in articulating the long-term vision and opportunities for using HPC to address scientific challenges in the atmospheric sciences.

CISL supports over 1,000 users annually and 200 applications in the atmospheric and related sciences. The primary models used by these communities include the Community Earth System Model (CESM) and its constituent components which form a fully-coupled, community, global climate model; several variants of the Weather Research and Forecasting (WRF) model which serves as a mesoscale numerical weather prediction system designed to serve both atmospheric research and operational forecasting needs; the Model for Prediction Across Scales (MPAS), a collaborative model using unstructured Voronoi meshes to provide both quasi-uniform and locally refined grids for atmosphere, ocean and other earth-system simulation components; and a broad range of applications for the post-processing, analysis, and visualization of simulation and observational data.

An overview of NCAR’s computational workload [3] summarizes key aspects of the application and job mix, and provides a quantitative assessment of how the current Yellowstone system is being used.

This discipline-specific user community results in a more narrow and focused applications base than for many other publicly-funded HPC centers in the United States; over half of Yellowstone’s delivered core-hours are for running the CESM. The scientific goals driving the need for additional computational capability and capacity are clear. Atmospheric science already relies on large-scale simulation, and over the next several years it will move to incorporate the additional physical processes and higher resolution needed to achieve more faithful representations of real-world systems. Additionally, a large and significant number of the scientific discoveries are not made at the largest computational scales, but rather, performed using ensembles of individual, mutually-independent simulations.

# INSTRUCTIONS TO OFFERORS

Prospective Offerors are to submit proposals in response to this RFP as described in the following subsections.

## Proposal Due Date and Time

Firm fixed price proposals are due no later than 15:00 MDT on [A1] ~~Tuesday, 19~~ Friday, 29 May 2015.

## Questions Due Date and Time

All questions concerning the requirements of this RFP must be submitted, via email, to the attention of the Contract Administrator listed below by 15:00 MDT on Wednesday, 22 April 2015. All questions with corresponding answers will subsequently be distributed to all Offerors via the NWSC-2 RFP website, referenced below.

## Proposal Submission

The Offeror shall submit one (1) electronic copy of the proposal, with all supplemental material, to the UCAR Contracts Office as indicated below. All proposal materials must be submitted in an electronic form by the Offeror and received by the UCAR Contract Administrator no later than the specified time on the proposal due date.

|  |  |
| --- | --- |
| Email | apropes@ucar.edu |
|  |  |
| U.S. Mail | University Corporation for Atmospheric Research |
|  | Attn: Alison Propes, Contract Administrator |
|  | Contracts Office |
|  | P. O. Box 3000 |
|  | Boulder, CO 80307-3000 |
|  |  |
| Hand carried | University Corporation for Atmospheric Research |
|  | Attn: Alison Propes, Contract Administrator |
|  | Contracts Office |
|  | 3375 Mitchell Lane |
|  | Boulder, CO 80301 |
|  |  |
| Commercial Carrier | University Corporation for Atmospheric Research |
|  | Attn: Alison Propes, Contract Administrator |
|  | Contracts Office |
|  | 3090 Center Green Drive |
|  | Boulder, CO 80301 |
|  |  |
| Additional contact | Voice: 303-497-8877 |
| Information | Fax: 303-497-8501 |

Acceptable media for electronic submission are via email attachment or on ISO 9660 compliant DVD-ROM, USB flash drive, or USB hard drive. Electronic files that are less than 20 megabytes in size may be submitted via email attachment to the UCAR Contracts Administrator, otherwise they must be delivered on physical media.

Acceptable formats for electronic submission of proposal materials are Microsoft Word, Microsoft Excel, Adobe PDF, AutoCAD DWG, GIF, PNG and JPG. Pricing information, benchmark performance results, and other tabular data shall be provided in Microsoft Excel files. Proposal files must not contain additional embedded files.

## Proposal Content and Format

The Offeror’s proposal shall consist of two volumes: “Business/Price Volume” and “Technical Volume”. UCAR’s proposal evaluation process separates the technical assessment of value from the business-price assessment; therefore, the technical volume must be devoid of pricing information. The information supplied in each volume should be unambiguous, detailed and sufficient for UCAR to make an informed assessment of the Offeror's capability to perform the work as specified in Attachment 1, NWSC-2 Technical Specifications.

Should the Offeror's technology offer certain architectural choices which may be advantageous for UCAR to consider (e.g. choice of high speed interconnect topology or connectivity options, file system software, etc.), the Offeror may propose options in their designs. However, proposals must include all mandatory elements as described in §2 of Attachment 1 (NWSC-2 Technical Specifications). The Offeror should submit a single proposal that covers all design options, with the differences presented in side-by-side comparisons in both the Technical and Business/Price volumes.

The Offeror’s proposal must be clear, complete, readily legible, and conform to the following requirements:

* Each section of the response should identify the corresponding section(s) of the RFP and/or its attachments.
* The total page count for the combined Technical and Business/Price volumes of the Offeror’s response shall not exceed four hundred (400) printed pages and shall use a common typeface at a font size of 11 points or larger. A font size of less than 11 points may be used for mathematical formulas or equations, figure, table or diagram captions and when using a symbol font to insert Greek letters or special characters. The Offeror is cautioned, however, that the text must still be legible.
* No more than six lines of text within a vertical space of one inch.
* Top, side and bottom page margins (which may include page headers and footers) must be at least one inch.
* A double-sided sheet is considered two pages.
* Page limits include attachments, appendices, and all supplementary documentation.

The two proposal volumes shall contain the following information.

* + 1. **Business/Price Volume**

The Business/Price Volume shall be submitted in sufficient detail to enable UCAR to conduct an analysis to determine the Offeror’s ability to execute the proposed work as well as the proposed cost reasonableness and fairness. This volume shall include:

1. An executive summary of the Offeror’s proposed NWSC-2 solution.
2. The Offeror’s most current audited financial statement/annual report.
3. The Offeror’s corporate information, including history and number of years in business and expertise relevant to high-performance computing and storage technologies, organizational chart, awards or recognitions.
4. Product development or expansion plansthat directly affect the Offeror’s proposal and or the Offeror’s proposed products.
5. The Offeror’s past experience with contracts of a similar size and nature, including a list of names, affiliations and contact information for similar accounts that are currently active or completed; a minimum of three such references must be provided.
6. The Offeror’s proposed project management and execution plan.
7. Resumes with the qualifications of the proposed personnel, their role on the project, and sufficient detail to permit evaluation.
8. If the Offeror takes exception to any of the terms and conditions contained in the sample Subcontract documents, they must be provided (utilizing Microsoft Word change tracking) in the Offeror’s proposal and the rationale for such exceptions fully described the Business/Price Volume. Exceptions must be noted in the following documents:
 Attachment 5 (NWSC-2 Sample Subcontract Terms & Conditions),
 Attachment 5A (Schedule A, NSF Flow Downs),
 Attachment 5C (Schedule C, Contact Information),
 Attachment 5F (Schedule F, Acceptance Criteria and Testing), and
 Attachment 5G (Schedule G, Project Management Requirements).
The Offeror may also provide modified copies of Attachment 5B (Schedule B, Statement of Work), Attachment 5D (Schedule D, Subcontractor Proposal) and/or Attachment 5E (Schedule E, Deliverable Requirements), but the final content of those is reserved for negotiations. There will be no negotiation of UCAR Terms and Conditions not previously noted in the change-tracked Sample Subcontract documents and described in the Business/Price Volume of Offeror's response to this RFP.
9. Insurance certificate in accordance with the requirements identified in Article 22 “Insurance Requirements” of Attachment 5, Sample Subcontract Terms & Conditions.
10. Completed and signed Representations & Certifications form (see Attachment 4, NWSC-2 Representations and Certifications).
11. All pricing information, including options pricing, shall be provided in an Excel spreadsheet, with an accompanying narrative in the Business/Price Volume.
12. Pricing for each major component of the NWSC-2 HPC and PFS production and test systems, software, support and maintenance shall be independently itemized. Each requested and proposed option, and any corresponding additional software, support and maintenance, shall be separately priced. All applicable pricing components should be broken down by materials, non-recurring engineering (NRE), recurring labor, lower-tiered subcontracts, maintenance, equipment, facilities, travel, freight, insurance, installation, etc. Pricing information shall also include Offeror list and GSA pricing where available. Please note that UCAR is eligible for GSA and educational discounts. The Offeror must include a statement that the prices quoted do not exceed the prices charged to all other customers, including the U.S. Government (e.g. GSA) for like or comparable quantities and conditions for sale.
13. Prices for all proposed options, as described in the Offeror’s Technical Volume, must be separately itemized and described.
14. A proposed payment schedule, including all equipment installation and acceptance phases, and support and maintenance costs.
	* 1. **Technical Volume**

The technical volume shall include:

1. An executive summary of the Offeror’s proposed NWSC-2 solution including a detailed explanation of the Offeror’s approach and methods to be used in meeting or exceeding the technical specifications.
2. A thorough and detailed technical response to Attachment 1, NWSC-2 Technical Specifications, including technical information for all proposed options, identification of risks and explanation of how the Offeror plans to mitigate these risks to ensure the Offeror's ability to meet the scheduled delivery dates, acceptance testing and proposed system reliability. The Technical Volume shall be formatted to state sequentially each technical requirement, followed by the Offeror’s response. The Technical Volume must retain the section numbering contained in Attachment 1, NWSC-2 Technical Specifications.
3. A narrative of the Offeror’s benchmark methodology and results, performance projection model and results, and a discussion of benchmark results as applicable to the proposed NWSC-2 solution.
4. A detailed description of the system(s) used to run the NCAR benchmark applications and the model used for performance projections to the proposed NWSC-2 system.
5. NWSC-2 benchmark modified source files and output files, as identified in Attachment 2, NWSC-2 Benchmark Instructions.
6. A completed copy of Attachment 3, NWSC-2 Benchmark Results spreadsheet containing the Offeror’s benchmark timings and projections.
7. Any Offeror modifications to Attachment 5F, Acceptance Criteria and Testing, and the corresponding description thereof in the Business/Price volume, shall be reproduced in the Technical Volume.
8. Any Offeror modifications to Attachment 5G, Project Management Requirements, and the corresponding description thereof in the Business/Price volume, shall be reproduced in the Technical Volume.

## Preference for US Manufactured Systems

UCAR will give preference to proposals offering systems manufactured in the United States and considered to be a domestic end product as defined in the Buy American Act (41 U.S.C. 10a – 10d) and Executive Order 10582, December 17, 1954.

## Authority to Commit the Offeror

The person signing the Offeror’s proposal must have the authority to commit the Offeror to all of the provisions of the proposal.

## Proprietary or Confidential Information

Any information in the Offeror’s proposal that is considered proprietary, trade secrets, commercial or financial information that is privileged or confidential or of a personal nature must be specifically marked and identified as such. Marking every page in the proposal as proprietary or confidential is not a recommended way to do this.

## Export Controlled Information

Proposals that contain export controlled technical data must be clearly identified with the appropriate ITAR or EAR classification. Where possible, export controlled technical data should be separated from the rest of the proposal and included as an appendix to the Technical Volume (preferably as an electronic document separate from the Technical Volume) and flagged with the appropriate identifying classification. If separation is not possible, the section(s) of the proposal that contain export controlled technical data shall be flagged as export controlled, with appropriate identifying classification.

## Expenses Related to Proposal Submission

UCAR will not pay any expense incurred in the preparation or delivery of any proposal submitted in response to this RFP.

## Amendments

If this RFP is amended, then all terms and conditions that are not modified shall remain the same. The Offeror will implicitly acknowledge receipt of any amendment to this RFP by downloading such amendment(s) from the RFP website, or explicitly via email to the Contract Administrator. Acknowledgment must be received by the time and at the place specified for receipt of proposals. If the RFP is amended, the Offeror will be given a reasonable amount of time to submit a revised proposal, if required.

## Late Submissions, Modifications, and Withdrawal of Proposals

Any proposal or modification to a proposal received after the receipt deadline will not be considered unless it is deemed to be in the best interest of UCAR. The Offeror must provide proof that the proposal was delayed for causes beyond the Offeror’s control. A late modification of an otherwise successful proposal that makes its terms more favorable to UCAR will be considered at any time it is received and may be accepted at UCAR’s discretion.

Proposals may be withdrawn, by written notice of the Offeror, or received at any time before the deadline for receipt of proposals.

## Period for Acceptance of Proposals

The Offeror agrees to furnish any or all items at the price set forth in the Offeror’s proposal if this proposal is accepted within three hundred sixty (360) calendar days (Offeror may specify a longer time period) from the proposal due date specified in this RFP.

## Acceptance of Terms and Conditions

Any contract resulting from this RFP shall be subject to the requirements, including terms and conditions, contained herein. Any exception to the terms and conditions specified in this RFP must be stated in the proposal or it will be presumed that the Offeror has no exceptions and that the solution described in the Technical and Business/Price Volumes cover the requirements as defined herein.

## Place of Performance

The place of performance shall be at the NCAR-Wyoming Supercomputing Center in Cheyenne, Wyoming, the NCAR Mesa Laboratory in Boulder, CO, and the Offeror’s facilities unless otherwise specified in the Offeror’s proposal. The Offeror shall clearly identify in the proposal the primary location where all services will be conducted.

## Delivery

Delivery of all proposal materials should be to the Contract Administrator as specified in §2.3.

The delivery address for the NWSC-2 systems is:

NCAR Wyoming Supercomputing Center
8120 Veta Drive
Cheyenne, WY 82009

## Taxes

UCAR is a non-profit organization and maintains an exemption status from any federal, state, or local sales, use or similar tax applicable to the purchase or use of any goods and/or services to be furnished under this proposal. In the event that any taxes are not subject to the exempt status and are levied against any goods and/or services provided, the Offeror shall itemize those taxes and furnish this tax information as a separate line item of the Price Volume. The final negotiated price will not include taxes determined to fall under the exemption category. The Offeror will make a best effort to obtain all necessary exemptions. UCAR will provide the Offeror any necessary support documentation.

## Trademarks

All names and/or descriptions used in this RFP which are trademarks, trade or brand names, or other references to proprietary products, are hereby acknowledged as the property of their respective owners. No entry, term or definition in this RFP should be regarded as having any implication as to the validity or otherwise of any trademark. The appearance of any such proprietary name or reference in this document should not in itself be taken to imply a preference for one product over another, except if preference is explicitly stated.

## NWSC-2 RFP Website

This RFP, and all information related to it, including any amendments, forms and other files to be used in preparing and submitting proposals, is available to the Offeror at <https://www.cisl.ucar.edu/NWSC-2>. The NWSC-2 RFP website will be used, in addition to email notification(s) from the Contract Administrator, for communications by UCAR to the Offerors regarding this RFP. The NCAR benchmark applications are available from <https://www2.cisl.ucar.edu/hpc_benchmarking>.

## RFP Revision History

After the initial release of this RFP, amendments to it will be communicated through an email notification to the Offeror by the Contract Administrator and reissuing the modified documents on the RFP website (see §2.18). All such changes will be documented in a separate **NWSC-2 Amendments.docx** file, available from the RFP website.

## Live Test Demonstration

Prior to final selection, those Offerors whose proposals are determined to be in the competitive range may be expected to provide a Live Test Demonstration (LTD). Should UCAR elect to conduct an LTD, UCAR will notify the Offeror subsequent to proposal submission. Should UCAR request an LTD, it will be conducted at the Offeror’s facility utilizing the Offeror’s system(s). The Offeror’s LTD system is not required to be full-scale, but of sufficient size to verify all specified and proposed functionality. The LTD will be conducted by the Offeror at no cost to UCAR (UCAR will pay its own travel expenses), to the extent possible, on equipment and with products identical in configuration to the Offeror’s proposed NWSC-2 solution.

Should an LTD be conducted, the Offeror will be expected to develop, in consultation with UCAR, a schedule and itemized test plan which shall include a detailed description of the equipment and products that are to be used, portions of the NCAR benchmark applications, and other tests to be performed by the Offeror and UCAR.

## Schedule

The following table provides the desired NWSC-2 acquisition schedule.

|  |  |  |
| --- | --- | --- |
| Milestone | Day | Date |
| NWSC 2 RFP issue date | Fri. | 3 April 2015 |
| NWSC-2 RFP questions due to UCAR | Wed., 15:00 MDT | 22 April 2015 |
| UCAR response to RFP questions distributed to Offerors | Wed. | 29 April 2015 |
| Proposals due to UCAR | [A1] ~~Tue~~ Fri., 15:00 MDT | [A1] ~~19~~ 29 May 2015 |
| Clarification Question Period | - | May/June 2015 |
| Evaluation of proposals completed | - | July 2015 |
| Negotiations concluded | - | August 2015 |
| Subcontract award | - | September 2015 |
| Project management meetings, installation planning, pre-delivery testing | - | October 2015 through June 2016 |
| Test systems delivery/installation | - | IPEDD minus 30-60 days |
| AMPS system delivery/installation | - | To be negotiated |
| Initial production equipment delivery date | - | IPEDD (TBD) |
| Installation of initial equipment complete | - | October 2016 |
| Acceptance of initial equipment | - | End December 2016 |

# PROPOSAL EVALUATION AND AWARD FACTORS

Proposals will be evaluated on a best value basis considering the Business/Price and Technical proposals.

One or more award(s) will be made to the highest rated, most responsive, responsible Offeror(s) whose proposal(s), conforming to the requirements of this RFP, will be the most advantageous to UCAR considering the factors specified below. UCAR may, at its sole discretion, award all components to a single Offeror or award one or more components of the NWSC-2 system to different Offerors. UCAR reserves the right to award any amount of the available funding, including making no award if no compelling proposal substantively addresses the requirements.

UCAR may award a subcontract on the basis of initial proposals received, without discussions. Therefore, each proposal should contain the proposal’s best terms from a price and technical standpoint. UCAR expressly reserves the right to reject any proposal on the grounds of information provided regarding business and technical organization, financial and other resources, or business experience, as compared with the solution and services proposed.

UCAR reserves the right to waive any informalities or technicalities relative to any or all proposals if it is determined to be in the best interest of UCAR to do so.

## Award Factors

Factors to be evaluated include, but are not limited to, the following criteria.

1. Proposed technical solution and compliance with technical specifications (see §2.4.2 for details), including but not limited to:
	1. The aggregate sustained application performance of the proposed NWSC-2 Production HPC system as measured by the NCAR benchmark applications
	2. The aggregate data storage capacity and performance of the proposed NWSC-2 Production PFS
	3. Filesystems software functionality, resiliency and performance
	4. The quality and utility of the administrative, operations and management facilities for the proposed system(s)
	5. The quality and integration of the proposed software suite, including workload scheduling and resource management, and the programming, debugging and performance tuning environment
	6. Offeror’s response to the optional elements
2. Interoperability of the HPC and PFS systems
3. Integration with the existing NCAR GLADE and HPSS environments
4. LTD findings, if conducted
5. Business and price evaluation (see§2.4.1 for details)
6. Reliability and resiliency of the proposed systems’ hardware and software
7. Offeror references and past experience with contracts of a similar size and nature
8. Proposed hardware maintenance and software support
9. Delivery and installation schedule
10. Technical and business risk assessment
11. Proposed project management plan

UCAR will evaluate each proposal to determine which offer provides the best value to UCAR and will recommend that the corresponding Offeror(s) be awarded a subcontract. This recommendation will be sent to NCAR and UCAR management and the National Science Foundation for review and approval. Contingent upon these approvals, UCAR anticipates the Subcontract award to occur as indicated in §2.22.

## Award Guidance

No other evaluation or award guidance will be supplied to Offerors other than that provided in this solicitation and its technical specifications. UCAR does not intend to grant “post-mortem” assessments or debriefs to Offerors subsequent to receipt of Offeror proposals or Subcontract award.

# REFERENCES

[1] <https://www2.cisl.ucar.edu/resources/yellowstone>

[2] <https://www2.cisl.ucar.edu/sites/default/files/NWSC_Science_Objectives.pdf>

[3] <https://www2.cisl.ucar.edu/NWSC-2>