

NOAA HPCC Network & Advanced IT Program

FY 2009 Proposal Guidance

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Introduction

The NOAA High Performance Computing and Communications (HPCC) Network and Advanced IT Program is a competitive, internally focused program designed to accelerate the adoption of advanced computing, communications and information technology throughout NOAA.

The HPCC Program is an element of NOAA’s Environmental Modeling Program (EMP), residing in the NOAA [Office of the Chief Information Officer \(OCIO\)](#) under the direction of Joseph Klimavicz. Mike Kane, Acting Deputy CIO, leads the [HPCC Program Office](#). The NOAA HPCC [Network Working Group \(NWG\)](#), which is comprised of IT personnel from several Line Offices nationwide, advises the Deputy CIO, and provides objective evaluations of proposals.

Proposals are requested and welcomed from all NOAA Line and Staff Offices. Awards are granted based on proposal merit, subject to availability of funds. Awarded funds must be obligated prior to the end of the fiscal year (FY).

Specific themes for FY 2009 are identified to encourage efforts in areas targeted by the HPCC Program in support of NOAA's Strategic Plan.

The NWG has prepared the following guidelines and specific instructions for the proposal process. This guidance document outlines a process similar to that used last year and reflects some modifications and clarifications as a result of the lessons learned from prior years and the evolution of program goals.

Proposal authors should read the [Evaluation Criteria](#) and [Proposal Format](#) carefully. Note some of the more significant requirements:

- Competition is annual. Multi-year funding is NOT provided. Projects must be completed within one year, but may build on previous years' accomplishments.
- Cost sharing (i.e., matching funds) is essential.
- Since HPCC awards are considered seed money for R&D and proof of concept projects, the program will NOT fund recurring costs. The requesting NOAA organization is responsible for these costs.
- Progress Reports and Final Reports are required, including tracking spending.
- FTE base salaries are NOT permitted as part of the proposal cost.
- NOAA IT security requirements must be addressed when describing the proposed solution and review by the local Information System Security Officer (ISSO) is expected. Signature is required.
- Collaboration among other Line Offices and with other agencies and academia is encouraged and considered during the evaluation process.
- Proposals must be submitted in the NOAA standard Microsoft Word® format (Times New Roman 12).

The working group will strictly enforce the requirements and deadlines in this proposal guidance. Please read this *entire document* and contact your regional representative if you have any questions. Successful (i.e., funded) proposals from previous years may be reviewed at the [NWG website](#). The URL is: <http://www.pmel.noaa.gov/cnsd/hpcc-nwg/>

HPCC Proposal and Project Cycle

All completed proposals must be submitted **no later than Monday, December 15, 2008** to your [NWG regional representative](#). Late entries will NOT be considered.

The HPCC Proposal review and award process follows this general schedule each year:

General Schedule for HPCC Proposal and Project Cycle	
August	Review and develop guidance document for submitting proposals
October	Announce opportunity for proposals
December	Develop and submit proposals for consideration
December	Deadline for submission of proposals
February	Review, evaluate and recommend proposals
February	Select proposals to be funded
March	Fund transfers to awarded projects*
May	HPCC project status review for projects funded the previous year
June	Final reports due for projects funded the previous year

* Subject to availability of funds. This may vary widely from year to year!

The Network Working Group will begin reviewing and discussing the proposals after the due date specified above. During the fall meeting the Working Group will evaluate all proposals against the Evaluation Criteria listed below utilizing the weighting factors as shown. The scoring of each proposal against each criterion will be by **consensus** scoring of the committee. The results of the Working Group's evaluation will be presented to the NOAA HPCC Program Office.

Final decisions regarding the funding of proposals will be made by the NOAA HPCC Office after consultation with the HPCC Board. The NWG only provides recommendations to the HPCC Office that are used to help prioritize projects and the group will not have project funding information until after the NOAA HPCC Office releases the final list of successful proposals.

Awarded projects are required to submit information to the HPCC Program Office on a routine basis. Typically this involves providing brief spending and progress reports. Formal reports on the project milestones and deliverables are required during the mid-year meeting after the end of the project year (see the final report details). Participation in the HPCC mid-year meeting is required either in person, or remotely. Participation in the bi-annual NOAA Tech conference is encouraged but not required. In addition, the HPCC Office occasionally requests additional anecdotal descriptions of the impact of successful projects in order to keep NOAA management and the public better informed.

The Principal Investigator (PI) for the project is expected to be the primary point of contact for communications and reporting.

R&D Proposal Themes/Topics

The primary goal of the NOAA HPCC program is to *foster information technology research and development that supports and enhances the NOAA mission*. The program encourages R&D projects that leverage advances in technology that enable NOAA to achieve these specific objectives:

- Provide greater access to NOAA's vast holdings of real-time and historical information to customers in a more complete, more usable form, and in a much more timely manner.
- Improve researcher access to and utilization of NOAA's Research and Development High Performance Computing System (R&D HPCS).
- Enhance HPCC networking, collaboration, visualization, analysis, and disaster response capabilities through effective application of new or improved information technology.
- Improve technology for access to critical data, information and unique resources in a manner that increases mission effectiveness and furthers NOAA's service to the nation.

With this in mind, the NOAA HPCC Office and NOAA HPCC Network Working Group (NWG) have prepared the following themes for new proposals. There are some changes however; most of the same themes were used in FY 2008. Additional information can be found on the [NWG website](#).

The Themes and Topics for FY2009 proposals are:

1. Remote Usage of NOAA High Performance Computing (HPC) -

Next generation networking and follow-on tools and technologies capable of supporting remote usage of NOAA High Performance Computing

2. Advanced Networking Technologies -

Innovative infrastructure supporting or extending the NOAA Enterprise Architecture

3. Technologies for Modeling, Analysis, or Visualization -

Modeling frameworks for high performance computing activities

Enabling applications to efficiently access or use large datasets at a distance.

4. Disaster Planning, Mitigation, Response and Recovery -

Access to NOAA products & models using Geographic Information Systems (GIS)

Information support for emergency managers

Advanced mobile field information access and distribution

All of these areas are critical to NOAA's information technology infrastructure. This fiscal year, the HPCC proposals should avoid basic networking and connectivity projects and focus on those that tackle *innovative and technically challenging solutions* for resource and information sharing.

Proposals should strive to take advantage of the opportunities offered by advanced next generation network technologies however; all new infrastructure proposals must be consistent with the [NOAA Enterprise Architecture](#) (EA).

Remote Usage of NOAA High Performance Computing (HPC)

One of the highest priorities this year is to find methods for NOAA researchers to use NOAA Research & Development High Performance Computing System (RDHPCS). This system is composed of three sub-systems which are located in three geographically distinct locations in Princeton, NJ, Boulder, CO, and Rockville, MD. Proposals under this theme should focus on tools and technologies, including networking, that assist researchers in using the resources of these HPC sub-systems to take advantage of the added compute capacity. These tools should be flexible, extensible, and scalable but at a minimum be able to ensure that the connection between the sub-systems is secure.

Advanced Networking Technologies

Proposals submitted under this theme should focus on next generation networking technologies and applications. The NOAA HPCC program will be looking for an integrated approach to all connectivity projects in this area and expects regional and national coordination of wide area network designs. It will require the identification of an advanced networking partner that supports a high performance connection to one or more of the national high speed backbones. This could include Internet working with the existing UCAID/ Internet2, DoD/DREN, NASA/NREN, or DoE/ESnet backbones or any emerging national optical networking initiatives such as [National Lambda Rail](#) and the [Internet2 Network](#). However, peering and routing policy issues between these networks must be addressed. Special attention should be given to the existing relationship NOAA has with the UCAID and Internet2 network. Proposals may also include solutions that prepare NOAA for access to the next generation of national high speed backbones by implementing **essential** high performance infrastructure upgrades needed for participation in advanced network projects. These should be leveraging an existing or proposed NOAA [Internet2](#) connectivity project and, where applicable, should be designed as a shared NOAA resource. Advanced networking technologies would include proposals seeking to develop revolutionary applications that require the utilization of **high end** networking capabilities such as IPv6, Dense Wavelength Division Multiplexing (DWDM), Generalized Multiprotocol Label Switching (GMPLS), dynamic optical switching, multicasting or quality of service. This new generation of applications would have bandwidth and/or network service requirements not commonly available over the existing commercial Internet.

The NOAA HPCC Office recognizes the need to support some shared infrastructure expenses and to fill in basic information technology gaps in order to ensure that adequate resources are available for completing HPCC projects. However, proposals addressing the more innovative focus areas will be given the highest priority among projects. Some examples might be prototyping differentiated services, data multicasting, audio/video streaming and multicasting, innovative web-farm implementations, network security, virtual private networking, self-defending network designs and advanced network protocols.

Another area of interest is the advancement of secure wireless technology within NOAA. Combining data connectivity with user mobility and security will provide the capability for NOAA to better support the scientific mission and the requirements of the mobile workforce of the future. Benefits from WLAN projects would extend beyond just user mobility and productivity to enabling portable high speed self-configuring LANs. NOAA would be able to realize the productivity gains of integrating WLANs with hand-held terminals and notebook computers to transmit real-time information to centralized hosts for processing and receiving products and information from centralized host activities.

Proposals for projects that simply provide access to new or otherwise here-to-fore unavailable data sets or seek to implement private telecommunications, computing or storage resources will be deemed as "not appropriate" and will not be evaluated. Proposals that request basic computing or networking components as part of a larger development effort will be evaluated on the uniqueness of the technology or application solution being proposed relative to HPCC goals and must clearly justify the need for any additional hardware or software resources. Projects should leverage and share existing HPCC computing and networking resources where possible.

Technologies for Modeling, Analysis, or Visualization

These are advanced enabling technologies that cover a wide range of possibilities including applications sharing, scientific whiteboarding, distributed data integration and session indexing management. Successful deployment of these technologies will require the cooperation of multiple sites and perhaps the introduction of advanced communications protocols. These would be modern network based applications that demonstrate new techniques for working with NOAA data and information. Proposals should look to develop tools that are extensible, scalable, and available for easy deployment throughout NOAA. Forward looking proposals that utilize the advanced features available through NOAA's participation in the Internet 2 network infrastructure or National Lambda Rail infrastructure are encouraged.

Applications and tools proposed under this theme should be designed using a framework approach that enables the software to be integrated with other related packages and interfaced with major off-the-shelf software products. Development should allow for the inclusion of the broadest range of potential users and the initial target group for using and supporting the development must be identified. Modules that work with existing products are encouraged. Standalone applications that are being considered to meet the requirements of an individual program or organization. Efforts seeking to develop frameworks for modeling, visualization, or analysis applications and tools are encouraged.

Frameworks provide a structure within which components can be added or upgraded without the complexity of rewriting the model. By bundling a large amount of reusable code, it saves time for the developer. Frameworks are designed with the intent of facilitating software development, by allowing designers and programmers to spend more time on meeting software requirements rather than dealing with the more tedious low level details of providing a working system.

The [Earth System Modeling Framework](#) (ESMF) is an important example of component modeling. It is supported by government, including NOAA, and university groups to foster a flexible and interoperable software infrastructure for numerical climate & weather prediction along with other Earth science applications. A component is a unit of software composition that has a coherent function, and a standard calling interface and behavior. Components can be assembled to create multiple applications, and different implementations of a component may be available. In ESMF, a component may be a physical domain, or a function such as a coupler or I/O system. Proposals in this field would serve to enhance the current ESMF either by adding new physical models or computational enhancements such as parallel communication.

Proposals that explore the use of framework enabling technologies such as service oriented architectures, web services, and standard schemas are encouraged. A resource for general government use of XML can be found on the [XML.GOV](#) site that was established to facilitate the efficient and effective use of XML through cooperative efforts among government agencies.

Applications that take advantage of the emerging computer grid technologies such as that employed by [The TeraGrid](#) project launched by the National Science Foundation are encouraged. These grid applications would use the Open Grid Services Architecture ([OGSA](#)) built on the Open Grid Services Infrastructure (OGSI) that is based on an integration of Grid and Web services concepts and technologies. [The Globus Alliance](#) focuses on the research needed to build computational grid infrastructures and develop applications that use grid services. [The MEAD expedition](#) was a major project within the National Center for Supercomputing Applications ([NCSA](#)) that developed and adapted a cyber infrastructure that enabled simulation, data mining, and visualization of atmospheric phenomena.

Disaster Planning, Mitigation, Response, and Recovery

Disaster response in IT refers to a suite of capabilities (innovative information access, user interfaces, and applications) which support the response of the Federal government, especially NOAA and its customers, to natural and man-made disasters. Hurricanes, floods, oil spills, and even the terrorist attacks on September 11th required NOAA to respond rapidly. The report [Computing and Communications in the Extreme: Research for Crisis Management and Other Applications](#) provides additional background on this subject. This provides an opportunity for research into technologies that can better serve NOAA missions in this area. Projects that seek to transition NOAA products and services for use within the emergency management community are encouraged.

Proposals submitted under this theme may focus on tools or software applications that convert non-spatial data to geographic information system (GIS) compatible data; expedite the transfer of spatial data (e.g., meteorological, hydrological, coastal, terrestrial, oceanographic, etc.) to coastal

professionals or emergency managers; enhance analyses used for disaster preparedness, mitigation, response, and recovery activities; or increase the compatibility of and access to data between federal and state emergency management agencies, coastal zone management agencies, and other federal agencies or organizations that provide emergency support functions.

This request for proposals specifically targets projects that will develop innovative tools, user interfaces, mobile technology, and applications that will expand emergency management capabilities by incorporating real-time and/or historical data; utilize advanced forecasts, impact modeling, and decision-support technologies; or provide quickly accessible data for rapid decision-making capabilities that include, but are not limited to, evacuation planning, emergency protective measure implementation, search and rescue operations, debris management, human and tactile resource estimation/allocation/deployment, damage assessment (e.g., bathymetric data used for establishing baseline scenarios in primary navigation channels to assist with post-disaster damage assessments), vulnerability analyses, and hazard mitigation planning all within a secure environment. Proposals may also include an augmentation of existing technologies or applications.

Projects that advance mobile network capabilities within NOAA and seek to better integrate field activities during disaster response and homeland security situations are encouraged.

Proposal Format and Content

All proposals must be submitted in the NOAA standard, Microsoft Word® format (.doc). The document format must follow the outline specified in the template documents provided below. It **must be no longer than seven (7) printed pages using Times New Roman 12 font**. The seven page limit includes the one Title page, five (or less) Project Description pages, and one Budget page. Links may be included in the proposal for background information. However, these links will not be utilized during the evaluation. Information relevant to the evaluation criteria and themes must be in the body of the proposal.

Proposal Template

A [template document](#) written in Microsoft Word® is included for you to download and edit.

These standards will be strictly enforced. **Proposals that do not adhere to the required format, length, and layout will not be accepted.** If you have any questions please ask your regional representative.

Note: Please do not edit or delete the very first line of text in the title page of the template as this is a place holder reserved for use by the NWG to allow easy addition of a proposal number to the submitted document.

Project Funding

The NOAA HPCC program **DOES NOT** fund multi-year proposals. Projects can build on prior year accomplishments. However, each year a new proposal must be submitted and will be evaluated on its own merits. Remember all milestones must be reached and all deliverables must be achieved within one year.

Recurring Costs

The HPCC program **DOES NOT** fund recurring costs resulting from successful proposals. These operational costs should be indentified in the proposal however; they must be assimilated and paid for by the host organization.

You should identify these costs within the recurring cost table that is provided in the budget summary of the proposal template document.

Note: Proposals that specify a specific source for funding any recurring costs will receive a more favorable rating in that evaluation criteria. If you have any questions please ask your regional representative.

Evaluation Criteria

The evaluation criteria, values and relative weights used to rank FY2009 proposals is as follows:

Appropriateness: How appropriate is the proposal, considering the [NOAA HPCC Program Mission and Objectives](#) statement and current Themes/Topics in this Guidance Document?

Technology: Does the proposal plan on utilizing state-of-the-art technology, or even technologies that "push the envelope" of what is currently available?

Scope: How wide an impact will this proposal have? Outside NOAA? On all NOAA, and the users of its data? On a NOAA campus? On a NOAA Line Office? On a NOAA organization/lab?

Leverage: Does this proposal take advantage of previous NOAA HPCC funded work or the work of others doing similar work? Are matching funds, personnel resources, or equipment proposed?

Cost/Benefit: Is the proposed cost of the work reasonable considering the benefits that will result?

The following relative weights and values will be utilized for each evaluation criteria above. Each of the above criteria is given a value from 0 to 9 inclusive. The meaning of value points is as follows:

- 0 - Does not qualify for further consideration. Eliminate proposal.
- 1 - 3: Qualified for acceptance. Is not particularly novel or challenging to accomplish. Infrastructure oriented. Equipment purchase is a significant part of the proposal. Scope limited to immediate activity. Little collaborative aspect. Little or no leverage from previous NOAA HPCC funds or other support (funds, personnel resources, etc.). Cost benefit limited primarily to activity/agency.
- 4 - 5: Addresses at least one NOAA HPCC Network and Advanced IT theme directly and clearly. Aspects of technical risk and novelty exist. Some elements of collaboration at least within the region or between activities and line offices. Possibly useful for other purposes. Small or no contribution from other sources. Cost relative to benefit fair.
- 6 - 7: Addresses more than one NOAA HPCC Network and Advanced IT theme directly and clearly. Moderate technical risk and novelty. Requires collaboration within the region or between agencies for success. Easily applicable in other regions or organizations. Utilizes existing investments effectively. Contributing funds and resources from other sources. Reasonably short time to payoff. Reasonable return on investment (cost to benefit payoff).
- 8 - 9: Addresses more than one NOAA HPCC Network and Advanced IT theme, as well as larger objectives of the NOAA HPCC program. Moderate to leading edge technical risk. Clearly novel, employing existing or state-of-the-art technology in unexpected ways. Applications throughout the agency come to mind immediately. Technology transfer easily accomplished. Success results in large scale collaboration with all regions and most line offices. Other agencies play active roles. Benefits clearly exceed costs invested.

The criteria have been assigned relative weights that reflect the importance of each criterion to the HPCC program. These criteria values may change as the goals of the NOAA HPCC program change. Currently, the weights for each of the criteria are as shown in the following table.

The final score is obtained by multiplying the weight times the point value for each criteria then adding the products.

Example Scoring - As an example of scoring, assume a proposal that partially matches the HPCC guidelines, utilizes standard technology, only benefits part of a single lab, but is supplied with matching funds, and is relatively inexpensive.

Sample Scoring

Example Scoring Table

Proposal Title: yy-rr-ttt-##

<u>Criteria</u>	<u>Weight</u>		<u>Value</u>		<u>Score</u>
Appropriateness	30	x	6	=	180
Technology	25	x	4	=	100
Scope	20	x	3	=	60
Leverage	15	x	7	=	105
Cost/Benefit	10	x	7	=	70
			Total Score:	=	515

Project Reporting

The Principal Investigator (PI) for a funded project is expected to be the primary point of contact for providing all requested status report information. At a minimum, each PI must provide one **oral presentation** on the status of their project to the NWG and a **written final report** for the HPCC Office.

Oral Presentation

The oral presentation must be given to the NWG during the mid-year project review meeting held about one year after funding is received, currently scheduled for May of 2010. Material can be presented in person or from a remote location using voice, video or online conferencing tools. Options for remote presentations may be limited depending on the capabilities available at the host facility. The format for this oral presentation is very flexible but should follow the same general guidelines specified for the final report. The presentation should be limited to 15, including the time for discussion and Q&A. Be sure to coordinate and discuss expectations with your regional representative.

Written Final Report

A [template document](#) written in Microsoft Word® is included for you to download and edit.

Each PI must also provide to their respective NWG Regional Representative a written final report detailing the accomplishments for their completed project. This will be due about one month after the HPCC mid-year project review meeting, June 2010. The document must follow the outline given below and should be no longer than the equivalent of three (3) printed pages using Times New Roman 12pt. font. External links to products, references, and related information may be included in the report.

Electronic copies of all presentation materials and the final report must be submitted to your NWG Regional Representative and will be posted on the NWG web site for future reference.

The HPCC Program Office routinely reviews all aspects of funded proposals and may request additional information during the performance of a project. Occasionally requests are made for anecdotal descriptions of the impact of successful projects in order to keep NOAA management and the public better informed.

The requirement for final reports will be strictly enforced. **Investigators who do not provide the final presentation and written report will not receive future funding.**

Note: If you produced, reformatted or made available any data during this project you are required to describe it using the FGDC metadata format and make that description electronically available to the NOAA/NESDIS/CIO Office as per your line office procedures. Please see the web pages at <http://www.fgdc.gov/> for general information on the FGDC format or contact the NOAA FGDC representative, Tony Lavoie (tony.lavoie@noaa.gov) if you have specific questions.

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