associated with the preparation or submission of applications if an award is not made.

(The Catalog of Federal Domestic Assistance number for this program is 81.049, and the solicitation control number is ERFAP 10 CFR part 605.)

Issued in Washington, DC, on November 3, 2003.

John Rodney Clark,

Associate Director of Science for Resource Management.

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DEPARTMENT OF ENERGY

Office of Science Financial Assistance Program Notice DE–FG01–04ER04–03; High-Performance Network Research: Scientific Discovery Through Advanced Computing (SciDAC) and Mathematical, Informational, and Computational Sciences (MICS)

AGENCY: Department of Energy.

ACTION: Notice inviting grant applications.

SUMMARY: The Office of Advanced Scientific Computing Research (OASCR) of the Office of Science (SC), in the U.S. Department of Energy (DOE), hereby announces its interest in receiving grant applications for projects in the high-performance network research program. Opportunities exist for research with a primary focus on integrated experimental networks to support high-impact applications in the Scientific Discovery through Advanced Computing (SciDAC) program and for ultra high-speed network technologies under the Mathematical, Computational, and Information Sciences (MICS) Division. More specific information on this solicitation is outlined in the supplementary information section below.

DATES: Potential applicants are strongly encouraged to submit a brief preapplication. All preapplications, referencing Program Notice DE–FG01–04ER04–03, should be received by DOE by 4:30 p.m., e.s.t., December 15, 2003. A response to the preapplications encouraging or discouraging a formal application generally will be communicated to the applicant within 14 days of receipt. The deadline for receipt of formal applications is 4:30 p.m., e.s.t., February 25, 2004, in order to be accepted for merit review and to permit timely consideration for award in Fiscal Year 2004.

ADDRESSES: All preapplications referencing Program Notice DE–FG0104ER04–03, should be sent electronically to Dr. Thomas D. Ndousse, Mathematical, Informational, and Computational Sciences Division, Germantown Bldg./SC–31, Office of Science, U.S. Department of Energy, 1000 Independence Avenue, SW., Washington, DC 20858–1290. Email: *tndousse@sc.doe.gov,* Phone: 301–903–9960, Fax: 301–903–7774.

The preapplications should consist of two to three pages of narrative describing the research objectives and technical approach(es). Preapplications will be reviewed relative to the scope and research needs of the ASCR ultra high-speed networks for high-end scientific computing, as outlined in the summary paragraph and in the Supplementary Information. The preapplication should identify, on the cover sheet, the title of the project, the institution, principal investigator name, telephone, fax, and e-mail address. The focus element (SciDAC or MICS) for the preapplication should also be clearly identified. A response to each preapplication discussing the potential programmatic relevance of a formal application will be communicated to the Principal Investigator within 7 to 14 days of receipt.

Formal applications in response to this solicitation are to be electronically submitted by an authorized institutional business official through DOE's Industry Interactive Procurement System (IIPS) at: *http://e-center.doe.gov/.* IIPS provides for the posting of solicitations and receipt of applications in a paperless environment via the Internet. In order to submit applications through IIPS your business official will need to register at the IIPS website. It is suggested that this registration be completed several days prior to the date on which you plan to submit the formal application. The Office of Science will include attachments as part of this notice that provide the appropriate forms in PDF fillable format that are to be submitted through IIPS. IIPS offers the option of submitting multiple files—please limit submissions to only one file within the volume if possible, with a maximum of no more than four files. Color images should be submitted in IIPS as a separate file in PDF format and identified as such. These images should be kept to a minimum due to the limitations of reproducing them. They should be numbered and referred to in the body of the technical scientific proposal as Color image 1, Color image 2, etc. Questions regarding the operation of IIPS may be e-mailed to the IIPS Help Desk at: *helpdesk@pr.doe.gov* or you may call the help desk at: (800) 683–0751. Further information on the use of IIPS by the Office of Science is available at: *http://www.sc.doe.gov/production/grants/grants.html.*

If you are unable to submit the application through IIPS, please contact the Grants and Contracts Division, Office of Science at: (301) 903–5212 or (301) 903–3604, in order to gain assistance for submission through IIPS or to receive special approval and instruction on how to submit printed applications.

SUPPLEMENTARY INFORMATION: Emerging large-scale experiments in many areas of science, such as high-energy physics, nuclear physics, climate modeling, biological sciences, etc., are anticipated to generate up to several Petabytes of data that will be transferred to geographically distant terascale computing facilities for analysis. The problems of efficient transfer of Petabyte-scale data, remote visualization of the resulting analysis, remote access to complex scientific instruments, and efficient large-scale scientific collaboration over today's networks all present serious technical challenges to networking and science communities. Addressing these challenges calls for a new generation of highly scalable transport mechanisms that can deliver and sustain multi-Gbps to high-end scientific applications; agile networking technologies that will make bandwidth on-demand possible; innovative scalable cyber security systems that operate efficiently and effectively at ultra high-speed (10 Gbps and beyond); intelligent network services that enable scientists to use network infrastructures with ease. These components are the critical building blocks of a new generation of ultra high-speed networks for DOE high-impact science applications.

The design of ultra high-speed networks that are effectively coupled distributed high-impact science applications is especially challenging because existing widely-deployed, low-speed network technologies do not perform well at ultra high-speeds. For example, transport protocols, such as the TCP and UDP stacks, intrusion detection systems, network interface cards, network measurement tools, firewalls, and the related middleware perform poorly at ultra high-speed.

Research is needed to enhance the performance of existing components and in some cases to develop radically new components that work effectively and efficiently at ultra high-speed. In addition, understanding how these components can be integrated to develop production-quality, ultra high-speed networks that can deliver end-to-end multi-Gigabits/sec to distributed

scientific applications is of significant importance.

These challenges will be addressed through an integrated program that emphasizes fundamental research and experimental network engineering activities designed to demonstrate the capabilities of ultra high-speed networks under realistic high-end computing scenarios for accelerated scientific discoveries. The integrated experimental network pilots will be supported under the SciDAC program while the fundamental networking research and development will be supported under the MICS program. More information on DOE networking requirements for distributed high-end application can be found in the following workshop reports:

(1) DOE Science Networking Challenges Workshop: Roadmap to 2008: *http://www.es.net/hypertext/welcome/pr/Roadmap/index.html,*

(2) Office of Science High-Performance Networking Planning Workshop, *http://doecollaboratory.pnl.gov/meetings/hpnpw/finalreprot/high-impact_science.pdf,*

(3) Ultra High-Speed Transport Protocols and Network Provisioning Workshop: *http://www.csm.ornl.gov/ghpn/wk2003.*

A. SciDAC Program: Integrated Experimental Ultra High-Speed Networks

Background

Beyond the scientific computing and computational science research embedded in DOE research programs, SC invests in a portfolio of coordinated research efforts directed at exploiting the emerging capabilities of terascale and petascale computing under the collective title of Scientific Discovery through Advanced Computing (SciDAC). The research projects in the SciDAC portfolio respond to the extraordinary difficulties of realizing sustained peak performance for those scientific applications that require terascale and petascale capabilities to accomplish their research goals. In recognition of these difficulties, the SciDAC research projects are collaborative efforts involving teams of physical scientists, mathematicians, computer scientists, and computational scientists working on major software and algorithm development for problems in the core research programs of SC. Research funded in the SciDAC portfolio must address the interdisciplinary problems inherent in ultra-scale computing, problems that cannot be addressed by a single investigator or small group of investigators.

This element high performance networks, focuses on using the science applications in the SciDAC portfolio to test and validate the capabilities of ultra high-speed networks. This effort is designed to determine and demonstrate how ultra high-speed networks, high performance middleware, and high-end science applications can be seamlessly integrated to build a new generation network environment for accelerating scientific discoveries. All grant applications submitted under this element must have three distinct but integrated components: the DOE Science UltraNet test and/or the Energy Science Network (ESnet), a set of distributed high-end science SciDAC application prototypes, and a suite of high-performance middleware tools and services to efficiently couple the high-end science applications to the underlying network. In addition, projects in this effort must satisfy the following requirements:

- It must address ultra high-speed network capabilities and at least one or more science applications of national and international significance related to DOE's mission, and must have a high visibility.
- It must involve a distributed high-impact science applications, preferably previously funded SciDAC science applications. A complete description of the SciDAC program at: *http://www.osti.gov/scidac/.*
- High-performance middleware or grid technologies must be employed to couple the selected applications to the underlying high-speed network infrastructures.
- It is expected that projects must use the DOE Science UltraNet Testbed or segment of high-performance networks, such as ESnet with comparable capabilities. Detailed information on the DOE Science UltraNet testbed can be obtained at: *http://www.csm.ornl.gov/ultranet,* and that of ESnet at: *http://www.es.net.*

Specific network capabilities to be demonstrated in these experimental network pilot projects may include but are not limited to the following:

- Petabyte-scale data distribution engineering—ultra high-speed data transfers over very long distances using enhanced TCP and non-TCP protocols, SANs over wide-area networks, network data caching, and dynamic network provisioning network technology for on-demand data transfers, etc. This effort must include appropriate high-impact science applications areas with significant needs for very high-speed data transfers.
- Network monitoring infrastructure—a collection of scalable network monitoring platforms, strategically located at impact science sites and in peering points. This infrastructure must enable national and international researchers to monitor the end-end performance of networks, diagnose faults, and predict network performance at various layers of abstraction including the application layer. The target network environment for this infrastructure should be the DOE UltraNet testbed and/or a segment of the Energy Sciences Network (ESnet) which operates 10 Gbps and above.
- Cyber Security Infrastructure for open science Communities—a comprehensive cyber security infrastructure for a community of scientists that will enable them to collaborate and share distributed resources securely. The target science community must have well-defined shared resources and a collection of appropriate middleware services and policies to share them.

It is recommended that target science applications and tools selected for the above project be selected from current SciDAC projects or projects that are consistent with its vision. A complete list of funded SciDAC projects can be found at: *http://www.osti.gov/scidac/projects.*

B. MICS—Base Program: Ultra High-Speed Network Engineering

The MICS aspect of this solicitation deals with research and development of ultra high-speed network technologies on a longer time horizon. It focuses primarily on deployable network transport protocols, advanced end-to-end network services, network-aware middleware, and end-to-end dynamics provisioning technologies, all of which must operate efficiently at ultra high-speed (10 Gbps and beyond). The specific technologies of current interest include but are not limited to the following:

- Ultra high-speed transport protocols scalable transport protocol—stacks that deliver and sustain multi-Gigabits/second to high-end applications efficiently on dedicated or shared single/multiple ultra high-speed channels. Such protocols could involve the extension of the existing TCP stacks or radical new non-TCP/IP approaches that could interoperate with existing network infrastructures.
- Dynamic provisioning technologies—agile network technologies to provide on-demand optical channels, wavelength scheduling, wavelength sharing, coarse-grain QOS to diverse science

communities. In addition, such technologies must provide the capability to establish packet-switched, circuit-switched, or hybrid optical paths dynamically from a pool of wavelengths.

• Ultra high-speed cyber security systems—scalable cyber security systems, such as firewalls, intrusion detection systems, authentication/authorizations systems, and related services that operate efficiently at ultra high-speed.

• Ultra high-speed network measurement and analysis—efficient tools and techniques for diagnosing, end-to-end performance prediction of ultra high-speed network.

Applicants are encouraged to refer to the final report of the DOE Science Networking Challenge: Roadmap to 2008 found at: *http://www.osti.gov/scidac/projects.html* for additional information on SC networking requirements.

Collaboration

Applicants are encouraged to collaborate with researchers in other institutions, such as: universities, industry, non-profit organizations, federal laboratories and Federally Funded Research and Development Centers (FFRDCs), including the DOE National Laboratories, where appropriate, and to include cost sharing wherever feasible. Additional information on collaboration is available in the Application Guide for the Office of Science Financial Assistance Program that is available via the Internet at: *http://www.sc.doe.gov/production/grants/Colab.html.*

Program Funding

It is anticipated that up to $5 million will be available for SciDAC and MICS Programs; up to six to ten awards are anticipated, contingent on availability of appropriated funds in Fiscal Year 2004 and the size of the awards. Multiple year funding is expected, also contingent on availability of funds and progress of the research.

Awards are expected to be at most $1.2 million per year for experimental ultra high-speed network research projects. Awards for integrated experimental ultra high-speed networks research projects are expected to be at most $1.2 million per year. Since integrated experimental networking projects are expected to be multi-institution and multi-disciplinary projects, awards under this notice would range from $150,000 to $500,000 for participation in an experimental networks project per participating project. Awards for ultra high-speed networking engineering will range from $150,000 to $300,000 per year for each single investigator. The funding period for all projects will range from two to three years subject to availability of funds. Grant applications funded under these programs will be handled as cooperative agreements.

Merit Review

Applications will be subjected to scientific merit review (peer review) and will be evaluated against the following evaluation criteria, which are listed in descending order of importance codified at 10 CFR 605.10(d):

(1) Scientific and/or Technical Merit of the Project,

(2) Appropriateness of the Proposed Method or Approach,

(3) Competency of Applicant's Personnel and Adequacy of Proposed Resources,

(4) Reasonableness and Appropriateness of the Proposed Budget.

The evaluation under item 1, Scientific and/or Technical Merit of the Project, will also consider the following elements:

(a) The potential of the proposed project to make a significant impact to distributed Petabytes-scale distributed data archives and other high-end science applications.

(b) The extent to which the results of the project are extensible operational production high-performance networks, such as ESnet.

(c) The degree ultra high-speed networking technologies can inter-operate with existing networking technologies.

The evaluation under item 2, Appropriateness of the Proposed Method or Approach, will also consider the following elements:

(a) The degree to which the project adheres to the management philosophy of incorporating science applications into the project execution.

(b) The quality of the plan for ensuring interoperability and integration with related network environment software produced by other MICS and SciDAC efforts.

(c) The extent to which the project incorporates broad community (industry/academia/other federal programs) interaction.

(d) Quality and clarity of proposed work schedule and deliverables.

(e) Use of recent advances in optical network technologies, such as GMPLS to support distributed high-end applications.

The evaluation will include program policy factors, such as the relevance of the proposed research to the terms of the announcement and the agency's programmatic needs. Note: External peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. Non-federal reviewers will often be used, and submission of an application constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

Submission Information

The Project Description must be 20 pages or less, exclusive of attachments. It must contain an abstract or project summary on a separate page with the name of the applicant, mailing address, phone, FAX and email listed. The application must include letters of intent from collaborators (briefly describing the intended contribution of each to the research), and short curriculum vitaes for the applicant and any co-PIs.

Applicants must disclose all information on their current and pending grants. To provide a consistent format for the submission, review and solicitation of grant applications submitted under this notice, the preparation and submission of grant applications must follow the guidelines given in the Application Guide for the Office of Science Financial Assistance Program, 10 CFR Part 605. Access to SC's Financial Assistance Application Guide is possible via the World Wide Web at: *http://www.science.doe.gov/production/grants/grants.html.* DOE is under no obligation to pay for any costs associated with the preparation or submission of applications if an award is not made.

The Catalog of Federal Domestic Assistance number for this program is 81.049, and the solicitation control number is ERFAP 10 CFR Part 605.

Issued in Washington, DC on November 3, 2003.

John Rodney Clark,

Associate Director of Science for Resource Management.

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DEPARTMENT OF ENERGY

International Energy Agency Meeting

Notice of Meeting

AGENCY: Department of Energy.

ACTION: Notice of meeting.

SUMMARY: The Industry Advisory Board to the International Energy Agency (IEA) will meet on November 19, 2003, at the headquarters of the IEA in Paris, France in connection with a meeting of the