Partnership for Advancing Technologies in Housing (PATH)

National Science Foundation
Division of Civil and Mechanical Systems
Directorate for Engineering

Full Proposal Deadline(s) (due by 5 p.m proposer's local time):

April 21, 2003

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Partnership for Advancing Technologies in Housing (PATH)

Synopsis of Program:

The Engineering Directorate of the National Science Foundation (NSF) announces a research program in support of the Partnership for Advancing Technology in Housing, or PATH. The objectives of PATH are to improve the affordability and value of today's new and existing homes through the support of research and development, information and outreach, and planning and barrier analysis.

The purpose of this announcement is to support background research that contributes to the achievement of the PATH goals as described in Section: I Introduction.

Cognizant Program Officer(s):

- Perumalsamy N. Balaguru, Program Director, Directorate for Engineering, Division of Civil & Mechanical Systems, 545 S, telephone: (703) 292-7020, fax: (703) 292-9053, email: pbalagur@nsf.gov

- Richard N. Smith, Program Director, Directorate for Engineering, Division of Chemical & Transport Systems, 525 N, telephone: (703) 292-8371, fax: (703) 292-9054, email: rnsmith@nsf.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.041 --- Engineering

Eligibility Information

- **Organization Limit:** Proposals may be submitted by U.S. academic institutions in support of individual investigators or small groups.
- **PI Eligibility Limit:** Only one proposal may be submitted by a principal investigator. A principal investigator for one proposal may be a co-principal investigator on other proposals.
- **Limit on Number of Proposals:** None Specified.

Award Information

- **Anticipated Type of Award:** Standard Grant
- **Estimated Number of Awards:** 5
- **Anticipated Funding Amount:** $1,500,000 Estimate of $1.5 million in FY 2003, subject to availability of funds.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Full Proposal Preparation Instructions:** Standard GPG Guidelines apply.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required.
- **Indirect Cost (F&A) Limitations:** Not Applicable.
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Full Proposal Deadline Date(s)** (due by 5 p.m proposer's local time):
  April 21, 2003

Proposal Review Information

- **Merit Review Criteria:** National Science Board approved criteria apply.

Award Administration Information

- **Award Conditions:** Standard NSF award conditions apply.
- **Reporting Requirements:** Standard NSF reporting requirements apply.

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Summary of Program Requirements

I. INTRODUCTION

The Directorate for Engineering of the National Science Foundation (NSF) announces a research program in support of HUD's Partnership for Advancing Technology in Housing, or PATH, as part of its ongoing partnership with HUD. Whereas previous years' announcements have been open calls for a variety of research proposals, this year's announcement will focus on groundbreaking proposals in the three areas designated to be at the forefront of housing technology through PATH's Technology Roadmapping (see www.pathnet.org for a full description). These areas include:

- Information technology to accelerate and streamline home building;
- Advanced panel systems;
- "Whole house" and building process redesign.

NSF and PATH are also interested in proposals involving partnerships between research institutions, industrial enterprises, local government, and/or other broadly-defined research and development participants relevant to the home building industry. The submitting institution must serve as the lead institution in such a partnership. At a minimum, proposed partnerships must include an academic institution, a private sector organization, and a state/local government entity. These partnerships may capitalize on the shared interests of the partners, create new models for integrating research and development, and enable small- and medium-sized firms to utilize academic resources, and strengthen the capabilities of academic institutions for addressing site-specific technology innovation concerns.

In either case, the proposal must have a strong fundamental research component and demonstrate advanced knowledge of housing research needs rather than applications or transfers of other techniques within the housing technology arena. Far reaching exploratory research that can lead to breakthrough technologies and engage transcendent technologies is encouraged.

Background

According to the National Construction Goals, White House Office of Science & Technology Policy, 1994, despite the importance of the housing industry to the American economy, there is very little investment in developing new residential technologies. In addition,

fragmentation among the various industry stakeholders - homebuilders, material manufacturers, university researchers and government officials - impedes communication and slows adoption of new housing technologies (NAHB Research Center, "Building Better Homes at Lower Costs: The Industry Implementation Plan for the Residential National Construction Goals," 1996). As a result, true innovation and the introduction of emerging technologies into the housing marketplace rarely proceed beyond the prototype stage. For these reasons, PATH was created in 1998 and has continuously worked with the NSF to create this Program Announcement.

The Partnership for Advancing Technology in Housing (PATH) is a cooperative initiative of the federal government and the building industry to streamline the development, dissemination, and use of innovative housing technologies that will improve the affordability and value of America's homes. PATH works to speed the acceptance of innovative products and processes by understanding and eliminating the issues and institutional problems related to technology development in the housing industry, and by developing new technologies themselves. PATH created three measurable goals to fulfill this mission:

I. To develop new housing technologies. PATH supports and performs technological research with many governmental, industrial, and university research groups at all R&D levels of home construction. In this way, PATH contributes to the stock of housing technologies.

II. To disseminate new and existing technological information. While new technologies are created, there are many existing technologies that builders and homeowners need to know about. PATH coordinates innovation information that is unbiased, technically accurate, and relevant to different housing audiences--such as the new PATH website (www.pathnet.org) and the twin website at the NAHB Research Center (www.toolbase.org). In this way, more people are becoming familiar with new relevant technologies.

III. To determine the needs for improved housing technology development. There are many barriers to ensuring that technologies will continue to be developed in the future and keep current technologies from getting to market. PATH investigates the institutional barriers that impede innovation and proposes new services and tools that will help product manufacturers and builders bring those technologies to the home.

PATH recognizes that technological advances in fundamental research require continuous financial support. The National Science Foundation supports fundamental research that advances PATH's goals and serves as the program's primary exploratory research component.

PATH offers a variety of research and development initiatives to support housing technology at all stages of development, and the investigators are cautioned to review the appropriate stage of development for the work. These include:

- Background Research: Fundamental changes in the knowledge of materials or processes for housing are addressed by this NSF-PATH Program Announcement. While housing technology implies a specific application, it should not be inferred that proposals that apply technologies or technological knowledge from other fields or industries are considered for this program. Rather, innovative contributions from all relevant fields are necessary for consideration.
- Applied Research & Technology Development: Applications of technology from other fields or reconfigurations of existing technologies are applied research and do not qualify for NSF-PATH awards. Furthermore, creation of new products or marketable materials (or technology development) is not eligible for NSF-PATH support. PATH has created Applied Research and Technology Development Agreements to satisfy this need in housing. Please refer to the PATH website (www.pathnet.org) for further information.
- Technology Evaluation & Demonstration: The evaluation of technologies after commercialization or demonstration of technologies after development are critical components of housing technology research, but are not appropriate for NSF funding. Please refer to PATH's Field Evaluations and PATH Demonstrations programs for assistance in these areas.

More information on the PATH initiatives can be found at the PATH website (www.pathnet.org).

II. PROGRAM DESCRIPTION

This initiative is designed to support fundamental engineering and industrial research and technological innovations that will help achieve PATH's objectives and eventually promote their adoption by the home building industry. Proposals that address the three Technology Roadmaps namely:information technology, panelized systems, and whole-building design for home building, will be given preference. Proposed research projects should make a substantial contribution to the advancement of the state of technology and engineering, as well as have long-term significance for the home building industry. Although the primary emphasis will be on achieving a high degree of fundamental understanding, an investigation with a large potential impact on new applications will also be considered. Proposals that involve industrial development or applications of existing technologies--i.e., that do not contribute to the state of knowledge--are ineligible for this announcement. Note also that only proposals in the following areas of research will be considered: structures, materials, life-cycle issues, thermal transfer analyses, and/or fabrication/manufacturing systems. Proposals should not include demonstrations or applications of technology unless included as part of the larger research proposal.

It is anticipated that cooperation among researchers from different disciplines will open new avenues of research and develop new applications. Each research proposal should identify potential areas of application and potential impacts, and should address the ways in which education and training are integrated within the research program. Efforts to incorporate interdisciplinary education experience and to encourage student teamwork are also encouraged.

III. ELIGIBILITY INFORMATION

Proposals may be submitted by U.S. academic institutions in support of individual investigators or small groups. Only one proposal may be submitted by a principal investigator. A principal investigator for one proposal may be a co-principal investigator on other proposals.

IV. AWARD INFORMATION

NSF anticipates that $1.5 million will be available in FY 2003 for this initiative. Pending availability of funds, NSF anticipates funding awards for up to 36-month duration with a maximum of $300,000 per project. The final number of awards will be subject to the availability of funds and the quality of the proposals.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Instructions:

Proposals submitted in response to this program announcement/solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF *Grant Proposal Guide* (GPG). The complete text of the GPG is available electronically on the NSF Website at: http://www.nsf.gov/cgi-bin/getpub?gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

Proposers are reminded to identify the program announcement/solicitation number (03-527) in the program announcement/solicitation block on the NSF *Cover Sheet For Proposal to the National Science Foundation*. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost Sharing:

Cost sharing is not required in proposals submitted under this Program Solicitation.

Other Budgetary Limitations:

Total funding up to $300,000 per project. Maximum project duration: 3 Years.

Proposals must be submitted by the following date(s):

Full Proposal Deadline(s) (due by 5 p.m proposer's local time):

April 21, 2003

Proposers are required to prepare and submit all proposals for this announcement/solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at: http://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program announcement/solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this announcement/solicitation.

Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Proposers are no longer required to provide a paper copy of the signed Proposal Cover Sheet to NSF. Further instructions regarding this process are available on the FastLane Website at: http://www.fastlane.nsf.gov

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

The National Science Board approved revised criteria for evaluating proposals at its meeting on March 28, 1997 (NSB 97-72). All NSF proposals are evaluated through use of the two merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

On July 8, 2002, the NSF Director issued Important Notice 127, Implementation of new Grant Proposal Guide Requirements Related to the Broader Impacts Criterion. This Important Notice reinforces the importance of addressing both criteria in the preparation and review of all proposals submitted to NSF. NSF continues to strengthen its internal processes to ensure that both of the merit review criteria are addressed when making funding decisions.

In an effort to increase compliance with these requirements, the January 2002 issuance of the GPG incorporated revised proposal preparation guidelines relating to the development of the Project Summary and Project Description. Chapter II of the GPG specifies that Principal Investigators (PIs) must address both merit review criteria in separate statements within the one-page Project Summary. This

chapter also reiterates that broader impacts resulting from the proposed project must be addressed in the Project Description and described as an integral part of the narrative.

Effective October 1, 2002, NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary. It is believed that these changes to NSF proposal preparation and processing guidelines will more clearly articulate the importance of broader impacts to NSF-funded projects.

The two National Science Board approved merit review criteria are listed below (see the Grant Proposal Guide Chapter III.A for further information). The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which he/she is qualified to make judgments.

What is the intellectual merit of the proposed activity?
How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?
How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

NSF staff will give careful consideration to the following in making funding decisions:

Integration of Research and Education
One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities
Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

B. Review Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/solicitation will be reviewed by Panel Review.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the date of receipt. The interval ends when the Division Director accepts the Program Officer's recommendation.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See section VI.A. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (NSF-GC-1); * or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/cgi-bin/getpub?gpm. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Website at http://www.gpo.gov.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for the PI and all Co-PIs. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project reporting system, available through FastLane, for preparation and submission of annual and final project reports. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, publications, and other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding this program should be made to:

- Perumalsamy N. Balaguru, Program Director, Directorate for Engineering, Division of Civil & Mechanical Systems, 545 S, telephone: (703) 292-7020, fax: (703) 292-9053, email: pbalagur@nsf.gov

- Richard N. Smith, Program Director, Directorate for Engineering, Division of Chemical & Transport Systems, 525 N, telephone: (703) 292-8371, fax: (703) 292-9054, email: rnsmith@nsf.gov

For questions related to the use of FastLane, contact:

- Kimberly J. Bryant, Directorate for Engineering, Division of Civil & Mechanical Systems, 545 S, telephone: (703) 292-7006, fax: (703) 292-9053, email: kbryant@nsf.gov

IX. OTHER PROGRAMS OF INTEREST

The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at http://www.nsf.gov/cgi-bin/getpub?gp. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF E-Bulletin, which is updated daily on the NSF Website at http://www.nsf.gov/home/ebulletin, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's Custom News Service (http://www.nsf.gov/home/cns/start.htm) to be notified of new funding opportunities that become available.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF, although some programs may have special requirements that limit eligibility.

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the GPG Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at http://www.nsf.gov

- **Location:**   4201 Wilson Blvd. Arlington, VA 22230

- **For General Information**   (703) 292-5111
  (NSF Information Center)**:**

- **TDD (for the hearing-impaired):**   (703) 292-5090

- **To Order Publications or Forms:**

    Send an e-mail to: pubs@nsf.gov

    or telephone: (301) 947-2722

- **To Locate NSF Employees:**   (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to an information collection unless it displays a valid OMB control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Division of Administrative Services, National Science Foundation, Arlington, VA 22230.

OMB control number: 3145-0058.