Proposal to the NASA EPSCoR Program

Kentucky NASA EPSCoR Research Infrastructure Development Program

Project Director

Richard Hackney
Project Director
Western Kentucky University
1906 College Heights Blvd #11077
Bowling Green, KY 42101-1077
(270) 745-4156/4044 (voice)
(270) 745-4255 (fax)
Richard.Hackney@wku.edu

Authorizing Official of Lead Institution

Phillip E. Myers
Director
Western Kentucky University
1906 College Heights Blvd #11016
Bowling Green, KY 42101-1016
(270) 745-4652 (voice)
(270) 745-4211 (fax)
Phillip.Myers@wku.edu

Research Infrastructure Development Funding Request

Year 1: 2007/2008	**$125,000**
Year 2: 2008/2009	**$125,000**
Year 3: 2009/2010	**$125,000**
Total Request	**$375,000**

February 2007

Western Kentucky University

Kentucky NASA EPSCoR
Research Infrastructure Development Program

Certification of Compliance with Applicable Executive Orders and U.S. Code

By signing and submitting the proposal identified in this Cover Sheet/Proposal Summary in response to the NASA request for a proposal under the National Space Grant College and Fellowship Program, the Authorizing Official of the proposing institution, as identified below:

1. *certifies that the statements made in this proposal are true and complete to the best of his/her knowledge;*
2. *agrees to accept the obligations to comply with NASA award terms and conditions if an award is made as a result of this proposal;*
3. *provides certification to the following that have been reviewed on the following NASA website (http://genesis.gsfc.nasa.gov/grants/grants.htm#GrantForms):*

(i) Certification for Debarment, Suspension, and other Responsibility Matters; (ii) Certification Regarding Lobbying, (iii) Assurance for Nondiscrimination Compliance.

Institution Authorization: Phillip Myers 2/16/07

Dr. Phillip E. Myers
Director
Western Kentucky University

Date

Kentucky NASA EPSCoR Program
Research Infrastructure Development Proposal

Kentucky EPSCoR Committee
Signature Page

The Kentucky EPSCoR Committee Chairman has had an opportunity to review this proposal and discuss it with the NASA EPSCoR Director.

Signature: Wimberly C Royster Feb. 14, 07

Dr. Wimberly Royster, Chair, Kentucky EPSCoR Committee — Date

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DIRECTOR'S VITA: Dr. Richard L. Hackney

EDUCATION

Ph.D.	University of Florida	Astronomy	1972
M.S.	University of Tennessee	Physics	1968
B.S.	University of Tennessee	Engineering Physics	1966

PROFESSIONAL EXPERIENCE

Acting Head, Department of Physics and Astronomy, Western Kentucky Univ., 2002-2004.
Professor, Department of Physics and Astronomy, Western Kentucky University, 1988-present.
Director, NASA Kentucky Space Grant Consortium, 1992-present.
Director, Kentucky NASA EPSCoR Program, 1994-present.
NASA/IUE Final Archive Definition Committee, 1989-1992.
NASA/IUE Working Group on Improving Signal-to-Noise, 1986-1989.
NASA/IUE Satellite Guest Observer, 1978-1990.
Associate Professor, Dept. of Physics and Astronomy, Western Kentucky Univ., 1976-1988.
Assistant Professor, Dept. of Physics and Astronomy, Western Kentucky Univ., 1972-1976.
NASA Graduate Trainee, University of Florida, 1968-1972.

HONORS AND DISTINCTIONS

Phi Beta Kappa Honor Society, Phi Kappa Phi Honor Society, Phi Eta Sigma Honor Society Sigma Pi Sigma Physics Honor Society, Award as Outstanding Senior Physics Major at the University of Tennessee, Member of Executive Committee of the National Council of Space Grant Directors, Member of Board of Directors of the National Space Grant Foundation

GRANTS: Extramural grants total $16,534,000

SELECTED RELEVANT PUBLICATIONS

A World-Wide Network of Robotic Imaging Telescopes. McGruder, C., III, Barnaby, D., Carini, M., Gelderman, R, Hackney, K., Hackney, R., Marchenko, S., Scott, R., Yan, Li, and Chen, Wen-Ping, Proc. IAU 8th Asian-Pacific Regional Meeting, Volume II, ASP Conf. Series, 289, 19, 2003.

"*STARBASE: A Network of Fully Autonomous Telescopes for Hands-On Science Education.*" R. Gelderman, D. Barnaby, M. Carini, K. Hackney, R. Hackney, C. McGruder, R. Scott, in "Small-Telescope Astronomy on Global Scales", eds. B. Paczynski, W. Chen, and C. Lemme, (San Francisco: Astronomical Society of the Pacific), 2001.

"*Observations of a Major Outburst of BL Lacertae in the Active Galactic Nuclei Monitoring Program in the Center for Automated Space Science.*" M.T. Carini, K.R. Hackney, S.D. Clements, R.C. Culler, R.L. Hackney, J.C. Noble, R.G. Gelderman, R.L. Scott, and C.H. McGruder III, *NASA University Research Centers Technical Advances in Aeronautics, Space Sciences and Technology, Earth Systems Sciences, Global Hydrology, and Education*, Vol. III, 57, edited by T.L. Coleman, B. White, S. Goodman, P. Sakimoto, L. Randolph, and D. Rickman, 1998.

"*Quasi-Automated Remote (QuasAR) Monitoring of AGN in the Center for Automated Space Science.*" R. Hackney, K. Hackney, R. Scott, and M. Carini. *Astron. Soc. Pac. Conf. Series: Blazar Continuum Variability*, Eds: H.R. Miller, J.R. Webb and J.C. Noble, 110, 166, 1996.

"*Designing Matrix Models for Fluorescence Energy Transfer Between Moving Donors and Acceptors.*" B.W. Van Der Meer, M. Raymer, S.L. Wagoner, R.L. Hackney, J.M. Beechem, and E. Gratton. *Biophysical Journal*, 64, 1243, 1993.

Research Infrastructure Development Program Plan

Goals, Objectives, and Priorities of the Kentucky NASA EPSCoR Program

Goals: The Kentucky NASA EPSCoR Research Infrastructure Development Program is proposed for the mutual long-term benefit of NASA and Kentucky, through

- Development of Kentucky research infrastructure capacity with direct links to NASA
- Establishment of collaborative research in areas of strategic importance to NASA

Priorities: The Kentucky NASA EPSCoR Program supports NASA's programs and Vision for Exploration priorities with expanded research capacity. Kentucky benefits through the development of an academic research enterprise directed toward long-term, self-sustaining, nationally competitive capability in aerospace applications. The program will enhance interrelationships between Kentucky and NASA and among participating institutions in the State, and will contribute to the State's economic viability.

Objectives: Principal objectives of the Research Infrastructure Development program are:

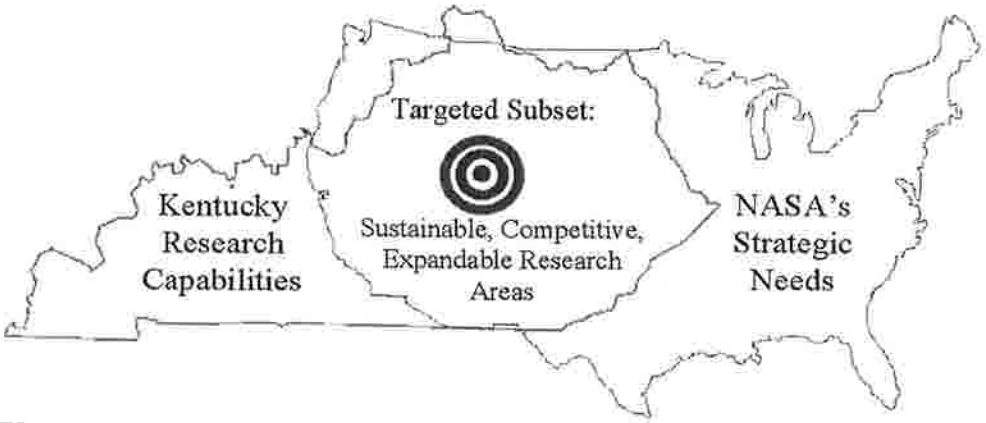
- To increase the number of young investigators in Kentucky who connect and collaborate with NASA researchers in areas of current and long-term importance to NASA's missions
- To develop expanded collaborations within Kentucky for larger multi-investigator projects in support of NASA mission research and development for present and future needs

The program is based on determining areas of overlap between NASA's strategic interests and Kentucky's research capabilities. Within this context, the program specifically targets Kentucky young investigators who will:

- Determine how they can contribute to NASA's strategic needs through consultation and planning with NASA researchers
- Establish a research project in direct collaboration with researchers at NASA Centers or in NASA Mission Directorates, addressing research or development of importance to the NASA mission
- Work toward achieving a sustainable research effort, based on future competitive funding from NASA or other federal sources
- Develop a plan for expanding the research in NASA's interests to a multi-investigator team effort that is competitive for further development under future NASA EPSCoR Research Area funding opportunities*

*As NASA announces opportunities for multi-investigator Research Area awards, the Research Infrastructure Development Program will serve as a ready structure to call for proposals from Kentucky researchers, to review and evaluate the proposals with existing advisory personnel, and to submit selected proposals to NASA.

We seek the best Kentucky young investigators on the basis of potential to achieve sustainable, competitive, expandable research in areas that contribute to and benefit NASA's strategic interests. Kentucky will benefit through the development of aerospace research capability that is sustainable through competitive federal funding.



Project Elements

Research Infrastructure Development Grants to Develop Research Collaborations with NASA Centers and Mission Directorates

The primary purpose of the Kentucky NASA EPSCoR Research Infrastructure Development Program is to establish mutually beneficial, collaborative linkages between increased numbers of Kentucky young investigators and NASA researchers, as a basis for building capacity for sustainable aerospace-related research in Kentucky. Investigators at all Kentucky institutions of higher education will be eligible for support, based on competitive proposals.

Awards will be specifically targeted to involve young investigators in research collaborations with NASA laboratories, addressing needs as identified by NASA collaborators in support of NASA's strategic needs and interests. More-experienced investigators may propose with a young investigator as funded Co-I, for the purposes of

- Mentoring the young investigators in connecting and collaborating with NASA, and
- Coordinating the design of a larger multi-investigator project to propose for the State in future NASA EPSCoR Research Area opportunities.

In January prior to each program year, the Kentucky NASA EPSCoR Subcommittee/Technical Advisory Committee will solicit proposals for support of research infrastructure development projects by Kentucky young investigators in collaboration with NASA researchers. The NASA EPSCoR Center Office will distribute the RFP statewide to inform potential researchers of the opportunity. Recipients of the Research Infrastructure Development grants will be determined on the basis of competitive proposals solicited from all colleges and universities in Kentucky. The solicitation is equal opportunity and will seek involvement of greater numbers of women and members of underrepresented groups. The Kentucky NASA EPSCoR Subcommittee/ Technical Advisory Committee will select awardees at a meeting held in May in conjunction with the Annual Kentucky EPSCoR Conference.

Criteria in the RFP for Research Infrastructure Development awards will include:

1. Indication by the NASA collaborator(s) of the importance of the project to NASA and their plan for direct collaboration in the project
2. Formative discussion of a plan for expanding the research in NASA's interests to a multi-investigator team effort that is competitive for further development under future NASA EPSCoR Research Area funding opportunities
3. Statement of a plan for achieving a sustainable research effort, based on future competitive funding from NASA or other federal sources

Required responsibilities of the PI will include:

1. Reporting on the development and growth of the collaboration with the researcher(s) at the NASA Center(s) or Mission Directorates(s)
2. Submission of a follow-on proposal for non-EPSCoR NASA or other federal funding to sustain the project, as well as publications and presentations of results of the project
3. Submission for review and possible selection for forwarding of a multi-investigator Research Area proposal to the national NASA EPSCoR Program

Funded research projects will begin in August and continue through the ensuing year. Progress reports are due from the investigators the following April, for evaluation and incorporation into the annual program reports to NASA and to the Kentucky EPSCoR Committee. The infrastructure development activities will recur on an annual cycle for the duration of the Kentucky NASA EPSCoR Research Infrastructure Development Program Cooperative Agreement. Funding recipients will be eligible for renewal, in competition with new applicants, and the development of longer-term projects will be encouraged.

Encouragement of Inclusion of Students

Experience with student support under previous NASA EPSCoR cooperative agreements underscores the importance of student involvement in NASA EPSCoR Research Infrastructure Development projects. Student involvement in learning scientific practice by participating in scientific research and connecting with NASA research efforts provides an important contribution to the development of human resources in support of the Kentucky strategic priority to "ensure that Kentucky education systems prepare highly skilled, knowledgeable graduates (including teachers) with the necessary mathematics and science capabilities for successfully maneuvering in the 21st Century knowledge economy."

Researchers proposing infrastructure-building collaborative projects with NASA will be encouraged to include students in their research proposals. Students may work in the research project at their home institution or at the collaborating NASA Center, or a combination of both, as needed to fulfill the scientific objectives of the project. As part of their experience in learning scientific practice, participating students must be provided with mentoring, interaction with the NASA collaborator(s), and opportunities to prepare and deliver presentations of results, such as publications and/or presentations at scientific meetings and conferences.

Student research contributions will be featured in the presentations at the Annual EPSCoR Conference. Researchers will be encouraged to ensure that the students interact with the collaborating NASA Center(s) and NASA researcher(s). Students receiving significant funding under any of these programs will be longitudinally tracked to document their successes through attaining their first employment.

Coordination with Space Grant and NASA Student Opportunities

Researchers will also be encouraged to recruit other prospective student researchers by working with them to propose mentored component research in the annual statewide competition for graduate research fellowships and undergraduate research scholarships offered by the Kentucky Space Grant Consortium. Researchers in Kentucky Space Grant Consortium projects will be encouraged to propose NASA EPSCoR Research Infrastructure Development projects to develop larger multi-investigator collaborative projects with NASA. Researchers in all programs will be

asked to encourage students to apply for NASA opportunities such as the NASA Academies, the NASA Graduate Student Research Program (GSRP) and Undergraduate Research Program (USRP), and for student research experiences and internships at the NASA Centers.

Overall coordination of the Kentucky NASA EPSCoR Program and the Kentucky Space Grant Consortium is facilitated by shared administrative structure and management. The Director and Associate Director of the Kentucky NASA EPSCoR Program are also the Director and Associate Director of the Kentucky Space Grant Consortium. From their office, communications and announcements for both programs are coordinated, and participants of each program are informed of all opportunities available in both programs.

Annual State Conference for NASA EPSCoR and Space Grant

An aerospace forum will be conducted each year, normally in May, as part of the Kentucky Annual Statewide EPSCoR Conference. The component aerospace forum will provide opportunities for NASA ESPCoR researchers to present results from their projects, and to interact with other-agency EPSCoR researchers, Space Grant researchers. and students who also present in the forum. The forum is attended by members of the NASA EPSCoR Technical Advisory Committee and External Advisory Panel, and by members of the Kentucky Space Grant Consortium Committee. The EPSCoR Conference and included aerospace forum together provide an important opportunity for these members to review the progress and results of projects in both programs, and to interact with the overall Kentucky EPSCoR Program to see the full context of EPSCoR in Kentucky.

Alignment with Kentucky Priorities and Agendas

Kentucky's needs and priorities in science and technology have been determined and presented in the state's adopted plan: *The Kentucky Science and Technology Strategy.* The following discussion is focused on items in the plan describing Kentucky's goals, needs, and strategies that are addressed most directly by NASA EPSCoR.

Goal: The Kentucky Science and Technology Strategy states that the overarching goal is:

- To create an innovation-driven, entrepreneurial economy that makes Kentucky a leader in the development of knowledge and its applications to people, firms and products.

Needs: Conditions cited by the Strategy as necessary for success include:

- Increased federal and industry R&D funds
- Expanded university support and leadership role

Priorities: Two key strategies are identified as priorities for development in Kentucky:

- Technological Infrastructure: Build the technological infrastructure (i.e., Kentucky know-how) that is essential to ensuring a competitive Kentucky economy.
- People: Ensure that Kentucky education systems prepare highly skilled, knowledgeable graduates (including teachers) with the necessary mathematics and science capabilities for successfully maneuvering in the 21st Century knowledge economy.

Strengths: *The Kentucky Science and Technology Strategy* acknowledges that:

> Kentucky appears to have the potential to build world class knowledge and companies in several areas including electronic commerce (including printers, printing, logistics and software); energy and materials science; life sciences (including medical sciences pharmaceuticals, agricultural biotechnology); logistics and distribution (including software

and engineering services); nutrition and food technologies; and vehicle parts and components (including plastics, metals, parts, components, materials and devices).

Kentucky's Priority Focus Areas:

- Biosciences
- Environmental and Energy Technologies
- Human Health and Development
- Information Technology and Communications
- Materials Science and Advanced Manufacturing

Fundamental Role of EPSCoR: *The Kentucky Science and Technology Strategy* expresses Kentucky's need for development of technological infrastructure and human resources, and recognizes that EPSCoR programs have been and will continue to be vital forces in achieving this development.

Agenda of the Statewide Kentucky EPSCoR Program:

- Strengthening the capability of researchers and institutions in the Commonwealth
- Improving the quality of Research and Development
- Developing the ability of researchers and institutions to compete for non-EPSCoR Federal, State and private sector R&D funding
- Aiding undergraduate education and the private sector through technology transfer and technological improvements

The Kentucky NASA EPSCoR Program is aligned with and directly supports Kentucky's agenda and priorities as outlined in the *Kentucky Science and Technology Strategy* and as discussed above. The Kentucky NASA EPSCoR Program operates as a component of the statewide multi-agency Kentucky EPSCoR Program and fully supports its agenda and goals, working in the context of aerospace-related research that supports NASA's needs and mission priorities as well.

Alignment with NASA Research or Technology Development Priorities

National and Agency Priorities

NASA's overarching priorities derive from the President's 2004 directive: *A Renewed Spirit of Discovery: The President's Vision for U. S. Space Exploration*, by which the Agency and Nation are committed to:

- A journey of exploring the solar system and beyond
- Returning to the Moon in the next decade
- Venturing further into the solar system
- Ultimately sending humans to Mars and beyond.

The *Vision for Space Exploration* is translated into strategic goals for NASA for the period 2006 through 2016 in the *2006 NASA Strategic Plan*. The two documents together define the strategic needs and interests of NASA for the present and future, and both will be cited in our Requests for Proposals as primary references for beginning proposal planning and seeking NASA researchers with whom to collaborate in solving problems of interest to NASA. Current NASA contacts at the Mission Directorates and University Affairs Officers at the Centers will serve as the Kentucky researchers' points of contact for developing projects of strategic interest to NASA

and collaborations with specific NASA researchers in conducting the projects.

As NASA provides the lead for the Nation in the implementation of the exploration vision, university researchers and other participants provide amplified expertise and research capacity, working with NASA researchers to achieve the national vision. All Research Infrastructure Development projects will be required to show that the research directly supports a need recognized by NASA for support of its mission. Selection will be strongly based on the participation of the NASA researcher(s) and their certification of the importance of the research to NASA's priorities.

NASA Education Priorities

The Kentucky NASA EPSCoR Program supports the NASA Education Strategic Coordination Framework in contributing to the development of the highly-educated and well-prepared workforce that has been and continues to be critical to the success of the Agency's mission. Specifically, through the involvement of students in mentored research connected with NASA, the Kentucky NASA EPSCoR Program supports the following goals of the NASA 2006 Education Strategy and Framework:

- **Strengthen NASA and the Nation's future workforce**—NASA will identify and develop the critical skills and capabilities needed to ensure achievement of the Vision for Space Exploration. To help meet this demand, NASA will continue contributing to the development of the Nation's science, technology, engineering, and mathematics (STEM) workforce of the future through a diverse portfolio of education initiatives that target America's students at all levels, especially those in traditionally underserved and underrepresented communities.
- **Attract and retain students in STEM disciplines**—NASA will focus on engaging and retaining students in STEM education programs to encourage their pursuit of educational disciplines and careers critical to NASA's future engineering, scientific, and technical missions.

The Program supports the following Outcomes and Objectives in the NASA Education portfolio:

- **Outcome 1**: Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goal through a portfolio of investments.
  - **Objective 1.1** – Faculty and Research Support: Provide NASA competency-building education and research opportunities for faculty, researchers, and post-doctoral fellows.
  - **Objective 1.5** – Targeted Institution Research and Academic Infrastructure: Improve the ability of targeted institutions to compete for NASA research and development work.
- **Outcome 2**: Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty.

The Kentucky NASA EPSCoR research projects, including opportunities for mentored student research, support both Outcomes 1 and 2. Objective 1.1 is the basis for the Kentucky NASA EPSCoR Program. Objective 1.5 is addressed through encouraging investigators to include faculty at targeted institutions in their multi-investigator proposals, providing opportunities for start-up involvement at institutions that may not have the basic supportive infrastructure and tradition of promoting faculty research.

Project Management, Coordination, and Evaluation

Project Management

The daily management and operation of the Kentucky NASA EPSCoR Program is vested in the Project Director, Dr. Richard Hackney, as Chair of the NASA EPSCoR Technical Advisory Committee and Subcommittee of the Kentucky EPSCoR Committee. Dr. Hackney is Professor of Physics and Astronomy at Western Kentucky University (WKU), and also serves as Director of the Kentucky Space Grant Consortium (KSGC). The Project Director is assisted in performing daily management tasks for the NASA EPSCoR Program by Associate Project Director Dr. Karen Hackney, Professor of Physics and Astronomy at Western Kentucky University, and by staff and secretarial support from the KSGC Center Office, located at WKU.

Responsibilities of the Project Director, aided by the Associate Director, include program coordination, quality control, and financial management. The Project Director monitors the progress of the research activities, works with investigators and college and university administrators to ensure that program objectives are met, coordinates the activities of the External Review and Advisory Panel, and reports to the NASA EPSCoR Subcommittee, the Statewide EPSCoR Project Director, the Kentucky EPSCoR Committee, and NASA.

Financial management of the program is provided by the Project Director through the Western Kentucky University Research Foundation at the Lead Institution, Western Kentucky University, designated as fiscal agent for the NASA EPSCoR Cooperative Agreement. Funding for infrastructure development projects will be awarded as subgrants, based on the statement of performance and budget proposed by the investigators and approved by the NASA EPSCoR Subcommittee. The Subgrantee's allowable expenditures as specified in the performance statement and budget in the subgrant are invoiced to Western Kentucky University Research Foundation for payment. Western Kentucky University, in turn, submits Form 272 for reimbursement by NASA. Western Kentucky University will provide to NASA all required financial statements and summaries. It will also provide, as needed, summaries and tracking information to the Statewide Director of EPSCoR Programs and to the Chair of the NASA EPSCoR Subcommittee/TAC.

The Statewide EPSCoR Committee, chaired by Dr. Wimberly Royster, and the Statewide EPSCoR Director, Dr. Richard Kurzynske, support the management of the program through acquisition of State matching funds, coordination with other agency requests, planning and arrangement of the annual Statewide Kentucky EPSCoR Conference, and management of a central database for collecting productivity data for projects.

A minimal amount of Research Infrastructure Development funding is used for partial support of program management. Salary support of 1.125 FTE months (12.5% Academic Year time, or 9.37% of Calendar Year) is provided for the Associate Project Director. An allotment of $5,000 per year is provided to the Statewide Kentucky EPSCoR Program to assist with their activities of coordination, conferencing, and data collection. Expert consultant services by the External Advisory Panel are supported by $2,700 per year in honoraria. Indirect costs at a minimal rate of 15.8% of modified direct costs are charged by the Lead Institution to partially offset costs of financial and subgrant management for the program. This rate is the minimum allowable, on the basis that most of the research work is not performed on the Lead Institution campus.

Project Coordination

Achieving the goals of the Kentucky NASA EPSCoR Program requires a high degree of coordination among all of the involved and interrelated constituencies: NASA EPSCoR researchers, NASA collaborators, NASA Center and Mission Directorate personnel, NASA Headquarters program management, Kentucky NASA EPSCoR program management, member institutions and financial offices, institutional offices of research administration, and other avenues for proposal solicitation throughout Kentucky, grant monitoring and performance evaluating agencies including NASA, the Statewide Kentucky EPSCoR Committee, the Statewide Kentucky EPSCoR Director, the NASA EPSCoR Subcommittee/Technical Advisory Committee (TAC), an External Review and Advisory Panel, the Kentucky Space Grant Consortium, and other agency EPSCoR programs in Kentucky.

NASA Field Centers and Mission Directorates: NASA centers and programs are vital partners in providing technical resources and guidance to relate program research to NASA's interests and to focus development of capabilities in areas with future possibilities for competitive funding awards. The NASA Center University Affairs Officers are the primary points of contact between the Kentucky program and the NASA Centers, helping facilitate the collaborative relationships being developed between Kentucky and NASA Center researchers. Kentucky NASA EPSCoR Program researchers and Project Directors will visit the corresponding UAO when visiting or working at a Center, to maintain his/her awareness of progress in the project, and to learn from him/her about other opportunities that may arise at the Center. Each investigator will keep the appropriate Center or Mission Directorate personnel apprised of results and progress through copies of project reports. State researchers will visit their collaborators at the NASA Field Center(s) at least once per year, and may visit more often if needed. The timing of the meeting(s) will be determined mutually by the State researchers and the NASA collaborators to achieve what is most needed for the project, including but not limited to set-up of facilities, conducting on-site experiments, extended planning discussions, analysis, and joint preparation of publications and proposals.

Kentucky EPSCoR Program and Committee: The Kentucky NASA EPSCoR Program operates under the auspices of the statewide Kentucky EPSCoR Program and Kentucky EPSCoR Committee. The umbrella organization for the Kentucky EPSCoR Committee and its agency-EPSCoR subcommittees is the Kentucky Science and Technology Corporation, Inc. (KSTC), a not-for-profit corporation operating in Kentucky in the interest of advancing science and technology capacity and economic development in the Commonwealth. KSTC and the Statewide EPSCoR Committee consist of and have board members who are business executives, governmental officials, and education leaders from throughout Kentucky.

Administration of the Kentucky EPSCoR Program is vested in the Statewide Kentucky EPSCoR Director, Dr. Richard Kurzynske. Together, Dr. Kurzynske and the Chair of the Kentucky EPSCoR Committee, Dr. Wimberly Royster, serve as liaisons between the EPSCoR Programs and the Governor, his staff, and State Legislators. State funding for matching in EPSCoR programs is appropriated by the legislature in biennial sessions, is allocated to the specific programs by the Kentucky EPSCoR Committee, and is managed by the Kentucky Council on Postsecondary Education (CPE) and the Kentucky Science and Technology Corporation (KSTC).

Other Federal EPSCoR Programs in Kentucky: The Kentucky EPSCoR Program coordinates the operation of and collaborations among all agency EPSCoR Programs in Kentucky, including

DOE, DoD, EPA, NASA, NIH, NSF, and USDA. The State EPSCoR Director facilitates coordination and communication among the agency-based programs and the Kentucky EPSCoR Committee and Kentucky Space Grant Consortium through interactions with the Subcommittee Chairs. The Chair of the Kentucky NASA EPSCoR Subcommittee is an ex-officio member of the Kentucky EPSCoR Committee, attending Committee meetings, reporting on NASA EPSCoR matters to the Committee, and interacting with the chairs of the other agency EPSCoR subcommittees at these meetings and at the annual joint-agency Statewide Kentucky EPSCoR Conference. Through these interactions, with exchange of news of program opportunities and results, each agency EPSCoR program is kept aware of program opportunities, activities, and results in the other programs in the state.

NASA Kentucky Space Grant Consortium: The Kentucky NASA EPSCoR Program works in tandem with the Kentucky Space Grant Consortium, which provides support through: administrative coordination; fellowships and scholarships for participating students; funding to enhance Kentucky's capacity for aerospace-related research; communication and networking on statewide, NASA-wide, and national scales; and the development of a "pipeline" of Kentucky students interested in space-related studies and careers. The KSGC and Kentucky NASA EPSCoR programs are jointly administered with a shared Director and Associate Director at Western Kentucky University in Bowling Green. The governing committees of the two organizations function separately and independently, although they share several members in common. The structure helps maintain a mutual awareness between the programs that is beneficial in coordinating their activities synergistically.

Technical Advisory Committee and External Review and Advisory Panel

Technical Advisory Committee: Program planning and the selection of infrastructure project awards are facilitated by the Kentucky NASA EPSCoR Subcommittee, which constitutes the NASA-required Technical Advisory Committee (TAC). The purposes of the TAC include advisement on aligning research with NASA and State priorities, provision of technical guidance to the program, and review and evaluation of project accomplishments. The TAC consists of Kentucky scientists and engineers from universities, industry, and State government, with members listed in the table below. TAC members are ineligible for NASA EPSCoR funding.

Kentucky NASA EPSCoR Technical Advisory Committee Membership

Dr. Richard Hackney, Chair, Western Kentucky University (KSGC)
Dr. Karen Hackney, Associate Project Director, Western Kentucky University (KSGC),
Dr. Ivory Griskell, Kentucky State University (HBCU)
Dr. Charles Hawkins, Northern Kentucky University (KSGC)
Dr. Thomas Kind, Murray State University (KSGC)
Dr. Benjamin Malphrus, Morehead State University (State EPSCoR Committee and KSGC)
Dr. Glenn Prater, University of Louisville
Dr. Barbara Ramey, Eastern Kentucky University (KSGC)
Dr. Keith Rouch, University of Kentucky
Dr. John Stencel, Tribo Flow Separations, LLC, (Industry and KSGC),
J.R. Wilhite, JD, Kentucky Cabinet for Economic Development (State Government)

External Review and Advisory Panel: To provide additional expertise in reviewing proposals and assessing the extent to which the NASA and Kentucky goals are achieved, the Subcommittee is advised by an External Review and Advisory Panel. This panel of distinguished scientists and engineers, selected nationally, is described in the following table:

Kentucky NASA EPSCoR Program External Advisory Panel Membership

Dr. Marvin Drake, The Mitre Corporation, Bedford, MA
Dr. Barry Turner, National Radio Astronomy Observatory, Charlottesville, VA
Dr. Arthur Vailas, University of Houston, Houston, TX
Dr. Raymond Viskanta, Purdue University, West Lafayette, IN

Policies for Interaction Among the TAC, External Panel, and Director

The principal interactions among the TAC, External Panel, and Project Director will occur at the annual Kentucky NASA EPSCoR Subcommittee meeting, chaired by the (non-voting) Project Director. At the meeting, the Subcommittee/TAC will receive the External Panel's reviews of proposals submitted in the statewide proposal competition and will discuss the proposals based on reviews and evaluation by the TAC membership. The process will include roundtable discussions with the External Panel members to incorporate their advice concerning proposals and program planning issues. The TAC will make formal decisions regarding the selection of proposals and program planning issues. Between meetings, the Project Director will work via mail and email communications with the TAC and External Panel to determine schedules, to develop and distribute requests for proposals (in January), and to plan and evaluate the program.

Schedule for Regular Meetings of the Technical Advisory Committee

The Technical Advisory Committee and the External Review and Advisory Panel will meet annually in May, in conjunction with the Annual Kentucky EPSCoR Conference. Both groups will interact with the State researchers in a presentation session. With advice from the Advisory Panel, the TAC and Program Director will evaluate the investigators' progress and performance.

Project Evaluation

The Kentucky NASA EPSCoR Research Infrastructure Development Program will be evaluated formatively each year, with a three-year summative evaluation at the end of the third year, evaluating overall program performance. The evaluation will be performed by the Technical Advisory Committee and program management, who will include the results in the annual program reports. Metrics used for the evaluation process include the following:

Key Metrics Used for Program Evaluation

Quantifiable Performance Metrics:

The quantitative metrics include tangible expectations for the research projects, with particular emphasis on submission of follow-on proposals by the investigators.

- Articles published in or submitted to refereed journals (Target: at least 1 per project)
- Presentations and abstracts at professional meetings (Target: at least 1 per project)
- Follow-on grant proposal submissions and awards (Target: at least 1 per project)
- Invention disclosures, patent applications, patent awards, technology transfer

Qualitative Evaluation Criteria:

Expectations for developing effective collaborative relationships with NASA will be evaluated based on the following qualitative information:

- Extent of interaction, collaborations, and results developed with NASA
- Progress in development of relationship with NASA researcher(s)
- Quality of follow-on proposal for NASA Research Area multi-investigator proposal

Data on which to base the evaluations will be acquired from annual progress reports provided by the principal investigators. These reports Information on will be required to include performance data in the form of both the quantifiable metrics and qualitative criteria described above. The principal investigators will report on the details of their collaboration with the NASA researcher(s) and progress in further developing the relationship with those researchers for evaluation of the qualitative metrics given above.

The annual formative evaluation and three-year summative evaluation will assess the following:

- Research success of individual investigators as measured by: articles submitted to or published in refereed journals, talks, presentations or abstracts at professional meetings, patents/patent applications, follow-on grant proposals submitted/funded.
- Improvements in Kentucky's research and development infrastructure.
- Extent to which collaborations with Kentucky agencies, industry, research and academic institutions, and with NASA have evolved.
- Evidence of how EPSCoR activities have furthered Kentucky's priorities.
- Discussion of interaction between and cooperation with Kentucky's Space Grant program.
- Demographic (ethnicity/race and gender) information on participants (post-doctoral, graduate, and undergraduate students).

Students receiving significant funding through research projects under this program will be longitudinally tracked to document their successes through attaining their first employment. The mentoring PI will be required to follow and report on student progress annually, during and following the term of the project. The close relationship developed between the mentor and the student researcher is the basis for continuing response from students after they leave the program.

Timeline for Each Project Year (Funding year beginning in August)

January (prior)	Issue RFP for Preparation Projects
April (prior)	Preparation Proposals Due
May (prior)	Selection of Projects for Award
August (begin funded year)	Funded Projects Begin
April	PI Reports Due
May	Presentations at EPSCoR Conference
May	Evaluation of Projects
May	Program Report to NASA
July	Program Report to Kentucky EPSCoR
July	End of Projects Funded for the Year

Budget Narrative Explanation (Forms Follow)

The detailed budgets for each of the first three years of the NASA EPSCoR Research Infrastructure Development Program are discussed below and on the following budget pages, together with the summary budget for the three years. The budget explanation that follows provides cost details for the three years of funding for the Research Infrastructure Development Program, including management costs, infrastructure development funding, and other necessary support costs (superscripts denote Year Numbers[1, 2, 3])

Personnel Salary (Management): Project personnel perform the tasks of year-round management and coordination of the program. Management operations take place at the Kentucky Space Grant Consortium (KSGC) Center Office at Western Kentucky University, with partial support from the secretary and staff of the KSGC. The request each year is for support of 1.125 FTE months (9.4% of Calendar Year = 168 hours/year = 3.5 hours/week) for the Associate Project Director, Dr. Karen Hackney, with labor costs including fringe benefits at 33.84% of salary. The funded management effort includes $9,760[1], $10,248[2], $10,761[3] in salary and $3,303[1], $3,468[2], $3,642[3] in fringe benefits, for total direct labor charged to the grant of $13,063[1], $13,716[2], $14,403[3], totaling $41,182 over three years.

Supplies: This category includes office supplies, postage and freight, and copying and printing of materials. $2,337[1], $1,684[2], $997[3].

Travel and Meeting Costs: Travel assumptions include one trip per year for up to four members of the External Advisory Panel to provide assistance with assessment of the performance of program components, and partial support for in-state travel for participants in EPSCoR Committee and Subcommittee meetings. Travel for EPSCoR investigators to NASA Centers will be supported as needed. The travel and meeting cost request is $8,000[1,2,3], totaling $24,000 over three years.

# Trips	Destination	Persons	Days	Subsistence	Airfare	Lodging	Total
4	Lexington, KY	1	2	200	1600	1200	3000
10	Lexington, KY	1	1	250	750 (mileage)	1000	2000
6	Marshall SFC	1	2	300	1500	1200	3000

Infrastructure Program Awards: The request is for NASA EPSCoR funds in the amount of $90,000[1,2,3]/year, with value-added cost share of $125,000[1,2,3]/year for the Research Infrastructure Development Program to be provided by the State of Kentucky, through the Kentucky EPSCoR Committee. The total of $215,000[1,2,3] each year in combined NASA and State funds in this category will be used for research infrastructure development based on approximately 5 grants for research projects (TBD) in collaboration with NASA researchers.

Consultant Services: External Advisory Panel members will be paid honoraria of $300/day for review of proposals and on-site participation in the annual assessment meeting. Services will likely be required twice per year, depending on the timing of NASA's calls for submission of Research Area multi-investigator proposals. Total: $3,600[1,2,3] each year.

Coordination by Kentucky EPSCoR: For each program year, $8,000[1,2,3] is budgeted for the Statewide EPSCoR Program Office for expenses incurred in coordinating the program with the state program, including meeting and conference costs, communication, printing, postage and freight.

Total Request: The total Research Infrastructure Development Program funding request each year is $125,000[1,2,3], matched with $125,000[1,2,3] in value-added cost sharing from the State of Kentucky.

YEAR 1 BUDGET

From August 1, 2007 To July 31, 2008

	RECIPIENT'S COSTS A	NASA USE ONLY B	C
1. Direct Labor (salaries, wages, and fringe benefits)	13,063		
2. Other Direct Costs:			
a. Competitive projects	90,000		
b. Consultant honoraria	3,600		
c. Equipment			
d. Supplies	2,337		
e. Travel, Meeting Costs	8,000		
f. Other - State EPSCoR Admin	8,000		
3. Indirect Costs			
4. Cost Share from State match	125,000		
5. SUBTOTAL -- Estimated Costs	250,000		
6. Less Proposed Cost Sharing (if any)	125,000		
7. Carryover Funds (if any) a. Anticipated amount_____ b. Amount used to reduce budget			
8. TOTAL ESTIMATED COST	125,000		xxxxxxxx
APPROVED BUDGET	xxxxxxxxx	xxxxxxxxx	

YEAR 2 BUDGET

From August 1, 2008 To July 31, 2009

	RECIPIENT'S COSTS A	NASA USE ONLY B	C
1. Direct Labor (salaries, wages, and fringe benefits)	13,716		
2. Other Direct Costs:			
a. Competitive projects	90,000		
b. Consultant honoraria	3,600		
c. Equipment			
d. Supplies	1,684		
e. Travel, Meeting Costs	8,000		
f. Other - State EPSCoR Admin	8,000		
3. Indirect Costs			
4. Cost Share from State match	125,000		
5. SUBTOTAL -- Estimated Costs	250,000		
6. Less Proposed Cost Sharing (if any)	125,000		
7. Carryover Funds (if any) a. Anticipated amount b. Amount used to reduce budget			
8. TOTAL ESTIMATED COST	125,000		xxxxxxxx
APPROVED BUDGET	xxxxxxxxx	xxxxxxxxx	

YEAR 3 BUDGET

From August 1, 2009 To July 31, 2010

	RECIPIENT'S COSTS A	NASA USE ONLY B	C
1. Direct Labor (salaries, wages, and fringe benefits)	14,403		
2. Other Direct Costs:			
a. Competitive projects	90,000		
b. Consultant honoraria	3,600		
c. Equipment			
d. Supplies	997		
e. Travel, Meeting Costs	8,000		
f. Other - State EPSCoR Admin	8,000		
3. Indirect Costs			
4. Cost Share from State match	125,000		
5. SUBTOTAL -- Estimated Costs	250,000		
6. Less Proposed Cost Sharing (if any)	125,000		
7. Carryover Funds (if any) a. Anticipated amount_____ b. Amount used to reduce budget			
8. TOTAL ESTIMATED COST	125,000		xxxxxxxx
APPROVED BUDGET	xxxxxxxxx	xxxxxxxxx	

THREE-YEAR BUDGET SUMMARY

From August 1, 2007 To July 31, 2010

	RECIPIENT'S COSTS A	NASA USE ONLY B	C
1. Direct Labor (salaries, wages, and fringe benefits)	41,182		
2. Other Direct Costs:			
a. Competitive projects	270,000		
b. Consultant honoraria	10,800		
c. Equipment			
d. Supplies	5,018		
e. Travel, Meeting Costs	24,000		
f. Other - State EPSCoR Admin	24,000		
3. Indirect Costs			
4. Cost Share from State match	375,000		
5. SUBTOTAL -- Estimated Costs	750,000		
6. Less Proposed Cost Sharing (if any)	375,000		
7. Carryover Funds (if any) a. Anticipated amount_____ b. Amount used to reduce budget			
8. TOTAL ESTIMATED COST	375,000		xxxxxxxx
APPROVED BUDGET	xxxxxxxxx	xxxxxxxxx	