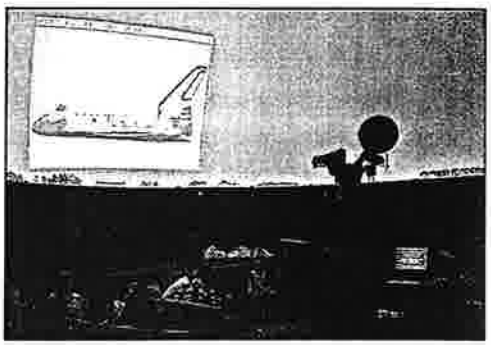
E. Public Service Program

Awaiting return-to-flight, Western Ky. Univ. alumnus, pilot/commander of 4 STS flights, Astronaut Terry Wilcutt, inspires the public.

Purpose and Goal: The overall purpose and goal of our Public Service Program is to enhance the public's awareness of science and technology and of NASA- and aerospace-related research and applications.

Objective: Our objective is to provide opportunities for broad *involvement* of the public with NASA- and aerospace-related topics and results.

Program Characteristics: We recognize that it is the U.S. public who ultimately provide support for NASA and the Nation's aerospace program. Many parents were inspired in their youth by the Apollo Program and more recently by the findings of the Hubble Telescope. The torch is carried in a new generation by students' early interest in science and space, and our hope is that participation by parents and children together can revitalize the parent's interest and reinforce the children's focus to prepare for participation in the science and exploration of the future. In order to deliver the widest possible geographical accessibility, KSGC's network of member institutions and their partners provide public information and participatory activities throughout Kentucky.



Kentucky planetaria serve thousands/year with NASA-based STEM involvement.

Planetarium public programs are a major avenue for attracting and sparking the interest of the public. Public programs and activities are provided by planetaria associated with KSGC institutions Western Kentucky University, University of Louisville, and Eastern Kentucky University. Northern Kentucky University will construct a planetarium in 2006. Planetarium presentations typically include NASA findings in coverage of most topics of interest to the public in astronomy. Some programs, such as "Cassini-Huygens at Saturn" and "Roving On -- The Continuing Adventures of Spirit and Opportunity", were created on-site to feature current NASA missions. Teachers bring thousands of students to the planetaria each year.

Campus observatory public viewing opportunities are provided at Western Kentucky University, University of Louisville, and Thomas More College. The University of Kentucky is about to construct a campus observatory, and a 20-meter steerable dish antenna is being completed at Morehead State University, where it will have public outreach capabilities in addition to student training, research, and tracking/telemetry for NASA. Telescope viewing opportunities are conducted approximately monthly, and for special astronomical events that appeal to the public. For events such as the appearance of Comet Hale-Bopp and the recent close approach of Mars, Kentucky observatories were visited by hundreds of people wanting to participate by viewing. KSGC personnel also assist each year with Space Day activities at the Louisville Science Center, providing safe public viewing of sunspots and the solar "surface."

NASA-based public opportunities provided by the Center for Space Enterprise include the NASA "Benefits of Space" exhibit and a conference: "NASA R&D and Emerging Technologies."

KSGC opportunities for planetarium presentations, public viewing, and teacher workshops are announced to a wide public by way of daily spot announcements in our presentation of *Stardate*

on a six-station radio network. We also have weekly evening announcements via partial sponsorship of *Nova* on public television.

Public outreach and information are provided in the course of other KSGC program activities, such as WFD projects. Moonbuggy and microgravity flight projects are reported through regional newspapers and television stations. The Big Blue projects have had extensive coverage in state newspapers, as well as on the Science @ NASA website and the NASA Education website, *Space News*, and *The Space Daily*. Portions of the projects have appeared on the History Channel's *Tactical to Practical* television series and in an exhibit at the Cooper-Hewitt National Design Museum in New York City. Public outreach activities are part of the Big Blue projects, including presentations to schools, Engineer's Day activities for the public, and development of a functioning wind-tunnel exhibit for the Lexington Aviation Museum. Video documentaries are produced for use with schools to recruit future STEM participation.

Montage of KSGC images of some subjects of public interest, including a pass of the International Space Station.

Enhancement Plan: KSGC currently reaches an average of 15,000 citizens each year through public participatory activities. Our goal for the future as a Designated Space Grant Consortium is to reach 50,000 with enhanced experiences. Achievement will require more-directed efforts by Campus Directors and an increase in expenditures from $7,000/year to $21,000/year for coordinating and advertising opportunities for enhancing public awareness. KSGC currently provides a small Campus Objectives Grant (COG) upon request by a Campus Director, to serve as a "seed" for initiating KSGC activities on campus. Campus Directors will identify specific needs that will strengthen the opportunities, and they will request additional funding to support those needs as additions through the COG grant. We will also encourage Campus Directors to determine how to get public announcements of events in their regions, either free or as spot announcements with features such as *Stardate*, which they could co-sponsor if available on their institutions' public radio stations. State matching funds can enable purchase of minor equipment that may be needed to enhance public participation and information.

Diversity: KSGC's public participation activities that we have described above are all equal-opportunity events -- every member of the public is encouraged to participate. The turnout depends upon the individual interests of citizens reached by the announcements. Women, underrepresented minorities, and persons with disabilities participate as represented in the population, and special attention is given to meeting the special needs of those with disabilities. KSGC also actively seeks to support targeted opportunities such as "Girls in Science Day" and special summer computer or science camps. As in the past, we will in the future provide from our public service funding some assistance with participants' costs to enable the fullest possible participation by the targeted special populations. Funding for such opportunities will come from the public service pool to the extent possible, and thereafter from the state matching funds.

Metrics, Targets, and Effect: Our quantifiable metric and annual targets are described in Section II-B Program Evaluation. The effect of our program will be to provide large numbers of people in Kentucky with information and activities that increase their awareness of science and technology, of aerospace, and of NASA and its *Vision for Space Exploration*.

Schedule of Anticipated Milestone Achievements with Augmentation

Increase Director's time commitment to implement enhanced program ..... Aug 2005

Award Fellowships/Scholarships from 05/06 augmentation
(est. $50,000, in addition to $65,500 already awarded from 05/06 base)..... Aug 2005

Award Research Infrastructure Projects from 05/06 augmentation..... Aug 2005

Award Precollege Workshop Projects from 05/06 augmentation ..... Aug 2005

Resume WFD projects using 05/06 augmentation ..... Aug 2005

Request proposals from Campus Directors for augmentation of 05/06
Campus Objective Grants (COG) for specific campus needs ..... Sep 2005

Open for requests for travel augmentations for Center visits ..... Sep 2005

Award COG augmentations for Public Service to institutions ..... Nov 2005

Annual Progress Report .....Dec 2005

Distribute RFP for proposals for fellowships and scholarships for 06/07 .....Jan 2006

CMIS reporting ..... Feb 2006

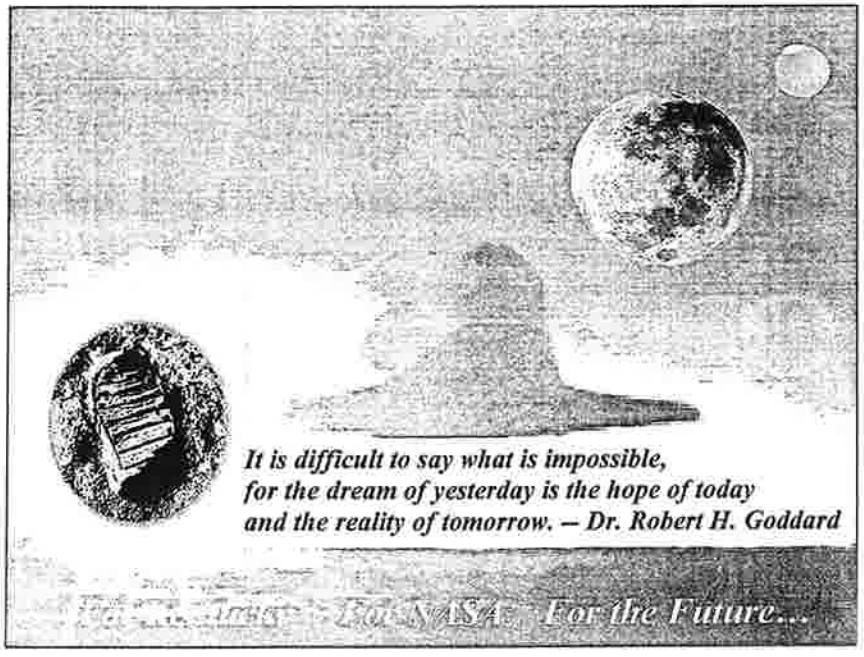
Receive and begin review of consortium-wide proposals for 06/07 .....Apr 2006

Award Fellowships/Scholarships from 06/07 augmentation
(est. $50,000, in addition to 06/07 base awards) .....May 2006

Open for requests for travel augmentations for Center visits ..... Aug 2006

Annual Progress Report .....Dec 2006

CMIS Reporting..... Feb 2007



Budget and Justification

The augmentation budget is summarized in a table following the narrative description below. The requested period of performance is August 1, 2005 to July 31, 2007. In the narrative below, the superscripts denote application in Year 1 (2005/06) or Year 2 (2006/07).

Fellowships/Scholarships: $100,000

Funds will be utilized as justified in section II-B Fellowships and Scholarships. Awards from the augmentation will total $50,000[1], based on competitive selections determined in 2005. Awards from the augmentation will total $50,000[2] in the second year, with recipients determined in the competition of 2006.

Research Infrastructure: $20,000

Funds will be utilized as justified in section II-C Research Infrastructure. Awards from the augmentation will total $20,000[1], based on competitive selections in 2005. Cost share of $20,000[1] will be provided by the institutions awarded Research Infrastructure funding.

Precollege: $12,000

Funds will be utilized as justified in section II-D-1 Precollege Program. Awards from the augmentation will total $12,000[1], based on selections in 2005.

Higher Education (Workforce): $100,000

Funds will be utilized as justified in section II-D-2 Higher Education Program. The augmentation funding will support workforce development (WFD) projects for 2005/06, requiring $100,000[1]. Cost share of $99,306[1] will be provided by the institutions awarded WFD funding.

Public Service: $21,000

Funds will be utilized as justified in section II-E Public Service. The funds are scheduled to be applied in the first year in the amount of $21,000[1].

Aerospace Forum: $2,000

Funds will augment an enhanced Aerospace Forum in 2005/06 with $2,000[1] for participant expenses and display materials.

Materials: $8,216

Funds will provide materials and supplies required for the enhanced program, including printing, media preparation, and distribution ($3,910[1], $4,306[2]).

Travel: $24,000

Funds will be utilized for travel to meetings and collaborative activities for Consortium members, including project participants, Campus Directors, and other project personnel ($12,000[1], $12,000[2]). The following travel is anticipated in each year of the augmentation on the basic of average cost per trip:

# of Trips	Destination	Persons	Days	Subsistence	Airfare	Lodging	Registration	Cost/ Trip	Total Budget
6	NASA Centers	2	3	200	600	200	-	1,000	6,000[1,2]
4	Conferences	2	4	300	700	300	200	1,500	6,000[1,2]
Total Each Year									12,000[1,2]

Salary: $42,570

Funds support salary for Director for 0.5 academic year (AY) FTE for three semesters, augmented by cost sharing from the Lead Institution. In 2005/06 the funds provide $20,766[1] for 0.5 AY FTE Director time and effort for one semester. In 2006/07 the funds provide $21,804[2] for 0.25 AY FTE for each of two semesters, with another 0.25 AY FTE in each semester provided as cost share in the amount of $21,804[1], $21,840[2].

Fringe: $13,848

Fringe on the grant-paid salary at 32.53% amounts to $6,755[1], $7,093[2]. Fringe on the cost-shared salary is contributed as cost share in the amounts $6,755[1], $7,093[2].

F&A: $9,366

Facilities and Administration charges on the basis of 22% of salaries are for costs of facilities and financial administration provided by the Lead Institution in amounts $4,569[1], $4,797[2]. Equivalent F&A costs are cost shared for cost-shared salaries in amounts $4,569[1], $4,797[2].

Cost Share: $253,000

Cost share totaling $253,000 is contributed in amounts of $100,000 from state funding, $119,306 from institutions funded for WFD and Research Infrastructure projects, and $33,694 from the Lead Institution for Director salary, fringe, and F&A on salary.

The Budget Summary is tabulated the following page.

Kentucky Space Grant Consortium

Augmentation to Base Awards

Budget Allocations and Sources
FY 2005/2006 and FY 2006/2007

Consortium Program Applications	Apply in 05/06	Apply in 06/07	Total 05/06 + 06/07	Cost Share
Fellowships/Scholarships	50,000	50,000	100,000	
Research Infrastructure	20,000		20,000	20,000*
Precollege	12,000		12,000	
Higher Education (Workforce)	100,000		100,000	99,306*
Public Service	21,000		21,000	
Aerospace Forum	2,000		2,000	
Materials	3,910	4,306	8,216	
Travel	12,000	12,000	24,000	
Director Salary (0.5 FTE for 3 semesters)	20,766	21,804	42,570	21,804
Fringe (32.53%)	6,755	7,093	13,848	7,093
F&A on Salary (22%)	4,569	4,797	9,366	4,797
State Match				100,000
NASA Request and Cost Share	253,000	100,000	**353,000**	**253,000**

Richard Hackney 6/12/05
Richard Hackney,
Director, Kentucky Space Grant Consortium
Western Kentucky University (Lead Inst.)

Phillip E. Myers
Executive Director, Western Kentucky
University Research Foundation
6/15/05

* Cost sharing by institutions on project awards.

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, Dept. of Physics and Astronomy, Western Kentucky University, 2002-2004
Professor, Department of Physics and Astronomy, Western Kentucky University, 1988-present.
Director, 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.
NASA Graduate Trainee, University of Florida, 1968-1972.

PROFESSIONAL ACTIVITIES, HONORS

Phi Beta Kappa Honor Society
Phi Kappa Phi Honor Society
Phi Eta Sigma Honor Society
Sigma Pi Sigma Physics Honor Society
Douglas Roseberry Memorial Award, Outstanding Senior Physics Major, Univ. of Tennessee
Sigma Xi Research Society
American Astronomical Society
Kentucky Association of Physics Teachers
Kentucky Academy of Science
State Chair, Kentucky NASA EPSCoR Committee
Ex-Officio Member, Kentucky EPSCoR Committee
Member, Executive Committee of the National Council of Space Grant Directors

GRANTS

Extramural grants total: $14,985,400

PUBLICATIONS (Abbreviated)

"A World-Wide Network of Robotic Imaging Telescopes", C.H. McGruder,III, D. Barnaby, M.T. Carini, R.F. Gelderman, K.R. Hackney, R.L. Hackney, S.V. Marchenko, R.L. Scott, Li Yan, and W. Chen, Proc. of the IAU 8th Asian-Pacific Regional Meeting, Vol. II, 2002.

"*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: ASP), 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.

"Computers for Extending Experience in Introductory Physics Labs." Karen Hackney, Richard Hackney, Dudley Bryant, Douglas Harper, Roger Scott, Max Robinson, Scott Cassady, Mike Pentecost, and Matt Raymer. Invited paper in the *Proceedings of the American Association of Physics Teachers Lab Focus '93*, 77, 1993.

"Models for Fluorescence Energy Transfer Between Moving Donors and Acceptors." B.W. Van Der Meer, M.A. Raymer, S.L. Wagoner, R.L. Hackney, J.M. Beechem, and E. Gratton, *Time-Resolved Laser Spectroscopy in Biochemistry III, Proc. Int. Soc. Opt. Engin. (SPIE)*, **1640**, 220, 1992.

"Eight Years of Ultraviolet Spectra of the Variable BL Lacertae Object PKS 2155-304." C.M. Urry, Y. Kondo, K.R.H. Hackney, and R.L. Hackney, *Astrophysical J.*, **330**, 791, 1988.

"Simultaneous Multifrequency Observations of the BL Lac Object Markarian 421." F. Makino, Y. Tanaka, M. Matsuoka, K. Koyama, H. Inoue, K. Makishima, R. Hoshi, S. Hayakawa, Y. Kondo, C.M. Urry, S.L. Mufson, K.R. Hackney, R.L. Hackney, S. Kikuchi, Y. Mikami, W.Z. Wisniewski, N. Hiromoto, M. Nishida, J. Burnell, P. Brand, P.M. Williams, M.G. Smith, F. Takahara, M. Inoue, M. Tsuboi, H. Tabara, T. Kato, M.F. Aller, and H.D. Aller, *Astrophysical J.*, **313**, 662, 1987.

"Variability of the UV Spectrum of BL Lacertae Objects." M.-H. Ulrich, K.R.H. Hackney, R.L. Hackney, and Y. Kondo, *Astrophysical J.*, **276**, 466, 1984.

"Coordinated Multifrequency Observations of the BL Lac Objects Mrk 180 and Mrk 501." S.L. Mufson, D.J. Hutter, K.R. Hackney, R.L. Hackney, C.M. Urry, R.F. Mushotzky, Y. Kondo, W.Z. Wisniewski, H.D. Aller, M.F. Aller, and P.E. Hodge, *Astrophysical J.*, **285**, 571, 1984.

"Coordinated Multifrequency Observations of the BL Lac Objects Mrk 180, Mrk 421, and Mrk 501." S.L. Mufson, D.J. Hutter, K.R. Hackney, R.L. Hackney, Y. Kondo, C.M. Urry, W.Z. Wisniewski, M.F. Aller, and H.D. Aller, *Future of Ultraviolet Astronomy Based on Six Years of IUE Research*, **NASA CP-2349**, 143, 1984.

"Very Recent IUE Observations of BL Lacertae Objects." C.M. Urry, Y. Kondo, K.R.H. Hackney, and R.L. Hackney, *Future of Ultraviolet Astronomy Based on Six Years of IUE Research*, **NASA CP-2349**, 139, 1984.

"Improved Continuum Definition in High-Background IUE Images." R.L. Hackney, K.R. Hackney, and Y. Kondo, *Future of Ultraviolet Astronomy Based on Six Years of IUE Research*, **NASA CP-2349**, 525, 1984.

"Coordinated Observations of Markarian 501 at Ultraviolet, X-Ray, Optical, and Radio Wavelengths." D.J. Hutter, S.L. Mufson, K.R. Hackney, R.L. Hackney, Y. Kondo, R.F. Mushotzky, C.M. Urry, W.Z. Wisniewski, M.F. Aller, H.D. Aller, and P.E. Hodge, *Advances in Ultraviolet Astronomy: Four Years of IUE Research*, **NASA CP-2238**, 189, 1982.

"Coordinated Observations of Markarian 180 at Ultraviolet, X-Ray, Optical, and Radio Wavelengths." S.L. Mufson, D.J. Hutter, K.R. Hackney, R. L. Hackney, Y. Kondo, R.F. Mushotzky, C.M. Urry, W.Z. Wisniewski, M.F. Aller, H.D. Aller, and P.E. Hodge, *Advances in Ultraviolet Astronomy: Four Years of IUE Research*, **NASA CP-2238**, 185, 1982.

"Spectroscopy of Two BL Lacertae Objects." C.M. Urry, K. Hackney, R. Hackney, S. Holt, Y. Kondo, and R. Mushotzky, *Advances in Ultraviolet Astronomy: Four Years of IUE Research*, **NASA CP-2238**, 177, 1982.

"Spectral Anomalies in Low-Dispersion SWP Images." R.L. Hackney, K.R. Hackney, and Y. Kondo, *Advances in Ultraviolet Astronomy: Four Years of IUE Research*, **NASA CP-2238**, 335, 1982.

"Ultraviolet and X-Ray Observations of the BL Lac Object PKS 0548-322." C.M. Urry, R.F. Mushotzky, Y. Kondo, K.R.H. Hackney, and R.L. Hackney, *Astrophysical J.*, **261**, 12, 1982.

"Quasi-Simultaneous Observations of the BL Lac Object MK 501 in X-Ray, UV, Visible, IR and Radio Frequencies." Y. Kondo, D.M. Worrall, R.F. Mushotzky, R.L. Hackney, K.R. Hackney, J.B. Oke, H. Yee, G. Neugebauer, K. Matthews, P.A. Feldman, and R.L. Brown, *Astrophysical J.*, **243**, 690, 1981.

Kentucky Space Grant Consortium Strategic Plan

Strategic objectives for the Kentucky Space Grant Consortium are established in the areas of research, education, and public service. A common focus in all of these areas is to involve women, underrepresented groups, and persons with disabilities.

Research

- Fund competitive proposals for undergraduate scholarships and graduate fellowships for students to perform space-related, mentored research projects.
- Fund competitive proposals for faculty to perform research projects in which undergraduate and graduate students may participate.
- Leverage with NASA funds to acquire additional state and institutional funding for support of student and faculty research.
- Promote research collaborations between universities and NASA Centers and Directorates.
- Maintain a database of space-related projects and principal investigators in Kentucky.
- Coordinate with other agency programs in the state with similar objectives.
- Conduct an annual KSGC Aerospace Forum to showcase research projects, to exchange ideas, and to develop further collaborations among state researchers.

Education (Including Fellowships and Scholarships)

- Fund competitive proposals for undergraduate scholarships and graduate fellowships for students to perform space-related, mentored research projects.
- Fund competitive proposals for teacher workshops to enhance the capabilities of STEM teachers in teaching aerospace space-related subjects.
- Continue to review teacher education programs for the Kentucky Department of Education.
- Participate in the activities of NASA's SouthEast Regional ClearingHouse.
- Conduct an annual KSGC Aerospace Forum to showcase education projects, to exchange ideas, and to develop further collaborations among state educators and researchers.

Public Service

- Fund competitive proposals for undergraduate scholarships and graduate fellowships for students to perform science communication projects.
- Fund competitive proposals for planetarium and science center projects, and provide materials for use by planetariums and science centers.
- Conduct tours of space-related facilities at the Consortium universities.
- Provide financial management assistance to subgrantee institutions.
- Partnership with the Science @ NASA Science Communication Roundtable for communicating NASA's science to the public.
- Conduct an annual KSGC Aerospace Forum to showcase space- and NASA-related projects and activities in Kentucky.

Our strategic objectives provide the framework of principal activities and emphases by which the KSGC achieves its goals and objectives in support of the identified needs of Kentucky and its citizens, of NASA and the national Space Grant program, and of the Nation.

APPENDIX

APPENDIX TABLE 1 -- NASA Funded Research in Kentucky

Aerodynamics	Kentucky	Capece	Unsteady Aerodynamic Response Of A Linear Cascade Of Al
Aerodynamics	Kentucky	Huang	Modeling, Validation And Implementation Of Turbulence M
Aerodynamics	Kentucky	Capece	An Experimental And Computational Investigation Of Oscilla
Atmospheric Sci	Louisville	French	Short Term Quantitative Precipitation Forecasting Using Mult
CFD, Aerodyn	Kentucky	Huang	Modeling, Validation And Implementation Of Turbulence M
CFD, Turbines	Kentucky	Huang	Turbulence & Transition Modeling Of Low Pressure Turbine
CFD, Turbines	Kentucky	Huang	Transition And Turbulence Modeling For Unsteady Wake/B1
CFD, Turbines	Kentucky	Tzou	Hybrid Structure Concepts Development For Advanced Turbi
CFD, Turbines	Kentucky	Huang	Large Eddy Simulation Of Flows In Turbine Cascades Using
Combustion	Kentucky	Saito	Magnetically Assisted Combustion Experiment (Mace)
Galaxies	Kentucky	Ferland	Quantitative X-Ray - Uv Line And Continuum Spectroscopy
Galaxies	Kentucky	Ferland	The Hydrodynamics Of Photoionized Flows: Probing Conditi
Galaxies	Kentucky	Shlosman	Gas Dynamics In Active Galactic Nuclei: Broad Line
Galaxies	Kentucky	Shlosman	Central Regions In Disk Galaxies
Galaxies	Kentucky	Elitzur	Dust Evolution In The Early Universe And Galactic Systems:
Galaxies	Kentucky	Shlosman	Gas Dynamics In Active Galactic Nuclei: Broad Line
Inflatable Struct	Kentucky	Main	Investigating The Effects Of Foam Inflated Deployable Space
Materials in Space	Western	Pan	Synthesis And Characterization Of Electron-Beam Cured An
Micrograv Genetics	Louisville	Wang	Microarray Analysis Of Microgravity-Dependent Gene Expre
Micrograv Genetics	Louisville	Wang	Cloning And Functional Characterization Of Novel Genes W
Micrograv Genetics	Louisville	Wang	Shared Functional Genomics Between Space Flight & Aging
Nanomaterials	Kentucky	Menon	Simulations Of Carbon Nanotubes In Nanoelectronics And Bi
Nanomaterials	Kentucky	Menon	Device Applications Of Carbon Nanotubes A Simulations Ap
Nanomateriais	Kentucky	Sinnot	Computational Investigations Of Carbon Nanotube Materials
Nanotech	Kentucky	Menon	Simulations Of Signal Transmissions And Switching In Nano
Nanotech	Kentucky	Menon	Structure, Stability And Signal Processing In Branched Carbo
Nanotech	Kentucky	Sinnott	Carbon Nanotubules: Building Blocks For Nanometer -Scale
Nebula	Kentucky	Ferland	Temperature Fluctuations In The Orion Nebula And Nebular
Nebula	Kentucky	Ferland	Carbon Isotopes In Planetary Nebulae And H II Regions
Planetary Atmos	Louisville	Dowling	General Circulation Of Planetary Atmospheres
Plasmas	Kentucky	Ferland	Fundamental Problems In Astrophysical Plasmas (Lts A98)
Plasmas	Kentucky	Ferland	Fundamental Problems In Plasma Astrophysics: The Thermal
Protein Crystal	Eastern	Wilson	Metastable Solution Structure And Optimization Stragegies I
Robust Instrum	Kentucky	Hayes	Robust Requirements Tracing Via Internet Search Technolog
Sensors	Kentucky	Grimes	In-Situ, Remote Chemical Sensors Based On Thin Mag
Sensors	Kentucky	Daunert	Biomimetic Detection Schemes On A Microcentrifuge Platfor
Sensors	Kentucky	Singh	Dev/Applic Of Magnetoelastic & Magnetoacoustic Remote Q
Space Optics	Kentucky	Main	Figure Control Of Lightweight Optical Structures (NASA HQ
Space Optics	Kentucky	Main	GSRP Training Grant - George Nelson - Shape Tuning Of Ex
Space Optics	Kentucky	Smith	A Verified Design Tool For Large Aperture Membrane Teles
Track/Telemetry	Morehead	Malphrus	Development Of A Hybrid 18-Meter Antenna System For Re
Track/Telemetry	Morehead	Malphrus	Development Of The Morehead State Univ Space Tracking A
Space Stress	Louisville	Wang	Host Responses To Simulated Space Travel Stresses
Stars	Kentucky	Verner	Theoretical Studies Of Infrared Emission From Star
Stars	Kentucky	Ferland	The Hydrodynamics Of Photoionized Flows: Probing Conditi
Stars	Kentucky	Elitzur	Data Analysis Of Spectral Energy Distributions Of Young Ste
Stars	Louisville	Kielkopf	Quasi-Molecular Satellites Of Lyman Lines In Zz Cetis
Stars	Western	Marchenko	Spectacular Wind-Collision Effects In The LMC Binary Brey

APPENDIX TABLE 2 -- KSGC Funded Research Projects

Aerodynamics	Kentucky	Smith	BIG BLUE Satellite: A High-Altitude Inflatable Wing Experi
Astronomy	Western	McGruder	The Detection of Extrasolar Planets
Chemistry/Micrograv	Eastern	Wilson	Chemical Mixing in Microgravity Environment
Computational Tech	Kentucky	Holloway	Dynamic Fault Detection and Diagnosis Via Trajectory Encod
Cosmic Radiation	Northern	Nutter	A Measurement of the Cosmic Ray Antiproton Flux from the
Cosmology	Kentucky	Bhavsar	Development of Global Statistical Methods for Studying Larg
Cosmology	Kentucky	Bhavsar	Further Applications of the Minimal Spanning Tree for the St
Cosmology	Morehead	Yess	An Evaluation of the Distortions in Redshift Space Distributio
Cosmology	Morehead	Yess	Development of Global Statistical Methods for Studying Larg
Cosmology	Morehead	Yess	The Three Dimensional Topology of the Las Campanas Redsh
Cosmology	Northern	Fernando	Gravitational Lensing in String Theory
Fluid Dynamics	Kentucky	LeBeau	Improving the ICAT Unstructured Grid Code for Application
Fluid Dynamics	Kentucky	LeBeau	Validation of Hybrid Turbulence Models Using Direct Numer
Galaxies	Kentucky	Bhavsar	How Special are the Quasars? Statistics of Extremes
Galaxies	Western	CarInt	A Search for Signatures of Accretion Disks in BL Lac Objects
Galaxies	Western	CarmI	A Search for Signatures of Accretion Disks in BL Lac Objects
Galaxies	Western	CariniI	An Analysis of Multi-Wavelength Archival Observations of th
Galaxies	Western	CarmI	Microvariability in Radio Intermediate QSOs
Galaxies	Western	Canto	Microvariability in Radio Quiet QSOs
Galaxies	Western	Carini	Numerical Analysis of Variability in Blazars
Galaxies	Western	Carini	Photometric Monitoring ofBL Lacertae Objects
Galaxies	Western	Scott	Multi-Color Observations ofBlazar Microvariability
Masers	Centre	Lockett	Astrophysical Masers
MEMS Technology	Murray	Rogers	In-Situ Experiments into MEMS Adhesion Using Interferomet
Mesosphere	Western	Lehmacher	Mesospheric Dynamics Study for November 1994 by Using S
Nanotechnology	Western	Shon	Controlled Assembly of C60-Conjugated Nanoparticle Films f
Pattern Recognition	Kentucky	Bhavsar	Investigating Pattern Recognition Algorithms and Robust Stat
Planetary Science	Kentucky	LeBeau	Development of a Multi-Planet Boundary Layer Model
Plasma Chemistry	Murray	Fannin	Investigation of the Feasibility of a Low Power Reduced Press
Propellant Combus	Murray	Hickman	Combustion Modeling of a Two Ingredient Propellant
Remote Sensing	Centre	Ziemba	Remote Sensing and Water Quality in the Kentucky River Bas
Remote Sensing	Kentucky	Rowe	Satellite Remote Sensing of Sea-Surface Variability in the Ber
Remote Sensing	Murray	Cetin	Environmental Change Detection Using Multi-temporal Remo
Remote Sensing	Murray	Cetin	Land Cover Mapping of Western Puerto Rico Using MODIS
Remote Sensing	Murray	Cetin	Remote Sensing and Geophysical Techniques for Mapping Str
Remote Sensing	Murray	Cetin	Western Kentucky Geographic Information System (WKGIS)
Remote Sensing	Northern	Hansen	Remote Sensing and Geospatial Tools for Assessing Sustaina
Sounding Rocket	Western	Lehmacher	Support of Mission Planning and Payload Construction for the
Space Physiology	Louisville	Essock	Role of Spatial Orientation Cues on Visual Perception
Space Physiology	Louisville	Koenig	Effect of Head-Down Tilt and Lower Body Negative Pressure
Space Physiology	Louisville	Pantalos	Effect of Gravitational Acceleration on Cardiac Diastolic Func
Space Structures	Kentucky	Leifer	Prediction of Low-Velocity Impact Forces in Orbiting Satellit
Space Structures	Kentucky	Leifer	Static Analysis of Singly-Curved Gossamer Membrane Struct
Space Structures	Kentucky	Leifer	Static Analysis of Tensioned Gossamer Membrane Structures
Space Structures	Kentucky	Main	Verification of a Deployment Model for Inflatable Aerospace
Space Structures	Kentucky	Smith	BIG BLUE: Autonomous Flight Demonstration of Mars Airpl
Space Structures	Kentucky	Smith	Deployment Dynamics and Pressurization of an Instrumented
Space Structures	Kentucky	Smith	Docking Excitation for System Identification
Space Structures	Kentucky	Smith	Inflatable Wing Alternatives and Advanced Control Designs
Space Structures	Kentucky	Smith	Morphology of Free-Floating Foam-Rigidized Inflated-Structu
Space Structures	Kentucky	Smith	Variability of Precision Deployed Structures
Space Structures	Kentucky	Smith	Zero-Gravity damage Evaluation (Z-GraDE)
Superconductors	Western	Harper	Materials Characterization of High Tc Superconductors

APPENDIX TABLE 3 -- KSGC Fellowship and Scholarship Projects

Aerodynamics	Kentucky	Jacob	Development of High Lift Adaptive Airfoils for Low Density
Astronomy	Western	Gelderman	Improving the Efficiency of Utilization of the Bell Observator
Astronomy	Western	Lehmacher	Preparing a Sensor Package for the Detection of Extrasolar Pl
Crystals	Louisville	Sunkara	Vapor Phase Methods for Growing Single Crystal Quality and
Fluid Dynamics	Kentucky	McDonough	Construction of 3-D Discrete Dynamical System Models oft
Galaxies	Kentucky	Troland	Magnetic Fields in the Galaxy
Galaxies	Western	Carini	Monitoring the Optical Brightness Variations of Blazars
Galaxies	Western	Gelderman	Black Hole Masses from [OIII] Line Profiles in PG Quasars
Interstellar Medium	Kentucky	Ferland	A New Approach to Determining Physical Conditions in Star
Interstellar Mediium	Kentucky	Troland	Interstellar Magnetic Fields and Star Formation
Interstellar Medium	Western	Marchenko	Clumps in the Wolf-Rayet Wind of the Rosetta Stone Binary
Lasers	Louisville	Cohn	Patterned Diffuser Arrays as Holograms and Grayscale Lithog
Mesosphere	Western	Lehmacher	Modeling the Stratosphere and Mesosphere
Microgravity Chem	Eastern	Wilson	Project Xlink: Analysis of Supersaturated Protein Solutions in
Nanotechnology	Louisville	Sunkara	Direct Synthesis of Nanowires with Built-in Interfaces
Micrograv Protein	Eastern	Wilson	Characterization of Cross-Linked Protein Solutions in Microg
Remote Sensing	Murray	Whiteman	Utilization of Remote Sensing to Model Current and Future T
Sensors	Kentucky	Smith	Evaluation of Sensor Placement Algorithms for Space Platfor
Space Materials	Louisville	Sunkara	Nanostmctured Metal-Doped Diamondlike Carbon Coatings
Space Optics	Kentucky	Smith	Minimization of Cross Polarization Effects of Space-Bom Ref
Space Physiology	Kentucky	Patwardhan	Effects of Menstrual Cycle on Cardiovascular Autonomic Fun
Space Physiology	Louisville	Essock	Effects of Spatial Orientation Cues on Human Visual Perform
Space Structures	Kentucky	Leifer	Effects of Gravity on Ripple Configuration in Tensioned Singl
Space Structures	Kentucky	Main	Analysis of Inflated Structure Deployment in Zero Gravity
Space Structures	Kentucky	Smith	Boundary Control at the Interface ora Spacecraft and a Flexib
Space Structures	Kentucky	Smith	Evaluation of Nonlinear Dynamic Response in a Solar Array
Space Structures	Kentucky	Smith	Simulating Nonlinear Response of Flexible Solar Arrays
Space Surfaces	Western	Harper	Investigations of Particle-Surface Interactions in Space
Stars	Western	Marchenko	Revealing the Nature of Faint X-Ray Sources in the Star-Form
Superconductors	Western	Harper	Investigation into the Effects of Radiation Damage on the Tra

APPENDIX TABLE 4 -- Kentucky NASA EPSCoR Research Projects

Aerodynamics	Louisville	Richards	Detection of Aeroelastic Instability and Estimation of Unstead
Aerodynamics	Kentucky	Jacob	Developing and Testing of Enabling Technologies for Morphi
Comp Fluid Dynam	Kentucky	Huang	Development and Application of High-End Engineering and P
Comp Fluid Dynam	Kentucky	LeBeau	Systematic Validation Program for Hybrid Turbulence Models
Comp Fluid Dynam	Kentucky	McDonough	Discrete Dynamical Systems Subgrid-Scale Models for Turbul
Galaxies	Kentucky	Shlosman	Formation and Evolution of Disk Galaxies
Galaxies	Western	Carini	Optical Photometric Monitoring of Gamma Ray Bright BL La
Galaxies	Western	McGruder	Optical Detection of Gamma Ray Bursts
Microgravity Health	Kentucky	Knapp	Monitoring and Assessment of Human Health and Responses
Microgravity Health	Louisville	Pantalos	Chest Compression Efficacy for CPR in Microgravity
Microgravity Health	Louisville	Sharp	Computer Modeling of Cardiovascular Function in Astronauts
Nanotechnology	Louisville	Cohn	Nanofabrication of Photonic Crystals
Nanotechnology	Louisville	Sunkara	Direct Synthesis of Nanowires with Built-in Interfaces
Planetary Atmos	Louisville	Dowling	Development and Application of High-End Engineering and P
Remote Sensing	Murray	Cetin	Early Detection of Nitrogen Deficiency in Agricultural Crops
Robotic Vision	Kentucky	Hassebrook	Hybrid Range-Sensing Camera for High Lateral and Depth Re
Robust Systems	Murray	Hereford	Robust Systems Using Evolvable Neural Nets
Sensors	Kentucky	Anderson	Miniaturized Multicellular-Based Biosensors for Detecting To
Sensors	Kentucky	Bachas	Sensors for Monitoring and Assessment of Human Health and
Space Materials	Western	Buthelezi	Development of Organic Modified Layered Silicates Based N

APPENDIX TABLE 5 -- NSF Funded Research in Kentucky

Astronomy, Astrophysics	
Kentucky	Measurements Of Magnetic Field Strengths In The Galaxy
Kentucky	Modeling Of Physical Conditions In High Z Protogalaxies
Kentucky	Obscuration Of Active Galactic Nuclei And The Starburst Connection
Kentucky	Theoretical Studies Of Astronomical Masers
Louisville	Atmospheric Dynamics Modeling Of Venus With Realistic Topography And Structure
Biology, Biological Sciences	
Kentucky	Biomimetic, Conformational Motifs For Practical Molecular Recognition
Kentucky	Chloroplast-Localized N-Terminal Protein Processing By Peptide Deformylase
Kentucky	Evolutionary Species Responses To Global Environmental Changes
Kentucky	Fatty Acid Signaling Pathway And Its Role In Plant Defense
Kentucky	Follicular Patterning Directed By Janus Kinase Signaling
Kentucky	Hexamerin Gene Prior To Metamorphic Commitment
Kentucky	How The Superoxide Dismutase Protein Specifies The Reactivity Of Bound Fe
Kentucky	Influences Of Geology And Tree Species Composition On The Response Of Forest Nutrient
Kentucky	Integrative Evolutionary Research
Kentucky	Linking Abiotic Stress To Gender Specific Fitness In A Desert Bryophyte
Kentucky	Maintenance Of A Functional Proteome Through Dynamic Repair
Kentucky	Molecular Biology And Biosynthesis Of Lolines By Grass Endophytes
Kentucky	Molecular Regulation And Transport Of Sterols In Plants
Kentucky	Presynaptic Direct Structures-Function Analysis
Louisville	Candidate Genes Controlling Cortical Neuroplasticity
Louisville	Models In Mathematical Biology: A Feedback Perspective
Louisville	Synaptic Organization Of The Primate Pulvinar Nucleus
Louisville	The Complete Genome Sequence Of A Mini Consortium Of Marine Ammonia Oxidizers
Louisville	The Evolution Of Pheromone Signals And Their Role In Behavioral Isolation
Western	Molecular Phylogenetics And Allpolyploidization In Rubus (Rosaceae)
Chemistry, Chemical Engineering	
Kentucky	Alligned Carbon Nanotube Composite Array As Permeable Membrane For Selective Chemical
Kentucky	Catalytic Conversion Of Pvc Waste Into Fuel Oil
Kentucky	Ceramic-Based Multisite Microelectrode For Electrochemical Recordings
Kentucky	Design And Construction Of Responsive Surfaces By Means Of Tethered Chain Nanolayers
Kentucky	Development Of Optical Sensors Based On Spherical Microparticles
Kentucky	Environmental Catalysis: Gas Phase Hydrodechlorination Of Chlorophenols
Kentucky	Experimental Investigation Of Thrust Surfaces With Deterministic Micro Asperities
Kentucky	Gas Phase Hydrodechlorination Of Chlorophenols
Kentucky	Kinetics And Engineering Of Functional Nanoscale Organic-Inorganic Hybrids
Kentucky	Molecular Structure And Microstructure Of Pm2.5 Derived From Stationary And Mobile Fossil Fuel
Kentucky	Proline-Rich Sequences And Polyproline Ii Helix Formation
Kentucky	Sequence Dependence Of Polyproline Ii Helix Formation
Kentucky	Spectroscopic Studies Of Weakly-Bound Metal-Molecule Complexes
Kentucky	Spectroscopy Of Main Group Reactive Intermediates
Kentucky	Tailored Fluorinated Surfactant Templates For The Design Of Ordered Nanoporous Ceramics
Kentucky	Titanium-Mediated Catalytic And Stoichiometric Carbon-Carbon Bond Formations
Kentucky	Towards Fundamental Understanding And Rational Control Of Crystal Growth
Kentucky	Well Defined Low Valent Titanium Reductants
Louisville	Catalytic Applications Of Ligands With Variable Denticity
Louisville	Synthetic Models Of Nitrile Hydratase To Elucidate Electronic And Second Coordination Sphere
Northern	Cycloaromatization Of Arenediynes
Western	Acquisition Of Instrumentation For The Manipulation And Laser Spectroscopic Characterization Of
Western	Acquisition Of Nuclear Magnetic Resonance Spectrometer
Western	Insights Into Catalysis Of Directed Orth-Metalation Reactions
Western	Surfactant Immobilized Sorbent Material For Solid Phase Extraction
Western	Virtual Systhesis Of 3d Nanoheterostructure Units With Pre-Designed Charge Transport Properties
Computer Science, Computer Engineering	
Kentucky	A Framework For The Design And Implementation Of Fault-Tolerant Distributed And Mobile
Kentucky	Algorithms: Multiscale, Multicolor, Multigrid-Like Solvers For High Performance Computing
Kentucky	Data Dynamic Simulation For Disaster Management
Kentucky	Decision-Theoretic Planning With Constraints
Kentucky	Develop Robust Scalable Linear System Solvers With Scientific, Engineering And Industrial

Kentucky	Fast And Accurate Computations Of Applied Eigenproblems
Kentucky	Fast Solvers For Computational Pharmacy, Life Sciences, Mathematics, Physics
Kentucky	Information-Based Complexity Of Multivariate Problems
Kentucky	Internet Topology Models - A Foundation For Large-Scale Simulations
Kentucky	Interpreting High Resolution Geodetic Data With Visoelastic Models
Kentucky	Investigation Of Electric Transmission Line Routing Using A Decision Landscape Methodology
Kentucky	New Concept And Parallel Algorithms For Robust Preconditioning In Large Scale Parallel Matrix
Kentucky	Nonmonotonic Reasoning And Computational Knowledge Representation
Kentucky	Pde-Based Image Restoration: Efficient Numerical Algorithms And Software Engineering
Kentucky	Pervasively Secure Infrastructures \(Psi\): Integrating Smart Sensing, Data Mining, Pervasive
Kentucky	Predictive Contaminant Tracking Using Dynamic Data Driven Application Simulation (Dddas)
Kentucky	Representation And Remote Visualization Of Digital Artifacts
Kentucky	Secure Information Sharing For Internet-Based Collaborative Applications
Kentucky	Tessellation, Fairing, Shape Design, And Trimming Techniques For Subdivision Surface Based
Kentucky	The Light Portal: 3d Reconstruction And Visualization Over Space And Time
Louisville	Processing And Optimization Of Generalized Quantification
Engineering	
Kentucky	Control Of Gas Tungsten Arc Weld Pool Surface
Kentucky	Device Controller Synthesis For Systems Of Interacting Discrete-State Components
Kentucky	Double-Electrode Gas Metal Arc Welding
Kentucky	Elliptically-Polarized-Surface-Wave-Scattering-Based Diagnosis Of Self-Assembly And Nano-
Kentucky	Integrated Approach To Superplastic Forming Of Advanced Materials: Mechanics-Materials-
Kentucky	Microstructures And Residual Stress In Polycrystalline Materials: Their Nondestructive
Kentucky	Prediction Of Texture And Formability Of Continuous Cast Aluminum Alloys
Kentucky	Staggered Probes For Integrating Nano Machining And Metrology
Louisville	Acquisition Of A Virtual Presence Surface Profiling Microscope For Nanomanipulation
Louisville	Carbon Nanotube Based Spin Electronic Devices
Geology, Geosciences	
Louisville	A Microstructural Study Of Simulated And Natural Fault Gouge Using Digital Image Techniques
Louisville	Structure And Compressibility Of Hydrous Mantle Phases
Mathematics	
Kentucky	Calculus Of Variations In Fully Nonlinear Subelliptic Equations On Carnot Groups
Kentucky	Computing Interior Eigenvalues Of Large Matrices By Preconditioned Krylov Subspace Methods
Kentucky	Inequalities For Polytopes And Permutations, And Homology For Newtonian Coalgebras
Kentucky	Inverse Problems In Geometry And Partial Differential Equations
Kentucky	Precondition Krylov Subspace Algorithms For Computing Eigenvalues Of Large Matrices
Kentucky	Spectral Geometry Of Non-Compact Domains And Riemannian Manifolds
Western	Computation Of Rope Length Of Large Thick Knots
Physics	
Kentucky	4d And 5d Transition Metal Oxides: A New Frontier Of Materials With Exotic Phenomena
Kentucky	Acquisition Of A Hybrid Small/Macromolecule X-Ray Diffractometer System
Kentucky	Collisions Of Electrons With Rydberg Atoms At Ev And Sub Ev Energy
Kentucky	Disordered, Interacting Electrons: Two Tractable Limits
Kentucky	Electro-Optic Studies Of Charge Density Wave Conductors
Kentucky	Fundamental Reliability Physics Of Mos Devices Based On Deuterium Isotope Effects
Kentucky	Large Scale Quantum Mechanical Simulations Of Nanomechanics
Kentucky	Low Energy Studies Of The Pion Nucleon System
Kentucky	Nuclear Structures Studies With Fast Neutrons
Kentucky	Numerical Simulations Of Non-Equilibrium Plasmas And Their Spectra- Applications To Active
Kentucky	Phase Segregation And The Influence Of Microstructure On Multispecies Thin Solid Film Growth
Kentucky	Space-Time Properties In String Theory
Kentucky	Spectral And Transport Properties Of Random Media
Kentucky	Studies Of Broken Symmetries And Fundamental Constants With Muons And Pions
Kentucky	The Electro-Optic Effect In Charge-Density-Wave Conductors
Kentucky	Theory Of Loosely Bound Composite Systems: High Order Corrections To Energy Shifts And G-
Kentucky	Topics In Gravitational Physics, Quantum Fields, And String Theory
Kentucky	Tunneling Experiments: Conductance Peak And Pseudogap Measurement
Kentucky	Using Fast Neutrons To Explore Nuclear Structure
Louisville	Development Of Self-Consistent And Environment Dependent Hamiltonians Large-Scale
Morehead	Acquisition Of A Scanning Electron Microscope With An Energy Dispersive Spectrometer For Multi-
Northern	Physics Of Charm States Produced In The Babar Detector
Western	Applied Nuclear Technology