



FISCAL YEAR 2005

**ANNUAL PERFORMANCE REPORT
TO THE WHITE HOUSE INITIATIVE OFFICE ON
HISTORICALLY BLACK COLLEGES & UNIVERSITIES**

National Aeronautics and Space Administration
Office of the Chief Education Officer

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

**FISCAL YEAR 2005 ANNUAL PERFORMANCE REPORT TO
THE WHITE HOUSE INITIATIVE OFFICE ON
HISTORICALLY BLACK COLLEGES AND UNIVERSITIES**

Office of Education

NASA Headquarters
Washington, DC 20546-0001

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)
 FISCAL YEAR 2005 ANNUAL PERFORMANCE REPORT
 TO THE WHITE HOUSE INITIATIVE OFFICE ON
 HISTORICALLY BLACK COLLEGES AND UNIVERSITIES (HBCU)**

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EXECUTIVE SUMMARY

The National Aeronautics and Space Administration (NASA) is highly committed to ensuring the broadest participation of Historically Black Colleges and Universities (HBCU) in the Agency's research and education programs and its overall mission. The Agency's goals for HBCUs, as stated in its FY 2005 Annual Plan to Assist HBCUs, provide the foundation and guide NASA's planned spending and technical assistance to HBCUs. Executive Order 13256, President's Board of Advisors on HBCUs, requires all Federal agencies to plan and report annually on how they increased the capacity of HBCUs to compete effectively for Federal funding. The NASA programs highlighted in this report are examples of the Agency's strategy for strengthening and expanding research and academic infrastructure development in science, technology, engineering and mathematics (STEM) at HBCUs.

NASA's commitment is evidenced by the significant progress made toward the Agency's FY 2005 Annual Plan to Assist HBCUs. NASA's planned investment for HBCUs in FY 2005 was \$56.2 million. The actual investment in HBCUs for FY 2005 was \$52.6 million. This represents a 6-percent decrease over our projected FY 2005 investment. NASA was unable to meet its projected investment due to covering the cost of Congressionally-Directed Appropriations (CDAs). Some of the funds used to cover the cost of CDAs would have been used to support several solicitations for Minority Institutions.

In FY 2005, NASA continued its college corporate recruitment program begun in FY 2004 for STEM and business management majors. Over 1500 students visited the NASA booths at the Central Intercollegiate Athletic Association (CIAA) (composed of 12 HBCUs) event and the National Society of Black Engineers Annual Conference. Seven students were offered NASA jobs and five accepted. The students participated in individual consultations with NASA Center personnel and informational workshops on careers, scholarships/fellowships, and cooperative education and summer employment opportunities. The recruitment program represented NASA's proactive effort to attract underrepresented and underserved students as potential scientific and technical personnel to replenish and increase the diversity of the workforce.

Evidence of the Agency's funding commitment is seen in the research conducted through the Minority University Research and Education Programs (MUREP). As a result of sustained NASA funding in FY 2005, HBCUs reported 501 publications, 7 patents pending, 6 African Americans received doctoral degrees, 52 African Americans received Master degrees, and 177 African Americans received baccalaureate degrees in STEM disciplines.

An example of an HBCU participating in cutting-edge research is Tennessee State University's (TSU) Center for Automated Space Science (CASS). TSU has developed and now operates seven 10-inch to 32-inch robotic telescopes located in southern Arizona. These telescopes operate automatically every clear night and return their data via the internet to TSU each morning. They are capable of making measurements of stellar brightness changes more precisely, efficiently, and economically than any previous instruments. TSU's completely automated observatory is unique in the world

and is able to contribute to cutting-edge research in many exciting ways. Because of these demonstrated capabilities, TSU has been called upon to provide observations crucial to a wide variety of research projects relevant to NASA's Space Science themes, specifically the astronomical search for origins and planetary systems and the Sun-Earth connection.

CASS will have extensive involvement with NASA Projects, such as Gravity Probe B satellite, the Space Infrared Telescope Facility (SIRTF), and the Space Interferometry Mission (SIM).

SUMMARY OF AGENCY AWARDS TO HBCUs BY CATEGORY: FY 2005

1. Agency: National Aeronautics and Space Administration

2. Agency Representative: Angela Phillips Diaz
Acting Associate Administrator
for Education

(Signature/ Date)

3. Total Funds for Institutions of Higher Education (IHE): \$1,153,711,113

DISCRETIONARY AWARDS

<i>CATEGORY</i>	<i>AWARDS TO IHEs+</i>	<i>AWARDS TO HBCUs*</i>	<i>AWARDS TO HBCUs AS % OF TOTAL AWARDS TO IHEs</i>
1. Research & Development		\$32,898,388	
2. Program Evaluation			
3. Training		\$8,070,738	
4. Facilities and Equipment		\$42,115	
5. Fellowships, Traineeships, Internships, Recruitment, and Arrangements under the Intergovernmental Personnel Act (IPA)		\$1,970,430	
6. Student Tuition Assistance, Scholarships, and Other Aid		\$2,096,246	
7. Direct Institutional Subsidies			
8. Third-Party Awards		\$4,995,942	
9. Private-Sector Involvement		\$2,500,000	
10. Administrative Infrastructure			
11. Other Activities			
TOTAL	\$1,153,711,113	\$52,573,859	4.5%

Michael D. Griffin

Administrator

(Signature)

+ IHE=Institutions of Higher Education

* HBCUs=Historically Black Colleges and Universities

**TOTAL FY 2005 AWARDS TO
HISTORICALLY BLACK COLLEGES AND UNIVERSITIES**

	<i>Institutions of Higher Education</i>	<i>Historically Black Colleges and Universities</i>
DISCRETIONARY AWARDS:	\$1,153,711,113	\$52,573,859
LEGISLATED AWARDS:	\$0	\$0
TOTAL AWARDS:	\$1,153,711,113	\$52,573,859

State/Institution	R&D	PE	Training	F&E	Fellows	STA	DIS	TPA	PSI	AI	Other	Grand Total
Tennessee												
Fisk University	\$160,000		\$252,533									\$412,533
Tennessee State University			\$207,060		\$129,810	\$510,270						\$847,140
Texas												
Prairie View A&M University	\$428,543		\$58,910			\$34,395						\$521,848
Texas Southern University	\$1,269,538											\$1,269,538
Wiley College			\$125,000									\$125,000
Virgin Islands												
University of the Virgin Islands			\$150,000									\$150,000
Virginia												
Hampton University	\$15,251,760		\$551,000		\$608,100							\$16,410,860
Norfolk State University	\$1,762,000		\$511,928									\$2,273,928
Washington, DC												
Howard University	\$270,000				\$53,000	\$34,396						\$357,396
University of the District of Columbia			\$376,000									\$376,000
West Virginia												
West Virginia State University			\$100,000		\$126,110							\$226,110
Other HBCU Awards												
American Society for Engineering Education (ASEE) - Helen T. Carr Fellowship								\$50,000				\$50,000
Central Intercollegiate Athletic Association (Scholarship Fund)								\$100,000				\$100,000
Enterprise for Innovative Geospatial Solutions (EIGS)								\$134,045				\$134,045
NASA Space Grant College Fellowship Program								\$511,897				\$511,897
United Negro College Fund Special Programs, Inc. - Harriett G. Jenkins Predoctoral Fellowship Program								\$1,750,000				\$1,750,000
United Negro College Fund Special Programs, Inc. - Curriculum Improvement Partnership Awards (CIPA)								\$1,200,000				\$1,200,000
United Negro College Fund Special Programs, Inc. - NASA Administrator's Fellowship Program (NAFP)								\$1,250,000				\$1,250,000
NASA Research and Education Support Services (NRESS)									\$2,500,000			\$2,500,000
GRAND TOTAL	\$32,898,388		\$8,070,738	\$42,115	\$1,970,430	\$2,096,246		\$4,995,942	\$2,500,000			\$52,573,859

ABBREVIATIONS KEY	
R&D	Research & Development
PE	Program Evaluation
TRAINING	Training
F&E	Facilities and Equipment
FELLOWS	Fellowships, Traineeships, Internships, Recruitment, and Arrangements under the Intergovernmental Personnel Act (IPA)
STA	Student Tuition Assistance, Scholarships, and Other Aid
DIS	Direct Institutional Subsidies
TPA	Third-Party Awards
PSI	Private-Sector Involvement
AI	Administrative Infrastructure
OTHER	Other Activities

AWARDS BY OBJECT CATEGORY

Research and Development

STATE	INSTITUTION	DESCRIPTION	AWARD
AL	Alabama A&M University	Center for Hydrology, Soil Climatology, and Remote Sensing (HSCaRS)	\$1,200,000
AL	Alabama A&M University	Characterizing Electro-Optical Properties	\$100,000
AL	Alabama A&M University	Research and Development to Establish an Independent Verification and Validation Facility Simulation Testbed/Tools	\$57,000
AL	Oakwood College	Evaluation of Numerical Techniques for MGD Propulsion Simulation	\$50,000
AL	Tuskegee University	Center for Food and Environmental Systems for Human Exploration of Space (CFESH)	\$1,189,553
AL	Tuskegee University	Electrical Issues in Nuclear Electric Propulsion Systems	\$100,000
AL	Tuskegee University	Turbulence Modeling Using Maximum Entropy Concept	\$99,852
DC	Howard University	Center for the Study of Terrestrial and Extraterrestrial Atmospheres	\$270,000
FL	Florida A&M University	Center for Nonlinear and Nonequilibrium Aerosciences (CENNAS)	\$349,000
FL	Florida A&M University	University Research Engineering Institute	\$300,000
FL	Florida A&M University	Design and Control of a Robot Master Manipulator for a Telerobotic System	\$100,000
GA	Clark Atlanta University	High Performance Polymers and Composites Center	\$1,200,000
GA	Clark Atlanta University	Multiscale Modeling of Metallic Alloys	\$99,000
GA	Clark Atlanta University	Simulation of Cavitating Flows Using Mixed Discontinuous Galerkin and Stabilized Galerkin Finite Element Methods	\$75,000
GA	Clark Atlanta University	Development and Implementation of Implicit FVM and FEM for Simulations of Compressible and Two-Phase Experiments	\$75,000
GA	Clark Atlanta University	Liquid Fuels: Pyrolytic Degradation and Fire Spread Behavior as Influenced by Buoyancy	\$60,000
GA	Morehouse School of Medicine	Space Medicine and Life Sciences Research Center	\$791,404
GA	Morehouse School of Medicine	Gravitational Effects on Nutrient Diffusion Through Cartilage Matrix	\$70,000
LA	Southern University and A&M College-Baton Rouge	The Advanced Thin Ionization Calorimeter Balloon Experiment	\$55,000
LA	Southern University and A&M College-Baton Rouge	The Center for Coastal Zone Assessment and Remote Sensing	\$1,198,888
MD	Morgan State University	Chesapeake Information-Based Aeronautics Consortium	\$2,956,000
MD	Morgan State University	Advanced Computational Fluid Dynamics (CFD) Analysis/Experimental Validation and Transient Model Development for the Flow in SSME Exhaust Duct	\$80,000

STATE	INSTITUTION	DESCRIPTION	AWARD
MD	Morgan State University	Manufacturing Cost Reduction for Multiple Production Runs of Nanosats and Related Aerospace Products through Integrating Robustness Concepts	\$69,274
MD	University of Maryland Eastern Shore	Mid-Atlantic Institute for Space and Technology (MIST)	\$200,000
MD	Morgan State University	Center for Advanced Microwave Research and Applications	\$1,759,046
NC	North Carolina A&T State University	Low-Power SOI CMOS Transceiver	\$455,000
NC	North Carolina A&T State University	Third Generation Reusable Launch Vehicle Technology Institute	\$175,000
NC	North Carolina A&T State University	A Wireless Radio Location System for Use in an Indoor Environment	\$100,000
NC	North Carolina A&T State University	Continuous Sensor System for Health Monitoring of Aerospace Fuel Tanks	\$100,000
NC	North Carolina A&T State University	North Carolina A&T State University Center for Aerospace Research	\$218,250
NC	North Carolina A&T State University	Optimal Trajectory Planning for Interplanetary Mission using Hybrid Evolutionary Algorithms	\$100,000
NC	North Carolina A&T State University	Performance Evaluation & Modeling of Affordable Composites Manufactured Using Stitching & Z-Pinning Processes	\$100,000
NC	North Carolina A&T State University	Study of GaAsSbN Alloys for Solar Cell Applications	\$81,000
NC	North Carolina A&T State University	Investigation of Next Generation Design Tool for Aerospace	\$83,280
NC	North Carolina A&T State University	Developing Ultra-Efficient Engine Technology Through Education and Research	\$60,000
NC	North Carolina A&T State University	Meyer Institute for Future Space Transportation	\$50,000
TN	Fisk University	Center for Photonic Materials and Devices	\$160,000
TX	Prairie View A&M University	Center for Applied Radiation Research	\$359,997
TX	Prairie View A&M University	Model Calculations of Radiation Environment Research Foundation at MARS and Data from Martian Radiation Experiment	\$68,546
TX	Texas Southern University	NASA Research Center for Biotechnology and Environmental Health	\$1,189,554
TX	Texas Southern University	Oral Absorption and Drug Interaction Kinetics	\$79,984
VA	Hampton University	Picasso-CENA International Science Advisory	\$560,932
VA	Hampton University	Hampton University Testing Facilities	\$83,000
VA	Hampton University	Aeronomy of Ice in the Mesosphere (AIM) Mission	\$12,700,000
VA	Hampton University	A Complete Adaptive Digital Signal Processing System	\$94,769
VA	Hampton University	Hampton University Aeropropulsion Center	\$1,092,000
VA	Hampton University	Advanced Air Transportation Technologies (ATT) Project at Langley Research Center	\$20,903
VA	Hampton University	Meteorological Event Classes for Moderate Resolution Imaging Spectroradiometer (MODIS) Data Analysis	\$95,000

STATE	INSTITUTION	DESCRIPTION	AWARD
VA	Hampton University	Understanding Radiation Measured by Satellite-Based Instruments	\$605,156
VA	Norfolk State University	Power Allocation and Distributed Logic/Circuit/Smart Membrane Actutory Controlled by a Microwave	\$100,000
VA	Norfolk State University	Novel Spin Polarization Transport Phenomena for Applications in Space Microelectronics Technology	\$90,000
VA	Norfolk State University	Development of a High Efficiency and Lightweight Photovoltaic Device	\$150,000
VA	Norfolk State University	Application of Variational Method in the Analysis of Fluid-Structure High Speed Thermal Fluid Design Densitivity Analysis	\$100,000
VA	Norfolk State University	Center for Research and Education in Advanced Materials	\$1,200,000
VA	Norfolk State University	Power Allocation and Distribution (PAD) Logic Circuit for Smart Membrane Actuators Controlled by a Microwave	\$100,000
VA	Norfolk State University	The Use of Proteomics to Analyze Antioxidant and Phosphoinositol Signal Transduction Pathways	\$22,000
TOTAL			\$32,898,388

AWARDS BY OBJECT CATEGORY

Program Evaluation

In FY 2005, NASA conducted an Inventory and Program Review in response to the Administrator's directive for an inventory and review of NASA's education portfolio. The NASA Education Program Operating Principles were used to evaluate the programs. The Operating Principles are as follows: customer focus, content, pipeline, diversity, evaluation, and partnership/sustainability. As a result of the review, the Office of Education will establish a regular and systematic review of projects within each program, including independent reviews and site visits.

In addition to the program review, all grant awards experienced some form of oversight through a combination of NASA technical monitors, data collection on key metrics, site visits, and/or reverse site visits. For institutional research programs, technical review committees comprised of NASA experts in relevant research areas conducted site visits at least annually. These evaluations and assessments are critical tools that provide valuable information to HBCUs that can be utilized to strengthen their research and program outcomes.

Performance Outcomes

In order to monitor the progress of NASA HBCU programs, all grant recipients were required to submit a Performance Outcomes Report as part of their annual performance report. The Performance Outcomes Report consists of numerical outcomes data and a narrative summary of project accomplishments covering Academic Year (AY) 2004-2005 and the summer of 2005. The data were collected electronically via the World Wide Web. This single annual collection of data provides the information necessary for the annual performance goals reports, required White House reports, budget submissions and justifications, responses to congressional inquiries, and comparative assessments of programs and projects.

The numerical data measure program performance against metrics that apply to all NASA education and research programs. These metrics emphasize outcomes over process, and are applicable to any project. They are aggregable both horizontally and longitudinally, and they allow adjustable benchmarking standards to be applied. For research projects, including URCs, the metrics track two basic areas--student outcomes (degrees awarded and post-degree plans) and research outcomes (refereed publications, leveraged funding, patents, and commercial products). Vital process information, such as numbers of faculty and students supported and the gross categories in which funds are spent, is also collected. For education projects, the Performance Outcomes Report continues to collect data on numbers and demographics of students supported, but also primarily focuses on measurable improvements in student performance. Both short- and long-term metrics are utilized in the collection of data that pertains to education projects.

The narratives on each project provide information on accomplishments relative to that project and, therefore, are not necessarily captured in the Performance Outcomes data. These narratives serve as input for the annual HBCU Performance Report and other similar reports, as required.

Site Visits

Onsite reviews of grants were conducted at 15 HBCUs during FY 2005. The purposes of the visits were to ascertain the projects' accomplishments to date, identify any potential barriers to achieving project objectives, determine whether collaboration between the institution and NASA is sufficient to achieve maximum benefits for the university and for NASA, and to allow NASA personnel an opportunity to review the management of the grant.

AWARDS BY OBJECT CATEGORY

Training

STATE	INSTITUTION	DESCRIPTION	AWARD
AL	Alabama A&M University	Graduate Space Science Education and Research	\$249,000
AL	Alabama A&M University	High School Outreach Program	\$41,800
AL	Alabama A&M University	Summer Faculty Research Opportunity	\$41,800
AL	Lawson State Community College	Achieving Destinations	\$100,000
AL	Oakwood College	Enhancing Mathematics and Science Education Through Research (EMSER)	\$238,500
AL	Oakwood College	Project Mi Futuro	\$50,000
AL	Oakwood College	Pre-service Teacher Institute	\$168,000
AL	Stillman College	Project Mi Futuro	\$100,000
DC	University of the District of Columbia	Partnership for a Sustainable Space Science Program	\$251,000
DC	University of the District of Columbia	Science, Engineering, Mathematics, and Aerospace Academy (SEMAA)	\$125,000
FL	Bethune Cookman College	NASA Education Exploration Team (NEET)	\$410,000
FL	Bethune Cookman College	Pre-service Teacher Institute	\$60,000
GA	Albany State University	Science, Engineering, Mathematics, and Aerospace Academy (SEMAA)	\$400,000
GA	Spelman College	Model Institutions of Excellence (MIE)	\$946,800
LA	Southern University A & M	Space Science at Southern University	\$120,000
LA	Xavier University	Pre-service Teacher Institute	\$64,910
MD	Bowie State University	Bowie State's Satellite Operation Control Center	\$50,000
MD	Bowie State University	Model Institutions of Excellence (MIE)	\$1,112,000
MD	Morgan State University	Science, Engineering, Mathematics, and Aerospace Academy (SEMAA)	\$125,000
MD	University of Maryland Eastern Shore	Science, Engineering, Mathematics, and Aerospace Academy (SEMAA)	\$93,750
MD	University of Maryland Eastern Shore	Small Educational Rocket Initiative (SERI)	\$20,000
MS	Jackson State University	Project ICI (Institutes for College Instructors)	\$99,989
NC	Fayetteville State University	Pre-service Professional Development Model for Partnership and Change	\$90,000
NC	Livingstone College	Science, Engineering, Mathematics, and Aerospace Academy (SEMAA)	\$125,000
NC	North Carolina A&T State University	Partnership for Research and Education in Space Science	\$235,000
NC	North Carolina Central University	Integration of Nanotechnology and Computational Modeling NASA Research in the Undergraduate Curriculum at North Carolina Central and Fisk Universities	\$400,000
NC	Winston-Salem State University	Science, Engineering, Mathematics, and Aerospace Academy (SEMAA)	\$31,250
OH	Wiberforce University	Science, Engineering, Mathematics, and Aerospace Academy (SEMAA)	\$62,500

STATE	INSTITUTION	DESCRIPTION	AWARD
PA	Cheney University	Collaborative for Excellence in Teacher Preparation	\$54,008
SC	South Carolina State University	New Directions in Astronomy and Astrobiology	\$249,000
TN	Fisk University	Fisk Astronomy, Space Science and Technology (FASST) Program	\$251,000
TN	Fisk University	Summer Faculty Research Opportunity	\$1,533
TN	Tennessee State University	Science, Engineering, Mathematics, and Aerospace Academy (SEMAA)	\$125,000
TN	Tennessee State University	Summer Faculty Research Opportunity	\$39,560
TN	Tennessee State University	TSU College Bound IV Program	\$42,500
TX	Prairie View A & M University	Pre-service Teacher Institute	\$58,910
TX	Wiley College	Science, Engineering, Mathematics, and Aerospace Academy (SEMAA)	\$125,000
VI	University of the Virgin Islands	Saturday Science Academies and Summer Science Enrichment Academies	\$150,000
VA	Hampton University	Space Science Minor at Hampton University	\$251,000
VA	Norfolk State University	Space Science Education and Research at Norfolk State University	\$235,000
VA	Norfolk State University	2005 Pre-Service Teacher Program (Institute and Conference)	\$276,928
VA	Hampton University	Continuing Education Aeroscience Center	\$300,000
WV	West Virginia State University	West Virginia State University (Independent Verification and Validation Facility)	\$100,000
TOTAL			\$8,070,738

AWARDS BY OBJECT CATEGORY

Facilities and Equipment

There are no competitively awarded grants specifically for facilities and equipment. A small portion of funding is normally permitted under a research or education grant to fund equipment required to support research or education activities. In addition, to the degree that it is available from NASA Centers, HBCUs are able to acquire excess or loaned equipment to support research efforts or scientific teaching.

STATE	INSTITUTION	DESCRIPTION	AWARD
GA	Morehouse College	JPL transferred a customized Varian Spectrometer	\$42,115

AWARDS BY OBJECT CATEGORY

Fellowships, Traineeships, Internships, Recruitment, and Arrangements under the Intergovernmental Personnel Act (IPA)

STATE	INSTITUTION	DESCRIPTION	AWARD
AL	Alabama A & M University	Graduate Students Researchers Program (GSRP)	\$72,000
AL	Tuskegee University	NASA Space Flight and Life Sciences Training Program	\$294,482
DC	Howard University	Public Service Intern Program	\$53,000
FL	Florida A & M University	Internship at Glenn Research Center	\$3,700
GA	Spelman College	Internship at Glenn Research Center	\$5,550
MD	Bowie State University	Summer Institute in Engineering and Computer Applications Program (SIECA)	\$425,338
MD	University of Maryland Eastern Shore	NASA University of Maryland Eastern Shore Student Internship Program (NUSIP)	\$50,000
NC	North Carolina A&T State University	NASA Ronald E. McNair Graduate Research Fellowship Program	\$179,000
NC	North Carolina A&T State University	NASA Summer Research Opportunity Program	\$23,340
TN	Tennessee State University	College Bound Program	\$38,000
TN	Tennessee State University	Graduate Students Researchers Program (GSRP)	\$24,000
TN	Tennessee State University	Internship at Glenn Research Center	\$32,945
TN	Tennessee State University	Minority Introduction to Engineering	\$34,865
VA	Hampton University	Internship at Glenn Research Center	\$8,100
VA	Hampton University	Langley Aerospace Research Summer Scholars Program (LARSS)	\$600,000
WV	West Virginia State University	Summer internship at Goddard Space Flight Center	\$65,000
WV	West Virginia State University	Upward Bound Program	\$61,110
TOTAL			\$1,970,430

AWARDS BY OBJECT CATEGORY

Student Tuition Assistance, Scholarships, and Other Aid

STATE	INSTITUTION	DESCRIPTION	AWARD
DC	Howard University	Co-op Education Program	\$34,396
FL	Florida A&M University	Increasing Minority Access to the Graduate Engineering Program (IMAGE)	\$40,000
GA	Morehouse College	Strategic Preparedness Advancing Careers in Engineering/Sciences (Project SPACE)	\$687,000
GA	Spelman College	Women in Science and Engineering (WISE) Scholars Program	\$687,000
LA	Southern University and A & M College – Baton Rouge	Co-op Education Program	\$34,395
LA	Xavier University	Co-op Education Program	\$34,395
MS	Jackson State University	Co-op Education Program	\$34,395
TX	Prairie View A & M University	Co-op Education Program	\$34,395
TN	Tennessee State University	Undergraduate Scholars Program	\$510,270
TOTAL			\$2,096,246

AWARDS BY OBJECT CATEGORY

Direct Institutional Subsidies

NASA does not provide direct institutional subsidies.

AWARDS BY OBJECT CATEGORY

Third-Party Awards

INSTITUTION / DESCRIPTION	AWARD
American Society for Engineering Education (ASEE) - Helen T. Carr Fellowship	\$50,000
Central Intercollegiate Athletic Association (Scholarship Fund)	\$100,000
Enterprise for Innovative Geospatial Solutions (EIGS)	\$134,045
NASA Space Grant College and Fellowship Program	\$511,897
United Negro College Fund Special Programs, Inc. - Harriett G. Jenkins Predoctoral Fellowship Program	\$1,750,000
United Negro College Fund Special Programs, Inc. - Curriculum Improvement Partnership Awards (CIPA)	\$1,200,000
United Negro College Fund Special Programs, Inc. - NASA Administrator's Fellowship Program (NAFP)	\$1,250,000
TOTAL	\$4,995,942

AWARDS BY OBJECT CATEGORY

Private-Sector Involvement

ORGANIZATION	DESCRIPTION	AWARD
Diversified Global Resources	NASA Research and Education and Support Services (NRESS)	\$2,500,000
TOTAL		\$2,500,000

NASA's Office of Education programs, including the MUREP, are supported by NASA Research and Education and Support Services (NRESS) a consolidated contract, of which Diversified Global Resources is the prime contractor. NRESS' functions include the development and enhancement of an internet-based electronic management system to support solicitation development, peer review and selection, post-award evaluation, and grants/cooperative agreements management with HBCUs and Other Minority Universities (OMU). Additionally, NRESS provides technical assistance to HBCUs and ensures that they are familiar with and capable of accessing NASA's programs online, via the electronic management system, to receive announcements of opportunity and to submit proposals, evaluations, and post-award management activities.

AWARDS BY OBJECT CATEGORY

Administrative Infrastructure

There were no awards funded specifically for Administrative Infrastructure at HBCUs during FY 2005.

AWARDS BY OBJECT CATEGORY

Other Activities

There were no awards funded specifically for Other Activities at HBCUs during FY 2005.

AWARDS AND EXEMPLARY PROJECTS

NASA employs a comprehensive and complementary array of strategies to achieve its established goals for HBCUs. These programmatic initiatives are carried out in close collaboration with the Mission Directorates and NASA Centers. The Mission Directorates and Centers support minority university programs through direct funding, use of their facilities, and commitment of their personnel to serve on Technical Review Committees (TRC) and assist in other facets of program implementation. As a result of the involvement of the Mission Directorates and NASA Centers in the programs of the Office of Education, numerous students and principal investigators (PI) from HBCUs are knowledgeable about and make significant contributions to the aeronautics and space community.

Outreach to HBCUs will continue to be made in collaboration with the Mission Directorates and NASA Centers to ensure that HBCUs are knowledgeable about and responsive to the Agency's Strategic Plan. The Office of Education will continue to set specific program goals that lead to measurable program outcomes that are consistent with the Agency's investment in HBCUs. Sample awards and exemplary projects are outlined below.

University Research Centers (URC)

The URC awards are collaborative programs conducted in cooperation with the Mission Directorates and the NASA Centers. These awards are designed to achieve a broad-based, competitive aerospace research capability among the Nation's HBCUs that will foster new aerospace science and technology concepts, expand the Nation's base for aerospace research and development, develop mechanisms for increased participation by faculty and students in mainstream research, and increase the number of underrepresented and underserved students (who are U.S. citizens) with advanced degrees in NASA-related fields.

The 14 HBCU URCs achieved the following outcomes in FY 2004-2005 and the Summer of 2005:

- 391 students from underrepresented minority groups participated in URC research: 265 undergraduates, 77 masters students, and 49 doctoral students
- 103 faculty members, 44 research associates, 104 graduate assistants, and 16 postdoctoral researchers conducted NASA-related research at URCs
- 60 degrees in science, technology, engineering, or mathematics (STEM) disciplines were awarded to underrepresented and underserved students as follows: 33 bachelors of science degrees, 21 masters of science degrees, and 6 doctoral degrees
- 258 refereed papers and/or book chapters were published or accepted for publication, including 179 with at least one student author
- 248 technical presentations, 229 which included at least one student presenter
- 2 patents are pending and 1 patent has been issued
- Students and faculty members participated in 72 peer review and expert discussion panels, 6 sponsored by MUREP, 5 by other NASA programs, and 61 by other Federal agencies

- 48 research partnerships were developed

The statistics indicated above were reported by the following HBCU URC institutions: Alabama Agricultural and Mechanical University, Clark Atlanta University, Fisk University, Florida Agricultural and Mechanical University, Hampton University, Howard University, Morehouse School of Medicine, Morgan State University Norfolk State University, North Carolina Agricultural and Technical State University, Prairie View A&M University, Southern University and Agricultural and Mechanical College at Baton Rouge, Tennessee State University, Texas Southern University, and Tuskegee University

An Exemplary URC

Prairie View A & M University Center for Applied Radiation Research

PROGRAM DESCRIPTION

The Center for Applied Radiation Research (CARR) at Prairie View A&M University (PVAMU) focuses on research in space radiation dosimetry, dosimetry instrumentation, and shielding and radiation effects on materials and electronic devices. CARR performs ground-based and flight experiments to explore space radiation effects on crew, spacecraft materials, and electronic devices and how to mitigate these effects. These experiments are performed at various radiation facilities including the NASA Space Radiation Laboratory at the Brookhaven National Laboratory, the Loma Linda Medical School Proton Therapy Facility, and the Los Alamos Neutron Science Center.

CARR research in radiation dosimetry uses a unique suite of instruments, known as proportional counters, which measure the radiation dose to small volumes of human tissue, carbon, bone, lead and silicon for various radiation environments. These instruments provide the Center the capability to make dosimetry measurements relevant to both human crew and electronic devices. The tissue equivalent proportional counter (TEPC) is functionally identical to instruments used on board the space shuttle and International Space Station (ISS). These instruments characterize the radiation environments in the Center's experiments and evaluate the shielding characteristics of relevant spacecraft materials. CARR researchers have flown TEPC instruments on high altitude balloons and developed a flight instrument for long duration balloon flights in Antarctica.

CARR research in materials focuses on new and existing materials that can be used for spacecraft structures and serve as radiation shields. This work is performed in collaboration with NASA/Langley and NASA/Johnson Space Center. At PVAMU, carbon composite made with simulated martian and lunar regoliths are fabricated for research purposes.

CARR research in the radiation effects on electronics focuses on new and emerging technologies with potential applications for human and robotic space flight. A current project studies radiation effects on new semiconductor materials such as ilmenite, which is a common lunar mineral. In addition, the radiation effects on the electronic properties of carbon nanotube materials are being investigated.

CARR research emphasizes the participation of undergraduate and graduate students in on-going projects and experiments. Student researchers participate in experimental work in the CARR labs and radiation facilities all over the world. This hands-on experience helps prepare them for their future careers in academia, government and industry. Along with working in the CARR labs, CARR students participated in experiments at a variety of radiation facilities and in the launching of a radiation instrument on board a high altitude balloon. CARR faculty and students also participate in outreach projects designed to enhance K-12 student interest in STEM in general and the space program in particular.

PROGRAM RELEVANCE TO NASA

One of the major obstacles to human exploration of the solar system is the detrimental effects space radiation can have on the human body. Space radiation can also temporarily upset, damage or even destroy electronic equipment used in both human and robotic missions. It is therefore vital for present and future long-term space missions that there are:

1. Accurate ways to characterize radiation environments and measure radiation dose;
2. Effective shielding strategies for humans and electronics with appropriate materials;
3. Methods for evaluating the radiation characteristics of present and emerging electronic technologies.

The CARR research program is focused on these requirements for present and future safe and successful space flight.

CARR also provides educational enhancement through research and infrastructure development in areas of interest to NASA. This helps prepares students, particularly African-American students, for careers in field where NASA will obtains its future diverse, highly skilled workforce in NASA-related fields.

PROGRAM BENEFITS TO SOCIETY

1. Perform fundamental and applied radiation research that will result in safer, more reliable, and more productive space missions.
2. Increase minority participation in the STEM disciplines through hands-on research experiences and through the development of academic programs of interest to NASA and the national economy.
3. Establish and maintain research capabilities at the university that will attract leveraged research funding to enhance sustainability and provide research opportunities for both undergraduates and graduate students.
4. Be a national resource in radiation research and education for NASA, other government agencies, industry, and academia.

PROGRAM ACCOMPLISHMENTS

During the reporting period, the CARR research program completed the following technical and educational accomplishments:

1. Performed some of the first radiation degradation experiments on carbon nanotube/polyethylene composites under heavy ion irradiation simulating exposure to galactic cosmic rays.

2. Developed new methods for measuring the radiation shielding effectiveness of materials in a high energy neutron environment, which would be relevant to exploration class missions.
3. Characterized TEPC radiation dosimetry instruments in a variety of radiation environments including the NASA Space Radiation Laboratory at Brookhaven National Laboratory.
4. Conducted experiments to study radiation induced defects in hafnium oxide-based electronic devices to study the potential use of electronic devices based on these materials for space applications.
5. Studied carbon composites with Martian and lunar regolith for their shielding properties and mechanical degradation properties; these measurements were part of a master's thesis.
6. Developed flight instrumentation for radiation dosimetry measurements on the NASA Deep Space Testbed high altitude balloon project.
7. In partnership with Texas Southern University, started development of a new student pipeline program in radiation science and engineering. Initial funding was secured from NASA for pipeline and curriculum development.
8. New classes in nuclear engineering were developed by CARR faculty investigator Dr. Sukesh Aghara. The content of these classes included discussions of space radiation and shielding.

STUDENT ACCOMPLISHMENTS

1. Students were co-authors on 6 conference papers and journal papers.
2. Twenty-one (21) undergraduate and eleven (11) graduate students participated in CARR research.
3. Six undergraduate students performed student internships with CARR during Summer 2005.
4. Nine (9) CARR students graduated, all were placed in STEM jobs or entered graduate school.
5. Two (2) students graduated with their Master of Engineering degree.

Curriculum Improvement Partnership Award (CIPA)

The Curriculum Improvement Partnership Award (CIPA) program funds innovative advances in the instructional areas of STEM. Jointly administered by NASA and the United Negro College Fund Special Programs Corporation (UNCFSP), CIPA assists minority colleges and universities in creating STEM programs that elevate institutional prestige, attract and prepare future generations of students for successful careers in the fields of science and technology.

Since its launching in 1999, CIPA has contributed more than ten million dollars to Innovative Programs at Minority Institutions. Thirty-seven institutions are now on the

CIPA honor roll. They represent a broad range of two and four-year institutions, serving underrepresented and underserved students engaged in various fields of training and study. Together these institutions are advancing the educational excellence that will lead to a new era of innovation and discovery.

CIPA's mandate is to increase the quantity and quality of STEM curricula at Minority Institutions. CIPA also sets ambitious goals to bolster the number of minority students at the pre-collegiate and collegiate levels who study these disciplines and pursue careers in NASA-related fields.

CIPA grantees receive up to \$300,000 over a three-year period. Recipients must demonstrate a significant impact on their institution's long-range development plans, must focus on the creation or improvement of NASA-related disciplines or areas of study, and must generate an increase in the number of NASA-related academic or technical degrees.

The 6 HBCUs participating in the CIPA Program achieved the following outcomes in FY 2004-2005 and the Summer of 2005:

- Implemented 12 curriculum development initiatives and created 6 new course offerings
- 760 students registered and completed one or more of the new course offerings

An Exemplary CIPA

Lincoln University

Successful Undergraduates in Courses Connected to Early System Sciences (SUCCESS)

PROGRAM DESCRIPTION

The Department of Agriculture, Biology, Chemistry and Physics in the College of Natural Sciences, Mathematics and Technology at Lincoln University has developed new courses related to earth system science and enhanced existing ones by including NASA data and other materials. New courses developed are Environmental Methods, Sampling and Data Analysis, Watershed Management and Water Quality, and Environmental Geology. Existing courses enhanced are Fundamentals of Geographic Information Systems, Fundamentals of Remote Sensing, and Environmental Monitoring and Remediation. These courses are part of the newly developed and approved B.S. program in environmental science. Some of them are also part of the existing minor in environmental science and the newly approved minor in Geospatial Information Science.

The school is also working to increase the numbers of minority undergraduate students who enroll in earth system science related courses and K-12 students exposed to earth system science. Five to ten undergraduate students, committed to taking a set of classes connected to earth system science, are recruited to serve as student assistants to the project. They are provided with mentoring, role-modeling, and networking opportunities so as to retain them and aid them in successfully completing earth system science related courses. To ensure the quality of teaching, faculty involved in teaching earth system science related courses are being retrained through summer courses for updating knowledge and technical skills. The SUCCESS project could serve as the

initial step toward creating the first minor in Earth System Science at an 1890 institution.

PROGRAM RELEVANCE TO NASA

The project aligns with the NASA Science Mission Directorate mission. The project also prepares underrepresented minority students in science, technology, engineering, and mathematics (STEM) and encourages them to consider academic and/or research careers in earth system sciences.

PROGRAM BENEFITS TO SOCIETY

The overall goals of this project are to (1) enhance undergraduate education in environmental science by strengthening Lincoln's curriculum in earth system science, and (2) to increase the number of underrepresented minority students exposed to earth system science.

PROGRAM ACCOMPLISHMENTS

In the two years since the NASA Office of Education awarded the Chairs of Excellence grant, the Program has become a premier model for developing and enhancing Lincoln's Earth Science curricula. The CIPA has yielded quantifiable results in:

1. the creation of a new BS program in Environmental Science, a new minor in geospatial information science, and an enhanced minor in environmental science;
2. improved quality of faculty by training the instructors;
3. the number of faculty seeking and being awarded more grant funds from 2 other sources;
4. the development of 2 new courses and the enhancement of 2 current course offerings; and
5. improved student learning as indicated by better grades, a reduced drop out rate, and student involvement in research activities.

STUDENT ACCOMPLISHMENTS

Students have secured scholarships, have won first place at scientific meetings, and have published over 25 abstracts, papers or proceedings.

Minority University and College Education and Research Partnership Initiative (MUCERPI) in Space Science

MUCERPI represents a critical step by NASA to broaden the participation of underrepresented groups and minority institutions in NASA research programs and missions and to encourage and foster the development of linkages among the NASA Science Mission Directorate, the space science research community, and minority institutions through the establishment of exchange programs and long-term partnerships. MUCERPI awards support programs in one of two broad categories: (1) Academic Program Development or (2) Faculty/Student Professional Enhancement and Development through Partnerships and Exchange Programs. The capabilities developed under this initiative may include research, undergraduate or graduate courses or degree programs, precollege or public outreach programs, and/or teacher training in space science.

Five HBCUs, first funded in FY 2001 under this initiative, were awarded 3-year renewals in FY 2004. These institutions were Alabama A&M University, Hampton University, Norfolk State University, South Carolina State University, and Southern

University and A&M College. New FY 2004 HBCU awardees were Fisk University, North Carolina A&T State University, and the University of the District of Columbia.

The most significant MUCERPI Outcome for FY 2005 was the following:

- MUCERPI awards resulted in 14 new academic courses relevant to space science.

An Exemplary MUCERPI Project

University of the District of Columbia

MUCERPI--Partnership for Space Science Program at UDC in Collaboration with Catholic University and NASA GSFC

PROGRAM DESCRIPTION

The program is designed to create a pipeline and inspire students from underrepresented minority groups and provide them access to space science instruction. The program at the University of the District of Columbia (UDC) is designed for middle school students, high school students, and pre-service teachers. The program also aims to provide space science related research and development opportunities for faculty and undergraduate students.

PROGRAM RELEVANCE TO NASA

Participants of the program, upon completion of their academic degrees, will provide NASA with a highly qualified pool of underrepresented minority candidates for other NASA research and education programs. UDC's outreach efforts to the K-12 education community will help in creating a pipeline by disseminating quality information on NASA education programs, opportunities, and resources to members of the underrepresented minority community.

PROGRAM BENEFITS TO SOCIETY

The UDC program will enhance and facilitate professional development for faculty and underrepresented minority students and expand space science coursework requirements in the pre-service teacher education program at UDC. These teachers will further aid in the development of the STEM pipeline by integrating what they learned from UDC's space science curriculum into their future classrooms thereby inspiring students' interest in STEM.

PROGRAM GOALS

One goal of the program at UDC is to expose middle schools to a well structured space science curriculum. Another goal is to provide high school students with an opportunity to visit a NASA Center to participate in NASA research projects. UDC also seeks to increase high school student enrollment in the UDC freshman level introductory astronomy course.

PROGRAM ACCOMPLISHMENTS

To date, UDC has developed a new introductory level astronomy course for freshmen and early college students at a partner high school; developed the syllabus for a course in physical science based on astronomy for pre-service education majors; hired a tenure-track faculty member for a future astronomy program; conducted research and seminars in space science; and established a lasting partnership with GSFC and Catholic University to create a pipeline for future space scientists and engineers.

An Exemplary Project

Harriett G. Jenkins Pre-doctoral Fellowship Program (JPFP)

PROGRAM DESCRIPTION

The Harriett G. Jenkins Pre-doctoral Fellowship Program (JPFP) launches the careers of aspiring scientists, mathematicians, and engineers. Since the program's inception in 2000, the JPFP has opened new worlds of opportunity to tomorrow's scientific pioneers. The JPFP is jointly administered by NASA and the United Negro College Fund Special Programs Corporation (UNCFSP) through a NASA Cooperative Agreement, was developed with a mission to increase the number of underrepresented persons with master's and doctoral degrees in science, technology, engineering and mathematics (STEM) disciplines in the NASA pipeline, and ultimately in our Nation's STEM workforce.

PROGRAM RELEVANCE TO NASA

With NASA and other federal agencies continuing to be concerned by a rapidly aging workforce, the JPFP addresses NASA's priorities and needs by producing vital resources in the form of human capital. As the JPFP continues on, nearly 150 underrepresented STEM graduates will access the NASA-related workforce pipeline.

PROGRAM BENEFITS TO SOCIETY

Recent studies by the National Center for Education Statistics show that master's degrees awarded to African-American (5.37%), Hispanic (3.29%), and Native American (0.39%) students and the number of doctoral degrees awarded to African-American (2.36%), Hispanic (2.14%), and Native American (.23%) continue to be alarmingly disproportionate in the STEM disciplines (*Digest of Education Statistics 2003, 2003, U.S. Department of Education, National Center for Education Statistics, <http://nces.ed.gov/programs/digest/d03/tables/dt271.asp>, February 17, 2005*). The JPFP successfully addresses the need for supporting, mentoring, coaching and nurturing of students during their graduate school experience resulting in 34 fellows receiving a Masters degree and 11 fellows completing Doctoral degrees in STEM disciplines.

PROGRAM GOALS

The program has four main goals:

1. To develop U.S. science, technology, and engineering expertise in ethnic and gender groups that are currently underrepresented in the STEM workforce, including those with disabilities;
2. To offset financial barriers for students underrepresented in STEM fields pursuing a graduate education;
3. To provide hands-on research experiences at NASA Centers; and
4. To expose students to the salient aspects of professional and career development.

PROGRAM ACCOMPLISHMENTS

JPPF continues to be successful in meeting or exceeding program goals and achieved the follow accomplishments during FY 2005:

1. Twenty (20) JPPF fellows received a NASA Research Award in 2005. Of that number, 2 fellows will continue their studies at an HBCU
 - a. One fellow is pursuing a Ph.D. in Computer Science at Morgan State University. She received her B.S. and M.S. from Morgan State as well.
 - a. Another fellow earned a Ph.D. in Electrical Engineering at North Carolina A&T University She also received her M.S. from North Carolina A&T.
2. Three (3) JPPF fellows have participated in a NASA internship. Two of these fellows are associated with an HBCU.
 - a. One fellow completed a Post Doctorate at Johnson Space Flight Center in Astrobiology, completed her Ph.D. studies at Texas Southern University and earned her Ph.D. in Environmental Toxicology.
 - b. Another JFFP fellow completed an internship in Atmospheric Science at Goddard Space Flight Center. He completed his B.S. in Computer Science at Elizabeth City State University and Master of Science at Hampton University.

STUDENT ACCOMPLISHMENTS

As a result of JPPF support students were able to achieve the following accomplishments during FY 2005:

3. Two (2) of the 5 JPPF fellows who received Ph.D. are associated with an HBCU.
 - a. One fellow received a Ph.D., M.S. and B.S. from Texas Southern University in Environmental Toxicology.
 - b. Another fellow, who completed her Ph.D. and M.S. at North Carolina A&T University, also attended South Carolina State University, where she received her B.S. (all in Electrical Engineering).
4. Three (3) of the 6 fellows who received a Master of Science in 2005 have ties to an HBCU.
 - a. One JFFP fellow earned a B.S. from Florida A&M University in Materials Science Engineering.
 - b. Another JFFP fellow has ties to both North Carolina A&T University, where she completed her graduate studies in Operations Research Science, and Spelman College where she received a B.S. in Mathematics.
 - c. One fellow completed a Ph.D. in Biomedical Engineering and received her B.S. in Mathematics from Fort Valley State University.