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H.R. 2183, MINORITY SERVING INSTITUTION DIGITAL AND WIRELESS TECHNOLOGY OPPORTUNITY ACT OF 2003

HEARING

BEFORE THE

SUBCOMMITTEE ON RESEARCH

COMMITTEE ON SCIENCE

HOUSE OF REPRESENTATIVES

ONE HUNDRED EIGHTH CONGRESS

FIRST SESSION

JULY 9, 2003

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H.R. 2183, MINORITY SERVING INSTITUTION DIGITAL AND WIRELESS TECHNOLOGY OPPORTUNITY ACT OF 2003

WEDNESDAY, JULY 9, 2003

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON RESEARCH,
COMMITTEE ON SCIENCE,
Washington, DC.

The Subcommittee met, pursuant to call, at 10:06 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Nick Smith [Chairman of the Subcommittee] presiding.

RESEARCH SUBCOMMITTEE
COMMITTEE ON SCIENCE
U.S. HOUSE OF REPRESENTATIVES

H.R. 2183, The Minority Serving Institution Digital and Wireless Technology Opportunity Act

Wednesday, July 9, 2003
10:00 AM
2318 Rayburn House Office Building (WEBCAST)

Witness List

Panel I

Honorable George Allen
Member
U.S. Senate

Honorable Edolphus Towns
Member
U.S. House of Representatives

Panel II

Dr. Fred Humphries
President
National Association for Equal Opportunity in Higher Education

Dr. Ricardo Fernandez
President
Herbert H. Lehman College-CUNY

Dr. Larry Earvin
President
Huston-Tillotson College

Dr. Dwight J. Fennell
President
Paul Quinn College

Panel III

Dr. Rita R. Colwell
Director
National Science Foundation

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HEARING CHARTER

SUBCOMMITTEE ON RESEARCH
COMMITTEE ON SCIENCE
U.S. HOUSE OF REPRESENTATIVES

H.R. 2183, Minority Serving Institution Digital and Wireless Technology Opportunity Act of 2003

WEDNESDAY, JULY 9, 2003
10:00 A.M.—12:00 P.M.
2318 RAYBURN HOUSE OFFICE BUILDING

1. Purpose

On Wednesday, July 9, 2003, the Research Subcommittee of the House Science Committee will hold a hearing to examine the technology infrastructure needs of minority-serving institutions (MSIs) and to consider H.R. 2183, the *Minority Serving Institution Digital and Wireless Technology Opportunity Act.*

2. Witnesses

Panel I

Senator George Allen (R–VA)

Congressman Edolphus Towns (D–NY)

Panel II

Dr. Fred Humphries is the President of the National Association for Equal Opportunity in Higher Education. Prior to joining NAFEO, Dr. Humphries served as President of Florida A&M and Tennessee State Universities for a total of more than 27 years.

Dr. Richardo Fernández is the President of Herbert H. Lehman College-CUNY and he will be testifying on behalf of the Hispanic Association of Colleges and Universities. Prior to joining CUNY-Lehman, Dr. Fernández served at the University of Wisconsin, beginning as an Assistant Professor of Cultural Foundations and rising to full Professor and Assistant Vice Chancellor for Academic Affairs.

Dr. Larry Earvin is the President of Huston-Tillotson College in Texas and he will be testifying on behalf of the United Negro College Fund.

Dr. Dwight J. Fennell is the President of Paul Quinn College in Texas. Prior to joining Paul Quinn, Dr. Fennell worked as a American Council on Education Fellow and he served in various capacities at Saint Augustine's College, ranging from Assistant History Professor to Vice President for Academic Affairs.

Panel III

Dr. Rita R. Colwell is the Director of the National Science Foundation (NSF). Before joining the Foundation, Dr. Colwell served as President of the University of Maryland Biotechnology Institute and Professor of Microbiology at the University Maryland. She was also a member of the National Science Board from 1984 to 1990.

3. Overarching Questions

The hearing will address the following overarching questions:

1. What is the Administration's position on H.R. 2183?
2. What is the state of networking, connectivity and technological preparedness at minority-serving institutions (MSIs)? Are major federal investments in this area warranted?
3. What are the principal findings of the Department of Commerce's review of Historically Black Colleges and Universities (HBCUs) and minority racial/ethnic populations?

4. How does H.R. 2183 propose to meet the needs of MSIs? How might federal assistance better complement existing initiatives by the states, localities and private sector?
5. How would H.R. 2183 ensure that federal spending is used to further the education and research mission of MSIs?

4. Brief Overview

- The term "digital divide" was popularized in the U.S. Department of Commerce series entitled *Falling Through the Net,* which documented the disparity in access to technology between whites and minority populations. Despite recent gains, our most recent data suggest that a digital divide still exists between racial and ethnic groups and it may be grower wider still.
- In particular, a recent survey by an association representing minority serving institutions found that Historically Black Colleges and Universities (HBCUs) trail behind other institutions of higher education, with limited access to networking and computer resources, less integration of technology into classroom activities and fewer students with access to their own computing resources. Other minority-serving institutions report technology problems similar to those of HBCUs.
- Minority-serving institutions award about one-fifth of all degrees and certificates to the minority populations they serve.
- H.R. 2183, the *Minority Serving Institution Digital and Wireless Technology Opportunity Act,* which would create a $250 million grant program at the National Science Foundation, seeks to help narrow the digital divide by building the technology infrastructure of these minority-serving institutions.
- One issue with H.R. 2183 is whether this program belongs in the National Science Foundation, which generally provides funds for research and education programs on a competitive basis to all institutions of higher education. H.R. 2183, on the other hand, is a set-aside for equipment, primarily for the benefit of minority serving institutions.

5. Background

Minority Serving Institutions

As defined by the Higher Education Amendments of 1998, minority serving institutions (MSIs) are institutions of higher education that have a combination of different minority groups that total at least 50 percent of their enrollment. MSIs fall into one of several categories. A Historically Black College or University (HBCU) is any black college or university that was established prior to 1964 and whose principal mission was, and is, the education of black Americans. There are currently 103 HBCUs in the U.S. There is no official designation of Hispanic Serving Institutions (HSIs) but the Higher Education Act identifies HSIs as accredited and degree granting institutions of higher education with at least 25 percent or more full time undergraduate Hispanic students. In 1999, there were 203 HSIs recognized by the Department of Education. Tribal Colleges and Universities (TCUs) were created to provide a quality education to American Indians and serve geographically isolated populations. The first TCU was created in 1968. Today, there are approximately 30 TCUs. Finally, the Higher Education Act defines Alaska Native Serving Institutions and Native Hawaiian Serving Institutions as those with an undergraduate student enrollment of at least 20 percent and 10 percent respectively.

MSIs have access to federal resources and monies that are not available to other institutions of higher education. Most significant, Title III of the Higher Education Act provides funds for institutions serving students from low income or racial minority backgrounds. Specifically, Part A authorizes funds for institutions that serve a high number of students receiving Pell grants. This program was funded at $81.5 million for FY 2003. Section 316 of Part A authorizes grants for TCUs: $22.8 million was appropriated for FY 2003. Similarly, Section 317 of Part A authorizes grants to Alaskan Native and Native Hawaiian institutions: $8.2 million was appropriated in FY 2003. Funds under Title III may be used for a variety of purposes, including the acquisition of educational technologies and the provision of educational services (such as faculty development in the use of these technologies). Part B provides 5-year formula grants to HBCUs. Authorized activities include education technology and related services and the program was funded at $214 million for FY 2003. Finally, Title V provides grants to HSIs and the uses of funds parallel Title III. The FY 2003 appropriation was $92.3 million.

Other smaller programs in the Department of Agriculture and the Department of Housing and Urban Development also support technology-related activities at minority serving institutions.

The Digital Divide

During the Clinton Administration, the U.S. Department of Commerce issued a series of reports that documented the existence of a "digital divide" among its citizens. For our purposes, the term "digital divide" describes the gap between the "information haves and have-nots," or between those Americans who use or have access to telecommunication technologies (e.g., computers, the Internet) and those who do not.

A July 2000 report, entitled *Falling Through the Net: Toward Digital Inclusion,* found that most groups of Americans were adopting the new technology, regardless of income, education, age or gender. Still, traditional "have-not" populations, including African-Americans and Hispanics, were experiencing a digital divide that persisted and, in some cases, grew. Whites were more likely to have access to the Internet from home than African-Americans or Hispanics from any location, with African-American and Hispanic households approximately one-third as likely as a household of Asian/Pacific Islander descent and roughly two-fifths as likely as white households. The 2000 report also found that the gap appeared to be growing wider, with the digital divide increasing slightly for African-Americans and Hispanics from their December 1998 rates.

The digital divide series prompted the National Association for Equal Opportunity in Higher Education (NAFEO), a non-profit public policy and advocacy group, to assess the computing resources, networking and connectivity of its member HBCUs. Of NAFEO's 118 member institutions, 80 HBCUs provided input into the study, known as the HBCU Technology Assessment Study. Funded by the U.S. Department of Commerce, the study found that 88 percent of HBCUs had access to T–1 lines, the minimum standard for connectivity and generally considered insufficient to support capabilities beyond Internet and World Wide Web connectivity. Larger bandwidth, for faster connections and more web-based applications, was available to half of reporting institutions.

The larger problem turned out not to be the availability of networking capacity, but rather its use. Only 7.5 percent reported using the high-speed lines even though they were available at half the institutions. Similarly, of the 29 percent of HBCUs with access to wireless technology, only 43 percent were using it. It was not clear why many HBCUs weren't using high speed connections even when it was available to them, but some speculated that it had to do with finance, lack of strategic planning, faculty motivation and training. Regardless of the reason, many schools reported minimal use of collaborative groupware, online registration, e-commerce, distance learning and connectivity with other libraries, state college systems or the Federal Government as a result of this lack of connectivity beyond the T–1 level.

In addition, the study found that none of the participating HBCUs required undergraduate students to own computers and only 15 percent recommended student computer ownership. As a result, the vast majority of HBCU students relied on institutional resources to connect to the Internet, World Wide Web or other networks; yet only 50 percent of the respondents reported providing "on-demand" student access to computing resources.

Although the report did not examine the need for an improved technology infrastructure at other MSIs, anecdotal information indicates that the problems at other MSIs mirror those at the HBCUs. Unfortunately, data are incomplete and the magnitude of the current need for all MSIs is somewhat difficult to quantify.

Current Issues

According to recent reports, 21 percent of all college degrees and certificates awarded to African-American, American Indian and Hispanic students are conferred by MSIs. For example, NAFEO member institutions award 29 percent of all Bachelor's degrees to African Americans in higher education, despite the fact that they enroll approximately 17 percent of all African-American students. Similarly, Hispanic-Serving Institutions (HSIs) award 42 percent of all degrees awarded to Hispanic graduates, and tribally-controlled colleges and universities (TCUs) award 19 percent of all associates degrees to American Indians.

Equally important, MSIs play an important role in the success of under-represented students in all disciplines, including science and engineering. For example, of African Americans earning Bachelor degrees in science, math, engineering or technology fields in 1996, 31 percent received them at HBCUs. Also, a high percentage of African Americans who go on to earn advanced degrees in science disciplines received their baccalaureate degrees at HBCUs. Similarly, HSIs produced 20 per-

cent of all science, math, engineering or technology Bachelor's degrees awarded to Hispanics in 1996.

These statistics are especially significant because minorities earn only one-tenth as many science and engineering doctoral degrees as their white counterparts. This at a time when up to 30 percent of the Nation's workforce now need to possess significant information technology skills to hold their jobs, and an estimated 50 percent of the Nation's jobs will require significant information technology skills within the next five years.

6. Legislation

On January 17, 2003, S. 196, The *Digital and Wireless Network Technology Act of 2003,* was introduced by Senator Allen to establish a $250 million per year grant program within the National Science Foundation to strengthen the ability of MSIs to provide instruction in digital and wireless network technologies. Senators McCain, Hollings, Campbell, Cochran, DeWine, Fitzgerald, Graham, Grassley, Hutchison, Lott, Miller, Santorum, Sessions, Stevens, Warner, Domenici, Talent and Kerry are cosponsors of the legislation.

On March 13, the Committee on Commerce, Science and Transportation reported S. 196 by voice vote and, on April 30, it passed the Senate by a vote of 97–0. According to the Congressional Budget Office, the cost estimate for fiscal years 2004–2008 is $823 million.

On May 21, 2003, Congressman Randy Forbes introduced bipartisan companion legislation to the Allen bill—H.R. 2183, the *Minority Serving Institution Digital and Wireless Technology Opportunity Act of 2003.* Representatives Alexander, Baker, Burns, Cantor, Clay, Filner, Hart, Hinojosa, Jackson-Lee, Owens, Payne, Pickering, Rogers (AL), Rush, Scott, Snyder, Vitter, Weller and Wilson are co-sponsors of the legislation. Congressman Edolphus Towns has introduced similar bipartisan legislation (H.R. 2272). Both bills have been referred to the House Science and the Education and the Workforce Committees.

7. Concerns

The Administration has raised concerns about the cost of the bill and about whether the National Science Foundation (NSF) is the appropriate agency to run the proposed grant program. (The Administration, however, did not release an official position on the bill while it was pending before the Senate.)

The concern is that NSF programs generally do not have set asides for particular types of programs and are not geared toward providing grants for general equipment purchases (i.e., purchases not connected with a particular research or education project).

Possible alternative locations for the program include portions of the Department of Commerce, including the National Telecommunications and Information Agency or the Technology Administration. Versions of the bill introduced in previous Congresses have placed the program in the Department of Commerce.

8. Section-by-Section—H.R. 2183

Section 1. Short title

Section 1 provides that the bill, if enacted, would be cited as the 'Minority Serving Institution Digital and Wireless Technology Opportunity Act of 2003.'

Section 2. Establishment of office

Establishes an Office of Digital and Wireless Network Technology within the NSF to serve the following purposes: to strengthen the ability of eligible institutions to provide instruction via digital and wireless networks through grants, contracts, or cooperative agreements; and to strengthen the national digital and wireless infrastructure by increasing national investments in eligible institutions.

Section 3. Activities supported

Authorizes the Office of Digital and Wireless Network Technology to award grants, contracts, or cooperative agreements to eligible institutions. Eligible grantees would be allowed to use such awards for the following purposes:

To acquire equipment, instrumentation, networking capability, hardware and software, digital network technology, wireless technology, and infrastructure;

To develop and provide educational services for students or faculty seeking an approved degree or certificate;

To provide teacher education, library and media specialist training, and preschool and teacher aid certification to those individuals who want to acquire or enhance technology skills for use in the classroom;

To implement joint projects and consortia to provide technology education to a State or State education agency, local education agency, community-based organizations, national non-profit organizations, or businesses, including minority businesses;

To provide professional development to administrators and faculty of institutions with institutional responsibility for technology education;

To provide eligible institutions with capacity-building technical assistance through remote technical support, workshops, distance learning, new technologies, and other technological applications;

To foster the use of information communications technology to increase scientific, mathematical, engineering, and technology instruction and research; and

To develop proposals to be submitted under the Act and to develop strategic plans for information technology investments.

Section 4. Application and review procedure

Requires that for an institution to be eligible to receive a grant, contract, or cooperative agreement, it must submit an application to the Director. Such an application would be submitted according to requirements developed by the Director. The Director, along with the Advisory Council established under subsection (b), would establish a procedure for acceptance and notification as well as a statement regarding the availability of funds.

Requires the Director to establish an Advisory Council. The Advisory Council would be responsible for advising the Director on the best ways to involve eligible institutions in the activities described in section 3. In selecting the members of the Advisory Council, the Director may consult with representatives of appropriate organizations, including representatives of eligible institutions, to ensure that the membership of the advisory council reflects participation by technology and telecommunications institutions, minority businesses, communities of eligible institutions, federal agency personnel, and other individuals who are knowledgeable about eligible institutions and technology issues.

Requires each institution awarded a grant, contract, or cooperative agreement under section 2 to provide the new Office of Digital and Wireless Technology with any relevant institutional statistical or demographic data it requests.

Requires the Director to hold an annual meeting with those institutions that receive awards. Such meetings are expected to foster collaborations and promote capacity building activities among eligible institutions, allowing for the dissemination of information and ideas.

Section 5. Matching requirement

Requires that when an institution is awarded a grant, contract, or cooperative agreement by the Director, it make available non-federal contributions in an amount that is 25 percent of the award or $500,000, whichever is less. The matching requirement is waived for any institution with no endowment, or an endowment worth less than $50,000,000.

Section 6. Limitations

An institution awarded more than $2,500,000 shall not be eligible for another grant, contract, or cooperative agreement, until every other eligible institution that has applied for an award has received one. Even when each grant, contract, or cooperative agreement has been awarded for the implementation of a consortium or joint project, the funding shall be made available to, and administered by, an eligible institution.

Section 7. Annual report and evaluation

Requires each institution awarded a grant, contract, or cooperative agreement, to submit an annual report to the Director detailing its use of the funding.

Requires that the Director, in consultation with the Secretary of Education, review the reports required under subsection (a) and evaluate the program authorized by section 3 on the basis of those reports every 2 years.

Requires that the Director, as part of the evaluation of subsection (b), describe the activities undertaken and assess the short- and long-range impact of activities carried out with the use of the awards on the students, faculty, and staff of the institutions.

Requires the Director to submit a report to Congress based on the evaluation. The report shall include such recommendations, as may be appropriate, including recommendations concerning the continuing need for federal support of the program.

Section 8. Definitions

Defines the terms 'eligible institution,' 'Director,' and 'minority business.' The term 'eligible institution' is as defined in the Higher Education Act of 1965 (20 U.S.C. 1061(2)). The term 'Director' means the Director of the National Science Foundation. The term 'minority business' includes HUBZone small businesses as defined in section 3(p) of the Small Business Act (15 U.S.C. 632(p).

Section 9. Authorization of appropriations

Authorize $250,000,000 to the Director of the NSF for each of fiscal years 2004 through 2008, to carry out the Act.

Chairman SMITH. The Subcommittee on Research will come to order. It is a pleasure to welcome everyone to our hearing this morning on an issue of importance to, certainly, everybody, but especially, members of the Science Committee and the Research Subcommittee in particular. The role of technology in helping to create a diverse and scientific literate workforce is very important to our country's future.

We are all here today because we believe in the value of technology to improve commerce, the public sector, and even how citizens interact. And we recognize that many of our nation's smaller colleges and universities, certainly, those serving minorities, face challenges in meeting the ever evolving advanced technology requirements important to educating and preparing a 21st century workforce. These technological challenges have collectively become known as the "Digital Divide", and today we are going to examine the impact that the digital divide is having on our workforce, as well as some proposed solutions to the problem.

Let me just say that from the outset this committee has long recognized the importance of education in science, mathematics, engineering, and technology for all students. In fact, our National Science Foundation legislation that was signed into law last December 22, and originated in this subcommittee, included the Tech Talent and Math and Science Partnership legislation that is going to help implement our best efforts and best knowledge in stimulating an interest and the ability of K through 12 students.

That said, it would be a mistake to rest on our laurels. It is estimated that up to 30 percent of our nation's workforce now need to possess significant information technology skills if they are going to hold their jobs, and within the next five years, an estimated 50 percent of the Nation's jobs will require significant IT, information technology, skills if they are going to survive and if we are going to compete in the new challenges of a world economy. Unfortunately, many are not being adequately prepared and that is part of our discussion on legislation that has been introduced both in the Senate by Senator Allen and also here in the House.

According to recent statistics, minorities earn proportionately less science and engineering doctoral degrees and advanced degrees in math and science than their counterparts. The legislation before us today would attempt to address this problem by providing grants to strengthen the technology infrastructure and the ability to provide instruction and education technology to minority students in this country.

I embrace the goals of this legislation, but recognize that the so-called digital divide is more complex than it might first appear. Foremost, I want to take a close look at the limited dollars we have available and make sure they are appropriately targeted to solving the problem at hand and that taxpayer support be results oriented.

And I believe that the digital divide is a challenge that, if the Federal Government is to be involved, should be addressed on the basis of a school's financial need to provide, if you will, connectivity, networking, and other technologies to their students, not on the race and/or ethnicity of its student population. To be sure, many minority serving institutions do not have the depth and breadth of financial resources that large research universities have

and other colleges across this country, and that needs to be one of our goals and considerations. But we also know that not all minority serving institutions are poor and that hundreds of other smaller and rural colleges also face the challenge of bridging the digital divide.

In conclusion, I don't want to make false assurances to our minority-serving colleges and universities. The fact is that the effective use of technology and educational setting is not inexpensive. It is going to take a coordinated effort, one that involves institutions, governments, and the private sector to motivate and train more students to bridge this technology divide.

In an effort to strengthen the technology infrastructure at the minority serving institutions, I think we want to ensure that we do not inadvertently reduce the very programs in this committee's jurisdiction that help elementary and secondary school students be better prepared in science and math.

Without objection, the rest of my statement will be included in the record at this point, and I would ask Representative Johnson for her comments.

[The prepared statement of Chairman Smith follows:]

PREPARED STATEMENT OF CHAIRMAN NICK SMITH

It is a pleasure to welcome you to our hearing this morning on an issue of importance to the members of the Science Committee and the Research Subcommittee in particular—the role of technology in helping to create a diverse and scientifically literate workforce.

We are all here today because we believe in the value of technology to improve commerce, the public sector, and even how citizens interact. And we recognize that many of our nation's smaller colleges and universities, including those that serve minorities, face challenges in meeting the ever evolving advanced technology requirements important to educating and preparing a 21st century workforce. These technological challenges have collectively become known as the "Digital Divide," and today we will examine the impact the digital divide is having on our workforce, as well as some proposed solutions to this problem.

Let me just say from the outset that this committee has long recognized the importance of education in science, mathematics, engineering and technology for all students. In fact, last year, our National Science Foundation legislation that the President signed into law, and which originated in this subcommittee, included the "Tech Talent" and "Math and Science Partnerships" legislation—significant programs to educate and inspire our young people, and women and minorities especially, to become scientists, engineers and mathematicians.

That said, it would be a mistake to rest on our laurels. It is estimated that up to 30 percent of the Nation's workforce now need to possess significant information technology skills to hold their jobs, and within the next five years, an estimated 50 percent of the Nation's jobs will require significant information technology skills. Unfortunately, many are not being adequately prepared to meet this demand. According to recent statistics, minorities earn proportionately less science and engineering doctoral degrees as their non-minority counterparts.

The legislation before us today would attempt to address this problem by providing grants to strengthen the technology infrastructure—and the ability to provide instruction in education technology—to minority serving institutions through a new grant program at the National Science Foundation.

I embrace the goals of this legislation but recognize that the "digital divide" issue is more complex than it might first appear. Foremost, I want to take a close look at the limited dollars we have available and make sure they are appropriately targeted to solving the problem at hand and that taxpayer support be results-oriented.

And I believe that the Digital Divide is a challenge that, if the Federal Government is to be involved, should be addressed on the basis of a school's financial need to provide connectivity, networking, and other technologies to their students, not on the race and/or ethnicity of its student population. To be sure, many Minority-serving institutions do not have the depth and breadth of financial resources that large research universities have. But we also know that not all Minority-serving Institu-

tions are poor, and that hundreds of other smaller and rural colleges also face the challenge of bridging the digital divide.

In addition, I do not want to make false assurances to our minority serving colleges and universities. The fact is that the effective use of technology in educational settings is not inexpensive. It will take a coordinated effort—one that involves institutions, governments, and the private sector—to motivate and train more students to bridge the technology divide.

And in our efforts to strengthen the technology infrastructure at minority serving institutions, I want to ensure that we do not inadvertently reduce the very programs in this committee's jurisdiction that help elementary and secondary school students be better prepared in science, math, engineering and technology education. With regard to this, creating a competing program in NSF's Education and Human Resources Directorate could be a problem.

Finally, and most important, I want to ensure that these scarce federal resources are used to improve the technological literacy of students and faculty. In our discussions about bandwidth and connectivity, I hope we will remain mindful of the fact that bridging the digital divide is more than making technology available: it is using technology to improve education, make students more technologically literate and better equip them to solve problems in the community and work productively.

Working together, I am confident that we can address concerns while also ensuring a better future for the students and faculty at minority serving institutions.

With that, I am pleased to welcome all of our distinguished witnesses to our subcommittee hearing. And I especially want to thank Senator Allen and Representative Forbes, a member of our Committee, and Representative Towns—who are with us today—for their thoughtful leadership on the legislation before us today and their continued efforts on behalf of minority serving institutions. I look forward to the testimony.

Ms. JOHNSON. Thank you very much, Mr. Chairman, and let me express my appreciation for you calling this committee hearing, and welcome our distinguished guests—distinguished witnesses this morning.

Minority serving institutions will prepare a growing portion of the future science and technology workforce simply because demographics dictate that minority students will comprise a greater and greater share of the Nation's college-age population. It is in the national interest to ensure that minority serving institutions have the capability to provide a quality education for their students. This includes the presence of an information infrastructure capable of supporting distance learning, research collaborations with partner institutions, and remote access to educational resources and national research facilities.

Unfortunately, the capability does not exist at most minority serving institutions. A recent report from the National Telecommunications and Information Administration [NTIA] documents the deficiencies in the information infrastructure of these colleges and universities. Although most institutions have some Internet access, it is generally not the high speed access necessary to support distant education and research applications. More troubling, half of these institutions have no plan in place for upgrading the information technology infrastructure. Since minority serving institutions have significantly smaller budgets than other higher education institutions, and therefore, less money for information technology support and upgrades, they would inevitably, fall further behind as the technology continues its rapid advance.

The legislation on review today seeks to address this problem by providing grants to minority serving institutions for information technology upgrades and for training faculty and staff to use the technology effectively in support of their education and research activities. This morning, we will review why the program authorized

by H.R. 2183 is needed and will discuss how best to implement it. I solicit the comments and recommendations of our witnesses on ways to improve the legislation to make the program more effective.

Mr. Chairman, I want to thank you again for calling this hearing and for your intent to move this legislation expeditiously by scheduling a Full Committee Markup next week. I also thank our witnesses for appearing before the Subcommittee and I look forwards to our discussion. Thanks again, Mr. Chairman.

[The prepared statement of Ms. Johnson follows:]

PREPARED STATEMENT OF REPRESENTATIVE EDDIE BERNICE JOHNSON

Mr. Chairman, I am pleased to join you in welcoming our witnesses today to review this important legislation.

Minority serving institutions will prepare a growing portion of the future science and technology workforce, simply because demographics dictate that minority students will comprise a greater and greater share of the Nation's college-aged population.

It is in the national interest to ensure that minority serving institutions have the capability to provide a quality education for their students. This includes the presence of an information infrastructure capable of supporting distance learning, research collaborations with partner institutions, and remote access to educational resources and national research facilities.

Unfortunately, the capability does not exist at most minority serving institutions. A recent report from the National Telecommunications and Information Administration [NTIA] documents the deficiencies in the information infrastructure of these colleges and universities. Although most institutions have some Internet access, it is generally not the high-speed access necessary to support distance education and research applications. More troubling, half of these institutions have no plan in place for upgrading their information technology infrastructure. Since minority serving institutions have significantly smaller budgets than other higher education institutions, and therefore less money for information technology support and upgrades, they will inevitably fall further behind as the technology continues its rapid advance.

The legislation under review today seeks to address this problem by providing grants to minority serving institutions for information technology upgrades and for training faculty and staff to use the technology effectively in support of their education and research activities.

This morning we will review why the program authorized by H.R. 2183 is needed and will discuss how best to implement it. I solicit the comments and recommendations of our witnesses on ways to improve the legislation to make the program more effective.

Mr. Chairman, I want to thank you for calling this hearing and for your intent to move the legislation expeditiously by. I also thank our witnesses for appearing before the Subcommittee today. I look forward to our discussion.

Chairman SMITH. Thank you, Representative Johnson, and we have scheduled, not next week but the week after next, have scheduled for the full Committee. Without objection, Representative Forbes, who is a member of the Science Committee will sit with us in this subcommittee because of his interest and leadership in this particular issue. And Mr. Forbes, I am going to ask for your comments, but before that, I will yield to Mr. Gutknecht for about a minute for his comments, since he has to leave also.

Mr. GUTKNECHT. Mr. Chairman, thank you very much, and I want to congratulate the authors of this legislation. I want to thank you for having this hearing. And I apologize on behalf of other Members of this subcommittee. The attendance is not going to be what it really should be. This is a very important issue. Unfortunately, I have a Budget Committee meeting going on right now and I am going to have to leave as well. But I think this does

get to a pretty fundamental question, and that I think philosophically bridges a lot of territory.

The argument sometimes around here is between equality of opportunity and equality of result. I don't think we can guarantee equality of result, but we do have a responsibility to guarantee equality of opportunity. And if we are in the information age, and if research is going to become an increasingly important component of higher education, it seems to me we need to do everything we can to make certain that students that go to any university or any college in the United States, regardless, at least have the opportunity to have access to that information.

So this is a very important piece of legislation. I want to thank you for bringing it forward. Hopefully, we can move it along. And with a little help from the appropriators, can perhaps get something done this year. Thank you very much.

Chairman SMITH. And your comments, Representative Forbes.

Mr. FORBES. First of all, Mr. Chairman, let me thank you and Ranking Member Johnson for holding this hearing today. I am also grateful for our witnesses for joining us today to discuss H.R. 2183. I want to particularly thank Senator Allen, my colleague, Congressman Towns for testifying before the Committee today.

As we have heard mentioned, full access to technology has become the standard, not a bonus, in how we communicate and do our jobs every day. Right now, 60 percent of all jobs require information technology skills, and information technology jobs pay significantly higher than jobs in non-technology related fields. Yet, minority serving institutions often lack the basic information and digital technology infrastructure needed to provide their students the necessary skills and access to compete and qualify for America's best paying jobs.

A recent article published in the Chronicle of Higher Education highlights the need for this legislation. At the University of Virginia, there are 62 people to assist with the development, use, and maintenance of campus information technology. At Virginia Union, an historically black college with half the enrollment of the University of Richmond, has a computing staff of four for the entire school. At Virginia State University, which is located in my district, only 10 percent of the students own computers, while 96 percent of the students own computers at the University of Richmond.

Mr. Chairman, I just want to close by saying that whenever we get an issue like this, it is often times easy for us to agree on the goals. It is hard for us, though, to come together on the specifics. In this particular case, we can find all kinds of reasons to differ over the specifics and the details, but if we do and we take our eyes off the goal, we are going to lose that goal and it is not going to become a reality. I think this piece of legislation should move forward, and if it does, it is going to move a long way to providing the digital infrastructure that we need at our historically black colleges.

[The prepared statement of Mr. Forbes follows:]

PREPARED STATEMENT OF REPRESENTATIVE J. RANDY FORBES

Thank you, Chairman Smith and Ranking Member Johnson, for holding this hearing today. I am also grateful to our witnesses for joining us today to discuss H.R. 2183, the *Minority Serving Institution Digital and Wireless Technology Opportunity*

Act of 2003. I would also like to thank Senator Allen and my colleague Congressman Town for testifying before the Committee today.

Full access to technology has become the standard, not a bonus, in how we communicate and do our jobs everyday. Right now, 60 percent of all jobs require information technology skills and information technology jobs pay significantly higher than jobs in non-technology related fields, yet minority-serving institutions lack the basic information and digital technology infrastructure needed to provide their students the necessary skills and access to compete and qualify for America's best paying jobs.

H.R. 2183 would help provide essential resources to address the technology gap that exists at many minority-serving institutions by providing $250 million in grants Historically Black Colleges and Universities, Hispanic Serving Institutions and Tribal Colleges and Universities. The program would offer opportunities to these institutions for activities such as computer acquisition, campus wiring and technology training. Each of these activities is an important step towards bridging the digital divide.

A recent article, published in the *Chronicle of Higher Education,* highlights the need for this legislation. At the University of Richmond there are 62 people to assist with the development, use, and maintenance of campus information technology. At Virginia Union, a historically black college with half the enrollment of the University of Richmond has a computing staff of four for the entire school. At Virginia State University, which is located in my district, only 10 percent of the students own computers, while *96 percent* of the students own computers at the University of Richmond.

A study completed by the Department of Commerce and the National Association for Equal Opportunity in Higher Education indicates that no historically black college or university requires computer ownership for their undergraduate students; 13 HBCUs reported having no students owning their own personal computer; over 70 percent of the students at historically black colleges and universities rely on the college or university to provide computers, but only 50 percent of those universities can provide their students with access to computers. While this study did not address the needs of other MSIs, there is anecdotal evidence that other MSIs have the same problems as those found at HBCUs.

This legislation is a start in the right direction. I look forward to working with each of you to come up with a solution to solve this problem.

Again, I would like to thank Chairman Smith and Ranking Member Eddie Bernice Johnson for holding this important hearing on this pressing issue for our nation's minority-serving institutions.

Chairman SMITH. Thank you. And Senator Allen, we realize you have other meetings, so please proceed with your comments.

Panel I

STATEMENT OF GEORGE ALLEN, A UNITED STATES SENATOR FROM THE STATE OF VIRGINIA

Senator ALLEN. Thank you, Mr. Chairman, Chairman Smith, Ranking Member Johnson, other members of the Committee, and Congressman Forbes. It is great to be with you all and thank you for holding this hearing. It is good to be back in the people's House where I once served for a whole 14 months. It is great to be with you all and I really do thank you all for holding this hearing. I, particularly, want to thank Congressman Forbes for introducing H.R. 2183, which is the companion of Senate Bill 196, the Minority-Serving Institution Digital and Wireless Technology Opportunity Act, which passed the Senate on a vote of 97 to nothing. And the report of the Senate Committee on Commerce and Science and Transportation I think would be good reading for you all. The important background that your staff has done here in this committee, the Subcommittee, is very helpful as well.

As Congressman Forbes said, the goal of our legislation, of this legislation, is very clear. We want to increase access to technology

and address the technological deficiencies that exist at minority serving institutions and provide our young people, regardless of their ethnicity, regardless of their race, with important tools for success not just in college but in succeeding in life and the workforce.

Now, these initiates you can call it the digital divide. The way I look at this is it is an economic opportunity divide. It is, generally, an economic matter. It has manifested itself in colleges and universities, what you may see in the general public as far as access to the Internet, what you see in the general population insofar as computer ownership and all the rest, and it gets even manifested in greater intensity when you look at the facts, and figures, and statistics insofar as minority serving institutions.

I know the Members of this committee, the Subcommittee on Research, as well as Chairman Boehlert and all the folks on the House Science Committee, know better than most in Washington that the demand for workers in science and technology continues at a steady pace. The facts are that African-Americans, Hispanics, and American Indians constitute one-quarter of the total United States workforce and 30 percent of college-age population. It is estimated that in 10 years, these minorities will comprise nearly 40 percent of all college-age Americans. Yet, African-Americans, Latinos, American Indians comprise only seven percent of the U.S. computer and information science workforce, only six percent of the engineering workforce, and less than two percent of the computer science faculty. As Congressman Forbes said, 60 percent of all the jobs out there require technological proficiency, and clearly, those IT jobs pay more than the non-IT jobs. We have over 200 Hispanic-serving institutions, over 100 historically black colleges and universities, and 34 tribal colleges throughout our land. It is clear that minority serving institutions provide a valuable service to the educational strength and the future growth of our nation. These institutions must have the capabilities and the infrastructure available for their students, and as well as their faculty and even to attract faculty, so that those students can compete and succeed in today's workforce.

My view is we need to tap that under-utilized talent that we have in this country. I am in favor of the H–1B visas to bring in workers from overseas because of the demands of technology, but when you recognize the absolute truths and facts, there are millions of Americans with the proper training, with the proper education, that can get those good jobs, those good paying jobs right here in our own country. And the fact of the matter is, in particular, for the historically black colleges and universities, they are a legacy of the days of separate but unequal. They do not have the endowments, they do not have for the most part the foundations to pay for it so they are behind. Their students don't have the aid to get their own computers. And that is why we put in this bill the requirement that if anybody, any college or university has a $50 million endowment or more, there needs to be matching funds. So there is that aspect of economics to it.

And Hampton University in Virginia is one of those that does have it. They weren't real pleased with this. They said why in the heck should we have to do it. I said, look, this is better than what

you have otherwise, so the president wisely said, okay, we will go along with it. But gosh, just because we have a bigger foundation, we have done all this, why should we have matching funds. I said, it is an economics issue, it makes sense. But most students don't have computers so they are queued up in computer labs and that is why that infrastructure needs to be improved there. They also don't have the professors.

And Congressman Forbes mentioned the *Chronicle for Higher Education,* and Mr. Chairman, I would like the June 27, 2003 article entitled, Playing Catch Up, in the Chronicle for Higher Education be made a part of the record.

Chairman SMITH. Without objection, so ordered.

[Note: The article referred to appears in Appendix 2: Additional Material for the Record.]

Senator ALLEN. And it does show the difference between Virginia Union, an historically black college and university, compared to University of Richmond, both private colleges in Richmond. And I venture to say that if you compare Texas Southern to Texas Tech, or Florida A&M to Florida State, or Virginia State and Virginia Tech, you would see these vast disparities in opportunity and infrastructure. I will say that this has been supported by the Information Technology Association of America, ITAA, Computer Associates International, Oracle, Gateway, Bearing Point Technologies, Motorola, as well as others in the minority-serving associations.

There were some concerns by some, including our colleague here, Congressman Towns, insofar as a peer review process at the National Science Foundation. We do have that peer review while providing flexibility needed to administer the grant program. We are working—also, they would be working with the Advisory Council that was created in the bill. And our hope is to provide the NSF with a maximum amount of flexibility to develop an equitable and fair process for evaluating these grants while ensuring that any peer review panel include members from minority serving institutions.

So let me close with this, Mr. Chairman and Members of the Committee. A lot of us talk about doing something about the digital divide or the economic opportunity divide. There is a lot of talk, there are a lot of studies, a lot of facts, statistics, and a whole lot of rhetoric. With this measure that Congressman Forbes has introduced and the measure we got passed in the Senate, we recognize the time is now for action; not talk, but action—positive constructive ideas that will tangibly improve the educational opportunities for students and faculty at minority serving institutions across this country.

We need to provide that access, that better technology. And I trust, Mr. Chairman, with your leadership and that of Congressman Forbes, with this initiative, the Minority Serving Institution Digital and Wireless Technology Opportunity Act, with this measure we can truly help close that opportunity gap, that economic opportunity gap, here in the United States of America. We will see the tangible difference in positive improvements in those campuses and will help make sure that no college student is left behind.

I thank you, Mr. Chairman and all the Members of the Committee.

DISCUSSION

Chairman SMITH. With the permission of the Committee, and Representative Towns, with your permission, I would—since Senator Allen is on a tight schedule, if we might ask Senator Allen any questions the Committee might choose to ask, and then we will proceed with Representative Towns.

And Senator Allen, one question I have is how do we get some of these minorities into those colleges? We have started this partnership act, and it seems to me that it is very important that we look at ways to encourage and inspire, and if you will, put some kind of an effort to encourage more minority students to take an interest in science and math in the K through 12 and get them into college to accommodate the additional requirements of this.

How do we do something like this for the K through 12 effort to encourage more minority students, including women, to get into the science and math arena?

Senator ALLEN. We actually had a hearing on that in the Senate as well, my friend, Senator Wyden. I think that the basic K through 12 needs to have an increased emphasis and accountability in science and mathematics, as well as economics, and social studies, and language arts. And all of that is very important. And that is, primarily, in my view, a function of state governments working with administration of it by local governments. And so in Virginia, Senator—I keep calling him Senator Forbes—Congressman Forbes was a big ally when we put in high academic standards, and you can't leave any child behind. We don't want students being graduated from grade to grade without knowing the essentials of science and mathematics, as well as being able to read, and write, and speak the English language well, and know about major civilizations of the world and economics and technologies.

So in Virginia, we have the technology standards. Obviously, the academic standards in math, science, social studies, and language arts. We did have to get more graphing calculators for those who could not afford them because of the higher math standards. We had to provide also for different science probing kits for the science standards. And so you do have to invest in that area. Then you have to make sure that these students recognize, hey, there are good paying jobs here. There is something relevant to all of this. Why am I studying all of this? Well, there is a relevance, whether it may be interesting them to get into aeronautics, or nanotechnology, computer sciences, and others. But if they have that basic understanding when they go on to college to either become teachers or enter the field of work in the private sector, for African-Americans in particular, at least from my experiences and it is borne out by the facts in talking to Congresswoman Johnson, many of the historically black colleges and universities are nabbing you. It is a tradition, maybe their families went there, but still, it is a very important component in higher education. And if they then get there and they don't have, as Congressman Forbes said, the professors there, and they can't attract the professors because they don't have the infrastructure, what they are doing is just really limiting that higher education. Because the more education

someone gets, it is just proven by facts the more knowledge one has, the better jobs they have. That is the good logic to it all.

So K through 12 is important. This addresses, though, higher education, and higher education is where you fine tune those schools for those who do want to get those computer sciences or engineering jobs. But if you don't have the faculty because you don't have the critical technological infrastructure, the students may be doing fairly well, but they are really missing out on the opportunities to get the training, the education, that when they graduate from, whether it is Virginia Union, or Norfolk State, or Texas Southern, or Grambling, or Albany State, or the Mississippi Valley State, or Jackson State—we could go on for many of the schools—then they are not going to be able to get those good paying jobs and contribute to our society. So this is a comprehensive approach. It is focused on higher education and it is a great opportunity that I think we can make that positive impact on their lives and the security of our country, economic as well as national security.

Chairman SMITH. I agree. Senator, my staff nudged me and said that they had promised that you could leave by 20 after, but if there is a quick question for Senator Allen, I will accept it. Senator Allen, thank you very much for your leadership on this issue and for testifying before our subcommittee.

Senator ALLEN. Thank you, Mr. Chairman. I look forward to working with you and Congressman Forbes to get this over the goal line. Thank you.

Chairman SMITH. We will do it week after next. Congressman Towns, thank you for being here and for your leadership on this issue.

STATEMENT OF EDOLPHUS TOWNS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK

Mr. TOWNS. Thank you very much.

Chairman SMITH. Is your button on?

Mr. TOWNS. Thank you, Mr. Chairman and Ranking Member Johnson. Let me begin by expressing my appreciation to testify before you today with Senator Allen. In the 107th Congress, Senator Cleland and I decided it was time to do something about the lack of technological resources at our nation's MSIs. While our bill did not pass in the last Congress, I was pleased that we had strong bipartisan support in the Senate, including Senator Allen from Virginia, Chairman Young from Alaska here in the House.

This year, Senator Allen advanced the cause by introducing S.196, which placed a similar program in the National Science Foundation. I would first like to thank and congratulate Senator Allen for doing that, for his fine work, and I have been pleased to have the opportunity to work with him on the legislation, which passed the Senate a few weeks ago, 97 to 0.

While I support the effort of Senator Allen and my colleague, Congressman Forbes, I would like to briefly comment on the one difference in our two bills. It is on the issue of peer review. Peer review is the manner by which members of the MSI community would be able to advise the National Science Foundation on which school should receive this grant money. It is important, Mr. Chairman, as opposed to reviewers from large research universities who

do not have any familiarity with the MSI community. Similar language was included in the bill last Congress, which was supported by Senator Allen and myself.

It is my understanding that the NSF has concerns with the notion of a peer review provision, however, I believe the past record of performance by NSF argues strongly for a peer review provision. For example, in the year 2000, numbers suggest that only 1.29 percent of eligible NSF monies went to historically black colleges and universities. In Fiscal Year 2002, the representation of racial and ethnic minority reviewers who make decisions on grant recipients was approximately 1,100 individuals from a pool of over 37,000. These statistics definitely suggest that there is, in fact, a need for reviewers from MSIs to participate in a peer review process, which for this program goes beyond a mere advisory capacity.

I might add further, Mr. Chairman, I know that some have argued that this program may be better suited for placement in the Department of Commerce rather than NSF. As one of the authors of last year's bill, I do believe the MSIs would reap greater benefit from a program that was not limited to solely funding academic enhancements for science, research, and development, which would be the case if the program became part of NSF. Let me reiterate that last year's bill contained a peer review provision, because the Commerce Department did not have a record of interaction with MSIs.

I would certainly encourage the Committee to explore both the Commerce Department and the NSF as agencies which could house this program. I would also again stress that there remains a need for the inclusion of a peer review provision regardless of where the program is located.

Mr. Chairman, the legislation before us today reflects the need for a program that will help countless students at MSIs across the country regardless of where it is located. Just as the government has a responsibility to ensure that students have up-to-date textbooks and classrooms, we must also ensure that all of our students have access to modern technology services. I want to emphasize that my interest in this legislation is focused on creating opportunities available for all MSIs, not just those few who may have established themselves as elite research universities. If we all work together, this basic principle can be achieved if we make the commitment to do it.

I would once again like to thank Senator Allen and my colleague, Congressman Forbes, for their leadership on this issue, and look forward to working with them to enact legislation that would truly help lift all of these schools into the 21st century. I thank you, Mr. Chairman, for allowing me the opportunity to testify, and I agree with my colleague, Senator Allen. I think that the time for action is now, and I think that we should move as quickly as possible. And on that note, I yield back the balance of my time.

[The prepared statement of Mr. Towns follows:]

PREPARED STATEMENT OF REPRESENTATIVE EDOLPHUS TOWNS

Thank you Chairman Smith and Ranking Member Eddie Bernice Johnson and I appreciate the opportunity to testify before you today with Senator Allen regarding H.R. 2183.

Long before coming to the United States Congress, I have been intimately involved with our nation's Minority Serving Institutions or "MSIs," specifically His-

torically Black Colleges and Universities, not only graduating from North Carolina A&T but also serving on Shaw University's Board of Trustees and assisting for years in fundraising for the United Negro College Fund, now headed by our former colleague Bill Gray.

In the 107th Congress, Senator Cleland and I decided it was time to do something about the lack of technological resources at our nation's MSIs. While our bill did not pass last Congress, I was pleased that we had strong bi-partisan support in the Senate, including Senator Allen from Virginia as well Chairman Young from Alaska here in the House.

This year, Senator Allen advanced the cause by introducing S.196, which placed a similar program in the National Science Foundation. I would first like to thank and congratulate the gentleman from Virginia for his fine work and I have been pleased to have the opportunity to work with him on the legislation, which passed the Senate a few weeks ago.

While I support the efforts of Senator Allen and my colleague, Congressman Forbes, I would like to briefly comment on the *ONE* difference in our two bills. It is on the issue of Peer Review. Peer Review is the manner by which members of the MSI community would be able to advise the National Science Foundation on which schools should receive this grant money, as opposed to reviewers from large research universities who do not have any familiarity with the MSI community. Similar language was included in the bill last Congress which was supported by Senator Allen and myself.

It is my understanding that the NSF has concerns with the notion of a Peer Review provision; however, I believe the past record of performance by NSF argues strongly for a Peer Review Provision. For example, the Year 2000 numbers suggest that only 1.29 percent of eligible NSF monies went to HBCUs. Moreover, the current representation of racial and ethnic minority reviewers is approximately 60 individuals from a database containing over 240,000 people.

These statistics definitely suggest that there is, in fact, a need for reviewers from MSIs to participate in a peer review process, for this program, which for this program goes beyond a mere advisory capacity.

I might add Mr. Chairman; I know that some have argued that this program may be better suited for placement in the Department of Commerce rather than NSF. As one of the authors of last year's bill, I do believe that MSIs would reap greater benefits from a program that was not limited to solely funding academic enhancements for "science, research and development" which would be the case if the program became part of NSF. Let me reiterate that last year's bill contained a "Peer Review" provision because the Commerce Department did not have a record of interaction with MSIs.

I would certainly encourage the committee to explore both the Commerce Department and the NSF as agencies, which could house this program. I would also again stress that there remains a need for the inclusion of a peer review provision regardless of where the program is located.

Mr. Chairman, the legislation before us today reflects the need for a program that will help countless students at MSIs across the country regardless of where it is located. Just as the government has a responsibility to ensure that students have up to date textbooks and classrooms, we must also ensure that all our students have access to modern technology services. I want to emphasize that my interest in this legislation is focused on creating opportunities available for all MSIs, not just those few who may have established themselves as elite research universities. If we all work together, this basic principle can be achieved.

I would once again like to thank Senator Allen and my colleague Mr. Forbes for their leadership on this issue and look forward to working with them to enact legislation that will truly help lift all of these schools into the 21st Century. I thank you Mr. Chairman for the opportunity to testify today and look forward to taking any question the panel may have.

I yield back the balance of my time.

DISCUSSION

Chairman SMITH. Mr. Towns, when you talk about peer review, are you suggesting that there be minority representation on the peer review for all research grant applications?

Mr. TOWNS. That is correct.

Chairman SMITH. But normally, the review of a particular area of research is given—I mean, who we ask to review is, generally,

some of the individuals that are expertise in those particular areas. And it seems to me—are you suggesting that we legislatively demand that minorities be involved regardless of what the grant application is for?

Mr. TOWNS. Mr. Chairman, what I am saying is simply this, that if you have reviewers that have gone to these elite universities—and I think that they might not have the sensitivity to some of the other schools that we need to bring in, and I think that is the problem. So even if you have a minority person on, and that person is not, you know, familiar with some of the other universities, colleges, then I am not certain that they would be served well. So I think that we have to have the kind of balance to be able to make certain that everybody is included.

Chairman SMITH. I see. I think I agree with you that it is reasonable to make sure that there is an outreach to include schools that are serving minorities to get some of those research grants, but in terms of what grants and what research areas are going to be pursued maybe isn't as important as trying to make sure that some of the research grant effort go to all institutions.

Mr. TOWNS. I am not saying that you know—the point that I am making, I think we are agreeing with each other. I really do. What I am saying to you is this, that if you do not have, you know, people involved from these institutions that, Mr. Chairman, I am afraid they are going to be left out. You see, what happens is we have certain elite universities out there. They get the grants and others do not. Take, for instance, we have in Mr. Forbes' area a school like St. Paul, will never be able to benefit from, you know, if we don't indicate that. Like Everetts in my home town. Of course, if we don't say something about it or legislate it, then they will never benefit from it.

So what I am saying is simply this, that we have to have people that are sensitive to these kinds of issues to be able to include everybody, bring everybody in. If not, you know, we are going to continue business as usual, and I think we cannot afford the luxury of that.

Chairman SMITH. Thank you. Representative Johnson.

Ms. JOHNSON. Thank you, Mr. Chairman. Mr. Towns, I had a conversation with Senator Allen prior to us starting this morning. He indicated he has made a correction in his bill. Have you seen that correction?

Mr. TOWNS. I have not.

Ms. JOHNSON. Nor have I, but he feels that that takes care of the concern and felt that out of his research it warranted that change. If this coincides with your concern, can these bills be merged?

Mr. TOWNS. Right, if it does. I would like to see his language, Ms. Johnson, before I would commit to that.

Ms. JOHNSON. Sure.

Mr. TOWNS. But I am eager to move this along. I really want to see it happen. But the point is that I think that we do not want to make a mistake in terms of business as usual. So I would like to see the language and see—you know, if we could merge it, I would be receptive to doing that.

Ms. JOHNSON. Well, I agree with you totally. I would like to see it myself, because the record speaks for itself. It is documented

that these institutions have not received any significant grant dollars, and that certainly is going to be necessary to correct. We all know that most of the African-American teachers graduated from these institutions and the one thing that we need for the future is students who are literate in science and math. In my district, we have the number one institution, high school, in the country for science and engineering, scoring higher than any other high school in the country. But we are turning students away because of the lack of space. When we ask about getting assistance, it is clear that there is hardly anyplace to go. This has been an area that I came here concerned with because I saw Texas Instruments start from scratch and become a worldwide business, and several others, ADS, and we had the largest number of H–1B visa employees than anyplace else in the country because we were not producing the talent that is needed in the area. So the correction is certainly needed.

I have an historically black college in my district who has never received anything from the National Science Foundation. And I realize that, originally, the bill was set to be in Commerce. I think, correctly, it should be in the National Science Foundation. And I believe that the people there are willing to attempt to adjust to see that the problems are taken care of. We have had conversations about it, but we do need some concrete guidelines to be sure of that. When you look at the difference, it is just alarming. And so I will work with you to see that we have the proper language in whatever bill that does move to make sure that these problems are addressed. And I thank you for your efforts.

Mr. TOWNS. Right. And let me assure you as well, the last thing I want to do is slow this bill down. That I don't want to do. I want to make certain, you know, that we fix certain things that are broken, and that is my concern. And as soon as we could do that, you know, we could move it forward. I am not interested in terms of, you know, creating any kind of slowdown. I want to make that very, very clear, Mr. Chairman. But I do want to make certain that some of those institutions that have been left out are able to be pulled in. So thank you very much for the opportunity.

Ms. JOHNSON. Thank you.

Chairman SMITH. As I understand it, there are about 400 minority serving institutions. We are talking about 250 million. To adequately accommodate some of the needs, it is going to take maybe $2 or $3 million at some of these institutions. Give us your ideas. As we sort of left—the legislation leaves this a little open-ended on how we make the decision of which institution gets the funds. But obviously, we are not going to be able to—if you simply divide the $250 million to all 400 schools, then it is not going to be the kind of dollars that are necessary to accommodate the needs if they are going to be effective in accomplishing our goals, it seems to me. Any thoughts on how you decide which schools get the grants?

Mr. TOWNS. If we have a good peer review team, I think that they would be able to be helpful. Also——

Chairman SMITH. If a need based on their effort to——

Mr. TOWNS. Look at needs, but also, Mr. Chairman, I am hoping that we will come to the realization that additional money is needed. If we are serious about, you know, making certain that we are able to compete, then we might have to look at additional dollars.

But I think that with additional dollars and with the peer review team looking at these universities and their needs, I really feel that, you know, we can do a much better job. In terms of, you know, how we get them, if we put together the right kind of team, I think they can answer a lot of our questions, really, and a lot of our concerns if we have that. The point is that that is so crucial. That is key in terms of having people that are sensitive to what is going on out here, and to be able to reach out to some of these other schools.

And also, to let us begin to fight for additional money. Additional resources, you know, are needed. If we are going to say, leave no child behind, and then cut the budget, then leave all the children behind, I mean, something is wrong with that kind of thinking. So we have to now recognize the fact that if we are serious about leaving no child behind, we have to do all the kind of things to make certain they are not left behind. And I am hoping that you and the other members will begin to fight, you know, for that, and I think that we should because it is the appropriate thing to do. I mean, if we are going to be the leaders, we should exemplify that in terms of our commitment to the cause.

Chairman SMITH. Mr. Forbes, did you have a question?

Mr. FORBES. Mr. Chairman, I don't have any additional questions.

Chairman SMITH. Mr. Towns, thank you very much.

Mr. TOWNS. Thank you.

Panel II

Chairman SMITH. If Panel II would come to the table? A brief introduction, Dr. Fred Humphries is the President of the National Association for Equal Opportunity and Higher Education. And Dr. Humphries, prior to joining the NAFEO, Dr. Humphries served as President of Texas A&M and—pardon?

Dr. HUMPHRIES. Florida A&M.

Chairman SMITH. Florida A&M. Thank you. And also, Tennessee State University, for a total of what we have in our records as more than 27 years. So Dr. Humphries, thank you very much for giving your time to the Committee this morning.

Ricardo Fernández is the President of Herbert H. Lehman College, the CUNY, and he will be testifying on behalf of the Hispanic Association of Colleges and Universities. And prior to CUNY, Dr. Fernández served at the University of Wisconsin, beginning as an Assistant Professor of Cultural Foundations and rising to full Professor and Assistant Vice Chancellor for Academic Affairs. Dr. Fernández, welcome to our Committee.

Dr. Larry Earvin is the President of the Huston-Tillotson College in Texas, and he will be testifying on behalf of the United Negro College Fund [UNCF].

And Dr. Dwight Fennell is the President of Paul Quinn College in Texas. And prior to joining Paul Quinn, Dr. Fennell worked as an American Council on Education fellow, and he served on various capacities in the St. Augustine College, and his duties ranged from Assistant History Professor to Vice President for Academic Affairs.

So Representative Johnson, Texas is represented today in your behalf. Would you like to make any additional introductory comments?

Ms. JOHNSON. Mr. Chairman, I want to thank the panelists. I support what they stand for, what they are here for. I have worked with them. We have even discussed this bill in detail and I look forward to their testimony. I think they can offer us an idea of how we might be able to structure what dollars we do have to cover as much ground as we can. And I appreciate the fact that we have at least two Texans here. You know, we have a very, very large potential college enrollment in Texas, probably one of the State's largest, and so it is significant that we have two Texans here, besides, Texas being a leading state. Thank you.

Chairman SMITH. It almost makes me wish we had somebody here from Michigan. Project Hope, by the way, I need to get you to Michigan to visit our Project Hope in Detroit.

Dr. Humphries—for the record, everybody's total testimony will be included in the record. We will ask you to come close, between five and seven minutes, wherever you are comfortable. Dr. Humphries, please proceed.

STATEMENT OF DR. FREDERICK S. HUMPHRIES, PRESIDENT, NATIONAL ASSOCIATION FOR EQUAL OPPORTUNITY IN HIGHER EDUCATION

Dr. HUMPHRIES. Thank you very much, Mr. Chairman.

Chairman SMITH. Dr. Humphries, there is a button there.

Dr. HUMPHRIES. Okay. It shows you we need technology help. Mr. Chairman and distinguished members of the House Science Committee, Subcommittee on Research, I am the Chief Executive Officer of the National Association for Equal Opportunity in Higher Education, NAFEO. I want to thank you for the opportunity to participate in the hearing on H.R. 2183, the *Minority Serving Institution Digital and Wireless Technology Opportunity Act,* as introduced by Representative Randy Forbes. H.R. 2183 would establish within the National Science Foundation an Office of Minority Serving Institution Digital and Wireless Technology. The purpose of this office will be to strengthen the ability of minority serving institutions to provide a capacity for instruction in digital and wireless network technologies by providing grants to, or executing contracts or cooperative agreements with, those institutions to provide such instruction; and (2) strengthen the national digital and wireless infrastructure by increasing the national investment in telecommunication and technology infrastructure at minority serving institutions.

Very similar legislation, H.R. 2272, has been introduced in the House of Representatives by Representative Edolphus Towns, and in the Senate, Senator George Allen has introduced Senate Bill 196. The introduction of each of these measures collectively reflect the vision, understanding, and leadership needs to close the digital divide and to stimulate national awareness and involvement in this area.

NAFEO is the umbrella organization of the historical black colleges and universities and the predominantly black colleges in the United States of America. Our colleges span from Texas to Florida,

to Massachusetts, and from New York to California. We have 118 member institutions, 450,000 students, largely African-American, attend these institutions. They are 46 percent public and 54 percent private, the membership of NAFEO. The organization's membership is comprised of two-year and four-year institutions, and the schools that offer advanced and professional degrees, they are public and private, large and small, urban and rural, liberal arts, agricultural, and research. We embrace the whole scope of the institutions that consider themselves predominantly black or HBCUs in the United States of America.

There are two major dimensions to the digital divide: (1) Providing access to information technology; and (2) expanding the application and use of information technology. We think the $250 million, hopefully, will be done annually; not in just a one-single shot to solve the problem, but to do it annually. And that the level of funding, about $2.5 million per institution, to support the eight broad categorical areas that are introduced by the bill is just about right to really make a significant dent in the project for those schools that actually get the grant from the National Science Foundation. We support the idea of an advisory council and we support the idea of a peer review system wherein the peer review team comes from the institutions that will be served by the money that is granted from the National Science Foundation.

You asked that I address three specific questions, and I will direct my attention directly to that. The first question being what were the findings of the National Telecommunications and Information Administration funded report, entitled, Historically Black Colleges and Universities: An Assessment of Networking and Connectivity? What do these findings mean for graduates of historical black colleges and universities? We found that approximately 75 percent of the students attending the historical black colleges and universities do not own their own computers. The national average is about 50 percent; one out of two will own their computers across the higher education spectrum. So we have a really serious deficiency in our student body simply because students are poor, they come from poor families, and they cannot afford to buy a computer. And our financial aid allocation under the Title IV [of the Higher Education Act] programs of our government do not provide enough support that if you included a computer in the allocation of need, you couldn't fund it anyway, because the money that is appropriated in Title IV [of the Higher Education Act] does not meet the need today without a computer, of the needs of the student. So there is an insufficiency in funding to address the need. And if you just add a computer on top of that, you are exacerbating the lack of funding for the students.

Approximately, 88 percent of the historical black colleges have access to T–1 lines from their campuses, and therefore, the more sophisticated and the more demanding technology that is present, the state of the art that is operational in our society today, cannot be accommodated by the existence of just one T–1 line. So there is an insufficiency in communicating with the world, being a part of a global interconnectivity that is enjoyed in our society. We have very limited connection with the outside world. Only about 13 percent network with K through 12 school districts, a concern that you

have had, Mr. Chairman; 20 percent with the Federal Government and only five percent with commercial vendors.

One of the major things that need to be addressed is that as you advance in the technology holdings of your campus, as you become wireless, and as you add the fiber optic backbone to your campus, and as you connect up all of your buildings, and put facilities in dormitories, and add the T–1 line, supporting connectivity with the outer world, comes with that the requirement that you have the kind of sufficiency in terms of human resources that will deal with having the technical expertise that can maintain that system. And I can tell you that hardly any of our institutions have the capability or the money to provide the human resources that are required to operate at the state of the art level today in technology. So one of the big needs we have as we cross this digital divide is the ability to support the infrastructure in terms of human resource people to do that.

There is a requirement for maintenance and replacement of installed technology. We have to train people, the administration and the faculty, so that they can do distance learning courses and so that they can use technology in the actual instruction in their classrooms and be responsive to a student body that is doing that. Today, the average modality of our institutions in responding to technology and the absence of computer on the part of our students is that we set up computer laboratories. And if you were to visit one of our campuses, you would see those laboratories are completely active all day long. But it is not enough. It does not get to the point that you raised, Mr. Chairman, of providing the first rate technological instruction that makes our students competitive when they enter the world outside of those colleges, that they are up to snuff, know what the other people know, and can compete on an even level.

So this bill, if it is passed, will do a lot to alleviating that question. So we recommend for a very important reason that this bill and the fund, the program, be placed with the National Science Foundation. The reason for that is we think a lot of minorities going into the building out there in Arlington at the National Science Foundation will help them understand that they need to put more minorities in the other programs that they have, and there will be occasions that they will have a chance to discuss with a whole lot of people at NSF the need to have more minority involvement instead of the one plus percent that is in the other programs of the National Science. So the more minorities we see go into that building, the better we think it is for science and technology at the minority serving institutions. I thank you.

[The prepared statement of Dr. Humphries follows:]

PREPARED STATEMENT OF FREDERICK S. HUMPHRIES

INTRODUCTION

Mr. Chairman and distinguished Members of the House Science Committee, Subcommittee on Research, I am Dr. Frederick S. Humphries, President and Chief Executive Officer of the National Association for Equal Opportunity in Higher Education (NAFEO). First, I want to thank you for the opportunity to participate in this hearing on H.R. 2183, the *Minority Serving Institutions Digital and Wireless Technology Opportunity Act.* As introduced by Representative Randy Forbes (R–VA), H.R. 2183 would establish within the National Science Foundation an Office of Minority Serving Institution Digital and Wireless Technology. The purposes of this Of-

fice will be to (1) strengthen the ability of Minority Serving Institutions (MSIs) to provide capacity for instruction in digital and wireless network technologies by providing grants to, or executing contracts or cooperative agreements with, those institutions to provide such instruction; and (2) strengthen the national digital and wireless infrastructure by increasing national investment in telecommunications and technology infrastructure at MSIs.

Very similar legislation, H.R. 2272 has been introduced in the House of Representatives by Representative Edolphus Towns (D–NY); and, in the Senate, Senator George Allen (R–VA) has introduced S. 196. The introduction of each of these measures collectively reflects a vision, understanding and leadership needed to close the digital divide and to stimulate national awareness and involvement in this area.

As the CEO of NAFEO and a former college president, I believe this hearing is an exemplary way to acknowledge the contributions and relevance of MSIs, and the leadership we have provided in national policy development, particularly in the science and technology areas. Our inclusion and participation in this process of policy formation is a most necessary exercise, if we, as a community of stakeholders and leaders, are to succeed in meeting and overcoming the challenges before us. Moreover, the ultimate enactment of this legislation will put MSIs in a position to better address national science and technology (S&T) and workforce objectives, including engaging those communities where the digital divide is most serious. I am sure that this hearing will hasten a dialogue and implementation of programs that are long overdue.

NAFEO'S ROLE AND MISSION

BACKGROUND—As background, let me begin by describing NAFEO's mission and role in this discussion. NAFEO serves as the national umbrella organization for more than 100 predominately and Historically Black Colleges and Universities (HBCUs). Our mission is to champion the interests of our member institutions through the executive, legislative and judicial branches of Federal and State Government. For more than three decades, we have played a pivotal role in articulating the needs for a system of higher education where race, ethnicity, socio-economic status, and previous educational attainment levels are not determinants of either the quantity or quality of higher education. The organization takes lead responsibility for the development and dissemination of public policies, programmatic efforts, and strategic and educational materials that: (1) enhance the role of HBCUs, generally, and (2) promote African American student enrollment and attainment, specifically. NAFEO is comprised of institutions of higher education that represent a broad spectrum of interests—public and private, large and small, urban and rural, liberal arts, agricultural, and research. Of the HBCUs that belong to NAFEO, 46 percent are public, and 54 percent are private. The organization's membership is comprised of two-year and four-year institutions, as well as schools that offer advanced and professional degrees, and they are situated in every quarter of the country, the District of Columbia, and the Virgin Islands.

HISTORICAL MANDATE AND SIGNIFICANT ACCOMPLISHMENTS—At the time of *Brown vs. Topeka Board of Education* and the end of de jure segregation in the public schools, but not the end of racially exclusive, whites-only systems of higher education in the South or nearly all-white systems of higher education in the north, HBCUs were producing more that 90 percent of all Black baccalaureates and more than 90 percent of all Blacks who went on to become doctors, lawyers, and Ph.D.s. Now, HBCUs still enroll the largest concentration of both the well and under prepared African American students, many of whom come from high poverty school systems and low-income families. While HBCUs enroll approximately 16 percent of all African American undergraduate students, these institutions graduate about 30 percent of all African Americans who complete their baccalaureate degrees annually. HBCUs are the largest producers of African American teachers and baccalaureates in science and technology. Additionally, a higher percentage of Black Ph.D. candidates from HBCUs complete their degrees than those from non-HBCUs, 42 percent each year, to be exact. We also are building our Ph.D. programs to address the undersupply of African Americans in the science and technology fields as well as expanding our capacities to offer professional degree programs.

The enrollment and graduation rates of these institutions are most sensitive to even the slightest shifts in state and federal policies affecting college admission, retention, and completion. Therefore, for the last 40 years, HBCUs have served as the barometer that gives the earliest and most reliable indicators of whether new educational policies instituted by federal, State, or private sector policy-makers will advance or retard the movement toward equality of educational opportunity. Undoubtedly, the appropriation of federal dollars and the development of federal policies specifically targeting HBCUs have assisted greatly in meeting national goals of expand-

ing educational and workforce opportunities for all Americans, but particularly for African Americans. The legislation we address today is a welcome and overdue installment in our collective efforts to meet the worthy national objectives related to increasing opportunities for all Americans.

H.R. 2183 AND RELEVANT PROVISIONS

There are two major dimensions to the digital divide: (1) providing access to information technology (IT) and (2) expanding the application and use of information technology. H.R. 2183 seeks to address both of these issues and helps to remedy the issue of the digital divide that exists among HBCUs and other MSIs as well as the communities they serve. The bill seeks to strengthen the institutional capacity by authorizing $250 million annually (providing up to $2.5 million per institution) in support of eight broad categorical objectives.[1] The Forbes, Towns and Allen versions of the bill each include these eight categorical objectives under Section 3—Activities Supported.

Additionally, H.R. 2183 calls for the establishment of an Advisory Council; dissemination of information annually to further capacity building and collaboration; a matching requirement with a possibility of waiver in certain circumstances; and annual reports and evaluation.

QUESTIONS SPECIFICALLY RAISED BY THE SUBCOMMITTEE TO BE ADDRESSED

In preparation for today's hearings, Chairman Nick Smith (R–MI) specifically asked that three issues be addressed. They are:

- What were the findings of the National Telecommunications and Information Administration funded report, entitled *Historically Black Colleges and Universities: An Assessment of Networking and Connectivity?* What do those findings mean for graduates of Historically Black Colleges and Universities (HBCUs)?
- What are the most important technology issues for HBCUs? How will H.R. 2183 help meet those unmet needs?
- How do HBCUs currently fund their technology infrastructure? What is the source of that support (Federal, State, local, private)?

Each question is addressed below.

What were the findings of the National Telecommunications and Information Administration funded report, entitled Historically Black Colleges and Universities: An Assessment of Networking and Connectivity? *What do those findings mean for graduates of Historically Black Colleges and Universities (HBCUs)?*

In 2000, with the support of the Department of Commerce, NAFEO completed a study entitled *Historically Black Colleges and Universities: An Assessment of Networking and Connectivity* (see appendix). The study attempted to address a set of fundamental questions, e.g., "Where are HBCUs on the Information Super Highway? Are they on the side of the road, the on-ramp, or speeding along in the fast lanes?" The project conducted an assessment related to a broad spectrum of issues, including computer ownership, student/faculty access, connectivity, capacity, facilities, web-based services, distance learning and multi-media. Of 118 HBCUs surveyed, 80 participated.

There are several significant findings included in the study. For instance, half of the HBCUs surveyed did not have computers available in the location most acces-

[1] (1) To acquire the equipment, instrumentation, networking capability, hardware and software, digital network technology, wireless technology, and infrastructure; (2) to develop and provide educational services, including faculty development, related to science, mathematics, engineering, or technology; (3) to provide teacher education, library and media specialist training, and preschool and teacher aid certification to individuals who seek to acquire or enhance technology skills in order to use technology in the classroom or instructional process; (4) to implement joint projects and consortia to provide education regarding technology in the classroom with a State or State education agency, local education agency, community-based organization, national non-profit organization, or business, including minority businesses; (5) to provide professional development in science, mathematics, engineering, or technology to administrators and faculty of eligible institutions with institutional responsibility for technology education; (6) to provide capacity-building technical assistance to eligible institutions through remote technical support, technical assistance workshops, distance learning, new technologies, and other technological applications; (7) to foster the use of information communications technology to increase scientific, mathematical, engineering, and technology instruction and research; and (8) to develop proposals to be submitted under this Act and to develop strategic plans for information technology investments.

sible to students—their dormitories. Additionally, 80 percent of the computers on HBCU campuses are owned by the institution itself. Administrators and faculty are in the second category of ownership while students own the fewest. The study notes that one technology professor at a four-year, rural, public HBCU observed, *"We have a number of computer labs at our University that are open seven days a week, 24-hours a day. One of our labs has 60 computers and its packed all day every day."* In addition to these findings related to access and ownership, it is relevant to note that in those exceptional instances when we can identify students at HBCUs that own their own computers, they oftentimes own seriously outdated or incompatible equipment. Other findings included in the Department of Commerce study, which appear in the appendix and hereby are incorporated by reference, include the following:

- Approximately 75 percent of students attending HBCUs do not own their own computers and must rely on institutional resources to connect to the Internet, World Wide Web, or other networks. Contrast this finding with the 1999 Campus Computing Study, which reports that among all institutions of higher education, 49 percent, or about one out of every two students personally own their own desktop or notebook computers.
- Most HBCUs do not have high-speed connectivity to the Internet and World Wide Web. Only three percent of these colleges and universities indicated that financial aid was available to help their students close the "computer ownership gap."
- Approximately 88 percent of HBCUs have access to T–1 lines from their local ISPs and operating companies and connect to their networks using single or multiple T–1 lines. However, a single T–1 line is not sufficient to provide a large campus with effective bandwidth for 21st century connectivity. The more bandwidth capacity an HBCU has, the more possibilities that institution may have for participation in advanced projects such as Internet2, which may be one of the key areas that hold back HBCUs from making the digital leap into this century.
- Extensive connectivity to a global community appears to be underutilized among HBCUs. Connectivity beyond the campus borders only extends to regional and/or statewide networks, or in a few instances to the Federal Government.
- Out of the 80 HBCUs responding to the Commerce study, only 31 percent indicate that they network with state college systems, 13 percent network with the K–12 school districts, 20 percent with the Federal Government, and 5 percent with commercial vendors.

What these findings reveal is that while "HBCUs are not in the 'dark ages' of networking and connectivity by providing access for students and faculty to the Internet and World Wide Web," they do raise conclusive concerns that "the strategies to upgrade and improve network systems are generally weak." Additionally, HBCUs have insufficient resources to assist students close the "computer ownership gap." It is clear from the NAFEO study that absent proactive steps at the federal level to provide critical resources, the vast majority of HBCUs, their students, faculty, administrators and the communities they serve will be forced to operate on the periphery of the parameters that define the digital divide, or fall into a permanently disabling gulf of limited or no access.

What are the most important technology issues for HBCUs? How will H.R. 2183 help meet those unmet needs?

Many of the technology issues facing HBCUs were addressed in the Department of Commerce-sponsored study referenced above that was conducted by NAFEO. Connectivity, ownership, access, strategic planning, distance learning, and the infrastructure needed to support more advanced research and development activities are all areas where additional resources are needed. A short selection of certain key areas of concern can be summarized as follows:

- One of the single largest information-technology problems that colleges and universities must address is the need to assist faculty members in their efforts to integrate technology into instruction. There is a tremendous need for professional development and training.
- Every HBCU should have a plan and the resources to help faculty develop the skills and knowledge that will allow them to keep pace with the expectations of their students.

- HBCUs also need qualified technical staff and information technology specialists to help develop strategic plans and manage the operation of information technology systems. A focus must be on ensuring connectivity to other HBCUs, majority institutions, state and local agencies, industry and beyond the federal agencies.
- A critical need that separates low technology resource institutions from mainstream institutions is the availability and quality of Help Desk and on-site technical support for users and for the overall network/IT system reliability. These support services are ongoing, continuing costs associated with any successful operation.
- Maintenance and replacement of installed technology is a continuing cost that can approximate 10–15 percent of the total cost of the installed technology base on a campus. This includes costs associated with software and hardware.
- HBCU administrators need training and IT resources to manage complex data gathering, financial aid, accounting and other management processes, including Enterprise Resources Planning Systems/Enterprise Document Management/Data Warehousing systems to facilitate planning, accountability and quality responses to requests for data and reports from internal managers and government agencies.
- Many HBCUs are without sufficient bandwidth required for 21st Century connectivity. Specifically, institutional-wide access, i.e., students, faculty and researchers to Internet resources requires multi-megabit bandwidth by institutions, which is very costly. These bandwidth needs continue to escalate.
- Our students are without regular and timely access to quality computers.
- Facilities and equipment are outdated or otherwise ill-equipped to accommodate state-of the-art IT requirements. Resources for renovation and updating equipment are needed.
- Network security and protection of critical data to enable uninterrupted and secure transactions is a national issue. Current requirements, including network audits, performance analyses, installation of sophisticated firewalls and other intrusion detection systems are very costly. A performance analysis alone, on average at HBCUs, costs an estimated $100,000. Intrusion detection systems can cost up to $300,000.
- Resources to enable the planning, testing and implementation of disaster recovery and business continuity programs.

Even more specifically, on page two of the NAFEO study, it is noted that in order for HBCUs to successfully leap across the digital divide into the 21st Century, there will need to be a focus on institutional resources to address several areas of weakness: (1) improvement of high-speed connectivity rates; (2) dramatic improvement of student to computer ownership ratios; (3) improvement of the strategic planning process; and (4) willingness to incorporate innovative technologies into campus networks.

H.R. 2183 attempts to meet these needs by providing significant flexibility in the permissible use of funds, and the way in which funds can be awarded. Under the legislation, eight possible categories of use of funds have been identified. Funding can be awarded by grant, contract or cooperative agreement. Additionally, the bill will allow the appointment of an Advisory Council. *In designating appointments to the Council, NAFEO recommends that a representative from each MSI community be appointed and that any competitive proposals be peer-reviewed by persons from these communities.*

Turning to the issue of peer-review, NAFEO asks that H.R. 2183 be amended to incorporate language included in Representative Towns' bill, H.R. 2272, Section 4. Under Section 4 of the Towns bill, language is included that separates the function of a peer-review panel from that of the Advisory Council. *NAFEO deems it imperative that, in making competitive grant awards, representatives of the communities to be served be included in the review and award processes. These individuals will bring a distinct familiarity and understanding of the special challenges MSIs face related to IT.*

Finally, the one area not addressed in H.R. 2183 (or the other versions of the legislation), which the NAFEO study identifies as an area of critical need, is the student to computer ownership ratio. *In response to this particular finding related to the paucity of HBCU students who own a computer, NAFEO has drafted a proposal to provide every fully Pell eligible freshman at an HBCU with a computer that they would keep through matriculation. The estimated cost is about $20 million annually.*

We ask the committee to support the Freshman Computer initiative, either through the appropriations or authorization processes.

How do HBCUs currently fund their technology infrastructure? What is the source of that support (Federal, State, local, private)?

The HBCU community is pursuing all possible avenues of funding to support the building of its technology infrastructure. Federal, State, local and private resources have been secured to bring us where we are. However, funding patterns have been sporadic, fragmented and insufficient to meet the needs of the community. Therefore, comprehensive, strategic and coordinated assistance at the federal level is needed.

At the federal level, there are several competitive grant programs that support IT and related equipment acquisition efforts at institutions of higher education generally. Typically, HBCUs receive few of these dollars. In some instances, competition is keen, and the dollars available are small. In other instances, program descriptions often exclude HBCUs by targeting the larger, more advanced research institutions. Consider also, that the NSF reports that in 2001, institutions of higher education received $19.1 billion for federally supported research and development activities. Of this amount, 100 HBCUs only received $261.9 million, about 1.3 percent of the total. Compare this to the $879.7 million federal R&D funding received by Johns Hopkins alone in the same year. This data is significant because, the funding of R&D also affords institutions of higher education access to indirect costs that can then be used to support a number of facility enhancing activities, including IT. In this light, it appears that the under-representation of HBCUs in the federally funded R&D area, undoubtedly, has helped to exacerbate the digital divide.

As another example, in reviewing awards made as a part of the NSF Computer Science, Engineering, and Mathematics Scholarships (CSEMS)[2] program, in 2000 and 2001, there appears to be an under-participation of HBCUs. In 2000, HBCUs received 6.9 percent of the total awards. By 2001, HBCU participation had dropped to 6 percent, while funding for the overall program more than doubled—increasing from about $24 million to over $50 million. Funding for HBCUs, during that period increased by $100,000 (going from $1.4 million to $1.5 million), but the number of schools participating declined. The most significant and consistent source of federal funding, with the greatest flexibility and broadest coverage across the HBCU community probably is the Title III, Part B—Strengthening Institutional Capacity Program, funded by the Department of Education. However, these funds, averaging between $500,000 to $1 million, can be used for a multiplicity of purposes and often are used to address other pressing campus needs. Other HBCU specific accounts, cutting across the federal spectrum have been useful also. Federal funding, unfortunately, over the years, has not kept pace with the actual needs of the community.

At the State level, public HBCUs typically receive funding from their state legislatures. Historically, there have been disparate funding patterns that have caused many of these institutions to receive less than majority institutions located in the same states. This historic disparity has resulted in the provision of inadequate resources to support IT and many other activities. Some states, particularly in the South are now under court order and consent decrees to provide redress; but, with tightening budgets and historic shortfalls in many states, HBCUs also are feeling the pinch of budget cuts. Private HBCUs, on the other hand, typically receive no support at the state level. Many of these schools have church affiliations that have inadequate resources to keep up with the growing demands in the IT area.

Turning to the private sector, companies such as Gateway Computer Corporation, Microsoft and others have created alliances with HBCUs and offer equipment, software and other services at a discount. For example, for more than two years, the Gateway Computer Corporation has partnered with NAFEO to establish a comprehensive digital divide initiative. The agreement between the organizations enables the acquisition of computing resources, including personal computers, laptops, printers, hardware, and computer services (such as networking and technical support). Partial proceeds from purchases related to this initiative fund efforts at HBCUs related to ending the disparities that contribute to the digital divide. These efforts, while relevant, fall short of meeting the complex and critical IT challenges confronting HBCUs.

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[2] The CSMES program provides grants to post-secondary academic institutions to fund scholarship for academically talented, financially needy students seeking a degree in computer science, computer technology, engineering technology, or mathematics. CSMES is funded from a $1,000 fee that employer pay for each temporary foreign professional employee who enters the U.S. through the H–1B visa program. The 1998 Act allocated 28.2 percent of the H–1B fees to CSMES.

NAFEO'S RECOMMENDED LONG-TERM FEDERAL POLICY OBJECTIVES

As the subcommittee continues deliberations on H.R. 2183 and related measures, NAFEO asks the subcommittee to adopt policies that foster a positive environment for the achievement of the following long-term goals that endeavor to:

- Strengthen the capacity of HBCUs to participate in the national effort to improve the Nation's technology and telecommunications infrastructure and research enterprise;
- Improve the quality of education for students attending HBCUs, by encouraging policies and leadership that support the telecommunications infrastructure necessary for campus wide connectivity and workforce productivity, including student computer ownership;
- Strengthen NAFEO's capabilities and role as a national service organization that provides research, evaluation, and dissemination of information about telecommunications and technology infrastructure to HBCUs and minority institutions;
- Enable HBCUs to realize their potential as a major resource for meeting national goals related to the development and retooling of the current science, technology, engineering and mathematics (STEM) domestic workforce.[3]

HBCUs have been the trailblazers and standard bearers for equal opportunity and have been the beacons of light for African American communities for over 150 years, and they provide the optimum venue to help this nation remedy problems associated with the digital divide. Without these institutions, this nation would not have African American participation in the professions, the military, the legislatures, and in business. Clearly, it is in the best national interest to seize the opportunity to more fully utilize HBCUs to address the crises of the digital divide in African American communities and other communities of color. As stated previously, favorable consideration of H.R. 2183 is a step in that direction. This legislation will offer a significant opportunity for those institutions serving the largest concentrations of the Nation's minority and low-income students to keep pace with the advancing technologies of the 21st century.

Additionally, passage of H.R. 2183 will serve as a catalyst that promotes a technological and research trend that is so desperately needed at these institutions. It will go a long way in promoting the establishment of a technology-based curriculum that enables HBCUs to recruit, retain, and graduate students who are more competitive in the increasingly technology-based global economy and in the graduate and professional institutions. It will allow HBCUs to have more involvement in basic research to develop new technologies, which is the most desirable and effective method for assuring that HBCUs have the amount and level of technology needed for their administration, academic programs, student usages, and community outreach. It also will assist HBCUs in working with IT corporations and efforts to have them "mentor" HBCUs. For instance, consistent with provisions contained in the measure, major companies could adopt one college and work with the institution in assessing and implementing long-term IT strategies. Ultimately, this funding will allow the institutions to access and increase their individual technology needs, thereby making them more competitive.

CONCLUSION

Clearly, the provisions of H.R.2183 address almost all of the technology deficiencies identified in the NAFEO study by providing grants up to $2.5 million for each eligible institution to address technology needs related to infrastructure, networking, faculty development and student preparation, teacher education and media specialist training, community outreach, and leadership development. Such aid will not only strengthen HBCU technological capabilities, but also enhance inter-institutional relationships and community outreach. With the assistance of H.R. 2183 and related legislation currently under this committee's consideration, HBCUs and other MSIs would truly become leaders in helping to close the digital divide, which is widest in the communities we serve.

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[3] A Department of Commerce report published just last month, June 2003, entitled *Education and Training for the Information Technology Workforce,* p. ii, notes the "[w]idespread deployment of digital technologies throughout the Nation and our ongoing transformation to a knowledge-based economy have created strong demand for workers who can create, apply and use information technologies (IT)." It also notes that employers generally seek candidates with post-secondary education for professional-level IT jobs. A four-year degree, especially a technical degree, helps an IT professional get a foot in the door and get promoted. Two-thirds of IT workers have at least a four-year degree, and the percentage of college-educated workers is growing.

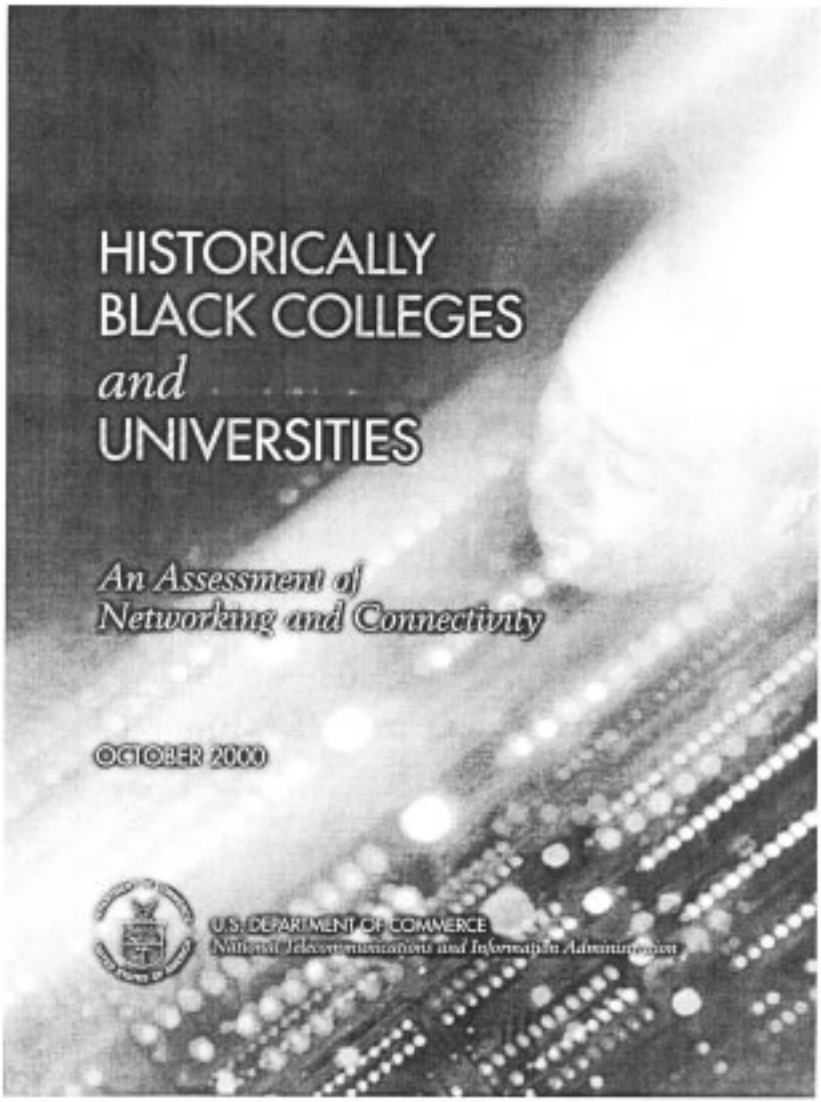
Finally, Mr. Chairman, there are some proponents of fiscal constraint who may be concerned about the $250 million proposed authorization level contained in H.R. 2183 and related measures. Some say the price tag is too high. Those of us in the MSI community would argue, the proposed level of funding is not high enough. But, we recognize it is a tremendous step in the right direction and will assist communities that have achieved unparalleled success related to transforming seed investments into fields of dreams and accomplishment. By making a reasonable investment now at the federal level, there will be significant economies of scale and costs savings in the long run. Many MSIs (and the communities they serve) will become more self-sufficient; our graduates will make more productive contributions to the national economy; and compelling federal objectives will be met. On the other hand, failure to commit sufficient resources to this effort will cause irreparable harm, not only to MSIs, but also to the Nation as a whole.

This concludes my testimony. Again, on behalf of the National Association for Equal Opportunity in Higher Education and its member institutions, I thank you for the opportunity to appear before you today. I would be happy to answer any questions.

APPENDIX A:

Historically Black Colleges and Universities
An Assessment of Networking and Connectivity
October 2000

U.S. Department of Commerce
National Telecommunications and Information Administration


HISTORICALLY
BLACK COLLEGES
and
UNIVERSITIES
An Assessment of
Networking and Connectivity
OCTOBER 2000
U.S. DEPARTMENT OF COMMERCE

HISTORICALLY BLACK COLLEGES AND UNIVERSITIES

An Assessment of Networking and Connectivity

Prepared For
U.S. Department of Commerce
National Telecommunications and Information Administration
Technology Opportunities Program
Norman Y. Mineta, Secretary

Prepared By
National Association for Equal Opportunity in Higher Education
Henry Ponder, Chief Executive Officer and President
Mildred Freeman, Director, Sponsored Programs
Stephanie Myers, Principal Investigator

October 2000

Note: Any views, findings, conclusions, or recommendations expressed in this report are those of the authors and do not necessarily represent the official views, opinions, or policies of the U.S. Department of Commerce.

THE SECRETARY OF COMMERCE
Washington, D.C. 20230

The Department of Commerce is proud to release *Historically Black Colleges and Universities: An Assessment of Networking and Connectivity.* This report contains findings from a technology needs assessment conducted at Historically Black Colleges and Universities (HBCUs) by the National Association for Equal Opportunity in Higher Education (NAFEO) for the National Telecommunications and Information Administration (NTIA). The study assesses the computing resources, networking, and connectivity of HBCUs and other institutions that provide educational services to predominantly African-American students.

The findings of this report are encouraging. Ninety-eight percent of the HBCU respondents reported having basic access to the Internet, World Wide Web, and campus networks. It is clear that significant numbers of our Nation's historically black institutions stand poised to make a "digital leap" into the 21st Century. Nonetheless, the report suggests that during this era of continuous innovation and change, continual upgrading of networking and connectivity is critical if these institutions are to take advantage of telecommunication opportunities such as Internet2 and third-generation wireless services. Presently, most HBCU campus networks rely on T-1 connectivity and over 75 percent of their students rely on campus computer labs to access the Internet and World Wide Web. This is especially interesting to note, since the recent trend in our Nation is that the laptop, along with the pencil, is becoming part of the standard set of school supplies for elementary schools.

The NAFEO technology assessment study provides a much-needed baseline of information about the technological preparedness of one of our Nation's valuable resources, HBCUs. We now have a benchmark to use in measuring the degree to which our institutions are keeping pace with change. Findings from the assessment serve as an important blueprint for support from the private sector, business and industry, and nonprofit organizations for the digital inclusion of a community of over 350,000 students and future leaders attending these institutions of higher education. Results from this study will assist both the Department and NAFEO to advise HBCU leaders, Federal and State Government, and the private sector about the strengths and shortfalls of our institutions. Finally, this report should serve as a useful tool for the institutions as they continue to plan for the future.

Along with Dr. Henry Ponder, Chief Executive Officer and President of NAFEO, I am happy to report that, in spite of overwhelming odds, the majority of HBCU Presidents and Chancellors have risen to the challenge and have "wired" their campuses. This report clearly outlines further avenues of research, suggestions for cross-cutting dialogue, and blueprint for future support.

Norman Y. Mineta

FOREWORD

The National Association for Equal Opportunity in Higher Education (NAFEO) has the unique charge of advocating on behalf of one of America's most precious treasures --118 Historically Black Colleges and Universities (HBCUs), located in 24 States, the District of Columbia, and the Virgin Islands. Each year, these institutions graduate fine young people with undergraduate, graduate, and doctoral degrees, who go on to make enormous contributions to American society and abroad.

An essential part of NAFEO's mission is to advocate on behalf of policies and initiatives that can improve the quality of education for students attending HBCUs. We work with Presidents and Chancellors at 118 HBCUs, as well as other institutions that serve predominately African-American student populations, to insure that our young people receive an education equal to that acquired anywhere in the world.

We all realize the information revolution is changing the landscape of education forever. That is why we wanted to gain an overall assessment of where HBCUs are on the *Information Super Highway*. This way we can determine whether our institutions are "keeping pace" with change or whether they have been seriously impacted by the *digital divide*. Results from this study will assist us to advise HBCU leaders, Federal and state governments, and the private sector about the strengths and shortfalls of our institutions. Most importantly, we must monitor how HBCUs are providing access for students to the Internet, World Wide Web, and other important networks.

Based on the results of this study, I am happy to report that, in spite of overwhelming odds, the majority of HBCU Presidents and Chancellors have risen to the challenge and have *wired* their campuses. However, it is clear from the findings that there are serious digital divide issues that affect the ability of HBCUs to be competitive with other institutions of higher education.

I am saddened to learn from our research that fewer than 25 percent of our students own their own computing resources. This means that in spite of the best efforts of HBCUs, students must often wait hours at labs to use computers in order to gain access to the Internet and the World Wide Web. We must find ways to get more computers in the hands of our students so they can have universal access to global networks.

Another area of concern is whether our faculty and administrators are making full use of the marvelous technology that encourages professional exchange and rewards creative instruction in the classroom. Our results indicate that work is needed in the area of integrating technology into the classroom. HBCU faculty and staff must realize that they will be measured, in coming years, on their ability to participate in networks and provide students with global access to knowledge.

In comparison with other similar technology studies, our findings indicate that HBCUs are just short of *"keeping pace"* with other institutions of higher education. However, I am not satisfied with that result

since *"keeping pace"* in today's ever-changing world of technology is tantamount to standing still. I believe that as minority-serving institutions, we have the first opportunity in the history of America, to leap ahead of the pack if our institutions become aggressive regarding the use of cutting edge technology.

The opportunity to respond to innovation and change should be possible for all HBCUs large, small, urban, rural, public and/or private. I would like to see our institutions develop the capacity to respond quickly and experiment with new innovations. I believe that by working in partnership with the Federal Government, state and local governments and the private sector, we can attempt a grand experiment to launch our institutions onto the cutting edge of the new economy in the 21st Century. Our report finds that overall, our institutions are ready for such partnerships.

I would like to thank Gregory L. Rohde, Assistant Secretary, National Telecommunications and Information Administration; Bernadette McGuire-Rivera, Ph.D., Associate Administrator, Office of Telecommunications and Information Applications; Stephen Downs, Director of the Technology Opportunities Program (TOP); and Francine E. Jefferson, Ph.D., Evaluation Specialist, Technology Opportunities Program, for their leadership and vision that enabled NAFEO to conduct this very important study. Without their commitment, this comprehensive look at the networking and connectivity of Historically Black Colleges and Universities may have been overlooked, as it has been in years past.

My sincere thanks go to the HBCU Presidents, Chancellors, and technology professionals who responded to our requests for information. In addition, I would like to thank our TAS team. Scattered throughout the country, our team studied the HBCUs, analyzed the data, and wrote the report using "virtual" communications. The TAS Team was led by Stephanie E. Myers, Principal Investigator, and includes Antoinette Hubbard, Eugene Royster, William Jordan, Lisa Hughes. Finally, a special thanks to Mildred Freeman, Director of NAFEO Sponsored Programs, and the NAFEO staff who provided support for this special effort.

Henry Ponder, Ph.D.
Chief Executive Officer and President
National Association for Equal Opportunity in Higher Education August 2000

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EXECUTIVE SUMMARY

This report contains findings from a technology needs assessment study of Historically Black Colleges and Universities (HBCUs) conducted by the National Association for Equal Opportunity in Higher Education (NAFEO), a non-profit Black college association representing the interests of 118 HBCUs. This study known as the HBCU Technology Assessment Study, (TAS) was funded by the Technology Opportunities Program (TOP), National Telecommunications and Information Administration (NTIA), U.S. Department of Commerce[1]. The TAS assesses the computing resources, networking, and connectivity of HBCUs and other institutions that provide educational services to predominately African-American student populations.

The TAS began with several fundamental questions...***"Where are HBCUs on the Information Super Highway? Are they on the side of the road, the on-ramp, or speeding along in the fast lanes?"*** To answer these questions, in early 2000, a NAFEO research team took a "snap shot" of the campus networks, computing and networking capabilities, and telecommunications infrastructure of HBCUs.

Out of 118 HBCUs, 80 provided input into the TAS. Of the 38 institutions that did not respond, it is safe to assume that some of these institutions are wired, but simply elected not to participate in the study. Phone conversations with some non-respondents indicated that they were overwhelmed by other requests from companies, foundations, and state and local governments for similar data. However, based on repeated phone calls to a number of the 38 non-responding HBCUs, it became clear that a number of them simply could not respond due to lack of technical personnel capable of responding to technical questions about networking and connectivity. More resources are necessary to dispatch a study team to visit the 38 non-responding institutions and observe firsthand the status of their campus connectivity.

Among the 80 HBCUs, roughly two-thirds of all HBCUs, the TAS found their overall status on the information superhighway as more positive than originally assumed. However, there are serious areas of *digital divide* in the area of student access, high-speed connectivity and insufficient infrastructure, particularly at smaller, rural institutions. Admittedly, the research team began the TAS with a commonly shared belief that many HBCUs were struggling to connect to the Internet via 56kbps lease lines. While TAS finds that HBCUs are connecting to the Internet with more sophisticated technology than 56k lease lines, the study does raise troubling questions about prevailing limited forms of access and connectivity and the lack of strategic plans for incorporating innovation and updating changing technology.

Results of the TAS indicate that most HBCUs are solidly on the *on-ramp* of the information superhighway. Ninety-eight percent of the institutions that responded report the existence of data, voice and/or data and voice campus networks at mostly T-1 connectivity speeds. While TAS findings indicate that HBCUs have basic access to the Internet, World Wide Web and campus networks, examination of the data finds that there are troubling *digital divide* concerns in the areas of: (1) HBCU student access to networking and

[1] TOP was formely named the Telecommunications and Information Infrastructure Assistance Program (TIIAP)

computing resources; (2) HBCUs usage of higher bandwidth technologies for accessing the Internet, World Wide Web, and other networks; (3) faculty utilization of Web-based resources in the classroom; (4) awareness of the importance of network security; and (4) utilization and maintenance of technology strategic plans. One finding that particularly concerned the TAS team was that private HBCUs, located in rural areas with student populations of 999 or less, report a significant gap in connectivity, equipment, student access, and overall computing resources.

In our view, in light of the overall positive picture of networking and connectivity among HBCUs, it is possible for significant numbers of these institutions to make a *digital leap* into the 21st Century. However, such a leap will require focus of institutional resources to address several areas of weakness: (1) improvement of high-speed connectivity rates; (2) dramatic improvement of student to computer ownership ratios; (3) improvement of the strategic planning process; and (4) willingness to incorporate innovative technologies into campus networks.

While it is reassuring to find that HBCUs are not in the "dark ages" of networking and connectivity by providing access for students and faculty to the Internet and World Wide Web, the TAS Team is concerned that the strategies to upgrade and improve network systems are generally weak. During this era of continuous innovation and change, continual upgrading of networking and connectivity systems is critical if HBCUs are to continue to cross the digital divide and not fall victim to it. Failure to do this may result in what is a manageable digital divide today, evolving into an unmanageable digital gulf tomorrow.

In reviewing the results of this TAS of HBCUs, many questions emerge from the data that would benefit from further research. Monitoring the status, growth, and expansion of HBCUs on the information superhighway is an important, even historic, effort and NAFEO plans to continue to be on the cutting edge of such research.

In closing, we would like to extend our appreciation to Dr. Henry Ponder, Chief Executive Officer and President, NAFEO, for providing top-level leadership to involve the HBCUs in the TAS; to Stephen Downs, Director, TOP Program; and Francine E. Jefferson, Ph.D., Telecommunications Policy Analyst, TOP Program, for their vision and support; to Mildred Freeman, Director of Health Education/Sponsored Programs, NAFEO, for her management expertise; to Steve Pruitt, Executive Vice President of the United Negro College Fund, for his early assistance with development of the TAS instrument; to Dr. Celine Alvey, Associate Vice President for Information Services, Florida Institute of Technology, for sharing her "lessons learned" from a similar Florida study; to James Harrington, Director, Minority University Space Interdisciplinary Network program, National Aeronautics and Space Administration, for his perspective regarding the technology capacity of HBCUs; to Roy J. Myers, President, R. J. Myers Publishing and Consulting Company, for his counsel and guidance; to NAFEO Staff Alicia Vargas, Statistician, for her hard work and statistical analysis; to Ashley Bell, Computer Specialist, for her technical expertise and to Regina Norman, for her editorial assistance.

Respectfully Submitted,

The TAS Research Team
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1.0 INTRODUCTION

The Historically Black Colleges and Universities Technology Assessment Study (TAS) contains findings from a technology needs assessment of 80, or 67 percent, of 118 Historically Black Colleges and Universities (HBCUs), in the United States, and Virgin Islands. TAS was conducted by a team of researchers assembled by the National Association for Equal Opportunity in Higher Education (NAFEO), a non-profit public policy advocacy association that represents the interests of 118 public and private HBCUs. This study was funded by the National Telecommunications and Information Administration's Technology Opportunities Program (TOP), U.S. Department of Commerce, Broad Agency Announcement No.98-01[2]. The TAS assesses the computing resources, networking, and connectivity of HBCUs and other institutions that provide educational services to predominately African-American student populations.

In an October 7, 1999, press statement announcing the TAS, William M. Daley, former Secretary of Commerce, declared, *"Access to information resources is critical to taking courses, researching, finding a job or public information...In a society that increasingly relies on computers and the Internet to deliver information, it is important to ensure that all Americans have access to information technology so that they can continue to be a part of our economic growth and prosperity." (See Appendix A for Press Release.)*

HBCUs educate significant numbers of African-American professionals in the disciplines of higher education at the baccalaureate, masters, doctoral, and post-doctoral levels. These predominately African-American students go on to lead important institutions in their communities and contribute to our Nation's productivity in all of the major industry sectors including the emerging technology sectors vital to the new economy. In keeping with Secretary Daley's statement, the TAS was developed out of the desire to ensure that graduates of HBCUs have equitable access to and utilization of information technology so that they can actively participate in the technology-based workforce of the future.

1.1 Background

NAFEO's interest in conducting the TAS was prompted in part by a report issued by the U.S. Department of Commerce, *Falling Through the Net*[3]. This report indicated that as of July 1999, whites were more likely to have access to the Internet from home than blacks or Hispanics from any location. The report also found that black and Hispanic households were approximately one-third as likely to have home Internet access as households of Asian/Pacific Islander descent, and roughly two-fifths as likely as white households. And, rural areas were less likely to be connected than urban areas. Regardless of income level,

[2] The TOP Program was formely known as the Telecommunications and Information Infrastructure Assistance Program (TIIAP), National Telecommunications Information Administration, U.S. Department of Commerce.

[3] Falling Through the Net, U.S. Department of Commerce, July 2000

those living in rural areas were lagging behind in computer and Internet access. At some income levels, those in urban areas were 50 percent more likely to have Internet access than those earning the same income in rural areas. *Falling Through the Net*, termed these discrepancies the *"digital divide."* The TAS focus was whether a *digital divide* was present among HBCUs and, if so, whether such a *digital divide* would reflect itself in differences in connectivity, access, and computing resources among different kinds of HBCUs, such as those institutional characteristics including urban, rural, public, private, large or small.

Another event that prompted NAFEO's concern about the status of HBCUs on the information highway, was a survey published in the May 1998 edition of *YAHOO's Internet Life*[4]. In an article titled, *America's 100 Most Wired Colleges*, not one HBCU was listed among the 1998 list of the 100 top universities and colleges. However, it should be noted that the year 2000 update of the YAHOO study reports that three HBCUs made the list.

The YAHOO list, coupled with *Falling Through the Net* and media coverage about the *digital divide* generated interest at NAFEO to find out the facts about the status of networking and connectivity at HBCUs. NAFEO also wanted to determine the extent and scope of campus networks. In order to determine with some degree of accuracy the facts about the networking and connectivity of HBCUs, NAFEO approached the National Telecommunications and Information Administration at the U.S. Department of Commerce with first an unsolicited proposal and later a proposal submitted under a Broad Agency Announcement contract program.

1.2 National Association for Equal Opportunities in Higher Education's Long Term Goals

NAFEO's long-term goals for the results of the TAS are tied to the overall objectives of finding ways to promote, support, and assist HBCUs as they strive to compete in the 21st Century. NAFEO's mission is to foster a positive environment for the achievement of the following long-term goals:

Goal 1: To strengthen the capacity of HBCUs to participate in the national effort to improve the Nation's technology and telecommunications infrastructure;

Goal 2: To improve the quality of education for students attending HBCUs, by encouraging policies and leadership that support the telecommunications infrastructure necessary for campus wide connectivity; and

Goal 3: To strengthen NAFEO's capabilities and role as a national service organization that provides research, evaluation, and dissemination of information about telecommunications and technology infrastructure to HBCUs and minority institutions.

[4] Yahoo Internet Life, "100 Most Wired Campuses," May 1998

1.3 Presentation of Results

Data in the TAS report are presented in the aggregate, rather than identifying the particular strengths and weaknesses of individual institutions. Keeping in mind NAFEO's mission to strengthen the capacity of all HBCUs, the TAS research team sought to ensure that answering questions regarding institutional capacities and capabilities would be done forthrightly, without concern for perceived institutional liabilities by institutions not yet on the cutting-edge of technology. Therefore, the TAS presents an overall picture of HBCUs and does not include individual school profiles.

For comparison, the TAS refers to two other campus technology assessment studies. First, the 1999 Campus Computing Study, conducted by Kenneth Green, Visiting Scholar, Claremont Graduate University, provides a baseline to determine whether or not HBCUs are keeping pace with other institutions of higher education in networking and connectivity technology, and whether the policy issues facing their institutions are similar or different. The second reference used as baseline data for TAS findings is the *YAHOO Internet Life 100 Most Wired Campuses Annual Survey*. We used survey findings for years 1998, 1999, and 2000.

1.4 Structure of the Report

The TAS report is organized in five major sections:

- Section 1: Introduction
- Section 2: TAS Methodology
- Section 3: TAS Areas of Inquiry
- Section 4: TAS Findings
- Section 5: TAS Conclusions
- Section 6: Appendices

2.0 TAS METHODOLOGY

The TAS methodology included a research design based on standard needs assessment practices, including identification of the target population, design of an assessment instrument, pilot test of that instrument, and revision and distribution of the instrument to the target population and compilation and analysis of results into a report.

2.1 Characteristics of the target population

There are 106 Historically Black Colleges and Universities (HBCUs), 104 of which participate with NAFEO. HBCUs are defined as postsecondary institutions founded prior to the Civil Rights Act of 1964 with the primary objective of educating African-Americans. There are 14 other colleges and universities that are referred to by NAFEO as "Other Equal Opportunity Educational Institutions" (EOEI). These institutions were founded after 1963 and enroll a plurality of blacks and other minorities. (Vargas, 2000.)

It should be noted that the number of institutions identified as HBCUs fluctuates according to standards set by the U.S. Department of Education. However, for the purposes of the TAS, the definition of HBCUs is based on a report compiled by NAFEO, *A Status Report of the Historically Black Colleges and Universities and NAFEO's Other Equal Opportunity Educational Institutions.* According to NAFEO, "HBCUs are postsecondary institutions founded prior to the Civil Rights Act of 1964 with the primary objective of educating blacks." (Vargas, February 2000).

HBCUs and EOEIs are located in 24 states, the District of Columbia, and the Virgin Islands and are found in large urban cities, suburbs, and small rural towns. They serve a campus community of over 350,000 students, many of whom graduate to become leaders of major institutions, including government, business, and education. The institution's focus on liberal arts, business, agriculture, research, science, and technology and graduate more African-American students who become professionals in medicine, dentistry, pharmacy, and teaching than all other institutions in the United States. Forty-six percent of HBCUs are public institutions funded by their state governments, and 54 percent are private institutions, a number of which are supported by national religious denominations. HBCUs and EOEIs include accredited two-year, four-year, and graduate and professional institutions.

HBCUs and EOEIs have multiracial staffs that provide educational services to increasingly diverse student populations, including white students. While most are located in the South, there are HBCUs in the Midwest, Mid-Atlantic Region, the Far West, and the Virgin Islands.

2.2 Research Approach

TAS was conducted by a team of five researchers located in five cities: Washington, DC; Cincinnati, OH; Silver Spring, MD; Kalamazoo, MI; and Detroit, MI. The TAS team met in a virtual environment using online technology as the mechanism for most of the communication. Team members included a public policy specialist, a professional evaluator and research consultant, two telecommunications professionals, and one Internet entrepreneur. NAFEO provided in-kind staff support to the team in the form of executive leadership, program monitoring, statistical analysis, computer programming, meeting facilities, and logistical support.

The first task of the TAS Team was to design a needs assessment instrument tailored to the issues that were relevant to HBCUs. To obtain input for this instrument, the team conducted a literature search to identify similar studies and solicited input from a variety of sources. These sources included review of a technology assessment instrument used by the United Negro College Fund (UNCF) for a 1999 technology assessment of UNCF institutions; obtaining input for critical areas of inquiry from James Harrington, Director, Minority University Space Interdisciplinary Network (MU-SPIN) program of the National Aeronautics and Space Administration (NASA); Consultation with Dr. Celine Alvey, Director of a 1997 technology assessment of the Florida Independent Colleges; and personal interaction with heads of technology attending the 1999 Clark Atlanta University HBCU Educational Technology Expo. (See Appendix F for TAS Instrument.)

Additional input for the instrument was obtained from reference documents on the Internet, articles appearing in journals of higher education such as the *Chronicle of Higher Education*, and professional reports and studies. (See Appendix C for Listings.) The team also conducted on-going consultation with TOP Evaluation Specialist, Francine E. Jefferson, Ph.D., for continuous review of the instrument, development of research strategy, and analysis of findings.

2.2.1 TAS Respondents

In order to identify the appropriate respondents for completion of the TAS Instrument, Presidents and Chancellors of participating institutions were asked to refer the instrument for completion to individuals at their institutions who had broad knowledge about the institution's computing capability. These respondents provided the data for TAS.

2.2.2. Pilot Test of Assessment Instrument

The TAS instrument was pilot tested with ten HBCUs. The pool of ten pilot test institutions was balanced to include urban and rural institutions, large and small, public and private. Upon receipt of comments from the pilot test institutions, modifications were made in some of the questions including in the TAS instrument.

An assessment instrument including input from the pilot test was distributed to all 118 HBCUs with the request to complete and return it to NAFEO. Eighty-three institutions indicated that they would participate in the TAS and out of that number, 80 institutions, or 96 percent of the number who promised to

participate, followed through. The results of those returns are summarized in this report. The 80 participating institutions represent 67 percent of the total number of 118 NAFEO designated HBCUs.

2.2.3 Non-Participating Institutions

The TAS Team followed up several times with the 38 institutions that declined to participate in the TAS. The Team's observations regarding why the 38 institutions did not participate include direct and anecdotal feedback such as: (1) lack of technical staff, (2) being overwhelmed by corporate, foundation, and local government studies seeking similar data, (3) inactive members of NAFEO, and (4) lack of interest. Note: Less than 1 percent of HBCUs returned their responses after the final deadline and could not be included in the study.

3.0 TAS AREAS OF INQUIRY

The objective of the TAS was to gain an overall perspective of the networking capabilities and connectivity of HBCUs. The assessment instrument was developed to obtain data that would evaluate the capacity of HBCUs to function as part of the national and global network. The emphasis was not so much on individual institutions, but on a distinct community within the higher education environment. Therefore, assessment inquiries were designed to obtain comprehensive information with the intent to discern trends. Described below are the categories and rationale for inquiry including:

- Institutional Information
- Campus Planning and Policies About Computing
- Campus Facilities and Computing Resources
- Campus Connectivity
- Campus Backbone
- Organization Access and Connectivity Environment
- Multimedia and Distance Learning

3.1 Institutional Information

The first version of the instrument requested a range of data regarding the demographics of the institutions. However, in response to comments made by institutions during the TAS Pilot Test, the final TAS instrument was revised to limit inquiry into demographic information. Instead, in compliance with requests from Pilot Test institutions, demographic data such as campus population size was based on data collected by NAFEO in its annual survey of HBCUs titled, *A Status Report of the Historically Black Colleges and Universities and NAFEO Other Equal Opportunity Educational Institutions.*(Vargas, 2000)

3.2 Campus Planning and Policies

The TAS focused on the institutional practice of planning for technological needs and usage and on the existing policies related to student computer competency. Such information is important because the

future of HBCUs utilization of technology is dependent upon their commitment to make strategic decisions and plans that align organizational practices with institutional goals.
Strategic planning usually means that an institution commits itself to a review and update of its accomplishments compared to its plans. These procedures focus on the organization's attention to a common purpose. Having no plan is, in fact, a strategic plan decision and is important information. Institutions were asked about the existence of strategic plans and the updating of those plans. TAS inquired into the policies guiding the behaviors and expectations of institutions regarding networking and connectivity using the theory that networking and connectivity policies should be based on strategic plans. TAS also attempted to elicit information about the expectations of participating HBCUs regarding student computer competency and use in order to better understand the planning process.

3.3 Campus Facilities and Computing Resources

TAS reviewed HBCU facilities and resources in order to assess student-to-computer ratios. The study reviewed the ownership of computers on campus, types of computers available, and whether the equipment was institutionally owned, leased, or personally owned by faculty and/or students. Further, it determined student/faculty access to those computers and location of workstations.

Assessments were made about the percentages of computers available on HBCU campuses. This section also asks about the numbers of buildings on campuses with updated wiring and estimated percentages regarding the total number of campus buildings that have been updated.

3.4 Campus Connectivity

One of the core concerns in the TAS is the composition and makeup of the network with regard to its ability and capacity for connectivity. This assessment requires an understanding of the capacity of HBCUs to share and access information both globally and locally on campus. A full understanding of the technological environment must include a look at the local telephone company and Internet service provider (ISP) since local telephone company and ISP infrastructures are an important part of this picture. If an institution's network is based on wiring and cable, the ability of an HBCU to access global and national networks is dependent upon the *last mile*. The *last mile* is defined as "the connection between the customer and the telephone or cable company." [5]

The TAS began with the question of the basic minimum requirement-is there a campus network? Following the determination of a basic "in place" network, an assessment was made about local service providers. The TAS objective was to have an assessment of the infrastructure capabilities of the telecommunications and ISPs for located in urban and rural areas. While access to broadband width may be available in many urban areas, the study, *Advanced Telecommunications in Rural America*, reports "rural areas are currently lagging far behind urban areas in broadband availability." (U.S. Dept. of Commerce/U.S.Dept of Agriculture, 2000.) The TAS team wanted to assess how the lag in access to broadband technology affected rural HBCUs.

[5] Definition from TechEncyclopedia, www.techweb.com, 2000

To facilitate evaluation of the data about the bandwidth and accessibility resources of HBCUs, the TAS team decided to establish an internal standard or baseline of minimal connectivity for the study. The team considered variables such as current market options, speed rate of connections, and the range of costs for connecting to networks by 56kbps, T-1, T-3, DSL, satellite, etc. After reviewing the options, the team decided that for the purpose of the TAS the minimum standard of access would be T-1 capability. In the view of the TAS team anything less than T-1 would indicate severe limitations for an institution to gain access to an Internet world and its resources. The internal standard for connectivity was based on notion that the more bandwidth capacity at HBCUs-the more possibilities.

Information was requested about student access to computing resources. These responses were compared with findings in the Campus Computing Study to gain a relative perspective about student access to computers at other institutions outside of the HBCU community (Green, 1999). TAS also obtained general data regarding the types of connections that are used by individual departments at HBCUs, and what the approximate overall institutional costs are for IT services. This information helps to provide a benchmark about the capabilities and resources of individual departments. For example, are engineering departments able to provide enough bandwidth for scientific work or are new uses of technology being visualized by departments of humanities or language arts?

3.5 Campus Backbone

For the purpose of the TAS, the "campus backbone" is defined as, "the part of the network that handles the major traffic and employs the high-speed transmission paths in the network..."[6] The TAS sought to gather information about campus network infrastructures. This area was important since the delivery of computing services to institutions is dependent on the computing backbone. Computing backbones affect the quality of the tools and pathways for connecting to the Internet, the computing resources and productivity and ultimately the capacity, output, and expandability of a campus network. Design of the architecture for virtual private networks and/or inter-campus connectivity are based on the capacity of campus backbones.

In order to assess the location of highly technical capacities on campuses, TAS inquired into the location of specialized workstations. For the purpose of TAS, specialized workstations are considered to be those workstations that are optimized in terms of hardware and software configuration to meet very specific demands such as modeling, statistical analysis, graphic arts, remedial learning, etc. Knowing what kinds of systems are distributed across campuses provides a perspective of whether high end computing power is being used at the departmental and academic levels or by the administrative functions. If workstations are used by technical or liberal arts programs, this data may show whether HBCUs are using technology to address specific problems that require high levels of support services and capital investment.

In this era of proliferating computer viruses that violate network security, the ability of all major institutions, including HBCUs, to secure their systems is a priority. The issue of network security was included in the study since decisions regarding the architecture of network security must be made simultaneously with decisions about which applications and data will be made available on the campus networks. Poor planning or the lack of understanding of the importance of network security may slow full utilization of investment in computing technology at HBCUs, particularly as Government and industry

[6] TechEncyclopedia, www.techweb.com

become more security conscious. The capacity of HBCUs to ensure network security could affect their capacity to participate in various types of grants, contracts, and partnerships.

3.6 Organization, Access, and Connectivity Environment

Data was obtained to assess the applications, access, and effectiveness of the campus networks with emphasis being paid to the usage priorities of the institutions, such as use of technology in the classroom, advanced research, professional collaboration, etc. This data would offer insight into whether HBCUs are aware of and emphasizing the collaborative, global, and resource aspects of the Internet world or if the campus networks are closed institutional islands, cut off from the larger educational community.

3.7 Multimedia and Distance Learning

TAS also asked about the use of media, instructional technology, and distance learning in order to determine what types of audio-visual, video, audio, and videoconferencing equipment are available. This section also sought to determine whether institutions are currently involved with distance learning and what their future plans may be regarding distance learning degree programs.

4.0 TAS FINDINGS

The results of the TAS are summarized in this section with an emphasis on overall trends within the HBCU community. No effort is made to provide a narrative or analysis of every question asked by the TAS instrument. Rather, this section attempts to reveal insights into the overall computing capacity of HBCUs and the scope of their networks.

No specific data are available regarding the networking and connectivity of the 38 institutions that did not respond to the TAS. However, anecdotal evidence indicates that non-responding institutions may have been: (1) overwhelmed with requests for computing information from state governments, non-profit organizations, and commercial companies; (2) short of the staff capacity to respond to technical questions about networking and connectivity; or (3) in-active members of NAFEO.

The results in this section are based on the 80 HBCUs who responded to either the entire TAS Assessment Instrument or the TAS Core Questions Instrument. The information in this section is organized under the following headings:

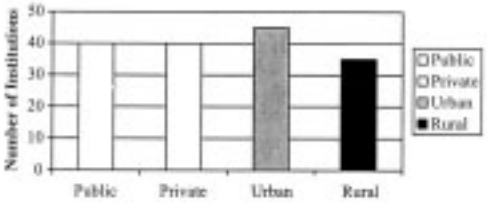
- Characteristics of Reporting Institutions
- Institutional Planning and Expectations
- Student/Computer Ratios and Access to Computing Resources
- Connectivity, Capacity, and Facilities
- Campus Backbone
- Web-based Services, Distance Learning, and Multimedia
- Administrative and Management Concerns

4.1 Demographics of Reporting Institutions

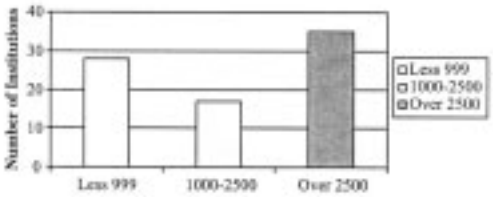
Of those 80 institutions participating in TAS, 74 are HBCUs and six are EOEIs. (See Appendix B for Participating HBCUs.) Forty-five, or 56 percent of the participating HBCUs, are located in urban or suburban centers, and 35 of the institutions, or 43 percent, are located in small town or rural settings. Of the reporting institutions, 40 HBCUs are public institutions, and 40 are private. Eleven of the participating HBCUs are two-year institutions, 68 are four-year institutions, and one is a graduate institution.

The urban and rural definitions used in the TAS were derived from *Peterson's College Guide for Four-Year Institutions and Peterson's College Guide for Two-Year Institutions*. The information from the college guides, together with the demographic data from the NAFEO annual report and responses to the TAS instrument, provided the TAS Report with sufficient data to demonstrate an overall "snap shot" of the computing resources of all reporting institutions, and to draw out meaningful comparisons of urban institutions with rural, public institutions with private, and large institutions with smaller ones. **(See Charts 1a and 1b.)**

PARTICIPTING HBCUs BY PUBLIC/PRIVATE & URBAN/RURAL
Chart 1a



PARTICIPATING HBCUs BY ENROLLMENT
Chart 1b



4.1.1 Significance of Demographic Characteristics

From an overall perspective, the data from reporting institutions revealed clear trends among all of the HBCUs regarding networking and connectivity access, connectivity speed rate, types of vendors, student access to computing resources, etc. However, when certain factors are considered, such as the campus population of HBCUs, whether they are public or private, or whether they are located in urban or rural areas, differences begin to emerge. For example, most of the public HBCUs located in urban centers are

the larger schools with 2,500+ students, while the private, rural HBCUs tend to serve fewer than 999 students. Public HBCUs have more access to public resources from local or state government networking systems while private institutions may not have access to those resources. Urban HBCUs have more options for access to technology than rural ones.

The categories of public and urban appear to track similar data while private and rural schools have similar findings. The size of the school and its location are relevant since these characteristics may affect the distribution of computing resources available to different institutions.

4.2 Institutional Planning and Expectations

4.2.1 Computer Competency Requirements

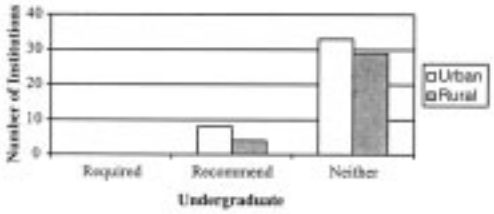
An important indicator of institutional readiness for technology is the expectation of institutions regarding computer training and computer usage by their students. Of the 80 reporting institutions, 55 percent indicated that they have a computer competency requirement, which is usually an introductory course in computer usage. Of that number, 47 percent of the public HBCUs require computer competency while a higher percentage, or 62.5 percent of the private institutions, require it. Sixty-five percent of the urban institutions require computer competency while 45 percent of the rural HBCUs have the requirement.

In the 1999 Campus Computing Study (Green, 1999), 39.3 percent of all colleges and universities nationwide had a computer competency requirement. It is interesting to note that ***as of spring 2000, 55 percent of HBCUs required some level of student computer competency, a number higher than Green's 1999 finding that 39 percent of all U.S. colleges and universities required student computer competency.***

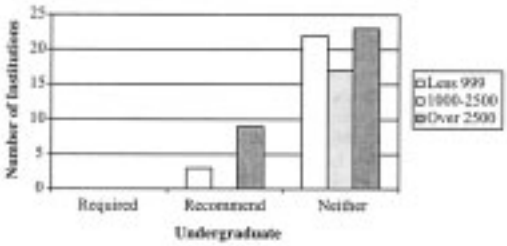
4.2.2 Policies Regarding Computer Ownership

None of the HBCUs reported policies that require student computer ownership and 15 percent of the HBCUs reporting indicate that they recommend student computer ownership. Among the urban and rural HBCUs, 17 percent of the urban institutions recommend that students own their own computers and 11 percent of the rural HBCUs have such recommendations. Even among larger HBCUs, less than 15 percent of HBCUs with enrollments of 2,500+ recommend computer ownership. When asked if they recommend computer ownership for individual units or academic programs (e.g., computer science, physics, etc.), only eight institutions, or 10 percent, indicated that their institutions make recommendations by discipline. The TAS finds that ***NONE of the 80 responding HBCUs require undergraduate students to own computers and only 15 percent recommend student computer ownership-both policies may affect on-demand student access to networks.*** **(See Charts 2a and 2b on next page.)**

HBCUs REQUIRING UNDERGRADUATE STUDENT COMPUTER OWNERSHIP (URBAN/RURAL 2a)



HBCUs REQUIRING UNDERGRADUATE STUDENT COMPUTER OWNERSHIP (ENROLLMENT 2b)



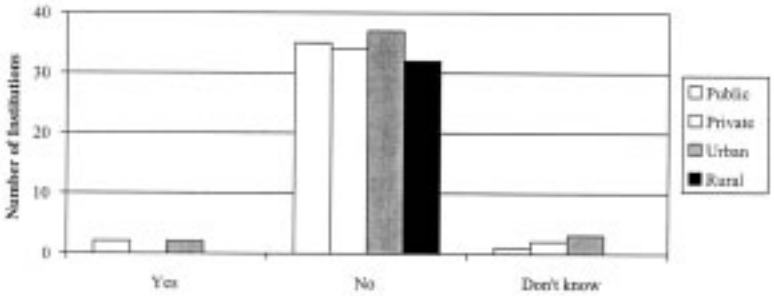
Regarding ownership policies, these findings are not that different from results of the campus computing study, which indicates that out of 530 institutions of higher education surveyed, only 2.7 percent have policies requiring student ownership of computers (Green 1999). However, the campus computing study indicates that 30.5 percent of the institutions surveyed do recommend student ownership of computers. ***Only 15 percent of HBCUs recommend that students own their own computers, compared to 30.5 percent of all institutions of higher education, which recommend that students own their own computers.***

4.2.3 Financial Aid for Computer Purchase

To determine whether financial aid is available to assist students with computer ownership, TAS asked whether institutions currently provide any form of assistance to students to purchase computers. ***Of the 89 responding institutions, only two institutions, or 3 percent, indicated that financial aid was available from their institutions to assist with the purchase of computers.*** These institutions went on to indicate that the form of financial aid was a discounted price from computer manufacturers.[7] **(See Chart 3a.)**

[7] Due to a February 2000 agreement signed between NAFEO and Gateway Computers, discounted computers are now available to all HBCUs and their students.

HBCUs PROVIDING FINANCIAL ASSISTANCE FOR STUDENTS TO ACQUIRE COMPUTERS (PUBLIC/PRIVATE & URBAN/RURAL) Chart 3a

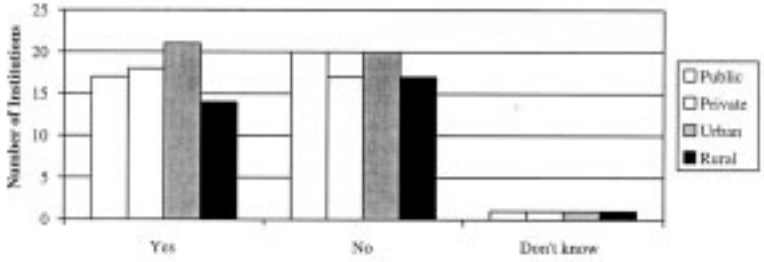


If financial aid is not available, why do not students use their own funds to purchase computers and bring them to campus? According to the report *Money Matters: The Impact of Race/Ethnicity and Gender on How Students Pay for College*, more than 36 percent of African-American students have income and assets that are so limited that the government does not expect them to make any contribution to their college education. Another 25 percent of African-American students are expected to contribute only $2,500 annually. And among HBCU students paying their own way through college, almost 64 percent have annual incomes of less than $20,000, and 39 percent have incomes less than $10,000 (American Council on Education 1999). In response to this data the TAS Team concludes, ***the limited financial status of African-American students makes it difficult for HBCU students to have the financial resources to purchase their own computers.***

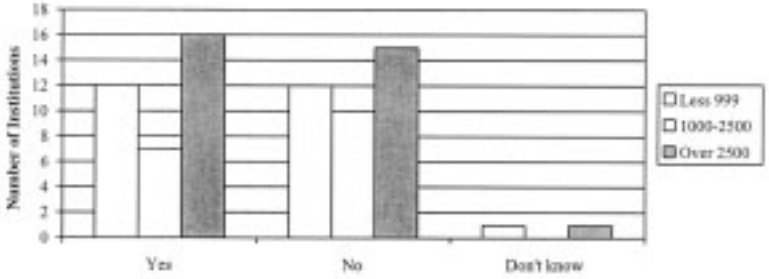
4.2.4 Institutional Computer Use Fees

TAS inquired whether institutions are imposing computer usage fees on students for access to computing. Among the 80 responding HBCUs, 43 percent report charging students a user fee with the fees ranging from $10 - $237 annually. Fifty percent of the urban institutions report imposing a user fee while 40 percent of the rural institutions impose user fees. **(See Charts 4a and 4b on the next page.)**

HBCUs WITH COMPUTER USE FEES (PUBLIC/PRIVATE & URBAN/RURAL), Chart 4a



HBCUs WITH COMPUTER USE FEES (ENROLLMENT), Chart 4b



According to the Campus Computing Study, (Green, 1999) the average technology fee among all reporting institutions was $125, with private universities charging the most at $186 and public universities charging $137. Among HBCUs, the average computer usage fee is about $79. Rural institutions charge slightly lower fees than urban ones.

4.3 Student Access to Computing and Networking Resources

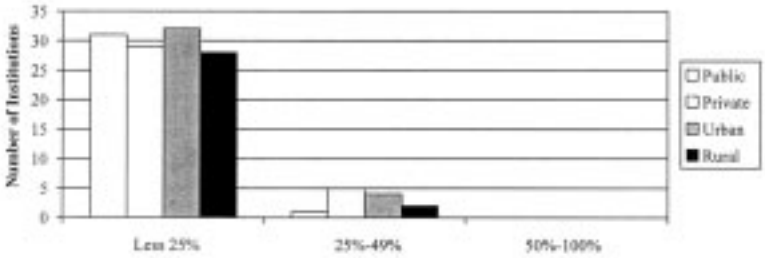
4.3.1 Student Ownership of Computers

A key to ensuring networking and connectivity for students is to provide them with full and ready access to computing resources. According to a 1996 strategic plan prepared for University of California at Los Angeles, providing students access to information technology services "...*generally requires access to a*

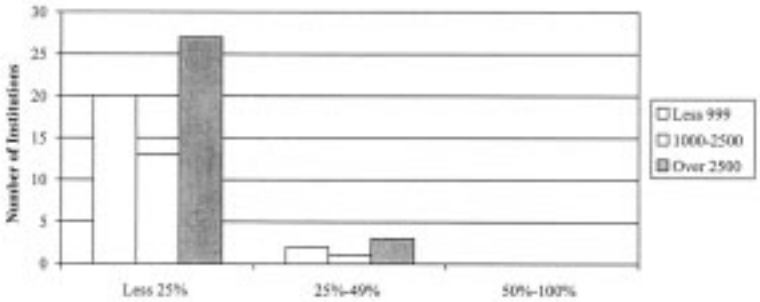
networked desktop computer, appropriate software and adequate support so that equipment and software can be effectively used." (UCLA Technology Strategic Plan, 1996.)

To determine student ownership of computing resources, TAS inquired into what percentage of students bring their own computers to campus. ***Of the 88 HBCUs participating in TAS, 76 percent estimate that fewer than 25 percent, or only 1 out of every 4 HBCU, students personally own computers.*** **(See Charts 5a and 5b.)** This finding is consistent across HBCUs whether they are urban, rural, public, private, large, or small.

STUDENTS BRINGING THEIR OWN COMPUTERS TO HBCUS (PUBLIC/PRIVATE & URBAN/RURAL) Chart 5a



STUDENTS BRINGING THEIR OWN COMPUTERS TO HBCUS (ENROLLMENT) Chart 5b

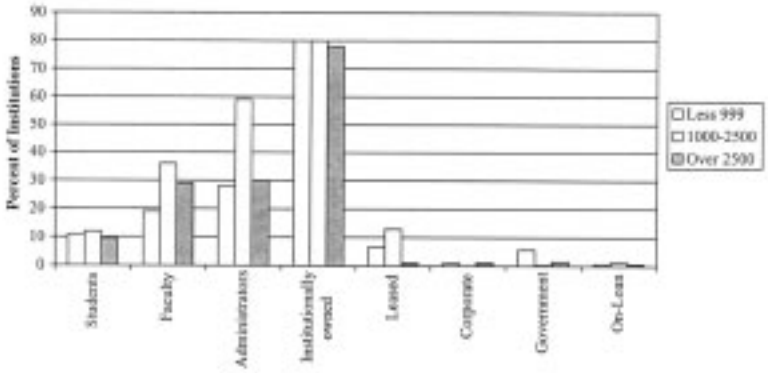


Nine percent of urban HBCUs indicated that 25-49 percent of their students have their own computers, while only 5 percent of the rural institutions indicated student ownership in the 25-49 percent range. Seven percent of the respondents indicated that they could not estimate student ownership. ***This finding regarding student ownership of computers contrasts with the 1999 Campus Computing Study, which reports that among all institutions of higher education, 49 percent, or about one out of every two students personally own their own desktop or notebook computers (Green 1999).***

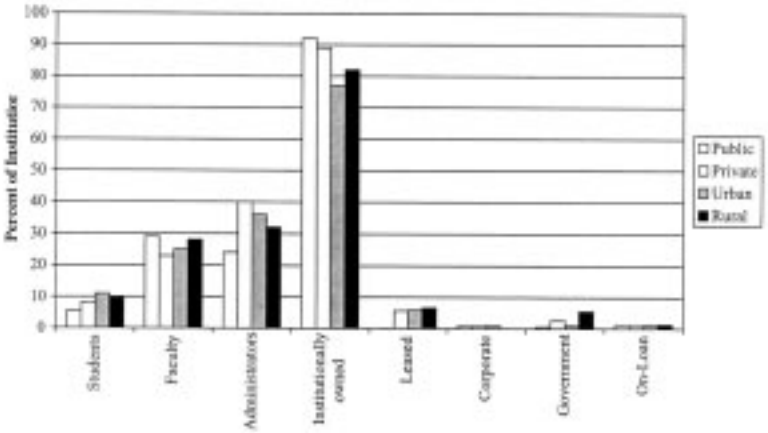
4.3.2 Institutional Ownership of Computers

An important feature of determining access to networks is to determine who owns computing resources. TAS findings indicate that approximately 80 percent of the computers on HBCUs campuses are owned by

OWNERSHIP OF DESKTOP OR LAPTOP COMPUTERS AT HBCUs (ENROLLMENT) Chart 6a



OWNERSHIP OF DESKTOP OR LAPTOP COMPUTERS AT HBCUs (PUBLIC/PRIVATE & URBAN/RURAL) Chart 6b



the institution itself. Administrators and faculty are in the second category of ownership while students, as indicated earlier in the report, own the fewest computers. HBCUs appear to be using few options other than direct ownership to obtain computers for their campuses. Given the need for students to obtain universal access to computers, other options could be considered such as leasing, using corporate-owned computers, government-owned computers, or computers loaned from sources in the community. **(See Charts 6a, 6b.)**

While it is essential that the institutions own computers to fill in obvious gaps in the capacity of students to own computers those institutional resources may impact students in a number of ways. By relying on institutionally owned computing resources, student access is dependent upon institutional funds, schedules, staffing, and availability. One technology professor at a four-year, rural, public HBCU observed, *"We have a number of computer labs at our University that are open seven days a week, 24-hours a day. One of our labs has 60 computers and it is packed all day every day."* ***Approximately 75 percent of students attending HBCUs do not own their own computers and must rely on institutional resources to connect to the Internet, World Wide Web, or other networks….a digital divide issue!***

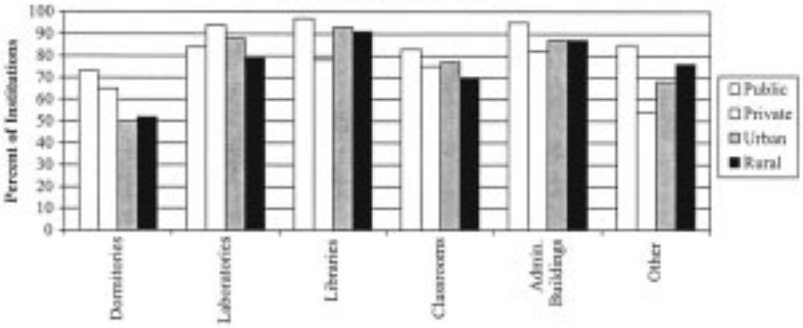
4.4 Connectivity, Capacity, and Facilities

4.4.1 Updated Wiring of Buildings

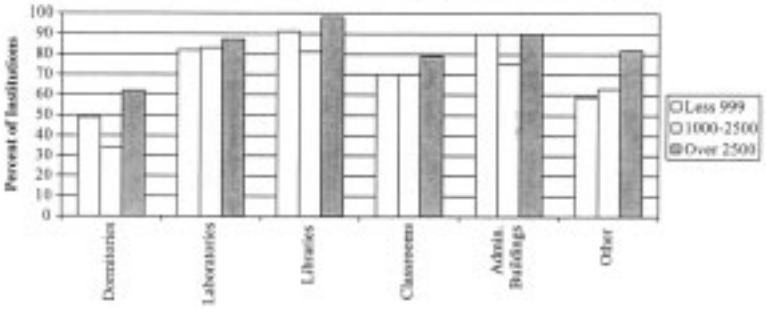
Key to installing campus networks is updating the wiring at buildings. Many HBCUs have old buildings and the TAS Team was interested to learn about the status of updating those buildings. Note: This information has not been verified by firsthand observation.

HBCUs report that over 50 percent of their buildings including dormitories have had their wiring updated. Libraries, laboratories, and administration buildings have the most updated wiring while classrooms and dormitories have the least. **(Charts 7a on this page and 7b on next page)**

HBCU BUILDINGS WITH UPDATED WIRING (PUBLIC/PRIVATE & URBAN/RURAL), Chart 7a



HBCU BUILDINGS WITH UPDATED WIRING (ENROLLMENT), Chart 7b



4.4.2 Campus Networks

Ninety-five percent of HBCUs indicate that they have campus networks composed of voice, data and voice, and/or data only. This indicates that most HBCUs institutions have some level of connectivity and offers a positive indication that HBCUs have made the initial investment required to begin laying the groundwork for providing networking and connectivity for the campus community. Not one HBCU reports distributing video over campus networks, although in Section 4.6 of the TAS it shows that 63 percent of HBCUs have basic videoconferencing capabilities. **(See Charts 9a and 9b on page 27.)**

4.4.3 Networking Campus Buildings

HBCUs network their buildings in a variety of ways. Fifty-one percent reported that they support voice and data on a single campus network for some, if not all, of their buildings. Fifteen percent reported single buildings being wired separately for voice and data. About 12.5 percent are wired for voice and data by geographic cluster on campus, and 12.5 percent reported being wired by functional cluster. Forty-one percent of the respondents indicated that all of their faculty offices are wired for both voice and data.

Since the TAS team was unable to inspect HBCU networks firsthand, it is surmised that a small number of the institutions may be reporting the existence of networks that are not yet functional. It is not possible to determine how many institutions may fall into that category; however, anecdotal information indicates that in the case of a few small, rural institutions, the backbone and infrastructure are in place but the connections have yet to be complete. For example, one campus official at a small, private, rural institution commented, "*We have laid the cables and wired our buildings and this fall we intend to have a fundraising campaign to pay for connecting computers to the campus backbone.*"

4.4.4 TAS Standard Of Connectivity

Based on TAS data, 88 percent of HBCUs have access to T-1 lines from their local ISPs and operating companies and connect to their networks using single or multiple T-1 lines. In addition to T-1 connections available to the majority of HBCUs, other Internet connection options such as T-3, Fractional T-1, DSL, Frame Relay and ISDN are also available to over 30 percent of the reporting institutions. Given the broad availability of T-1 access in the marketplace, the TAS team determined that a minimum standard of connection for HBCUs to national networks was T-1 connectivity. The study did not have the resources to determine the actual use of T-1 on a campus by campus basis, but it is reasonable to assume that a single T-1 is not sufficient to provide a large campus with effective bandwidth for 21st Century connectivity. Although for a small campus a single T-1 may be very adequate, it is safe to say that the more bandwidth capacity an HBCU has the more possibilities that institution may have for participation in advanced projects such as Internet2. While limited bandwidth may not be the only reason, the fact that only one HBCU is listed on the official Internet2 Web site as an Internet2 member may be partially explained by HBCUs who have access to high-speed lines not using that access.

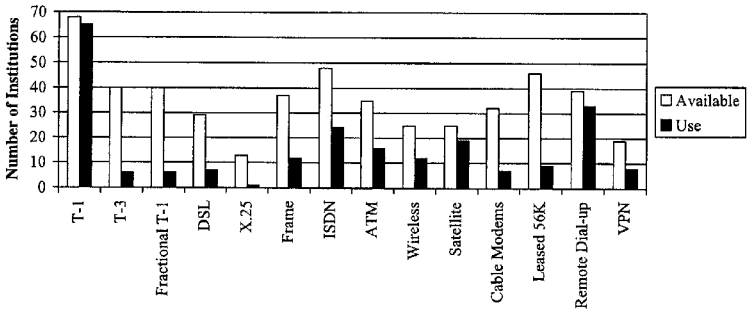
4.4.5 Comparison of Availability and Use of Services

T-I bandwidth provides a specific speed rate and capacity suitable for basic functions, such as supporting limited numbers of classrooms for videoconferencing and providing Internet and World Wide Web connectivity. Larger bandwidth technologies such as T-3 or Asynchronous Transfer Mode (ATM) switches can provide more access for more users at a faster rate and can support different applications. The TAS results indicate that HBCU usage diminishes quickly for higher bandwidth lines and other technologies providing advanced computing capacity.

Results show that most HBCUs are connected at the T-1 level with the second most prevalent method of connectivity being ISDN lines. As reported earlier, 85 percent of the HBCUs report having T-1 lines available in their areas. Among these schools the majority of them are using the T-1 connections. Fifty percent of reporting institutions have T-3 connectivity available in their area while only 7.5 percent report using these high-speed lines. This low use of wide bandwidth may explain why only one HBCU is presently a part of Internet2.

ATM switching is available for 43 percent of institutions, and of those 43 percent having access, 45 percent indicate that they use the technology. Fractional T-1 services are available to 49 percent of HBCUs while only 15 percent use Fractional T-1. Regarding access to DSL, 52 percent of urban HBCUs have access to DSL, and 29 percent report using it and among rural institutions, 11 percent have access to DSL and 25 percent of those having access to DSL use it. Twenty-nine percent of HBCUs report having access to wireless and 43 percent of those with access are using it. Note: Responses to the wireless question may actually refer to use of wireless cellular services and not necessarily wireless connections to the Internet and World Wide Web. **(See Chart 8 on next page)**

AVAILABILITY AND USE OF CONNECTIVITY SERVICES AT HBCUs
Chart 8

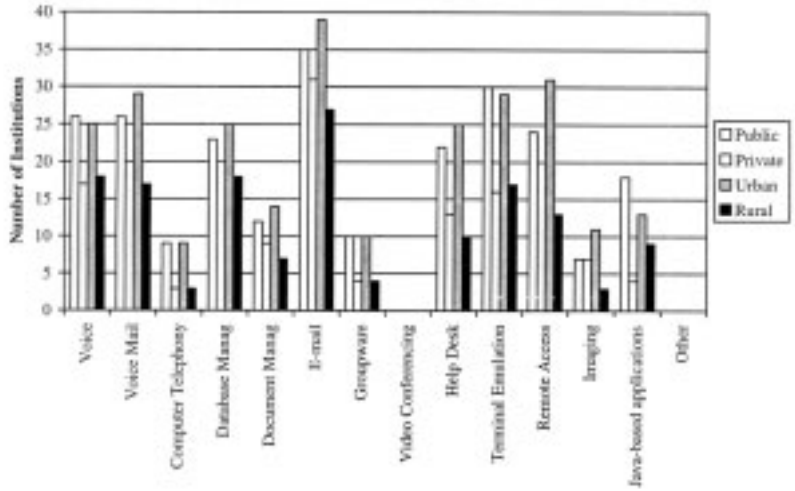


One question that emerges from this data is *WHY* are HBCUs, particularly private, rural institutions only using T-1 or ISDN when the marketplace has expanded to offer other options for high speed connectivity? This question is relevant in light of continuously expanding market demand for Web-based applications such as distance learning, telephony and Internet based videoconferencing, as well as the emerging projects such as Internet2.

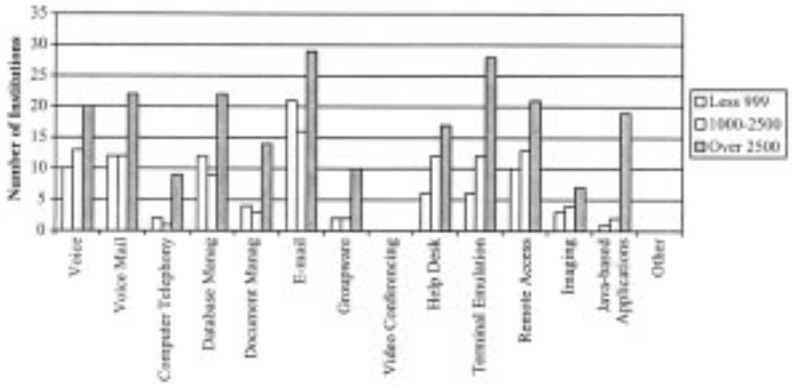
Looking at Table 8, it is clear that the majority of HBCUs are not using high-speed connections even if those connections are available in their communities. This raises the question as to whether or not HBCUs have the funds or technical staff to make full use of modern networks available to them. There is no indication in the TAS results that helps assess the reasons why the majority of reporting HBCUs do not go to the next stage in network design and use. However, the TAS team speculates that that the answers may lie in the areas of finance, lack of strategic planning, faculty motivation, and training. Expanded access to funding, further upgrades, and professional training may be needed to have fully functioning networks that take full advantage of available opportunities and resources and operate maximally. The opinion of the TAS Team after review of this data is...***Lack of connectivity beyond the T-1 level may be one of the key areas that hold back HBCUs from making the digital leap into the 21st Century!***

HBCU responses show a reasonable use of the network for administrative services and of other basic interconnection activities such as e-mail, voice mail, and help desk. However, responses also show that there is not much use of groupware software, which suggests that there is limited use of intranets, professional meetings, and professional collaboration over the Internet. Table 9 shows the use of particular applications at HBCUs: **(See Charts 9a and 9b on next page.)**

NETWORK APPLICATIONS USED AT HBCUs (PUBLIC/PRIVATE & URBAN/RURAL), Chart 9a



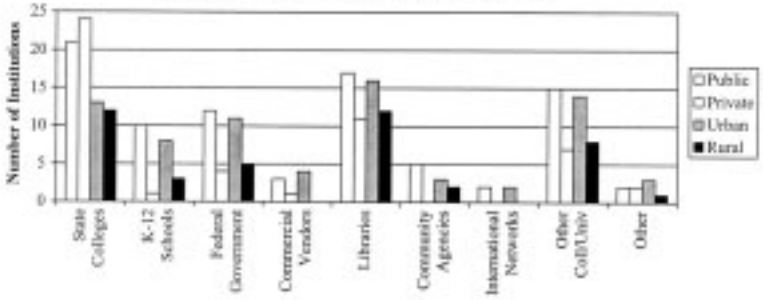
NETWORK APPLICATIONS USED AT HBCUs (ENROLLMENT) Chart 9b



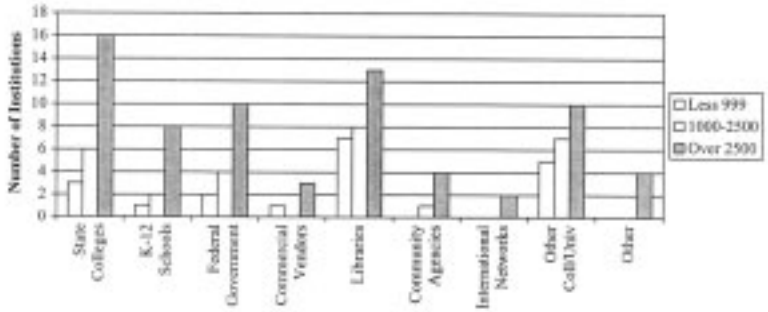
4.4.6 Global and National Networks

Among HBCUs, extensive connectivity to a global community appears to be underutilized. While baseline capabilities for connectivity exist within HBCUs, anecdotal evidence indicates that connectivity beyond the campus borders only extends to regional and/or statewide networks, or in some instances to the Federal Government. Out of 80 HBCUs only 31 percent indicate that they network with state college systems, 13 percent network with K-12 school districts, 20 percent with the Federal Government-a potential major source of funding and 5 percent with commercial vendors. Thirty-five percent network with libraries and 27 percent with other colleges and universities. International connectivity is virtually non-existent with only 2 percent indicating participation in international networks. **(See Charts 10a, 10b)**

HBCUs NETWORKED WITH NON-HBCU INSTITUTIONS (PUBLIC/PRIVATE & URBAN/RURAL), Chart 10a



HBCUs NETWORKED WITH NON-HBCU INSTITUTIONS (ENROLLMENT) Chart 10b



An HBCU professor at a public urban institution believes that HBCUs would benefit from a national or global private network that connects all HBCUs, *"At our college, we specialize in African languages,"* the professor comments *"If we had a private network among HBCUs nationwide, we could benefit from professional exchange. We could share our African language expertise with other HBCUs...in exchange we would have access to the expertise of other institutions...such a network could extend to the Caribbean and Africa."*

By using greater access to worldwide resources, institutions can avail themselves of significant new applications of technology in the marketplace such as first employment interviews, multi-national and cross cultural distance learning, academic exchanges, research collaboration, distance learning. HBCUs should consider the need to *"Act locally...think globally."*

4.4.7 Vendors and Access to Networking Services

Thirty-six percent of responding HBCUs indicated that they use their state or local government as their vendors for access to the Internet, rather than small independent Internet service providers, Bell operating companies or various cellular, wireless or other service providers. Of the 36 percent using state or local government vendors, 50 percent of the public HBCUs and 22 percent of private HBCUs utilized this form of service. From this data, it appears that there is a significant distinction between public and private schools in their access and use of state and local systems. Also, there is also a difference in use by size of student enrollment, with smaller schools being less likely to employ such services.

Small, private, rural institutions may want to seek increased collaborative opportunities with either urban or other rural "wired" HBCUs in order to increase their access to networks and connectivity, and hopefully to enhance their overall networking and connectivity capacity.

While use of state or local government services may be a benefit to public and private urban HBCUs in terms of cost and access, it may also mean that these same institutions are more subject to political issues regarding their budgets and choices for technology. One HBCU technology professor from a public, rural institution comments, *"Next year the state is going to cut our budget. This will impact our ability to increase our number of classrooms with access to high-speed computing connections."*

Conversely, institutions that either do not have access to state or local government systems, or do not use them, may have an advantage in the ability to access change and innovation in the wider computing world. For example, some private institutions in higher education are choosing to bypass the expense of wiring of buildings and dormitories to connect students to the Internet, World Wide Web, and other campus networks by using high-speed wireless networks instead. Mount St. Mary's, a small, private, non-HBCU college in Newburgh, NY, found that the cost of installing a wireless network system to cover its campus, including parking lots and dormitories was $10,000 - $15,000, compared with the $150,000 estimated to wire just its classrooms and dormitories (*New York Times*, April 20, 2000). HBCUs that are dependent on local or state government vendors may not have the option to use wireless networks or to take immediate advantage of innovation.

4.5 Campus Backbone, Baseline, Capacity, and Facilities

The importance of the campus backbone is most meaningful to the overall mission and objectives of the institution. For institutions seeking to conduct advanced research, the type of hardware and software they install, plus the capacity of the campus backbone to support advanced computer modeling, high-speed connectivity, Web-based videoconferencing etc, may affect the type and size of Federal, state, local and/or private sector funding they can attract. Increasingly, Federal agencies are requiring all institutions to apply for contracts and grants online, and the ability to do that requires specific types of software and connection speeds. In addition, participation by HBCUs in advanced research projects may require certain types of imaging capacity and high-speed connectivity.

4.5.1 Description of Campus Backbone

Ethernet is "a shared media LAN (Local Area Network) where all stations on the segment share the total bandwidth."[8] HBCUs indicate that they have basic connection topographies and operating systems in place with 72 percent of all of the institutions reporting using Ethernet; 55 percent fast Ethernet; 89 percent using Windows NT; and 67 percent TCP/IP. Fifty-seven percent of the urban institutions report using Novell Netware Operating Systems and 51 percent of the rural institutions report using Novell Netware. Ninety percent of the urban institutions and 89 percent of the rural institutions are using Windows NT.

Seventy percent of public HBCUs use Ethernet and 79 percent of the private institutions use it as a part of their campus backbone. For four-year public and private urban and rural institutions, the top two technologies for campus backbone are Ethernet and Fast Ethernet. It is important to note that both protocols are industry standards.

Most of the HBCUs have the necessary protocol to support Internet applications with 93 percent of the urban HBCUs reporting that their networks support TCP/IP and 80 percent of the rural ones report the same. Among public institutions, 96 percent indicated that their networks support TCP/IP while 93 percent of private institutions reported that their networks support TCP/IP.

As we look at the data, we find that HBCUs appear to be invested in a solid foundation for their campus networks based on industry standards, but there may be some question as to whether these backbones can handle high-end video and other bandwidth intensive applications. The networks appear to be suitable for administrative and business functions but, as noted earlier may fall short if HBCUs choose to move into Internet2 and research projects that require high speed capacity. Also, expansion of distance learning over the Internet will probably result in ever increasing demands for high-end video and the capacity to exchange elaborate files and images.

Regarding use of newer technology, 76 percent of the public institutions use Fast Ethernet in their campus backbones, while 50 percent of the private institutions use it. These differences may result in public institutions having campus backbones that are capable of providing faster connectivity as a result of their use of Fast Ethernet technology. HBCUs report very little use of FDDI, SONET, or Fiber Channel applications that can be used to support video.

[8] Tech Net Encyclopedia, July 2000

4.5.2 Access to The Campus Backbone

HBCU administration buildings and functions have greater access to the campus backbone while academic departments, instructional areas, and student-centered facilities such as dormitories, have less access, with the most notable exception being campus libraries. TAS data indicates that as long as students are accessing the campus network and the Internet from computer labs or libraries, their access is maintained. However, as they move outside of those locations their access diminishes substantially. While 88 percent of central administration offices have access to the campus backbone only 45 percent of the common areas of the dorms have access. While, admittedly, students can gain access to campus networks by connecting through phone lines, plug-in outlets in individual dorm rooms are preferable. Anecdotal evidence indicates that most dorm rooms do not provide plug-in access.

To take a closer look, public institutions report that 93 percent have central administration buildings connected to the campus backbone while 53 percent of the dormitory common areas are connected. Among private HBCUs, 92 percent of the central administration buildings are connected to the backbone while 48 percent of the dorms are connected. From the urban/rural perspective, 90 percent of the urban HBCUs have central administration buildings connected to the campus backbone and only 42 percent of the common dorm areas. Among rural schools, 85 percent of central administration is connected to the backbone while 52 percent of the dormitory common areas are connected. It would appear that most HBCU computing resources are invested in insuring that administration functions have connectivity while student access, at least from the location of campus dormitories, is a lower priority.

To contrast HBCU findings, the TAS looked at two other reports. First, the *Campus Computing Study* (Green 1999) reported that among all institutions of higher education, 62 percent of dormitory beds have network connections thereby providing students who own their own computers with direct access *on demand*. In the *America's 100 Most Wired Colleges* survey, it is reported that only 35 percent of all universities and colleges provide public computer equipment in labs or in dormitories. (YAHOO Internet Life, May 2000) However, although only 35 percent of the public dormitory areas of the YAHOO institutions are connected to networks, this number should be considered in light of the Campus Computing Study's finding that 62 percent of all individual dorm beds provide connectivity.

Since fewer than 25 percent of the majority of HBCU students own their own computers, HBCU students cannot access campus networks from their dorms, even through a telephone line, since they do not own the necessary equipment. Students must rely on common resources provided by their institutions, and there may be a number of factors that limit those institutional resources. One professor at a public, rural institution noted, "*Since male and female dorms are on opposite ends of the campus, our computer labs must be located with gender equity considerations for males and females. Even though our labs are open seven days a week, 24-hours a day, there is always a waiting list. Maintaining security for students walking from dormitories to computer labs during the middle of the night is quite a security problem.*" Therefore, a finding of the TAS is...***at approximately 50 percent of HBCUs campuses, "on-demand" student access to computing resources is not available at a critical location-the campus dormitory.***

4.5.3 Computers and Servers

Public and private institutions report using the same types of computing resources, including computers and servers. Public institutions report using PCs 94 percent of the time and private institutions report their PC usage as 97 percent. Regarding their use of servers, 42, or 78 percent, indicate that they are using

"Intel-based" servers to power network applications. This compares to 37 percent and 44 percent using mainframe and midrange systems respectively for powering their networks.

These findings are consistent with the telecommunications industry in general, which is adapting to the newer "Intel-based" technology for their networks and are not relying on older legacy systems. This is important because it indicates schools are upgrading their networks and implementing the latest network techniques. As one way of measuring use of new technologies, TAS inquired into the use of the net computer, an inexpensive PC-like device that uses the network for applications and computing power. Twenty-four percent of the urban institutions reported using net computers; however, of that number, only 11 percent of the rural institutions reported using the newer, more innovative technology.

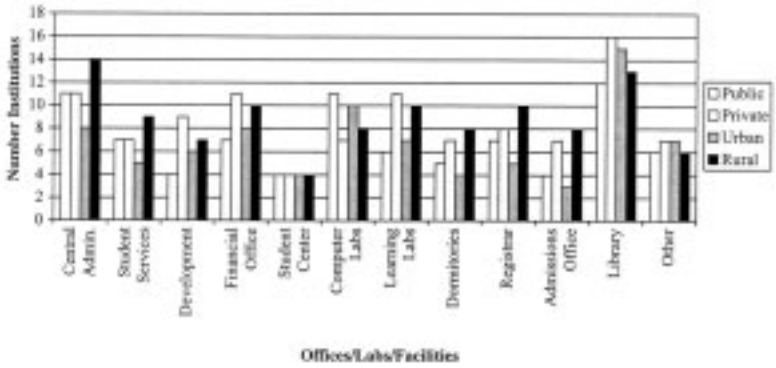
Regarding basic server applications such as file/print, e-mail and Web servers, the majority of the public and private HBCUs use these technologies for administrative and academic purposes. One hundred percent of the public and private institutions reported using file/print servers, over 90 of the public and private HBCUs use e-mail servers, and 97 percent of public and 82 percent of private institutions indicated using Web servers. There is no appreciable difference between the urban and rural institutions in this category.

In the area of specialized servers such as e-commerce, voice and/or video servers there is some limited use at HBCUs. Regarding the popular e-commerce applications, fewer than 20 percent of HBCUs report using e-commerce, whether viewed from the public, private, urban, or rural perspectives. Regarding voice servers, 30-40 percent reported using voice servers and 31 percent of those users are rural institutions. Twenty-two percent of HBCUs use video servers although of that 22 percent only 11 percent of those are rural HBCUs. Reviewing the use of specialized servers may provide an indication of some of the trends among HBCUs to integrate technology into the operations of the university and the educational process. For example, e-commerce may be applied to support online registration or video servers can be used to distribute educational content over the campus network. It appears from the data that these applications have begun in the HBCU community, but are not yet used extensively.

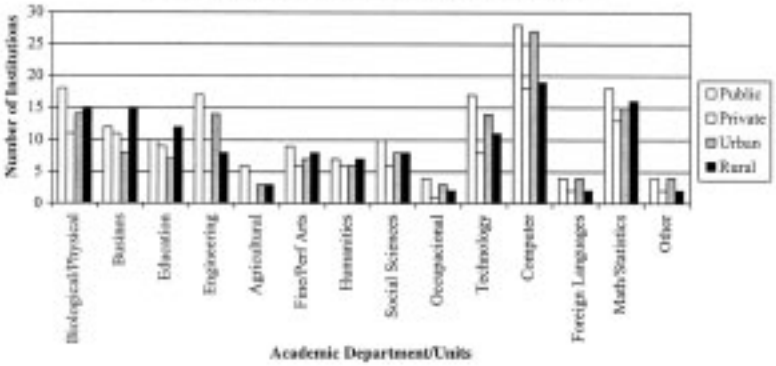
4.5.4 Location of Workstations

Specialized workstations are located in both administrative areas and academic departments at all HBCUs, with a slight edge given to workstations in administrative offices. Nineteen percent of urban HBCUs indicated that they have workstations in central administration while a surprising 40 percent of rural institutions have workstations in central administration. As would be expected, HBCUs reported that 60 percent of their computer science departments have specialized workstations, while 38 percent of their biological and science departments have them. Twenty percent of the HBCUs reported locating workstations in humanities and social science departments. Foreign language departments have the fewest workstations at nine percent. **(See Chart 11a, 11a continued, 11b, 11b continued. Note: Due to the amount of data two charts were required for 11a and 11b.)**

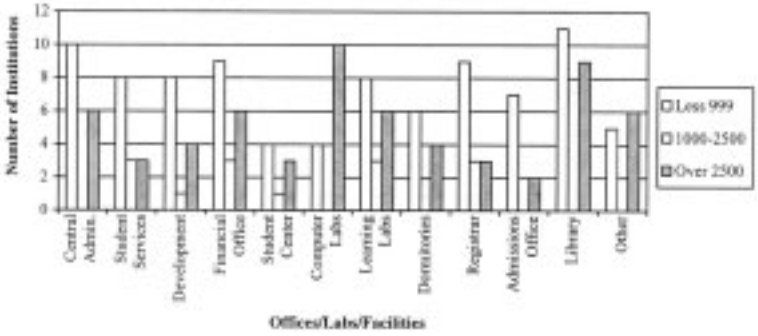
SPECIALIZED WORKSTATIONS IN HBCU ADMINISTRATIVE OFFICES/LABS/FACILITIES (PUBLIC/PRIVATE & URBAN/RURAL), Chart 11a



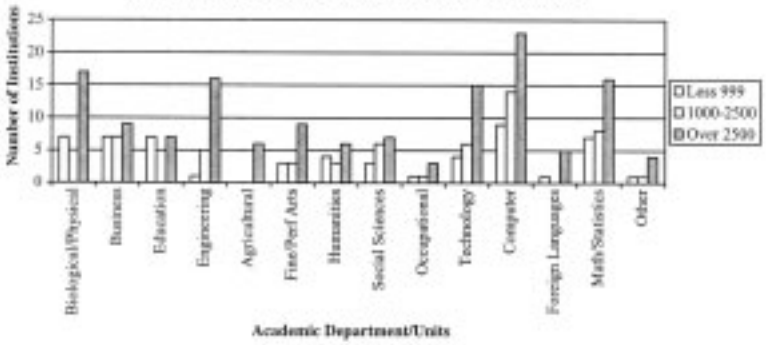
SPECIALIZED WORKSTATIONS IN HBCU ACADEMIC DEPARTMENT/UNITS (PUBLIC/PRIVATE & URBAN/RURAL), Chart 11a continued



SPECIALIZED WORKSTATIONS IN HBCU ADMINISTRATIVE OFFICES/LABS/FACILITIES (ENROLLMENT), Chart 11b



SPECIALIZED WORKSTATIONS IN HBCU ACADEMIC DEPARTMENT/UNITS (ENROLLMENT), Chart 11b continued



4.5.5 Cost of Connectivity

Forty-seven percent of urban HBCUs and 45 percent of the rural institutions, report spending $1,000-$5,000 per month to obtain connectivity and Internet services and eight

percent did not know. From the public and private perspective it doesn't change much with 39 percent of the public institutions spending $1,000-$5,000 per month for connectivity services and 46 percent of the private HBCUs spending a similar amount. Six percent of public institutions report spending between $5,000-$9,999 monthly and about 3 percent of private, and another 3 percent of public, report spending more than $10,000 per month.

Since a majority of the HBCUs report using T-1 lines, it can be assumed that much of the expense reported is to obtain use of those lines. Options for less expensive forms of connectivity may include DSL services available in urban areas, while HBCUs in rural areas without access to DSL may consider investigating options for wireless connectivity.

4.5.6 Network Security

Concerns about network security are becoming a major issue in the private and government sectors. Therefore, TAS included a few questions regarding login and password validation for access to all networks, applications, and data. Seventy-two percent of institutions indicated that they do require password validations.

When asked if the institutions were confident that their computers and networks are sufficiently secure, 55.6 percent of respondents were confident that their campus networks are secure. Seventy-five percent of private institutions indicated confidence in their computer security, while only 46 percent of the public institutions indicated such confidence. Since public institutions are also the larger ones, these findings may indicate that smaller, private institutions with fewer students, less hardware, and smaller campus networks have fewer areas of concern about network security.

While network security may be a more obvious concern for larger, public institutions, smaller private institutions would do well to monitor their network security as well since breaches in security, such as hackers, etc., can wreak havoc with institutional operations. In the future, insecure network operations may also have an impact on the capacity of HBCUs to participate in Federal or industry online programs that involve grants, contracts, and partnerships.

4.6 Web-based Services, Distance Learning, and Multimedia

4.6.1 Distance Learning and Multimedia

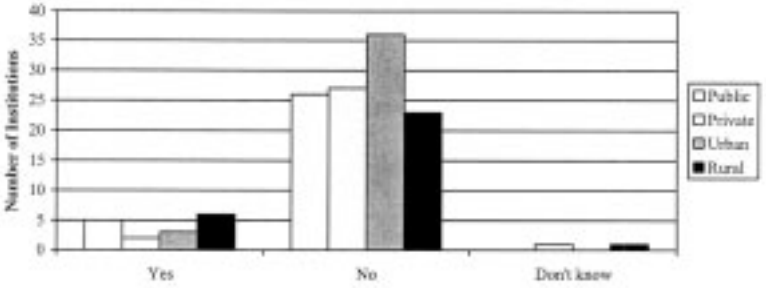
More than 50 percent of all HBCUs report that they have standard multimedia equipment, such as cameras, VCRs, projectors, and monitor installations used to support multimedia classrooms. Sixty-three percent

report that they have videoconferencing capability and 36 percent have audio teleconferencing. These technologies are used to support the HBCUs that participate in distance learning programs. Of the reporting HBCUs, 69 percent of them report having distance learning capabilities. Of the 69 percent who report having distance learning capabilities, 59 percent of them are urban institutions and 40 percent are rural, and 1 percent did not know.

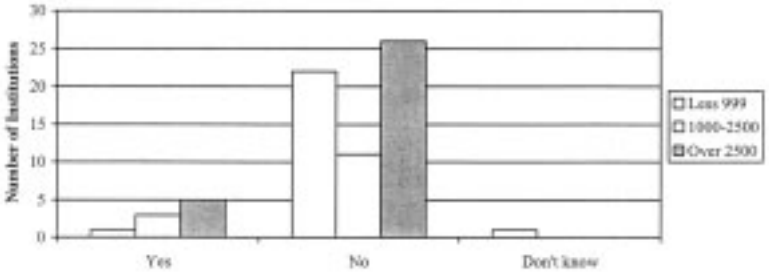
Fifty-six percent of HBCUs use two-way video/audio to support distance learning, 32 percent use satellite receivers, while 15 percent percent indicate that they use specialized Internet-based distance learning. Use of Internet-based distance learning technologies may increase as institutions invest in higher band width.

Fifty-eight percent of HBCUs indicate that they participate in distance learning. However, only 13 percent of them report that they currently offer degree programs by distance learning, 85 percent report that they do not offer degree programs, and 1 percent did not know. Of the 13 percent of HBCUs who report that they offer degree programs by distance learning, 33 percent are urban and 66 percent are rural. Larger HBCUs with enrollments of 2,500+ offer more degree programs by distance learning than smaller ones. **(See Charts 12a and 12b.)**

HBCUs OFFERING DEGREE PROGRAMS THROUGH DISTANCE LEARNING (PUBLIC/PRIVATE & URBAN/RURAL), Chart 12a



HBCUs OFFERING DEGREE PROGRAMS THROUGH DISTANCE LEARNING (ENROLLMENT), Chart 12b



Fifty-five percent of HBCUs participating in distance learning programs indicate that they do so primarily at the local level. While the TAS team did not precisely define "local level" means, anecdotal information indicates that videoconferencing is used by a number of HBCUs to support learning at extension locations in outlying communities within their home States.

Of the 85 percent of the institutions that report that they are not offering distance learning degrees programs at the present time, 48 percent of them indicate that they do plan to offer distance learning degree programs within the next three years, 20 percent of HBCUs indicate that they have no plans to offer distance learning degree programs within the next three years, and 30 percent did not know. The number of respondents reporting that they did not know their institutions' plans regarding distance learning may be an indication of weakness in the institutional strategic planning. As distance learning grows as an option for providing higher education and academic degrees the question of how HBCUs should participate further in the world of distance learning becomes an important administrative, strategic, and academic issue for colleges to evaluate. ***The TAS finds that of the reporting HBCUS, the majority of them are participating in distance learning programs, but 85 percent of them are not yet offering academic degrees through distance learning.***

4.6.2 Integration of Technology into Teaching

When asked whether faculty and academic units are effective at using the Internet and World Wide Web as a resource for curriculum and instruction, the average response was "somewhat effective." Predictably, HBCUs suggested that the library, computer science, and technology units were most effective while the foreign language, humanities, and fine arts departments were least effective. However, none of the respondents indicated that any of their academic or faculty units were "extremely effective" with use of the Internet in the classroom. TAS results indicate that HBCUs recognize that the use of Web-based applications opens up new possibilities for academic enhancement; however, TAS results also indicate that at the present time limited use is made of innovative Web-based applications. While results indicate primary HBCU use of technology to reach local student populations, extending the reach to global student populations coupled with market demands and interest stimulated by distance learning may afford great possibilities for all HBCUs.

4.7 Strategic Planning and Management Issues

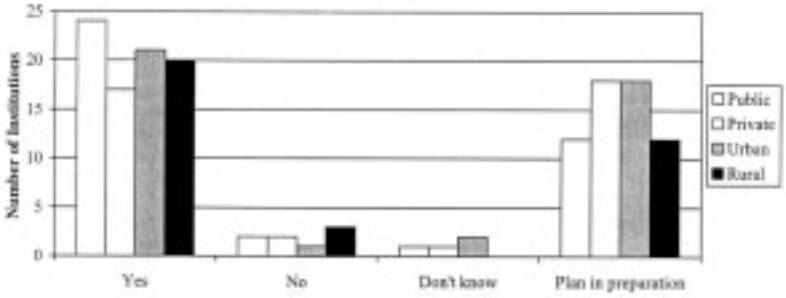
Critical to the successful utilization of computing technology is an institution's development of plans and policies about hardware, software, wiring, academic, and administrative uses; student usage; and a wide variety of other factors. In order to develop some idea of the activities taken by our institutions in this regard, respondents were questioned about studies assessing their institutions' technology needs and strategic planning related to information technology.

The development of strategic plans, which could include needs assessments, may encourage institutions to focus upon systemic relationships and to examine the utilization of information technology as a part of those relationships. ***It is encouraging to note that of the HBCUs responding to the TAS report, 52 percent indicated that they have a strategic plan and 42 percent reported that they are in the process of developing such a plan.***

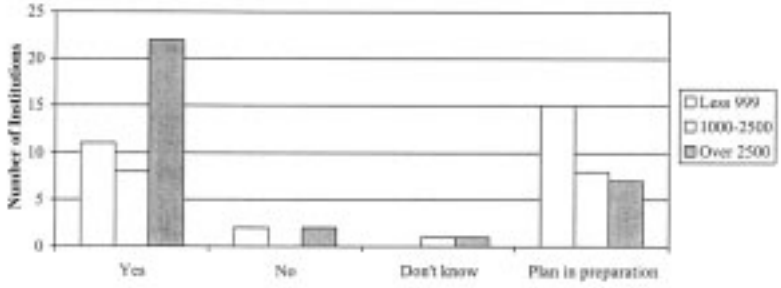
However, of those responding, only 65 percent have a process for measuring progress and updating their plans. The review and updating capacity is an important component of the effectiveness of strategic planning. Without this activity, institutions will not be able to adjust to unexpected changes in the implementation of their plans and to changing internal and external environmental conditions. In response to a TAS request for copies of those strategic plans, only three were provided.

The quality of the strategic planning process and of the adequacy of the plans cannot be determined in this study, but some recognition of their quality and of the assistance the institutions receive in developing their plans should be of critical importance for the future consideration and understanding of the capacity of HBCUs to provide students and faculty with competitive opportunities. **(See Charts 13a and 13b.)**

INSTITUTIONS HAVING STRATEGIC PLANS FOR THE DEVELOPMENT AND USE OF INFORMATION TECHNOLOGY (PUBLIC/PRIVATE & URBAN/RURAL), Chart 13a



INSTITUTIONS HAVING STRATEGIC PLANS FOR THE DEVELOPMENT AND USE OF INFORMATION TECHNOLOGY (ENROLLMENT), Chart 13b



4.7.1 Institutional Expectations

When asked to identify the most important technology issues for their institutions over the next five years, the vast majority of HBCUs identified seven items as extremely important issues: (1) providing universal access to the Internet, (2) providing adequate user support, (3) assisting faculty with integrating technology into instruction, (4) financing the replacement of aging hardware/software, (5) expanding/enhancing the campus network, (6) using IT effectively in distance education, and (7) enhancing library access to data bases and other institutions, etc.

These responses address not only issues of increased access but also items of enhancing how technology can be better used in teaching and learning. When the data are looked at from a public and private institutional perspective we find significant differences.

Overall, the private schools rate the seven issues identified above as more important than the public schools. Noting that the private schools are small and many are located in rural areas, this may suggest that the small rural institutions are more aware of the need to reach out for more computing resources that can enhance their capacity to offer and manage networks.

Also rated as very important to the HBCUs was linking libraries to a wide range of resources; improving overall speed/response time of network services such as e-mail and Web-access; linking PCs to larger computing systems; regularly updating hardware and software; linking dormitories to the campus network; and connecting desktop systems to share department or workgroup files. In reviewing these responses, based on characteristics of enrollment, we find minor differences between urban, rural, public, and private institutions.

Issues that were rated as lower priorities for the majority of the HBCUs include: creating plug and play networks for notebook computer users and digital image libraries. HBCUs should review these priorities since plug and play networks for laptop or notebook computers can provide students with flexibility to access networks. Scattering plug and play connections throughout campus and dorm rooms could increase access for those students who own their own computers. By not offering plug and play options, students must rely on access at campus labs, classrooms. and regular telephone lines.

The low prioritization of digital image libraries is another indication of the low use of wide bandwidth needed to support advanced digital images. This may be a refection of the fact that HBCUs are not using high-speed connectivity beyond the T-1 level that would be required to support certain types of research requiring them to use connections such as DSL, T-3, satellite, or wireless. As more HBCUs compete to participate in Internet2 and join in partnerships with government and industry, high-speed connectivity will probably become a more critical area of focus for strategic planning.

5.0 TAS CONCLUSIONS

In conclusion, in spite of difficulties that face many public HBCUs dependent on legislatures for public support or private HBCUs dependent on private sources to finance expensive technology, the TAS finds that the majority of HBCUs report the existence of some type of campus network that provides connectivity to the Internet and World Wide Web. Having these networks available to students attending HBCUs ensures that the predominately African-American student populations attending these historic institutions have access to technology that prepares them for the technology based workforce.

While campus networks are available at public, private, large, and small HBCU campuses located in urban centers and/or rural communities, the networks are unevenly distributed across campuses. Most of the computing and connectivity resources are focused at administrative buildings, but are not distributed equally to classrooms and dormitories. HBCUs may report campuses as "wired" and providing connectivity to the Internet and World Wide Web, but data indicates that all campus buildings do not provide connectivity to networks and the Internet, but provide it on a building by building basis.

HBCUs do own significant computing resources primarily located in computer labs, administrative and academic buildings, and libraries. These facilities provide students with access to the Internet, World Wide Web and other statewide and campus networks. However, individual student "on-demand" access to campus networks is seriously deficient due to either lack of student ownership of computers, lack of access from campus dormitories, or concentration of resources in selected locations. Computer ownership affects access to networks since students attending HBCUs only own computers at a rate of approximately one out of four, while approximately one out of two students attending non-HBCU institutions of higher education own computing technology. And, the TAS found that there is virtually no financial assistance in the form of loans or grants available to help students with limited financial resources to purchase computers and close this "computer ownership gap."

For the approximately 25 percent of the HBCU students who do own computers, they can access the Internet and World Wide Web from various locations on campus and from common areas in those dormitories that do provide connectivity. However, even the access of those students is impacted because fewer than 50 percent of the HBCUs report that their dorms provide connectivity. While it may be possible for students to access the Internet and campus networks through dorm room phone lines, it would be preferable for access to be provided by plug-in access in individual dorm rooms. For those students who do not own their own computers, access to networks requires reliance on institutional resources that may involve waiting for computer availability at computer labs and other facilities. In the view of the TAS Team, a digital divide issue is that a majority of HBCU students do not have universal access to campus networks and computing resources.

TAS also concludes that if HBCUs are to be competitive in the area of providing network technology supporting basic research, advanced research, e-commerce, imaging distance learning, and video applications, the institutions should dramatically increase their connectivity speed rates beyond the T-1 level.

Half of the HBCUs lack completed technology plans with strategies for updating those plans. This lack of a systematic and methodical approach to technology planning may result in campus networks not being reviewed, evaluated, and updated. This may impact future opportunities for HBCUs in taking advantage of funding, innovations, and increased competitiveness in the field of higher education.

One other concern of the TAS team is the finding that most HBCUs are connected to campus networks at the T-1 level. While T-1 connectivity provides basic access to the Internet, World Wide Web, and other networks, it is a first level of connectivity beyond dial-up modems. The question that rises from this finding is "WHY are HBCUs limiting themselves at that level?" This is an important question because it affects the capacity of HBCUs to participate in Internet2 and other research efforts that require high-speed connectivity. There is nothing definitive in the TAS results that helps assess why the majority of reporting HBCUs do not go to the next stage in network design and use. ***Lack of connectivity beyond the T-1 level may be one of the key areas that restrict HBCUs from making the digital leap into the 21st Century!***

5.1 Public vs Private Issues and Urban vs Rural

One issue that emerges from the TAS data is differences faced by the private versus the public institutions and urban vs rural as they deal with the digital divide. While factors related to these differences are not clear, they can be found in the areas of hardware, access, utilization, and expectations within the institutions. Some of the differences might be attributed to the fact that private HBCUs are predominately smaller than the public ones, while other differences may be due to the characteristics of public or private HBCUs or whether they are located in urban or rural areas. For example, small, private, rural HBCUs, and/or larger public, rural HBCUs do not have the same access to newer, less expensive technologies such as DSL due to local availability of such technologies. Also, private, rural institutions do not have the same access to state systems and networks as public rural or, urban institutions. However, while public, urban institutions may have greater access to state systems they also may have a higher degree of control over their budgets by state legislatures. This control may stifle flexibility of public institutions to introduce innovation or to experiment with different forms of connectivity.

For smaller institutions, technology could impact some disparities correlated to size differences. For example, economies of scale could be achieved by cooperation among HBCUs in purchasing materials, giving classes online, developing major courses of study through professional collaborative software, training staff and faculty collaboratively in the utilization of technology, and sharing the use of data bases for research and teaching, etc.

Institutional mentoring could be another area where smaller, rural, public and/or private HBCUs could benefit from the expanded connectivity of larger urban HBCUs. While frequently such cooperation occurs between small HBCUs and larger often non-minority institutions, the potential exists for HBCUs to increase their collaboration with each other.

The key to understanding the issues confronting smaller, private, rural institutions is to recognize that in contrast to prior times, geographical concerns are no longer a barrier in bringing institutions into true interaction and cooperation. Through networking and connectivity all HBCUs can expand the educational options for students; increase the level of opportunity for professional development for faculty, and enhance institutional stature and impact in the communities they serve. These goals can be achieved for all HBCUs-large, small, urban, rural, public, and private.

5.2 Highlights of Findings

Listed below are highlights of the TAS findings:

- Ninety-eight percent of HBCUs report some form of voice or data campus network.
- Fifty percent of HBCU campuses provide student access to the Internet, World Wide Web, and other networks at several locations on HBCU campuses, including computer laboratories, libraries, classrooms, dormitories and/or technology centers. However, among campus options for network access, dormitories provide the least for connectivity to the Internet and World Wide Web.
- Over 75 percent of HBCU students rely on institutionally provided computers in order to obtain access to the Internet and World Wide Web.
- There is basic equivalency in networking and connectivity services among TAS reporting institutions in urban areas, whether they are public or private. However, among rural, private institutions, there appears to be a significant technology gap.
- Approximately 25 percent or less of students attending HBCUs bring their own PCs or laptops to campus.
- Average HBCU expenditure for connectivity services ranges from $1,000 - $4,900 per month.
- The vast majority of HBCUs connect to networks and the Internet using T-1 lines while few report using high-speed capacity beyond the T-1 level. This may limit HBCU participation in Internet2.
- Over 85 percent of HBCUs do not offer distance learning degree programs at this time.
- Thirty-one percent of HBCUs plan to offer distance learning degree programs within the next three years.
- Forty-two percent of HBCUs report either partially completed strategic plans or no strategic plans.
- Seventeen percent of HBCUs report minimal use of collaborative groupware, online registration, e-commerce, and other applications.

APPENDIX A

U.S. Department of Commerce Press Release Announcing TAS Study

U.S. Department of Commerce - Sec. Daley Announces Contract for Study Aimed at Promoting Internet Access by Black Colleges

FOR IMMEDIATE RELEASE
Wednesday, October 6, 1999 Contact: Morrie Goodman
202/482-4883
Ranjit De Silva
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COMMERCE SECRETARY DALEY ANNOUNCES CONTRACT FOR STUDY AIMED AT PROMOTING INTERNET ACCESS BY BLACK COLLEGES

Washington, DC - Commerce Secretary William M. Daley today announced the award of a $90,027 contract for a study on the status of telecommunications capabilities of the nations's 116 historically black colleges and universities as part of a Clinton-Gore Administration initiative to help develop an information technology infrastructure that is accessible to all Americans. Daley said the study, to be conducted by the National Association for Equal Opportunity in Higher Education, will enable the Commerce Department to identify the technology and telecommunications needs of black college and university communities and help determine how the department can better assist them in accessing the Internet. "Access to information resources is critical to taking courses, researching, finding a job or public information," Daley said. "In a society that increasingly relies on computers and the Internet to deliver information, it is important to ensure that all Americans have access to information technology so that they can continue to be a part of our economic growth and prosperity."

The study is part of several initiatives the department is undertaking to try to close the "digital divide"-- the gap between those with access to information technology and those without. The department's National Telecommunications and Information Administration, in a report issued in July, said that while more Americans than ever were connected to the Internet the gap between the information "haves" and "haves nots" persists and has widened significantly in the last few years, with minorities among those lacking access.

The contract for the study was awarded by the Commerce Department's NTIA. Besides helping NTIA determine the computer capabilities of the black colleges, the study will, among other things, help promote telecommunications innovation, research and engineering, foster the institutions' continued growth in the economy and increase opportunities for their participation in NTIA- supported projects. The NAFEO is the only membership organization of all 116 historically and predominantly black colleges and universities in the nation and administers a number of programs that seek to strengthen their institutional capacities.

APPENDIX B

LIST OF PARTICIPATING INSTITUTIONS

Alabama A&M University
Albany State University
Arkansas Baptist College
Barber-Scotia College
Benedict College
Bennett College
Bethune-Cookman College
Bishop State Community College
Bluefield State College
Bowie State University
Central State University
Charles R. Drew University of Medicine
Cheyney University of Pennsylvania
Chicago State University
Claflin College
Clark Atlanta University
Clinton Junior College
Coahoma Community College
Concordia College
Coppin State College
Delaware State University
Dillard University
Grambling University
J.F. Drake State Technical College
Edward Waters College
Elizabeth City State University
Fayetteville State University
Fisk University
Florida Memorial College
Fort Valley State University
Hampton University
Harris-Stowe State College
Hinds Community College - Utica Campus
Howard University
Interdenominational Theological Center
Jackson State University
Jarvis Christian College
Kennedy-King College
Knoxville College
Lane College
Langston University
LeMoyne-Owen College
Lewis College of Business
Lincoln University
Mary Holmes College
Medgar Evers College
Mississippi Valley State University
Morris College
Norfolk State University
North Carolina A&T State University
Oakwood College
Paine College
Paul Quinn College
Prairie View A&M University
Rust College
Saint Augustine's College
Saint Paul's College
Savannah State University
Selma University
Shaw University
Sojourner Douglass College
South Carolina State University
Southern University and A&M System College
Southern University at Shreveport-Bossier City
Southwestern Christian College
Spelman College
Talladega College
Tennessee State University
Texas College
Tougaloo College
University of the District of Columbia
University of Maryland-Eastern Shore
University of the Virgin Islands
Virginia State University
Voorhees College
West Virginia State College
Wilberforce University
Winston-Salem State University
York College/The City University of New York

**Less than 1 percent of HBCU responses were received after the deadline and are not included in the study.*

APPENDIX C - REFERENCES

U.S. Department of Commerce, U.S. Department of Agriculture, April 2000. *Advanced Telecommunications in Rural America: The Challenge of Bringing Broadband Services to All Americans.*

Broadband Guide, Design, June 1998, *Essentials of Campus Telecommunications Design Internet Web site.*

UC Berkeley Report. *Infrastructure, Topology and Media*, The Physical Network.

Jacqueline E. King, *Money Matters: The Impact of Race/Ethnicity and Gender on How Students Pay for College*, American Council of Education, 1999.

Kenneth C. Green, *Campus Computing Study*, 1999.

Louisiana State Plan for Educational Technology, 1997, Appendix B, *Vision for Technology Infrastructure.*

National Association for Equal Opportunity in Higher Education, *A Status Report of the Historically Black Colleges and Universities and NAFEO's Other Equal Opportunity Educational Institutions*, February 2000.

North Carolina Instructional Technology Plan Guide, *Technological Recommendations and Standards.*

University of California, Santa Barbara, 1993, *Standards for Communications Cabling in UCSB Buildings.*

YAHOO, Internet Life, *America's 100 Most Wired Colleges*, 1998, 1999, 2000.

APPENDIX D -- ABOUT NAFEO

The National Association for Equal Opportunity in Higher Education (NAFEO) is the national umbrella and public policy advocacy organization for 118 of the nation's historically and predominantly black colleges and universities - public and private, large and small, urban and rural, liberal arts, agricultural, research, scientific and technological institutions. Its mission is to champion the interests of the executive, legislative, regulatory, and judicial branches of Federal and State Government - to articulate the need for a system of higher education where race, ethnicity, socio-economic status, and previous educational attainment levels are not determinants of either the quantity or quality of higher education.

NAFEO was founded in 1969, at a time when the nation had before it, overwhelming evidence that educational inequality in higher education remained manifest. The 1954 Supreme Court decision, Brown vs Board of Education, and its progeny, focused national attention on the dual and unequal primary and secondary education systems nationwide and spurred two decades of litigation and legislation designed to redress the inequalities. But the initial debate paid little attention to the inequalities in higher education nor did it focus on the nation's Historically Black Colleges and Universities as equal opportunity institutions and, thus, a solution to some of the nation's higher education issues.

The TAS was conducted under the leadership of Henry Ponder, Ph.D., CEO and President, NAFEO, and former President of Fisk University. Providing contractual liaison and management oversight for TAS was Mildred Freeman, Director, Health Education/Sponsored Programs. Mrs. Freeman is a former Federal employee of the Health Resources Services Administration, U.S. Department of Health and Human Services. Providing statistical support for the TAS was Alicia Vargas, NAFEO statistician, and technical and computer support was provided by Ashley Bell, staff assistant, NAFEO.

APPENDIX E: ABOUT THE TAS TEAM

Stephanie Myers, M.A., TAS Principal Investigator, Public Policy Consultant
Mrs. Myers serves as a senior consultant to the National Association for Equal Opportunity in Higher Education (NAFEO). She is vice president of the R.J. Myers Publishing and Consulting Company, a company specializing in research and electronic information dissemination. Mrs. Myers is a former Federal official having served as Assistant Secretary for Public Affairs, U.S. Department of Health and Human Services, and Director of the Office of Commercial Space Transportation, U.S. Department of Transportation, where she was the senior regulatory official for licensed commercial space launches of communications satellites. She holds a M.A. in Urban Planning from Occidental College, Glendale, California and was a Coro Foundation Fellow in Public Affairs.

Antoinette Hubbard, M.S., M.A., Telecommunications Specialist
For the past 15 years, Antoinette Hubbard has worked at major U.S. corporations, including TRW, Baxter International, and Sara Lee. Her experience included design and management of major network installations, new technology planning, and national contract negotiations with suppliers. In 1996 she received an Eisenhower Foundation Fellowship to teach at Masaryk University in Brno, the Czech Republic. Ms. Hubbard has an MA in communications management from the Annenberg School, University of Southern California and an MA in Education and Human Development, Holy Name College. In her present position as Principal, Leadership by Design, she works with groups in the areas of project definition, leadership development, and resource optimization.

Eugene C. Royster, Ph.D., Evaluation Researcher
Dr. Royster's career spans the academic and applied research arenas. He served as professor and administrator at two HBCUS in Pennsylvania--Lincoln University and Cheyney University, and held similar positions at the University of Rochester, NY, and Temple University, PA. Dr. Royster conducted national research and evaluation studies for the Federal Head Start program and the first evaluation of the magnet schools program of the U.S. Department of Education. Prior to the TAS, his most recent research project was for the Kellogg Foundation on empowering philanthropy in communities of color. He has been awarded the Lester F. Ward Award for distinguished lifetime contributions by the Applied Sociology Association. He is a graduate of Yale University.

William Jordan, B.S., Internet Entrepreneur
William Jordan is Co-Founder, Chief Executive Officer, and Product Development Manager for MelaNet, LC, an Internet consulting company. Mr. Jordan is a graduate of Howard University in Washington, DC, with a B.S. in Electrical Engineering. He has industry experience in digital electronic design, software development, and embedded systems hardware and software design. He has led projects through the full development cycle from specifications development to product delivery, and his support and systems experience includes IBM, SUN, SGI, and HP in Unix and PC operating environments.

Lisa Hughes, M.A., Telecommunications and Virtual Office Specialist
Lisa Hughes worked for 14 years at AT&T in management positions in sales and training as a facilitator, consultant, and trainer specializing in professional, team, and organizational development. In 1994 she began her practice, Worklife Associates, to improve the quality of communication and relationships in a workplace characterized by changing cultures, structures, and technology. Ms. Hughes is a virtual office specialist and author of the book, *Virtual Office Planning Guide*. She holds a M.A. degree in Organizational Management, a B.A .in American Studies, and has more than 20 years experience helping people to connect and communicate successfully at work.

APPENDIX F: THE TAS INSTRUMENT

HBCU Technology Assessment Study (TAS)

Prepared by the
National Association For Equal Opportunity In Higher Education

NAFEO
Keeping the Doors of Opportunity Open ™

8701 Georgia Ave., Suite 200, Silver Spring, MD 20910
Telephone (301) 650-2440Fax No. (301) 495-3306
http://www.nafeo.org/

Thank you for participating in this technology assessment of the Historically Black Colleges and Universities Technology Assessment Study (TAS). This study, funded by the U.S. Department of Commerce, is designed to obtain a comprehensive evaluation of networking and on-line connectivity of Historically Black Colleges and Universities (HBCUs) in the United States and Virgin Islands. Results may assist government policy-makers and the private sector in developing future initiatives and support.

We would appreciate your completing the TAS instrument by February 28, 2000. You may return the completed questionnaire to NAFEO by mail at the address listed above, or fax the document to NAFEO at 301-495-3306.

If you have any questions regarding the TAS please call Stephanie Myers, TAS Principal Investigator, 202-863-0056, or email your questions to rimpub@earthlink.net.

Note: To complete this questionnaire you may need the assistance of your Internet Service Provider or vendors who have assisted you with installing your campus network.

A. INSTITUTIONAL INFORMATION

1.0 Name of Institution_____

1.1 Mailing Address:_____

1.2 City: _____ 1.3 State: _____ 1.4 Zip:_____

1.5 Campus Website URL: _____

B. CAMPUS PLANNING AND POLICIES ABOUT COMPUTING

2. Has a technology needs assessment study been conducted at your institution? *(Please circle number left of the answer.)*

1) Yes 2) No 3) Don't know

2.1 If yes, year of Study _____ (If yes, if a report is available please provide a copy of the report when you return the survey.)

3. Does your institution have a strategic plan for the development and use of information technology? *(Please circle number left of the answer.)*

1) Yes 2) No 3) Don't know 4) Plan is in preparation

4. Does your institution have a process for measuring progress and updating your strategic plan? *(Please circle number left of the answer.)*

1) Yes 2) No 3) Don't know

If appropriate, Please Include copy of your strategic plan when you return the survey.

5. Does your institution require student computer ownership? *(please circle number on the right of the categories.*

		Require	Recommend	No	Don't know
5.1)	For all undergraduate students	1	2	3	4
5.2)	For graduate students	1	2	3	4
5.3)	For students in individual academic units or schools.	1	2	3	4

6. Does your institution have a computer instruction or computer competency requirement for all undergraduates? *(Please circle number left of the answer.)*

1) Yes 2) No 3) Don't know

If yes, Please include a statement or copy of your computer requirements.

7. What percentage of your students bring their own computers to campus? *(Please circle number left of the answer.)*

7.1) 75%-100% 7.4) Less than 25%
7.2) 50%-74% 7.5) Don't know
7.3) 25%-49%

8. Does your institution provide subsidies or financial incentives for students to acquire computers? *(Please circle number left of the answer.)*

1) Yes 2) No 3) Don't Know 4) Not Available

8.1 If yes, please indicate the method of incentive. *(Please circle number left of the answer.)*

1) Discounts 2) Financial aid 3) Free computers 4) Other

9. Does your institution have a special computer use fee or annual computer use charge for all students? *(Please circle number left of the answer.)*

1) Yes 2) No 3) Don't Know

9.1 If yes, what is the annual charge for 1999-2000?_____

C. CURRENT CAMPUS FACILITIES AND COMPUTING RESOURCES

10. What types of computers are currently used by your institution? *(Circle numbers left of the answers for all that apply.)*

10.1)	Mainframe computers	10.6)	PCs (Personal Computers)
10.2)	Midrange computers	10.7)	Laptop/notebook/handhelds
10.3)	RISC servers	10.8)	Net Computer
10.4)	Intel-based servers	10.9)	Other (Please specify)_____
10.5)	Workstations	10.10)	None of the above
		10.11)	Don't know

11. Where are the specialized workstations located on your campus? (e.g. cad/cam, statistical modeling, high end graphics, etc.) *(Please circle numbers left of the answers.)*

	Offices/Labs/Facilities		**Academic Departments/Units**
11.1)	Central Administration	11.15)	Biological & Physical Sciences
11.2)	Student Services	11.16)	Business
11.3)	Development	11.17)	Education
11.4)	Budget/Financial offices	11.18)	Engineering
11.5)	Student Activity Centers	11.19)	Agricultural Programs
11.6)	Public Access Computer Labs	11.20)	Fine & Performing Arts
11.7)	Remedial Learning Labs	11.21)	Humanities
11.8)	Dormitory common areas	11.22)	Social Sciences
11.9)	Registrar	11.23)	Occupational Programs
11.10)	Admissions Office	11.24)	Technology Programs
11.11)	Library	11.25)	Computer Science
11.12)	Others	11.26)	Foreign Languages
11.13)	None of the above	11.27)	Math/Statistics
11.14)	Don't know	11.28)	Others (Please specify)
		11.28)	None of the above
		11.29)	Don't know

12. What is your best estimate of the percentage of the total number of desktop and notebook computers currently on your campus that are non-institutionally owned? (Include personal computers, leased computers, or on-loan computers)

1) _____% 2) Don't know *(Circle if applicable)*

13. Using percentages, what is your estimate of the ownership of desktop or laptop computers on your campus within the following groups?

13.1) Students _____%
13.2) Faculty _____ %
13.3) Administrators/staff_____%
13.4) Institutionally Owned_____ %
13.5) Leased_____%
13.6) Corporate _____%
13.7) Government_____%
13.8) On-Loan_____%
13.9) Don't Know_____%

14. What buildings on your campus have had the wiring infrastructure updated to accommodate networking and connectivity? *(Please indicate your responses in the appropriate boxes)*

Type of Building	Number of Buildings	Number of Buildings with Updated Wiring	Percent of Buildings with Updated Wiring
14.1) Dormitories			
14.2) Laboratories			
14.3) Library(s)			
14.4) Classrooms			
14.5) Administrative Bldgs.			
14.6) Other (Please Specify)			
14.7) Don't Know			

D. CAMPUS CONNECTIVITY

15. Do you have a campus network? *(Please circle number left of the answer.)*
1) Yes 2) No 3) Don't Know

16. Who is your local telephone service provider? _____.

17. Which of the following types of vendors provide Internet and networking connectivity services to your institution? (Please *circle numbers left of answers that apply.*)

17.1) Small Independent ISPs
17.2) (Internet Service Provider)
17.3) Large National ISPs
17.4) Local/Regional Bell Operating Companies (BOC)
17.5) Competitive/Alternative Access providers
17.6) Cellular Provider
17.7) Wireless Provider
17.8) PCS Service Providers
17.9) Paging and Message Providers
17.10) Cable TV operators
17.11) Satellite Based Services
17.12) Local/State Government Network Operators
17.13) Other (Please specify) _____
17.14) None of the above
17.15) Don't know

18. Which of the following Internet interconnection options are available from ISPs in your local area? *(Please circle numbers to left of answers that apply.)*

18.1) T-1/E-1
18.2) T-3/E-3
18.3) Fractional T-1/E-1
18.4) X.25
18.5) DSL (all types)
18.6) Frame Relay
18.7) ISDN
18.8) ATM
18.9) WAN switches
18.10) Wireless/PCS/Cellular
18.11) Satellite/microwave
18.12) Cable modems
18.13) 56/64kbit/sec leased lines
18.14) Remote dialup access
18.15) PBX
18.16) Virtual Private Networks
18.17) Other
18.18) None of the Above
18.19 Don't Know

19. Indicate which of the following Internet and Wide Area Network (WAN) service options are currently used by your institution by selecting the appropriate quantity? *(Please circle number under the applicable range/answer for each category.)*

	Connection Types	**1-20**	**21-50**	**51-100**	**100 +**	**Do not use**	**Don't know**
19.1)	T-1/E-1	1	2	3	4	5	6
19.2)	T-3/E-3	1	2	3	4	5	6
19.3)	Fractional T-1/E-1	1	2	3	4	5	6
19.4)	X.25	1	2	3	4	5	6
19.5)	DSL (all types)	1	2	3	4	5	6
19.6)	Frame Relay	1	2	3	4	5	6
19.7)	ISDN	1	2	3	4	5	6
19.8)	ATM	1	2	3	4	5	6
19.9)	WAN switches	1	2	3	4	5	6
19.10)	Wireless/PCS/Cellular	1	2	3	4	5	6
19.11)	Satellite/microwave	1	2	3	4	5	6
19.12)	Cable modems	1	2	3	4	5	6
19.13	56/64kbit/leased lines	1	2	3	4	5	6
19.14)	Remote dialup access	1	2	3	4	5	6
19.15	PBX	1	2	3	4	5	6
19.16	Virtual Private Networks	1	2	3	4	5	6
19.17)	Other_____	1	2	3	4	5	6
19.18)	None						

20. Which answer best describes how voice/data networks are distributed throughout your campus? *(Please circle number under the applicable answer to the right of the category.)*

	Categories	Voice	Data	Both	Don't Know	None
20.1	All campus buildings on a single network	1	2	3	4	5
20.2	Single Buildings Wired Separately	1	2	3	4	5
20.3	Buildings wired in geographically based clusters	1	2	3	4	5
20.4	Buildings wired in functional clusters	1	2	3	4	5
20.5	All faculty offices	1	2	3	4	5
20.6	Other, (Please specify) _____	1	2	3	4	5

21. Which of the following network infrastructure technologies are currently deployed on your campus to distribute Internet access and other network services? *(Please circle number of all that apply)*

21.1) Voice
21.2) Voice mail
21.3) Computer telephony
21.4) Database management
21.5) Document management
21.6) E-mail
21.7) Groupware
21.9) Help desk
21.10) Terminal emulation
21.11) Remote access
21.12) Imaging
21.13) Java-based applications
21.14) Other (Please specify)_____
21.15) None of the above

22. Which Network Management tools are currently used by your institution? *(Please circle numbers of all that apply)*

22.1) Network Management Software
22.2) Systems Management Hardware
22.3) Network test equipment
22.4) Cabling test equipment
22.5) Protocol Analyzers/Monitors
22.6) Management Utilities
22.7) Outsourced Management
22.8) Trouble shooting tools
22.9) Network Security tools
22.10) Other (Please specify)_____
22.11) None of the above
22.12) Don't know

23. What Peripherals are currently used by your institution? *(Please circle number of all that apply)*

23.1) Network printers
23.2) Network scanners
23.3) RAID
23.4) Power Management
23.5) External magnetic-disk storage
23.6) External optical-disc hardware
23.7) External tape hardware
23.8) Storage/Backup software
23.9) Tape libraries/jukeboxes
23.10) Other (Please specify)_____
23.11) None
23.12) Don't know

24. Which of the following servers are currently used by the administrative and/or Academic functions at your institution? *(Circle the numbers 1,2,3, or 4 to the right of each category.)*

No.	Category	Administrative	Academic	Don't Know	Do Not Use
24.1)	File/print servers	1	2	3	4
24.2)	Transaction servers	1	2	3	4
24.3)	Terminal servers	1	2	3	4
24.4)	Fax servers	1	2	3	4
24.5)	E-mail servers	1	2	3	4
24.6)	C. PBX/voice servers	1	2	3	4
24.7)	Web/HTTP servers	1	2	3	4
24.8)	Video servers	1	2	3	4
24.9)	Remote-access servers	1	2	3	4
24.10)	Communications servers	1	2	3	4
24.11)	Proxy servers	1	2	3	4
24.12)	E Commerce	1	2	3	4
24.13)	Other (please specify)	1	2	3	4

25. What is included in your campus network Infrastructure? *(Please circle numbers of all that apply)*

25.1) Network Interface Cards
25.2) Switches
25.3) Hubs/concentrators
25.4) Bridges
25.5) Security
25.6) Copper Cabling/connectors
25.7) Wireless LANs/WANs
25.8) Fiber cabling/connectors
25.9) Routers
25.10) DSU/CSU
25.11) Media converters
25.12) Frame Relay
25.13) Stand-alone Modems
25.14) Modem pools/banks
25.15) Directory Services
25.16) ISDN terminal adaptors
25.17) Middleware
25.18) Multiplexors/ inverse mux
25.19) Other (please specify)_____
25.20) None of the above
25.21) Don't know

26. Which of the following Internet tools are currently used by your institution? *(Please circle numbers of all that apply)*

26.1) Web development tools
26.2) Web application suite
26.3) Web server software
26.4) TCP/IP stacks
26.5) Web-to-database middleware
26.6) IPX-IP gateways
26.7) SNA-IP gateways
26.8) Firewalls/proxy servers
26.9) Electronic Commerce
26.10) Web site management
26.11) Web usage monitoring
26.12) Java development tools
26.13) Web design services
26.14) Web hosting
26.15) Secure web server
26.16) Internet Service Providers
26.17) Online Services
26.18) None of the above
26.19) Other (Please specify)_____
26.20) Don't know

27. Please estimate the overall percentage of the computers in your campus labs and libraries, classrooms, dorms and technology centers that provide student access to your campus network and the Internet? 1)_____%. 2) Don't know *(Please circle if applicable)*

28. What types of Internet connections are in use by the following academic departments? (*Circle the numbers of all that apply for each category.)*

	Categories	Biological & Physical Sciences	Business	Education	Engineering	Agricultural Programs	Fine & Performing Arts	Humanities	Social Sciences	Occupational Programs	Computer Science	Foreign Languages	Math/Statistics
28.11)	T-1/E-1	1	2	3	4	5	6	7	8	9	10	11	12
28.12)	T-3/E-3	1	2	3	4	5	6	7	8	9	10	11	12
28.13)	Fractional T-1/E-1	1	2	3	4	5	6	7	8	9	10	11	12
28.14)	X.25	1	2	3	4	5	6	7	8	9	10	11	12
28.15)	DSL	1	2	3	4	5	6	7	8	9	10	11	12
28.16)	Frame Relay	1	2	3	4	5	6	7	8	9	10	11	12
28.17)	ISDN	1	2	3	4	5	6	7	8	9	10	11	12
28.18)	ATM	1	2	3	4	5	6	7	8	9	10	11	12
28.19)	WAN switches	1	2	3	4	5	6	7	8	9	10	11	12
28.20)	Wireless/PCS/ Cellular	1	2	3	4	5	6	7	8	9	10	11	12
28.22)	Satellite/ Microwave	1	2	3	4	5	6	7	8	9	10	11	12
28.23)	Cable modems	1	2	3	4	5	6	7	8	9	10	11	12
28.24)	56/64kbit/sec leased lines	1	2	3	4	5	6	7	8	9	10	11	12
28.25)	Remote dialup Access	1	2	3	4	5	6	7	8	9	10	11	12
28.26)	Other	1	2	3	4	5	6	7	8	9	10	11	12
28.27)	None												
28.28)	Don't know	1	2	3	4	5	6	7	8	9	10	11	12
28.29	Do Not Use	1	2	3	4	5	6	7	8	9	10	11	12

29. What is the estimated monthly cost for your institution to obtain connectivity and Internet services? *(Please circle number next to the amount range that applies.)*

1)	$1 -- $99	7)	$30,000 - $39,999
2)	$100 - $999	8)	$40,000 - $49,999
3)	$1,000 - $4,999	9)	$50,000 and above
4)	$5,000 - $9,999	10)	no cost
5)	$10,000 - $19,999	11)	Don't know
6)	$20,000 - $29,999		

30. Do you require login and password validation for access to all networks, applications and data? *(Please circle the number of all that apply)*

1) Yes 2) No 3) Don't know

31. Are you confident that access to your computers and networks are sufficiently secure? *(Please circle number to left of answer)*

1) Yes 2) No 3) Don't Know

E. CAMPUS BACKBONE

32. Which topographies are used to distribute Internet access throughout your campus? *(Please circle number left of answers that apply.)*

32.1)	Ethernet	32.7)	Fiber Channel
32.2)	Fast Ethernet	32.8)	SONET
32.3)	ATM Other	32.9)	Other (Please specify) _____
32.4)	FDDI	32.10)	None of the above
32.5)	XDSL	32.11)	Don't know
32.6)	Token Ring		

33. Which of the following Network Operating Systems/Protocols are used throughout your campus network? *(Please circle numbers left of the answers that apply.)*

33.1)	Netware (Novell)	33.7)	TCP/IP
33.2)	Windows NT	33.8)	SNA
33.3)	LAN Server	33.9)	Other _____
33.4)	VINES	33.10)	Don't have throughout the campus
33.5)	Appletalk	33.11)	Don't know
33.6)	Pathwork		

F. ORGANIZATION, ACCESS, AND CONNECTIVITY ENVIRONMENT

34. In your opinion, what are the priorities for networking on your campus? *(Rate each category on scale of 1 to 5 with one being not important to five being most important by circling the appropriate number. **Or** circle 6 for Don't know*

		Not Important				Very Important	or Don't Know
34.1)	Connecting desktop systems to share departmental or workgroup files	1	2	3	4	5	6
34.2)	Campus-wide mail systems on a network	1	2	3	4	5	6
34.3)	Supporting instructional labs and clusters	1	2	3	4	5	6
34.4)	Linking PCs to larger computing systems.	1	2	3	4	5	6
34.5)	Linking PCs to your library System.	1	2	3	4	5	6
34.6)	Linking with regional or national networks	1	2	3	4	5	6
34.7)	Creating WWW pages for departmental use and course resources	1	2	3	4	5	6
34.8)	WWW/Network access for all students	1	2	3	4	5	6
34.9)	Network printing	1	2	3	4	5	6
34.10)	Digital image libraries/archives	1	2	3	4	5	6
34.11)	Creating "plug & play" network for notebook computer users	1	2	3	4	5	6
34.12)	Linking dormitories to the campus network.	1	2	3	4	5	6
34.13)	Linking your library to a wider range of resources	1	2	3	4	5	6

35. What facilities and departments on your campus have access to the campus backbone? *(Please circle all that apply.)*

	Offices/Labs/Facilities		**Academic Departments/Units**
35.1)	Central Administration	35.15)	Biological & Physical Sciences
35.2)	Student Services	35.16)	Business
35.3)	Development	35.17)	Education
35.4)	Budget/Financial offices	35.18)	Engineering
35.5)	Student Activity Centers	35.19)	Agricultural Programs
35.6)	Public Access Computer Labs	35.20)	Fine & Performing Arts
35.7)	Remedial Learning Labs	35.21)	Humanities
35.8)	Dormitory common areas	35.22)	Social Sciences
35.9)	Registrar	35.23)	Occupational Programs
35.10)	Admissions Office	35.24)	Technology Programs
35.11)	Library	35.25)	Computer Science
35.12)	Others (Please Specify) _____	35.26)	Foreign Languages
35.13)	None of the above	35.27)	Math/Statistics
35.14)	Don't know	35.28)	Others (Please Specify) _____
		35.29)	None of the above
		35.30)	Don't know

36. Who has access to the Internet on your campus and where can they have this access? *(Please circle numbers In the boxes provided)*

		GROUPS				
	AREA	**Undergraduate**	**Post-graduate**	**Faculty**	**Administrators**	**Staff**
36.1)	Dormitories: Common Areas	*1*	*2*	*3*	*4*	*5*
35.2)	Dorm Rooms	*1*	*2*	*3*	*4*	*5*
36.3)	Office	*1*	*2*	*3*	*4*	*5*
36.4)	Library	*1*	*2*	*3*	*4*	*5*
36.5)	Laboratory	*1*	*2*	*3*	*4*	*5*
36.6)	Classrooms	*1*	*2*	*3*	*4*	*5*
36.7)	Other Common Areas (Please Specify) _____	*1*	*2*	*3*	*4*	*5*
36.8)	None of the Above	*1*	*2*	*3*	*4*	*5*
36.9)	Other (Please Specify) _____	*1*	*2*	*3*	*4*	*5*
36.10)	Don't Know	*1*	*2*	*3*	*4*	*5*

37. Which users are assessed a fee for E-mail and Internet access? (Please *circle the number of all that apply*).

7.1) Undergraduate students
37.2) Faculty
37.3) Staff
37.4) Graduate students
37.5) Administrators
37.6) Other (Please specify)
37.7) None
37.8) Don't know

38. Are you aware of the "E" rate for universal access to the Internet provided by the Federal Government to academic institutions (*Please circle number to left of answer*)

1) Yes 2) No 3) Don't know

38.1 If yes, does your institution benefit from the "E" rate? (*Please circle number to left of answer*).

1) Yes 2) No 3) Don't Know

39. Are your academic and administrative computing departments managed in a combined unit? (*Please circle number left of answer)* 1) Yes 2) No 3) Don't Know

39.1 If yes, to whom does the combined unit report to?

39.1) President
39.2) V.P. Academic Affairs
39.3) Vice President for_____
39.4) Dean
39.5) Other (please specify) ____
39.6) None of the above
39.7) Don't know

40. If the academic and administrative computing departments are managed separately whom do they report to? (Please circle *numbers of all that apply*)

40.1	**Academic Computing**	40.2	**Administrative Computing**
1)	President	1)	President
2)	V.P. Academic Affairs	2)	V.P. Academic Affairs
3)	Vice President for _____	3)	Vice President for _____
4)	Others (please specify) _____	4)	Others (please specify) _____
5)	Don't know	5)	Don't know

41. Is your campus part of a multi-campus system with shared computing resources? *(Please circle number to the left of the answer.)*

1) Yes 2) No 3) Don't Know

42. Are you part of a state network system? *(Please circle number left of the answer.)*

1) Yes 2) No 3) Don't Know

43. Is your campus networked with institutions outside of your campus? *(Please circle the number to the left of all that apply)*

43.1)	State College Systems	43.6)	Local Community Agencies
43.2)	K-12 school systems	43.7)	International Networks
43.3)	Federal Government Agencies	43.8)	Other Colleges/Universities
43.4)	Commercial Vendors	43.9)	Other (Please specify)_____
43.5)	Libraries	43.10)	None of the above
		43.11)	Don't Know

44. From your perspective, how well are faculty and academic units using the Internet and WWW as a resource for curriculum and instruction? *(Please rate each category on this scale of 1 to 5 with one being not well to five being most well by circling the appropriate number. **Or** you circle 6 for Don't know)*

	Academic Field/Program	**Not Important**			**Very Important**		**Don't know**
44.1)	Biological & physical sciences	1	2	3	4	5	6
44.2)	Education	1	2	3	4	5	6
44.3)	Engineering	1	2	3	4	5	6
44.4)	Fine & performing arts	1	2	3	4	5	6
44.5)	Humanities	1	2	3	4	5	6
44.6)	Social science	1	2	3	4	5	6
44.7)	Occupational Programs	1	2	3	4	5	6

44.8)	Business	1	2	3	4	5	6
44.9)	Agricultural Programs	1	2	3	4	5	6
44.10)	Technology Programs	1	2	3	4	5	6
44.11)	Foreign Language	1	2	3	4	5	6
44.12)	Math/Statistics	1	2	3	4	5	6
44.13)	Computer Science	1	2	3	4	5	6
44.14)	Library	1	2	3	4	5	6

45. Please rate these information technology issues confronting your institution on a scale of 1 to 5 in terms of their importance over the next two or three years are: (*Please follow the same instructions for Question Number 44.*)

	Statement	**Not Important**			**Very Important**		**Don't know**
45.11	Providing universal access to the Internet	1	2	3	4	5	6
45.12	Providing adequate user support.	1	2	3	4	5	6
45.13	Assisting faculty in integrating technology into instruction.	1	2	3	4	5	6
45.14	Financing the replacement of aging hardware/software.	1	2	3	4	5	6
45.15	Expanding/enhancing the campus network	1	2	3	4	5	6
45.16	Licensing (digital) content from publishers	1	2	3	4	5	6
45.17	Using IT effectively in distance education	1	2	3	4	5	6
45.18	Learning about how to install a network	1	2	3	4	5	6
45.19	Restructuring/reorganizing IT service units (computing, libraries, etc.)	1	2	3	4	5	6
45.20	Enhancing library access to databases, other institutions, etc.	1	2	3	4	5	6
45.21	Other (Please be specific below) _____	1	2	3	4	5	6
45.22	Don't know	1	2	3	4	5	6

BIOGRAPHY FOR FREDERICK S. HUMPHRIES

Frederick S. Humphries took office as the 4th President of the National Association for Equal Opportunity in Higher Education on January 1, 2002.

His selection by the organization's Board of Directors and the Council of Presidents marked the culmination of an intensive and exhaustive six-month national search. A renowned scholar and admired public servant, Dr. Humphries, a chemist by training, has had a distinguished, 27 year career as President of Florida A&M and Tennessee State Universities.

During his nearly 17 year tenure at Florida A&M, he more than doubled enrollment while simultaneously raising academic standards. He increased the number of National Achievement Scholars at the school ranking first in the Nation three times, out recruiting Harvard and Stanford, and made Florida A&M the Nation's number one producer of African-Americans with baccalaureate degrees and third in the Nation as the baccalaureate institution of origin for African-American doctoral degree recipients. He also increased Florida A&M's sponsored research by 17,705 percent, tops among historically and predominately Black colleges and universities and third in the 11 member State University System of Florida.

A tireless fundraiser, Dr. Humphries also raised more than $60 million dollars for FAMU, making the University's endowment the largest of the Nation's public Historically Black Colleges.

At NAFEO, Dr. Humphries has worked diligently to raise the profile of the Nation's 118 historically and predominately Black colleges. He has fought vigorously for increased resources and the expansion of programs at NAFEO member institutions.

As the public policy advocacy organization for the Nation's Black colleges, NAFEO, has been re-energized by Dr. Humphries' presence.

A national treasure, Dr. Humphries is respected throughout the Nation for his keen insights on the education of minority students, particularly in math and the hard sciences, and his unique and visionary approaches to producing successful educational outcomes. Corporate America has also sought his expertise as a member of the Board of Directors of Wal-Mart Stores, Inc. and Brinker International (the parent company of Chili's Grill & Bar, On The Border Mexican Grill & Cantina, Maggiano's Little Italy, Cozymel's Coastal Grill, Corner Bakery Cafe, Big Bowl Asian Kitchen and Rockfish Seafood Grill restaurants).

Born in Apalachicola, Florida, Dr. Humphries received a Bachelor of Science degree in chemistry, magna cum laude, from Florida A&M University and a Ph.D. degree in physical chemistry from the University of Pittsburgh. He is married to Antoinette McTurner Humphries. They are the parents of three grown children and the proud grandparents of four grandchildren.

September 12, 2003

The Honorable Nick Smith
Chairman, Research Subcommittee
2320 Rayburn Office Building
Washington, DC 20515

Dear Congressman Smith:

Thank you for the invitation to testify before the U.S. House of Representatives Science Committee, Subcommittee on Research on July 9 for the hearing entitled *H.R. 2183, the Minority Serving Institution Digital and Wireless Technology Opportunity Act.* In accordance with the Rules Governing Testimony, this letter serves as formal notice of the Federal funding I currently receive in support of my research.

Please see the attached tables for a listing of the Federal funding I currently receive.

Sincerely,

Frederick S. Humphries

NATIONAL ASSOCIATION FOR EQUAL OPPORTUNITY IN HIGHER EDUCATION
ACCOMPANYING INFORMATION
SCHEDULE OF GRANTS AND CONTRACTS EXPENDITURES
YEAR ENDED JUNE 30, 2002

	Total
HHS/CDC Post Secondary Students - 6053	$ 260,363
HHS/Office of Minority Health (OMH) - 6065	1,595,127
Department of Labor Internship - 6067	45,509
Department of Energy Internship - 6069	70,974
UNCF/DOD Property Mgt. - 6093	118,531
Department of Energy/HBCU - 6094	25,696
Federal Aviation Administration - 6096	245,180
Environmental Protection Agency - 6098	126,072
Central Intelligence Agency Internship - 6100	9,362
Dept. of Transportation Internship - 6120	120,374
Ohio State University -6180	172,875
Department Of Labor - 6200	145,447
Howard University - 6210	56,327
Department of Interior/INTRN - 6240	38,402
Jackson State University(JSU) - 6250	49,022
National Minority AIDS Council - 6260	130,191
Federal Deposit Insurance Corporation - 6270	45,990
Department of Veterans Affairs Central Office - 6280	66,953
Food and Drug Administration - 6290	24,104
Housing Urban Development - 6300	141,535
National Aeronautics & Space Administration - 6310	78,450
Council for Opportunity in Education - 6320	50,716
National Aeronautics & Space Administration - 6350	1,930,950
Department of Defense - 6370	32,099
Environmental Biosciences Program - 6380	2,430
National Aeronautics & Space Administration - 6390	191,704
National Library of Medicine- 6400	13,756
Environmental Protection Agency - 6410	117,517
HHS/Public Health Service - 6430	194,757
International Broadcasting - 6450	5,460
Department of State - 6470	8,410
Totals	$ 6,113,973

The National Association for Equal Opportunity in Higher Education
8701 Georgia Avenue ♦ Suite 200 ♦ Silver Spring, MD 20910
Telephone (301) 650-2440 ♦ Fax No. (301) 495-3306

SUMMARY OF FUNDING OF PROGRAM FOR 2003-2004 YEAR

NAME	*Present Yearly Funding*
NASA/AMES	$ 694,792.00 (2 years)
NASA/AMES	$ 1,539,894.00
NASA/Stokes	$ 581,966.00
EPA Research	$ 796,460.00
EPA Water	$ 440,911.00
HBC/MI Environmental Technology Consortium Program	$ 372,507.00
Workforce Innovation and Training Division (WITD) Department of Labor	$ 199,998.00
NAFEO/EDDI Action Research Program	$ 101,000.00
Department of Energy	$ 96,000.00
2003 Internship Program	$ 1,760,926.00
Health Related Total Projects	$ 2,003,904.00
TOTAL	$ 8,588,458.00

NAFEO

Chairman SMITH. Dr. Humphries, thank you. Dr. Hernandez.

STATEMENT OF DR. RICARDO R. FERNÁNDEZ, PRESIDENT, HERBERT H. LEHMAN COLLEGE-CUNY

Dr. FERNÁNDEZ. Thank you. Good morning, Mr. Chairman, Representative Johnson, and distinguished members of the Subcommittee on Research. I am honored to testify on behalf of the Hispanic Association of Colleges and Universities and the Hispanic higher education community in support of H.R. 2272 and 2183, the *Minority Serving Institution Digital and Wireless Network Technology Opportunities Act of 2003.*

My name is Ricardo Fernández and I am in my 13th year as President of Herbert H. Lehman College of the City University of New York. Lehman is a four-year comprehensive public institution located in Bronx County, New York. We are also federally designated as a Hispanic servicing institution, one of six, I believe, or seven in the City University system.

I applaud the leadership of the Senate which unanimously passed S. 196 in April. I had the pleasure of testifying before Senator Allen and his Committee on this very same legislation, and I would urge this committee to support this legislation as the most effective means to serve the urgent technology education needs of HSIs and minority serving institutions in general, in serving the youngest in our case, a very growing population.

I would like to just mention that HSIs are a growing and important resource for providing advanced knowledge and skills to Hispanics and to other populations. For example, in my own institution, Lehman College, we have—44 percent of our students are Latinos, but 33 percent of the students are African-Americans. St. Philip's College in Texas is designated both as an HSI and an historically black college and university. Such diversity within the student population at HSIs is not atypical; especially, at HSIs in diverse urban regions of the country. So any initiative aiding some of these institutions benefits other minority students that also attend these HSIs.

Mention was made earlier that there are more than 200 designated institutions as HSIs. That means that they have to have a full-time equivalent student enrollment of at least 25 percent Hispanic. There are, I would note, also, about 100 institutions that are emerging as HSIs. That is, their student enrollment is growing, so we expect that there will be more of these institutions. Half of all Latino students attend HSIs, and about 50 percent of the teachers that are trained are Latino teachers that are trained at these institutions.

You asked in the letter of invitation that three specific questions be answered. I would like to focus the bulk of my comments on those to give you a sense of how this impacts an institution and how we are handling that within the City University.

At Lehman—you asked what are the most important technology issues, and I want to focus on three of them. One of them is a lack of an appropriate information technology infrastructure and equipment. Second is a lack of a strategic IT plan, and thirdly, faculty development in the use of IT for teaching, learning, and research. At our own institution, in the past we have focused on cabling our

buildings with copper wire. Now we are moving to change that to get fiber optic across every building, not just in every building but, ultimately, in every room in that building. We have been able to do that to some extent, but we still have a ways to go. We are more and more now experimenting with wireless technology. We have six facilities where we have wireless capability. We estimate we need about 30 more facilities in our institution.

We have been working for the last three years on a multimedia center. We have received funding from the State and the City for about $10 million for the renovation of some facilities. We are still lacking about $3 million in equipment and we see the funds that would be awarded under this type of legislation as possibly coming partially from these funds.

We have recently installed a smart lab. That is a two-way interactive with video and audio facility. We estimated that that cost us about $45,000. We want to use these for, particularly, in our teacher training. This enables us to connect with certain schools in the Bronx in a number of districts so that we can afford our students who are training to be teachers to be observing master teachers in the classroom and become better teachers in areas such as science and technology.

We have recently installed a science education classroom, and that is our way of addressing some of the teacher education needs in New York City and in the Bronx, and we would like to do more of that, but these funds to purchase the equipment, to lay cable, to buy and upgrade software, to expand IT capabilities, such as video-conferencing, to provide wider access through wireless technology are urgently needed. We do get State support and local support, however, that support is being reduced. Tuition is going up, more fees are being charged to students.

The second question is how are we currently supporting technology infrastructure. The answer to that is that the trustees of the City University of New York last year enacted a student fee of $75 per semester. That yields in our institution about $1 million a year. Those funds have to be strictly limited to replacing computers, upgrading software, installing security measures such as firewalls so that hackers can't come and damage our data, and to pay staff and provide services to students. We have gotten, fortunately, some support from the City and from the State, but these I am afraid are nonrecurring grants that happen from year to year, not every single year. And we also have received from the Federal Government, FIPSE [Fund for the Improvement of Post-secondary Education], NTIA, NSF, and the Department of Education.

As far as IT planning, one of our major issues—and this is true of far too many, I think, minority serving institutions—is that they don't have an information technology strategic plan. The approach to building information technology infrastructure is haphazard in many instances, depending on grants and whatever available funding opportunities are there. At Lehman, we have recently completed participation in a program aimed at assisting minority serving institutions. By the way, it was funded by NSF through EDUCAUSE, and this grant enabled us to develop a plan and we estimate that this probably resulted—if we had to do that ourselves, we would have had to spend about $40,000 doing that. So

we have a blueprint now for IT expansion and development over the next three to five years. And the focus of our plan is going to be on developing our infrastructure, on teaching and learning, and on faculty development.

I might point out one specific example of collaboration that we have been able to put together involving Lehman and two of our community colleges in the same borough, Bronx Community College and Hostos Community College, to give you a sense of the kinds of partnerships that are possible. Each of us, independently, were thinking of buying a server to provide email to our students, because we are running out of space in our current server. By collaborating and participating in this partnership, we were able now to buy a single server that is going to serve all three institutions and is going to result in some real economies that we can then reprogram and invest in our core business. This type of collaboration I think is made possible by IT planning and by help that we have received from EDUCAUSE, thanks to the funding awarded by NSF for this purpose in involving in our case three institutions in our borough.

Faculty development is one of the areas that I believe is very, very significant, that we really need some assistance. We have a generational gap between older faculty and younger faculty. Most of our younger faculty come very well technologically oriented and equipped. They know, they have grown up with this technology. However, the older faculty, and still among the younger faculty, we need to integrate information technology into the curriculum. Our students need that, and when they get out in the world of work, that is the kind of environment that they are going to have to function in.

In conclusion, let me just say that we believe that HSIs have the expertise, the commitment to students to be able to provide these services, and we urge you to support this legislation. Thank you very much.

[The prepared statement of Dr. Fernández follows:]

PREPARED STATEMENT OF RICARDO R. FERNÁNDEZ

INTRODUCTION

Good morning Chairman Smith and Distinguished Members of the House Subcommittee on Research. It is an honor for me to appear here today to urge your support for legislation of tremendous importance to the Hispanic higher education community and to our nation's economic success and security. I speak in support of the *Minority Serving Institution Digital and Wireless Technology Opportunity Act of 2003,* introduced as H.R. 2183 by the Honorable Randy Forbes of Virginia and as H.R. 2272, introduced by the Honorable Edolphus Towns of New York.

I am honored to testify on behalf of the Hispanic Association of Colleges and Universities (HACU) and the Hispanic higher education community in support of H.R. 2272 and H.R. 2183, the *Minority Serving Institution Digital and Wireless Network Technology Opportunities Act of 2003.*

My name is Ricardo R. Fernández, and this is my 13th year as President of Herbert H. Lehman College of the City University of New York. Lehman College is a four-year comprehensive public institution, located in Bronx County, New York. Lehman College is a federally designated Hispanic-Serving Institution.

Additionally, I am Chair of the Board of the American Association of Higher Education (AAHE), a past Chair and current Board Member of HACU, and Board Member of the Hispanic Educational Telecommunications System (HETS)—a consortium of 18 Hispanic Serving Institutions (HSIs) engaged in distance education through Internet-focused technologies.

I applaud the leadership of the Senate, which unanimously passed S.196, the Senate version of H.R. 2272 and H.R. 2183, in April. As spokesman for the Hispanic higher education community, I urge this House committee to support H.R. 2272 and H.R. 2183 as the most effective means to best serve the urgent technology education needs of HSIs in service to the Nation's youngest and largest ethnic population, and to serve the urgent technology education needs of all Minority-Serving Institutions serving the largest concentrations of our country's fast-growing "emerging majority" populations.

OVERVIEW

Hispanic-Serving Institutions (HSIs) are the Nation's most important resource for providing advanced knowledge and skills to Hispanics, the Nation's fastest-growing school age population, and to other fast-growing minority populations. For example, the student enrollment at Lehman College is 44 percent Latino and 33 percent black. St. Philip's College in Texas is designated as both an HSI and a Historically Black College and University (HBCU). Such diversity within the student enrollment at HSIs is not atypical, especially at HSIs in diverse urban regions of the country. Any initiative that aids HSIs therefore benefits all minority students attending HSIs.

The more than 200 federally designated HSIs, which have a full-time equivalent student enrollment that is at least 25 percent Hispanic, are located in the fastest-growing Hispanic population centers in 25 states and Puerto Rico. Half of all Latino higher education students attend HSIs. HSIs also are a vital resource for every age group in every community served, providing essential pre-collegiate outreach throughout the K–12 education pipeline, and rapidly expanding workforce development and lifelong learning initiatives.

The critical role of HSIs is best discerned from the crucial role of Hispanics in our nation's future economic strength, security and global leadership role. U. S. Census Bureau reports this year confirm that Hispanics comprise the youngest and largest ethnic population in the United States. Hispanics already make up one of every three new workers joining the U.S. labor force today; by 2025, Latinos will make up one of every two new workers joining the U.S. workforce.

Yet, Hispanics suffer the lowest high school and college graduation rates of any major population group. Latinos also suffer the least access among major population groups to the very technologies that drive our economy, national security and leadership role in the international marketplace. According to the U.S. Commerce Department, more than one half of U.S. households have computers and more than four of every ten have Internet access; for Hispanic households, only one-third have computers and only about one-fifth have Internet access.

Because of their expertise, mission and proximity to every major Hispanic population center, HSIs are at the forefront of every significant effort to address these disparities. Many of the country's two-year and four-year HSIs also have formed effective "pipeline" partnerships that are ensuring a successful transition from two-year degree programs to four-year and advanced degree programs for Hispanic higher education students, many of whom are first-generation college students from low-income families. Because of their inherent expertise at serving multicultural populations, HSIs also are at the forefront of a substantial investment in international education to provide U.S. students a globally comprehensive familiarity with and understanding of diverse cultures essential to effectively serve an economy with such a dynamic impact on the global marketplace and world peace.

Yet, HSIs receive only about half the federal funding on average per student accorded to all other degree-granting institutions. Most HSIs are located in major, urban areas of the country with a comparatively higher concentration of poverty and subsequently lower average tax base. Thus, these HSIs cannot depend on local dollars to adequately address the digital divide.

Moreover, state support for higher education has been declining on a per-student basis in almost every region of the country. In this year's uncertain economy, this is especially true in states with large Hispanic populations such as New York, California and Texas currently suffering major budget shortfalls. Because the mission of these HSIs is to promote higher education access to a population that suffers historically high poverty rates, most HSIs have declined to increase their tuition and fee formulas. Many HSIs also have access to no endowments or very low endowments. HSIs are thus compelled to rely on the few federal resources now available to them. H.R. 2272 and H.R. 2183 will provide HSIs and other Minority-Serving Institutions a much-needed increase in federal dollars for technology education that ultimately will benefit all Americans.

INFRASTRUCTURE, EQUIPMENT AND CAPABILITIES

The *Minority Serving Institution Digital and Wireless Technology and Opportunity Act of 2003* would provide $250 million in competitive National Science Foundation grants in each year over a five-year period to eligible Hispanic-Serving Institutions (HSIs) and other Minority-Serving Institutions to substantially enhance their technology infrastructure, programs and training to bridge the digital divide. *Lack of an appropriate infrastructure and equipment to provide access to students and faculty in classrooms are two important issues affecting HSIs. This legislation would provide grants for new technology equipment and infrastructure expansion as well as new faculty development and technology leadership initiatives, and the funds to create cost-effective technology partnerships.*

That H.R. 2183 and H.R. 2272 specifically identify Minority-Serving Institutions, including HSIs, as eligible recipients of funding is very much in line with the intent of this Act to reap the greatest benefits out of each dollar invested in those institutions with the strongest expertise and widest reach to the "have-nots" of the digital divide.

HACU, as the only nationally recognized voice for HSIs, represents more than 300 HSIs and "emerging HSIs" with a large student enrollment that has not yet reached the 25 percent requirement to become HSIs. Many of these "emerging HSIs," or "Associate HSIs," will contribute to the expected doubling of HSIs expected to occur during the next few decades. An overriding goal of HACU and HSIs is to increase the numbers of Hispanic college graduates with advanced skills in every discipline in which Hispanics now are under-represented. H.R. 2183 and H.R. 2272 promise not only to narrow the technology training gap, but also to ultimately increase college completion rates overall by providing Minority-Serving Institutions the tools they need to enhance pre-collegiate and on-campus student success.

FACULTY DEVELOPMENT

H.R. 2183 and H.R. 2272 will allow HSIs and other Minority-Serving Institutions to seek grants, contracts or cooperative agreements to "develop and provide educational services, including faculty development, to prepare students or faculty seeking a degree or certificate that is approved by the State, or a regional accrediting body recognized by the Secretary of Education."

Increasing the ranks of Hispanic and other minority teachers is of paramount importance, not only to higher education institutions but also to the Nation's public schools. HSIs already award approximately 50 percent of all teacher education degrees earned by Hispanic higher education students. Especially needed are teachers in the fields of science, mathematics and technology. Funds provided under this legislation would assist institutions in improving their facilities and infrastructure.

However, because of a lack of funding for teacher education at HSIs, the shortage of Hispanic teachers is acute. While 14 percent of the elementary and secondary education student population is Hispanic, only 4.3 percent of public school teachers are Hispanic, according to the U.S. Census Bureau Digest of Education Statistics for 1998 and 1999. In higher education, only 2.4 percent of all full-time faculty members are Hispanic (IPEDS, 1997).

Hispanics now earn master's, doctoral and professional degrees at the rate of 2.4 percent among the adult population—compared to 6.0 percent for non-Hispanics. Hence, the numbers of Hispanics attaining advanced degrees must more than double to achieve parity. Yet, only 20 percent of HSIs offer a Master's degree. Less than 12 percent of HSIs offer a doctoral degree. H.R. 2183 and H.R. 2272 directly address the need to increase the capabilities of HSIs to produce more teachers with advanced degrees.

TECHNOLOGY IN THE CLASSROOM

H.R. 2183 and H.R. 2272 will allow HSIs and other Minority-Serving Institutions to seek grants, contracts or cooperative agreements to "provide teacher education, library and media specialist training and preschool and teacher aid certification to individuals who seek to acquire or enhance technology skills in order to use technology in the classroom or instructional process."

Enhancing teacher education, classroom technology use and instructional skills will focus on expanding the only means of technology access for many of the youngest of the "have-nots" of the digital divide. A survey on computer access released September 5, 2001, by the U.S. Census Bureau reports that while only 33.7 percent of Hispanic households own a computer, 70 percent of the Nation's Hispanic students have computer access at school.

The long experience and proven expertise of HSIs in addressing minority public school and community needs makes these institutions a vital partner in efforts to enhance teacher technology training, classroom and instructional skills. H.R. 2183

and H.R. 2272 capitalize on the geographic proximity, cross-cultural understanding and existing community outreach of Minority-Serving Institutions by inviting their active participation in new technology initiatives in the Nation's public schools.

TECHNOLOGY PARTNERSHIPS

H.R. 2183 and H.R. 2272 will allow HSIs and other Minority-Serving Institutions to seek grants, contracts or cooperative agreements to "implement a joint project to provide education regarding technology in the classroom with a State or State educational agency, local education agency, community-based organization, national nonprofit organization, or business, including minority business or a business located in HUB zones, as defined by the Small Business Administration."

Joint projects and partnerships to comprehensively address classroom technology needs are a practical, effective means to meet the technology needs of the Nation's larger minority communities. This component of the *Minority Serving Institution Digital and Wireless Technology Opportunity Act of 2003* encourages inclusiveness and the establishment of a wide base of community support and expertise.

HSIs, historically hampered by funding disparities, have come to depend on the combined strengths and added resources of such partnerships to successfully address issues ranging from adult workforce development and lifelong learning to precollegiate preparatory programs.

HSIs and other Minority-Serving Institutions already have established the foundation for forming effective partnerships to address technology disparities. H.R. 2183 and H.R. 2272 provide the funding and infrastructure support to capitalize on the proven effectiveness of such partnership approaches in addressing the digital divide.

LEADERSHIP DEVELOPMENT

H.R. 2183 and H.R. 2272 also will allow HSIs and other Minority-Serving Institutions to "provide leadership development to administrators, board members and faculty of eligible institutions with institutional responsibility for technology education." Historically under-funded HSIs can readily benefit from this investment in support of those leaders who are charged with the strategic direction and supervision of efforts to enhance technology infrastructure, training and outreach.

HSIs and other Minority-Serving Institutions recognize the critical role of leadership development in efforts to close the digital divide. For example, the Advanced Networking with Minority-Serving Institutions (AN–MSI) project, of which Lehman College is a member, includes a focus on assisting campus leadership in Information Technology training. AN–MSI is the result of a National Science Foundation (NSF) grant to EDUCAUSE, a consolidation of the former CAUSE and Educom higher educational technology associations. A sub-award was made to the Education, Outreach and training Partnerships for Advanced Computational Infrastructure (EOT–PACI).

EDUCAUSE established partnerships with HACU, the American Indian Higher Education Consortium and other associations and councils representing Minority-Serving Institutions. Leadership development aspects of this ongoing project have included the involvement of administrators of HSIs and other Minority-Serving Institutions at Seminars on Academic Computing and a recent Technology Summit. Thanks to this grant Lehman College has just completed a campus-wide strategic plan for information technology, which represents a savings of approximately $40,000.

The inclusion of leadership development in H.R. 2183 and H.R. 2272 is another example of the Act's potential for success by strategically addressing the Nation's digital divide on so many fronts—from enhancing teacher skills in the classroom to supporting administrative leadership development on the college campus.

CURRENT STATUS

A major source for funding technology initiatives at HSIs are technology fees that are imposed on students. At the City University of New York, the Board of Trustees enacted a Technology fee ($75/semester for full-time students) during this past academic year as a means of upgrading technology and equipment for student use at labs and the Library. Approximately $1,000,000 is available on a yearly basis to replace equipment, upgrade software, establish new computer labs, etc. Technology infrastructure improvements at Lehman College are funded through special, non-recurring capital allocations from NY state and New York City. Federal grants are also a source for funding some limited equipment for research at four-year HSIs.

At Lehman College we have managed over a period of many years to extend cabling to most of our buildings. However, we now see the need to replace the old copper lines with fiber optic lines and also to extend them to individual classrooms. The high cost of this project prevents from wiring all of the classrooms in need of

connectivity. Wireless access points are a more efficient way to provide connectivity to classrooms. We currently have six facilities with wireless capabilities, mostly in the student services area, and need an additional thirty locations for academic purposes. In addition, classrooms with two-way interactive audio and video capability would serve to enhance the teaching and learning experience of students. Again, the cost of this technology makes it prohibitive for us to have more than the eight classrooms which were part of a major capital upgrade of our Technology facilities.

Our most pressing need is to upgrade our network infrastructure, including network security and telephony; provide faculty with opportunities to develop teaching, learning and research processes utilizing asynchronous modalities, and to upgrade the curriculum of our teacher training program. We are endeavoring to meet these challenges by working closely with federal, state and local leaders to obtain funding for our initiatives. However, current budget conditions in our state indicate that our initiatives will have to be extended over a longer period of time.

CONCLUSION

HSIs and other Minority-Serving Institutions have the expertise, proximity and commitment to their students and communities to provide front-line leadership and support in the effort to close the information technology gap. However, these institutions cannot succeed without the support of Congress and its endorsement of a substantial investment in federal dollars.

The digital divide between minority and non-minority populations is not an empty buzzword, but an unfortunate reality in our nation. While all sectors of society are acquiring greater access to information technology and connectivity to the Internet, the gap between the better educated and those behind them is widening each year—not only in qualitative terms, but quantifiably as well.

The U.S. Department of Commerce series of reports—"Falling Through the Net," released in 2000, and "A Nation Online: How Americans Are Expanding Their Use of the Internet," released in 2001—document the divide between Hispanics and non-Hispanic whites and the Nation as a whole. The 2000 report, the last reporting on household Information Technology (IT) use, tells us that more than one half of U.S. households have computers and more than four of every ten have Internet access. For Hispanic households, the numbers are only one-third and about two of every ten, respectively.

This same report documents that in 2000, Hispanics made almost 27 percent less individual use of the Internet than non-Hispanic whites. In the latest 2001 report, the gap grew to more than 28 percent. While computer and Internet access is slowly increasing for Hispanics, the digital divide between them and the rest of the Nation's population is becoming wider.

Examining individual Internet use by age groups enables us to look at the traditional college-age population. In the 2000 report, Hispanics were 32.6 percentage points behind their non-Hispanic white counterparts (65 percent). The 2001 report, focusing on 18–24 year-olds actually in school or college, documents that Hispanics are about 20 percent less likely than non-Hispanic whites to have a home computer and almost 25 percent less likely to use the Internet at home.

This reports highlights the critical importance of this bill and the urgency of supporting our HSIs, because the gap between Hispanics and non-Hispanic whites lessens to 15 percent when one considers outside home use, which for these students overwhelmingly means school or college. The 15 percent gap is still large, but it is a sign of progress in the right direction. Similar patterns exist for Hispanics ages 3 to 17 years. The 2000 report shows substantially large gaps between non-Hispanic whites and Hispanics overall. The latest 2001 report underlines that Congressional action is necessary to bridge the widening digital divide for our youth by increasing their access to technology in the school setting.

H.R. 2183 and H.R. 2272 propose a comprehensive approach to aggressively address the digital divide, targeting potential funding to those higher education institutions serving the largest concentrations of minority higher education students in those communities with the fastest-growing minority populations. The *Minority-Serving Institution Digital and Wireless Technology Opportunity Act of 2003* is a strategically sound, cost-effective response to a challenge the Nation can no longer afford to leave unanswered.

HSIs are the most important national resource for the education and training of Hispanics and other disadvantaged students across the Nation. This fact will only be magnified in the years ahead as the Hispanic population continues to grow faster than any other ethnic community in the country and reaffirms its crucial role in the economic and public life of the Nation.

The changing nature of our economy demands that under-served and under-represented but fast-growing populations be educated and trained at increasingly high-

er levels for the jobs and leadership roles of the "new economy." Notwithstanding the recent bursting of the dot-com bubble, the high-technology sector continues to expand at the speed of human creativity. Thus, information technologies, telecommunications, and biotechnology, among others, require increasing numbers of workers with high skills and advanced knowledge that only a quality higher education can provide.

H.R. 2183 and H.R. 2272 present a tremendous, timely opportunity for Congress and the President to ensure that future generations of Hispanics and other disadvantaged populations do not remain stagnated at the bottom of America's educational ladder. This cost-effective legislation directly addresses the technology needs of our "emerging majority" populations, which surely will propel our nation to a future in which all of us benefit from this equitable, practical investment in our nation's economic success, security and leadership. I urge Distinguished Members of this committee to support the *Minority Serving Institution Digital and Wireless Technology Opportunity Act of 2003.*

BIOGRAPHY FOR RICARDO R. FERNÁNDEZ

Prior to his appointment in 1990, Fernández was Assistant Vice Chancellor for Academic Affairs at UW–Milwaukee, where he also was a Professor in the Department of Educational Policy and Community Studies.

His research interests have focused on educational equity, school desegregation and language minority students, public policy and bilingual education, and high school dropouts/at-risk students. For the past six years he has served as Chair of the Bronx Educational Alliance, a coalition of school districts, colleges and universities, and community-based organizations that promotes K–12 collaboration.

A member of AAHE and its Hispanic Caucus, in 1998–99 he was the Chair of the Governing Board of the Hispanic Association of Colleges and Universities and has been active on several committees of the American Council on Education and the American Association of State Colleges and Universities. He has served on accreditation teams for the Middle States Association and the Western Association of Schools and Colleges. Currently he is a member of the New York State Education Commissioner's Advisory Council on Higher Education and also of the New York State Senate's Higher Education Advisory Committee.

Dr. Fernández holds the Master's and doctorate from Princeton University and a B.A. and a M.A. from Marquette University. He attended the Institute for Educational Management at Harvard University in 1992, and was a Fellow in Academic Administration of the American Council on Education in 1981–82. In 1986–87 Dr. Fernández was a Research Fellow at UW–Madison's National Center for Effective Secondary Schools.

LEHMAN COLLEGE.

The City University of New York

August 29, 2003

The Honorable Nick Smith
Chairman, Research Subcommittee
2320 Rayburn Office Building
Washington, DC 20515

Dear Congressman Smith:

Thank you for the invitation to testify before the U.S. House of Representatives Science Committee, Subcommittee on Research on July 9 for the hearing entitled *H.R. 2183, the Minority Serving Institution Digital and Wireless Technology Opportunity Act.* In accordance with the Rules Governing Testimony, this letter serves as formal notice of the Federal funding I currently receive in support of my research.

I received no federal funding directly supporting the subject matter on which I testified, in the current fiscal year or either of the two proceeding fiscal years.

Sincerely,

Ricardo R. Fernández
President

Office of the President
Phone 718-960-8111 Fax 718-584-1765 www.lehman.cuny.edu
250 Bedford Park Boulevard West Bronx, NY 10468-1589

Chairman SMITH. Dr. Fernández, thank you. Dr. Earvin.

STATEMENT OF DR. LARRY L. EARVIN, PRESIDENT, HUSTON-TILLOTSON COLLEGE

Dr. EARVIN. Mr. Chairman and members of the House Committee on Science, as President of Huston-Tillotson College in Austin, Texas, I am pleased to appear before you today on behalf of the United Negro College Fund to discuss legislation to provide discretionary grants to America's historically black colleges and universities and other minority serving institutions of higher education to upgrade the technology infrastructure, instrumentation, and instructional capacity in order to produce students for the 21st century workforce.

I am very pleased to join my colleagues and peers in the higher education community and to have the opportunity to discuss with distinguished members of the Subcommittee an issue that should be among Congress's highest legislative priorities. Let me make three major points and then respond to any questions that you may have.

First, the digital divide is alive and well in America. Notwithstanding the enormous progress we have made as a nation in expanding access for racial minorities and the poor to computers and the Internet, colleges and universities like Huston Tillotson, which provide access to low income students who would otherwise find the door to post-secondary education closed, must overcome the double jeopardy of poverty and technological illiteracy in educating our students. With federal help, or more importantly, without federal help, we will fail in our mission to ensure higher education opportunity for all Americans, especially the growing majority of minorities. America will be shortchanged if we fail.

Second, the technological capacity at too many UNCF institutions, as well as at other HBCUs and other minority serving institutions, is insufficient to meet the extraordinary demand of students, faculty, and staff that we serve and employ. In fact, without the targeted support envisioned by H.R. 2183 and H.R. 2272, UNCF colleges and universities will be unable to take the necessary steps to become fully competitive with other institutions of higher education. We must all have a technological foundation with which to prepare our students in the omnipresent information age.

Third, the bills pending before the Subcommittee represent an important step in the right direction, but each could benefit from certain amendments. UNCF believes that both the bill introduced by Mr. Forbes and the bill introduced by Mr. Towns reflect considerable thought and deliberation, but contain provisions that need modification. UNCF urges the Subcommittee to consider adopting provisions from both bills in order to develop a bipartisan consensus proposal that can be adopted in the U.S. House of Representatives.

Among the recommendations included in my written testimony, UNCF urges the following: (1) Adopt a strong peer review provision to ensure that highly qualified persons who are both knowledgeable about and familiar with technological infrastructure, instrumentation, and instructional needs of the HBCUs and MSIs, but also, who are conversant with the academic programs and needs of these

institutions in general, will evaluate all proposals to determine their merit; (2) Evaluate carefully the agency best suited to house, manage, and assure the programmatic success of this program for the Congress; and (3) Ensure that adequate reporting requirements are applied both to agency administration and institutional implementation of the program so as to guarantee to the maximum extent practical the successful achievement of Congress's legislative objectives.

Thank you for the opportunity to present UNCF's testimony and to provide their recommendations. I would be pleased to answer any questions that you may have.

[The prepared statement of Dr. Earvin follows:]

PREPARED STATEMENT OF LARRY L. EARVIN

Good afternoon Mr. Chairman and Members of the Committee. I am pleased to appear before you today, with my other colleagues, on behalf of the United Negro College Fund (UNCF), of which Huston-Tillotson College, where I am President, is a member institution. I personally am honored to testify before a Committee represented by so many distinguished Members of Congress from the great State of Texas, which is home to Huston-Tillotson and 8 other historically black colleges and universities. UNCF's President and CEO, William H. Gray, III, was unable to testify and I am privileged to speak on behalf of the 39 member colleges and universities in UNCF. UNCF is America's oldest and most successful African American higher education assistance organization.

As you may know, Huston-Tillotson College is the oldest institution of higher education in Austin, Texas. Our current student body—554 students—is educated in an intimate academic atmosphere with a faculty/student ratio of 12 to 1, and an average class size of 12 students. Academic programs range from mathematics and education to political science and music. Huston-Tillotson is an innovator in teacher preparation and international business.

Mr. Chairman and Committee Members, the bill, H.R. 2183, the *Minority Serving Institution Digital & Wireless Network Technology Opportunity Act,* provides Congress with the opportunity to address the technology instrumentation and infrastructure needs of the Nation's Historically Black Colleges and Universities (HBCUs) and other minority-serving institutions. Enhancing the technology instrumentation and infrastructure at the HBCUs is one of the most critical issues affecting the education of African Americans and other minority students in America. It is critical that Congress enact legislation to assist HBCUs and other minority-serving institutions with the acquisition of technology instrumentation and infrastructure, faculty development, training and the integration of technology into the curriculum at the Nation's college and universities that educate our minority students.

Unfortunately, too many of these minority students have been raised in families without a computer in the home, attended poor urban and rural schools that were not wired nor equipped with 21st Century technology, and have been taught by educators who may have had less facility with computers than their students. This reality has been documented in *Falling Through The Net—A Report on the Telecommunications and Information Technology Gap in America* (July 1999). Despite attempts to deny this income-based reality—we face it everyday in American higher education.

For example, UNCF member institutions and other HBCUs enroll large numbers of poor students, whose parents are unable to help pay college costs. In fact, nearly 60 percent of all UNCF students come from families with incomes less than $25,000. An estimated 92 percent of all UNCF students receive some form of federal financial assistance, and sixty percent of UNCF students are first-generation college students. It is clear, then, that the confluence of these demographic factors make virtually certain that many UNCF students will have their first exposure to computers and to the Internet when they arrive on the college campus.

Mr. Chairman, let me describe for you the state of technology at UNCF member institutions and how, in conjunction with UNCF's Technology Enhancement Capital Campaign, the legislation being discussed today should be structured to address this important issue. For many UNCF institutions, which enroll large numbers of minorities, making up the digital deficits at home and at school constitutes a real financial challenge. The inability of institutions to finance the acquisition of needed technology infrastructure creates another digital divide. Compared to other colleges,

private black colleges have very small endowments and cannot fall back on sizable numbers of wealthy alumni. The average endowment of UNCF schools for the 1999–2000 academic year was $23.358 million. Larger, well-financed institutions have greater access to the funding necessary to purchase technology, than do smaller, private colleges with fewer resources.

Technology capacity, at some UNCF member institutions, is insufficient to support extraordinary demands of the students, faculty, and staff. As a result, those campuses are unable to take the necessary steps to being fully competitive with other institutions of higher education. Some campuses do not have adequate bandwidth; they have a T–1 line. Further, with only one broadcast domain, these institutions cannot segment the T–1 line. This is like needing an eight-lane highway and only having one lane. You are unable to manage the data. This means we are slow to receive information, and any increased traffic causes backups, etc.

Some UNCF member institutions would ultimately like to provide a wireless domain on campus, which they are unable to do currently. A wireless domain would allow portability to deliver curriculum in creative ways and not solely within the boundaries of an actual classroom. Such capabilities increase an institution's attractiveness to students. In fact, at some campuses, residential students are forced to choose between a wired dorm room shared with other students and a single room without computer access.

Faculty at UNCF campuses is skilled across the range of capabilities in terms of the technology on campus. For example, one member institution houses and hosts a super computer cluster that is used by numerous campuses, although this network is not robust enough to allow faculty to conduct research due to the limitations in the system to manage the traffic. Many are learning the basics of using technology and/or are moving to use technology to increase productivity. Very few yet have reached the mastery over technology where they are prepared to develop entirely new learning environments that utilize technology as a flexible teaching and learning tool.

What exists at UNCF member institutions is not dissimilar to what you have heard and will hear from the other distinguished witnesses. The 'digital divide' in higher education has been documented in "Historically Black Colleges and Universities—An Assessment of Networking and Connectivity" (October 2000), "Ending The Digital Divide—The Nation's Tribal College and Universities," and "Assessment of Technology Infrastructure in Native Communities;" and in "The Power of The Internet for Learning" (December 2000). The digital divide threatens to deny minority students and our institutions the competitive skills they need to defeat the remaining vestiges imposed by race and economic segregation in America.

Fortunately, UNCF member institutions have benefited from its Technology Campaign. Campuses now are closing the digital divide. In fact, last year, UNCF's President and CEO, William H. Gray, III, testified before the Senate Commerce, Science and Transportation Committee on this very topic. Without UNCF's assistance, many campuses would be that much more digitally challenged. Let me take a moment to highlight some of the accomplishments from the UNCF Technology Campaign.

In January 2000, UNCF announced a partnership with Microsoft, IBM, AT&T and other major corporations and launched an $80 million Technology Enhancement Capital Campaign (TECC). The campaign was designed to strengthen the technological capacity of each of the 39 member colleges and universities in three significant ways.

First, TECC strengthened the technology capacity through modernizing each institution's technology platform and gave every student and faculty member access to computers. As a result of this campaign, all UNCF colleges and universities meet certain minimum technology standards, including increased network capacity and uniform systems that enable electronic learning among institutions. Technical support was given so that all wiring, equipment installment, and data migration and configuration of hardware—including system testing—have been properly accomplished. This created equity in opportunity by making the same technology available to students attending UNCF member colleges and universities as is now available to students at majority institutions.

Second, on-campus training is being provided to a core group of campus officials who will then train others in the operation of all equipment. TECC also includes a faculty development component to assist faculty in integrating information technology into the curriculum and to assist faculty members in strengthening their research and instructional techniques using technology.

Third, TECC is helping make technology more affordable for individual students and faculty. HBCU students, faculty, and staff can purchase computer hardware and software from major technology providers, such as Dell, IBM, Hewlett Packard and Microsoft, at discounted prices—as low as three hundred dollars—along with

low-cost financing through UNCF's e-commerce web site, which was developed through a generous contribution of technical services from Electronic Data Services (EDS).

UNCF's TECC campaign is helping to close the digital divide on UNCF campuses. UNCF already has exceeded its $80 million TECC campaign goal. Here are a few examples of the campus-based results of the TECC campaign:

- In Texas, four member colleges—Paul Quinn College, Huston-Tillotson College, Jarvis Christian College and Wiley College—received from UNCF $8.3 million. With their share of the technology funds, Huston-Tillotson was able to purchase and implement a state of the art, voice-over IP telephone solution. Furthermore, the college also implemented a wireless LAN that expands the entire campus.
- In Florida, where UNCF has three member colleges—Bethune-Cookman College, Edward Waters College, and Florida Memorial College—UNCF provided $6.6 million in technology funds. One example of the use of the funds is that Bethune-Cookman established a quality infrastructure for storage and distribution of applications and data.
- In North Carolina, there are six member colleges and universities—Johnson C. Smith University, Shaw University, St. Augustine's College, Barber Scotia College, Bennett College and Livingstone College. Here UNCF has invested $13.7 million in technology. With its portion of the funds, Johnson C. Smith University developed a print solution and a robust e-mail system.
- In Georgia, UNCF colleges and universities—including Clark Atlanta University, Interdenominational Theological Center, Morehouse College, Spelman College and Paine College—received a total investment of $18.0 million. At Clark Atlanta University, computer lab capability and access were enhanced, with improved security.
- In Virginia, there are two member institutions—St. Paul's College and Virginia Union University, where UNCF funded $2.7 million in technology. As an example, Virginia Union University established a totally wireless campus and created mathematics computer labs for classroom teaching and accounting computer labs for teaching and student exercises.
- In Tennessee, three UNCF institutions—Fisk University, Lane College and LeMoyne-Owen College—received a total investment of $6.0 million. Fisk University installed computers in the dorms, improved its web site and enhanced networking capabilities.
- In Alabama, there are five UNCF member institutions—Miles College, Oakwood College, Stillman College, Talladega College, and Tuskegee University, where UNCF funded $12.5 million in technology. Tuskegee University wired its entire campus, enabling it to provide access to students and faculty campus-wide.

In addition, all 39 UNCF campuses have benefited from upgraded network infrastructures and increased access to technology for students, faculty, and staff.

- UNCF institutions have received hardware, including 5,500 desktop computers, almost 1,800 network printers, nearly 2,000 network servers, and about 2,000 laptops, as well as hundreds of hubs, switches and network routers, courtesy of Hewlett Packard, Cisco, Lexmark, Dell and Pfizer;
- The wiring of member institution campuses is completed—including over 3,800 network drops in learning centers and administrative and academic facilities and equipment installation and configuration; and
- UNCF member institution received 145,000 current versions of Microsoft, including Windows 2000, Encarta Reference Suite 2000, Microsoft Office Suite 2000, Windows XP, and Encarta Africana 2000 courtesy of an 'in-kind' gift from Microsoft.

For the record, Mr. Chairman, I am submitting the list of these contributors.

Even with all the support from UNCF and its supporters, we are far from closing the digital divide. Much more remains to be done. This leaves a clearly defined role for Congress to play.

Mr. Chairman and Members of the Committee, I must point out, however, that any legislation directed at closing the digital divide at UNCF member institution, its sister historically black colleges and universities, and other minority institutions of higher education, cannot be marginalized. Simply put—with the technology needs being so paramount at our schools—the legislation must be drafted and designed to meet the varying needs of the HBCUs and all MSIs. That is why so focus has

been given to placing such a critical federal initiative at the appropriate department or agency—one where there are no statutory constraints that limit the agency's ability to meet the needs of the eligible institutions and to accomplish the goals Congress has defined.

The question has been raised as to whether Huston-Tillotson, for example, could acquire technology for and train staff in the student financial aid office, if the program authority contemplated in H.R. 2183 is placed at the National Science Foundation (NSF). What if Huston-Tillotson wants to make a course in Farci, taught via the Internet or telecommunications satellite with the University of Texas, available to its students (and to students at neighboring Wiley College or Paul Quinn College) with technology purchased with H.R. 2183 funds? I know there are individuals who will argue that such activities are possible, if indeed a federal program were established at NSF. Nonetheless, I question whether NSF has the authority to fund activities that are not tied directly to research and education in the sciences, mathematics and engineering or to competitively fund "bricks and mortar" projects. As I noted earlier, UNCF member institutions' needs vary widely and may extend well beyond a narrow interpretation of NSF's focus.

In the past, NSF has been less than eager to fund science education and research projects at institutions that are not among the flagship academic and research institutions in America. NSF is not alone in this regard. The Department of Commerce and NSF's records of performance in providing grants, contracts, and cooperative agreements to the MSIs leave much to be desired. Presidents at UNCF member institutions can recount numerous stories about these federal departments' and agencies' track records with the HBCUs. I imagine that with Hispanic-Serving Institutions and with Tribal Colleges and Universities this track record also is far from stellar. Outside of the programs housed in NSF's Education and Human Resources Directorate, only a handful of minority-serving institutions benefit from the full complement of NSF's research and related activities. The Department of Commerce does not have a single dedicated HBCU or minority serving institution Therefore, UNCF member institutions are reticent about how such a program would fare at NSF, not to mention at other departments and agencies.

This is not to say that NSF, the Department of Commerce, and the other federal departments and agencies all should not have some dedicated, capacity building program for HBCUs. In fact, the President's Advisory Board on HBCUs has made such a recommendation to the President in its recent "2001–2002 Annual Report to the President Under Executive Order 13256." I hope that this very goal is something this Congress and this Administration will soon achieve.

Mr. Chairman, for these reasons, on behalf of UNCF member institutions, I make the following specific recommendations as you deliberate this issue and H.R. 2183:

- delete the Advisory Council in section 4(b) and substitute a strong peer review panel provision that ensures that people, both knowledgeable about and familiar with the technology infrastructure, instrumentation, and instructional needs of HBCUs/MSIs, and also conversant with the academic programs and the needs of these institutions in general, participate on these panels;
- modify section 3 (5) to state—"(5) to provide professional development and training to administrators and faculty of eligible institutions with responsibility for all phases of academic instruction and institutional administration;" and
- include a provision that calls for, to the maximum extent possible, equitable distribution of appropriated funds to the range of eligible institutions that will participate in the program.

UNCF also has some concerns regarding the reporting requirements in the bill, which it has provided some recommendations, for the record.

In addition, the legislation established an Office of Digital and Wireless Network Technology to carry out the activities designated in H.R. 2183. It remains unclear as to whether or not the salaries and expenses to support this office are stipulated in the bill as written.

In closing, HBCUs face the twenty-first century as maturing institutions with an educational legacy that now is more important than ever given the rapidly changing demographics of this nation. The action you take on this significant issue will have a momentous impact on the future prosperity and security of our entire nation.

Again, I want to thank the Committee for this opportunity to testify and to present the views of UNCF on this important legislation. UNCF is available to assist you, Mr. Chairman, and Members of the Committee as you proceed with consideration of the bill.

Attachment A

TECC INITIATIVE

OVERALL CAMPAIGN GOAL: $100 MILLION

CORPORATIONS

Microsoft*	$ 75,000,000	Exxon Mobil	$ 500,000
Oracle***	$ 9,890,225	General Motors	$ 500,000
Dell***	$ 2,300,000	Electronic Data Systems*	$ 280,000
Pfizer	$ 1,800,000	American Express	$ 250,000
Cisco Systems***	$ 1,699,750	Westvaco	$ 200,000
JP Morgan Chase**	$ 1,625,012	Sun Microsystems*	$ 110,670
Lockheed Martin	$ 1,050,000	Lexmark*	$ 76,450
AT&T	$ 1,000,000	Shell Oil	$ 55,000
Citigroup	$ 1,000,000	Southwestern Bell	$ 10,000
GE Fund	$ 1,000,000	Total	$100,347,107
Hewlett Packard*	$ 1,000,000		
Proctor & Gamble	$ 1,000,000		

* In-Kind Gift
** Challenge Grant
*** Part In-Kind, Part Cash

AS OF 2/28/03

Attachment B

PROPOSED REVISIONS IN SECTION 7

(c) Contents of Evaluation.—The Director shall prepare an evaluation of the program authorized by this Act, based on the annual reports submitted by each institution that receives a grant under this Act. The Director's evaluation shall assess the short- and long-range impact of the activities undertaken by each grantee relative to the institution's plan for addressing the technology infrastructure, instrumentation and instructional needs of that institution. The Director's evaluation shall include the first five years of funded institutional activity.

(d) Report To Congress. The Director shall prepare and submit a report to Congress no later than one-year after the fifth year of funded institutional activity. The Report to Congress shall include a summary of the institutional activity undertaken and a comprehensive report on each institutional award, including: the amount of funds provided, the institution's technology enhancement plan, the activities undertaken with federal funds, any activities undertaken with matching or institutional "in-kind" (non-federal) funds, and the institution's assessment of the impact of the grant. The Director may also include an assessment of the impact of the program on closing the "digital divide" at minority-serving institutions and appropriate recommendations for the continuing need for federal support for the program.

BIOGRAPHY FOR LARRY L. EARVIN

A post in education that was to last one year resulted in a 27-year career filled with numerous accomplishments, successes, and a presidential appointment. Effective July 1, 2000, Dr. Larry L. Earvin was appointed by the Board of Trustees as the fifth President and Chief Executive Officer of Huston-Tillotson College. His millennium year appointment was made during the College's 125th anniversary.

Dr. Earvin's reputation as an efficacious leader was established during his seven successful years as Dean of the School of Arts and Sciences at Clark Atlanta University. As President of Huston-Tillotson College, he has used his leadership skills to garner support for the College from the entire community.

Since his arrival in Austin, Earvin has steadied the pace of his leadership in building community and corporate support for higher education. He has become actively involved in several local public interest concerns including the Capital Area United Way, the Austin Area Urban League, and the Austin Area Research Organization. At the local level, he has also been applauded for his leadership in innovative collaborations which include Tarrytown United Methodist Church, The Austin Chapter of The Links, Southwestern University at Georgetown, and the Austin Idea Network.

Earvin's expertise has been recognized through his election to several state and national boards of directors, including the Independent Colleges and the University of Texas, the Council of Independent Colleges (Washington, D.C.), National Association for Equal Opportunity in Higher Education (Washington, D.C.), the University Senate, the Black College Fund of the United Methodist Church, and the Higher Education Council of the United Church of Christ.

Earvin obtained a Bachelor of Arts degree from the former Clark College, a Master's of Science from Georgia State University and the doctor of philosophy from Emory University.

Huston-Tillotson College OFFICE OF THE PRESIDENT
900 Chicon Street • Austin, Texas 78702-2795 • Phone 512.505.3002 • Fax 512.505.3195 • www.htc.edu

July 9, 2003

The Honorable Nick Smith
Chairman, Research Subcommittee
2320 Rayburn Office Building
Washington, DC 20515

Dear Congressman Smith:

Thank you for the invitation to testify before the U.S. House of Representatives Subcommittee on Science, on July 9th for the hearing entitled H.R. 2183. The Minority Serving Institution Digital and Wireless Technology Opportunity Act. In accordance with the Rules Governing Testimony, this letter serves as formal notice of the Federal funding I currently receive in support of my research.

Years 2001 - 2002

Amount	Grant Number	Federal Agency/Source Title	Fiscal Year Received
$ 1,539,233.00	PO31970036	US Dept. of Education/Title III	2001-2002
1,722,069.00	PO31BO20085	US Dept. of Education/Title III	2002-2003
348,094.01	PO47A990466-01B	US Dept. of Education/Upward Bound	2001-2002
366,735.00	PO47A990466-02	US Dept. of Education/Upward Bound	2002-2003
215,365.00	PO47A990405-01A	US Dept. of Ed./Upward Bound-Rural	2001-2002
230,234.00	PO47A990405-02	US Dept. of Ed./Upward Bound-Rural	2002-2003
124,464.00	DAAD19-02-1-0357	US Dept. of Defense	2002-2003

Sincerely,

Larry L. Earvin, Ph.D.
President and CEO

Chairman SMITH. Dr. Earvin, thank you. Dr. Fennell.

STATEMENT OF DR. DWIGHT J. FENNELL, PRESIDENT, PAUL QUINN COLLEGE

Dr. FENNELL. Good morning. Thank you, Chairman Smith and Ranking Member, Congresswoman Eddie Bernice Johnson, for the opportunity to testify before you today on behalf of Paul Quinn College. The need for higher education institutions to be in the forefront of the digital divide is paramount. In order to maintain a preparatory presence, it is essential that faculty, staff, and students keep abreast with the introduction of new and current technologies.

In this regard, higher education institutions must have, at a minimum, technologies that include desktop computers, connectivity with Internet access, and the ability to provide professional development on the various types of administrative and office productivity software. Higher education must also effectively prepare students to meet and address the workforce demands and expectations. For these purposes, it is critically important that higher education initiatives now include the element of a functional plan of action to upgrade the campus environment, retain and retool campus constituents, and maintain a vigilance about new technologies and their use.

Paul Quinn College is a private, four-year liberal arts institution located in Dallas, Texas. The college was founded in 1872 and has served an historically black population during her tenure. The college for 131 years has been meaningful to the development of individuals from communities throughout Texas and the Nation, with the provision of educational enhancements that provide the necessary, functional, and sustaining skill sets that are contemporary for competitive employment and/or pertinent to individuals' matriculation to graduate and professional schools.

This has been especially true in the area of technology, and in spite of the increasing demands placed on higher education with new software, hardware, and training, there continues to be a need to remain technologically functional. As a private institution, it is important to have access to funding pools that would increasingly aid in the building and maintaining the technology infrastructure. This is pertinent to both the administrative operations of the college and the instructional preparation of our students.

Paul Quinn College is currently positioned with a new wireless network and complete Internet access. The college has also purchased a new administrative software package called Comprehensive Administrative Management System, or referred to as CAMS. This purports that the administrative operations of the college, student labs, faculty offices, and select areas such as the library have been upgraded. Notwithstanding, the most pressing technology needs are enriching the living-learning environment of the college's residence halls and the need to further create a campus friendly initiative with the use of technology with on-line registrations, review of billing, expansion of inter-relational connectivity with the area campuses, and the establishment of informational opportunities between students and faculty. Significant to the aforementioned are training and professional development needs as well.

The current address of technology is achieved through the process of grantsmanship, fundraising, and philanthropic support. The United Negro College Fund is also a major supporter in both the provision and the creation of opportunities for acquiring technologies. As a result of technology having a short-term innovative life, the support for more available and assured streams of funding is essential. Also essential is the need to have funding for a computer/technology refreshing program and the need to revamp the core structure of the campus with technological upgrades.

In spite of the accomplishments to date, Paul Quinn College, as many other higher education institutions, continues to have an increasing obligation to do more with technology. As a result of the fast paced growth in this area, funding pools will continue to be needed to upgrade technology infrastructures, which are essential to the growth and development of our students. This, too, purports the training that is essential for faculty and training that is necessary for staffs that conduct the operations of our institutions.

As H.R. 2183, the *Minority Serving Institution Digital and Wireless Technology Opportunity Act,* takes form, it is proposed that the following items be considered for the betterment of all higher education. The recommendations would include that the Act allow for the provision of a process that provides for the receipt of funding that will be pertinent to any technology needs as identified by the institutions. This is critically important in that the needs as identified by the institution speaks to the necessary technology that is needed to advance the campus. Moreover, while institutions have comparable needs, they are not all the same needs in terms of technological advances.

Technically, the provision of a process that is not prescribed for select disciplines or programs. Most often, the use of technology is associated with the scientist, math, or engineering disciplines. Being a liberal arts institution, we find it now significantly important that liberal arts disciplines and programs also be prepared with the same technology for research, instruction, or delivery. The informational exchange is most practical and necessary during this time.

We believe, also, that there is a need for a process that ensures a peer review procedure. A peer review, in our opinion, is crucial and critical. A study or statement by those who best understand the institution from our history, from our mission, to our program delivery, is significantly important to offering the review that is needed to assist in advancing our institution's developments in technology.

And lastly, the provision of campus-wide opportunities in professional development and technical assistance. In order for students, faculty, and staff to advance, complimentary supports must be placed throughout the campus. Such supports for professional development and technical assistance provide for reinforcement across the campus in learning and providing the technological growth that is needed both for the institution and the individual.

The concerns as expressed on behalf of Paul Quinn College have universal appeal to institutions that are similarly situated. Moreover, independent private institutions, in particular, and all of higher education more generally, have a need for assistance with

building capacity, enriching the lives of our constituents, and enhancing the living-learning environment, all of which are essential for a better nation.

Thank you for the opportunity to present this testimony and we are prepared to answer any questions that are placed before us.

[The prepared statement of Dr. Fennell follows:]

PREPARED STATEMENT OF DWIGHT J. FENNELL

The need for higher education institutions to be in the forefront of the digital divide is paramount. In order to maintain a preparatory presence, it is essential that faculty, staff and students be kept abreast with the introduction of new and current technologies. In this regard, higher education institutions must have, at a minimum, technologies that include desktop computers, connectivity with Internet access and the ability to provide professional development on the various types of administrative and office productivity software. Higher education must also effectively prepare students to meet and address workforce demands and expectations. For these purposes, it is critically important that higher education initiatives now include the element of a functional "Plan of Action" to upgrade the campus environment, retrain and retool campus constituents and maintain a vigilance about new technologies and there use.

Paul Quinn College is a private four-year liberal arts institution located in Dallas, Texas. The College was founded in 1872 and has served a historically black population during her tenure. The College for 131 years has been meaningful to the development of individuals from communities throughout Texas and the Nation, with the provision of educational enhancements that provide the necessary, functional and sustaining skill sets that are contemporary for competitive employment and/or pertinent to the individuals' matriculation to graduate and professional schools. This has been especially true in the area of technology and in spite of the increasing demands placed on higher education with new software, hardware and training, there continues to be a need to remain technologically functional. As a private institution, it is important to have access to funding pools that would increasingly aid in building and maintaining the technology infrastructure. This is pertinent to both the administrative operations of the College and the instructional preparation of students.

Paul Quinn College is currently positioned with a new wireless network and complete Internet access. The College has also purchased a new administrative software package Comprehensive Administrative Management System (CAMS). This purports that the administrative operations of the College, student labs, faculty offices and select areas such as the library have been upgraded. Notwithstanding, the most pressing technology needs are enriching the living-learning environment in the College's residence halls and the need to further create campus friendly initiatives with the use of technology in on-line registrations, review of billing; expansion of interrelational connectivity with area campuses; and the establishment of informational opportunities between students and faculty. Significant to the aforementioned are training and professional development needs as well.

The current address of technology is achieved through the process of grantsmanship, fundraising and philanthropic support. The United Negro College Fund, Inc., is also a major supporter in both the provision and creation of opportunities for acquiring technologies. As a result of technology having a short-term innovative life, the support for more available and assured streams of funding is essential. Also, essential is the need to have funding for a "computer refreshing program" and the need to revamp the core structure of the campus with technological upgrades.

In spite of the accomplishments to date, Paul Quinn College (as many other higher education institutions) continues to have an increasing obligation to do more with technology. As a result of the fast paced growth in this area, funding pools will continue to be needed to upgrade technology infrastructures which are essential to the growth and development of our students. This too purports the training that is essential for faculty training and the training that is necessary for staffs that conduct the operations of the institution.

As "H.R. 2183, the Minority Serving Institution Digital and Wireless Technology Opportunity Act," takes form, it is proposed that the following items be considered for the betterment of all of higher education. The recommendations would include, the Act allowing for:

- The provision of a process that provides for the receipt of funding that will be pertinent to any technology needs, as identified by the institution.

- The provision of a process that is not prescribed for select disciplines or programs.
- A process that ensures a peer review procedure.
- Provision of campus-wide opportunities in professional development and technical assistance.

The concerns as expressed on behalf of Paul Quinn College have universal appeal to institutions that are similarly situated. Moreover, independent private institutions, in particular, and all of higher education more generally, have a need for assistance with building capacity, enriching the lives of our constituents and enhancing the living-learning environment; all of which are essential for a better nation.

BIOGRAPHY FOR DWIGHT J. FENNELL

Dr. Dwight Fennell is the 32nd President of Paul Quinn College. Dr. Fennell is a native of Miami, Florida where he completed all of his grade level education in the public school system.

Upon completion of high school, he attended Saint Augustine's College in Raleigh, North Carolina, where he completed the baccalaureate degree in History and Government. Immediately following his undergraduate education, he pursued and completed the Master of Arts Degree in History at (the then) Atlanta University. He also attended and completed a second Master of Education degree in Education at Florida International University, Miami Florida. The Doctor of Philosophy and Education Specialist degrees were completed at The Florida State University in Tallahassee, Florida.

Dr. Fennell began his career in higher education at Florida International University where he worked in various capacities associated with student services. While at Florida International University he worked with community service initiatives, Adult and Continuing Education and as assistant director of the college's Honors Program. He was also employed with Florida Atlantic University, in Boca Raton, Florida where he directed the university's initiative for student retention and served as assistant to the university's affirmative action officer.

After leaving the state university system of Florida, Dr. Fennell taught at Morris Brown College in Atlanta, Georgia, and later at Saint Augustine's College in Raleigh, North Carolina. While at Saint Augustine's College he became a tenured professor of History and education. He also became the Vice President for Academic Affairs, a position he held for seven years (of his eleven-year tenure).

Dr. Fennell came to Paul Quinn College in 1998, to the position of Provost. In this capacity, he was responsible for oversight of the areas of academic and student affairs and serving as needed when called upon by the President.

On last year Dr. Fennell was selected as Interim President, during the search period for a permanent president. It was also during this period that Paul Quinn College had a phenomenal year; the enrollment grew both semesters, the retention of students increased and the College operated in the black.

Effective May 4, 2002, Dr. Fennell received the unanimous vote of the Board of Trustees to become Paul Quinn College's 32nd President. Dr. Fennell states that he "sees a bright future for the College with an emphasis being placed on: increased enrollments, the establishing of 'niche' academic programs, greater enhanced retention, increased collaboration with the community, increased scholarship opportunities for students and expanded athletic programs." Dr. Fennell is very optimistic about the future of Paul Quinn College, as the gateway to the "educational corridor" in the Dallas community.

Dr. Fennell has contributed to the production of articles in history; he has contributed to research in both history and education; he has experience in grantsmanship and fundraising; and he has done extensive work in program accreditation and institutional accreditation.

Dr. Fennell is married to Angelia Fennell, and they have one son, Dwight, Jr.

OFFICE *of the* PRESIDENT

Dwight J. Fennell
President

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July 8, 2003

Mr. Nick Smith, Chairman
Research Subcommittee
U.S. House of Representatives
Committee on Science
Suite 2320, Rayburn House Office Bldg.
Washington, DC 20515-6301

Dear Chairman Smith:

This is to verify that the federal funds received by my college for the use of technology within the past four years is as follows:

Department of Education funding for Technology was received in the amount of $298,750.00 for the period of 2000-2004.

- FIPSE (2001-2004) $ 220,000.00
  (Funds for Improvement of Post Secondary Education)
- Student Support Services (2001-2003) $ 13,950.00
- Upward Bound Program (2000-2002) $ 11,300.00
- Title III (2002-2003) $ 53,500.00

Thank you for the opportunity to participate in this significant activity. Should there be a need for additional information, please do not hesitate to contact my office at the above numbers.

Sincerely,

Dwight J. Fennell, Ph.D.

DISCUSSION

Chairman SMITH. Thank you very much. For the panel's and the audience's information, in just a couple of minutes we are going to go to the Floor, I understand, for three votes. Interestingly, it is on education and how we encourage quality teachers in compliance with No Child Left Behind. But also, as a special priority for science and math, looking at increasing the forgiveness of student loans from, I think it is $5,000 now up to $17,000 for math and science teachers, to try to accommodate some of the great needs.

You know, originally, in the 107th when the bill was introduced, the legislation called for this responsibility going to the Department of Commerce. We have established the Technology Administration in Commerce. We will be talking about what is the best and most effective way to get this money out in a reasonable fashion, so we have also asked the Director of the National Science Foundation, Rita Colwell, to be here today to give us her ideas. Is there any particular thoughts that any of you have with why we shouldn't at least consider the technology administration in Commerce for administering this program? Does anybody have any particular comments on that? Dr. Humphries.

Dr. HUMPHRIES. I am going to become technologically literate before it is over. The National Science Foundation today already has programs which deal with minority institutions, and there are several of those programs that produce within the National Science Foundation a currency and knowledge about the institutions. They have programs that focus on the graduate level, they have programs that focus on the undergraduate level, and they have programs that focus pre-college in terms of getting people to do what you were talking about, how you get more minorities to come into science and technology.

So there is a base of knowledge pertaining to minority institutions that is within the National Science Foundation in existence. This couples the technology sufficiency at our institution, couples well with the kind of things that they are doing presently in terms of this, and so we need to do more with the National Science Foundation in terms of their support for minority serving institutions. The more we put over there, the more I think that we can get more of a synergy which relates to getting more focused.

Chairman SMITH. Dr. Fernández, you mentioned the importance of a blueprint, a plan. Should that be part of the requirements for these grants, that there is a plan in place to move ahead in this area? Should that be part of the grant application provisions?

Dr. FERNÁNDEZ. I would not want to put that as a requirement, because there are some institutions who need these funds precisely to put together that plan on how to best utilize that. But I would like to, if I may, talk also about the previous point. In looking at the NSF executive summary of the strategic plan, I note on page 3 that they talk about core strategies, one of which, the second one, is strengthen the physical infrastructure. And I quote, "Modernize existing facilities and instruments and plan for future needs, including taking full advantage of the capabilities of emerging information technologies." So that struck me as certainly one area, one justification, for including this program under the National Science

Foundation. But ultimately, I guess, it is up to the Committee to——

Chairman SMITH. I guess part of the challenge is that money is limited in NSF. Our budget is very modest compared to, for example, NIH. And so there has been some feeling of a priority that we get the most bang for our basic research dollar, and having peer reviews of what areas of basic research should we be looking at and who can best accommodate that research. I mean, I guess my personal feeling, it is possible, we could do it. I am reluctant to make NSF an affirmative action agency. I think even on this legislation, the question that comes to my mind is, you know, two areas maybe. One is what is the need for non-minority institutions? And I think we need to assess that. It might be some of our colleges that aren't necessarily serving minorities that have just as great a need. So need should be part of our priority, and the reason we are considering this bill is because it has become obvious that there is a greater need with minority serving institutions. And so I think it is reasonable and logical that we proceed with this bill, but the other part of this kind of effort to get results, it seems to me, is start examining a situation where other advanced learning institutions might need some of the same kind of help.

Any comments that any of you have on trying to help make sure that this is results oriented or that we help those colleges and universities that need this kind of help if we are going to have the kind of workforce in this country that is going to accommodate our future needs?

Dr. FENNELL. Mr. Chair, if I may?

Chairman SMITH. Yes, Dr. Fennell.

Dr. FENNELL. We are finding that in 2003, many of our students that come to HBCUs are first generation students, which essentially means that their parents have had no prior education and no understanding of the use of technology, which often purports that there is no technology in the homes unless it is affiliated with their matriculation during high school. This is not to say that majority or other institutions don't have as great a need as HBCUs, but I think all of higher education needs to look at this issue and emphasis, because in four years of high school, coming to institutions of higher learning and not receiving the type of preparation for technological literacy creates a further gap in terms of the education process.

I would offer that, however, the language and intent of the program or the bill is identified that it is done so with the full intent of making and creating a better technological society, and I think that is critical and crucial, and we all agree in regards to that regard. Now, how it is done, I think, again, the language needs to be looked at critically, and the components for which will be piped in the bill to achieve the intent need to be looked at very critically. And so I think some of us are not prepared to make specific comments as such because that language would need to be so noted and reviewed before there is some comfort with providing support for it.

Chairman SMITH. Thank you. Representative Johnson.

Ms. JOHNSON. Thank you very much for your testimony. Dr. Humphries, do you have an idea of a set amount of money that

would address most of the needs of the institutions? I know that most of them have very old buildings because they are old institutions, and some of the infrastructure has been improved and others have not. But do you have a good estimate of how much money might be needed to bring them up to par?

Dr. HUMPHRIES. Well, we indicated in my testimony that $2.5 million per institution would be extremely helpful in terms of attacking the deficiencies that we noted in the study. Now, $2.5 million is an average figure. There will be some institutions who will need more money than that, depending on how far away they are. And there will be some institutions needing less than that, depending on what they have done thus far. So again, the $2.5 million would all be taken up by historical black colleges and universities, and the core heart of institution has been stated as in excess of 400. So again, I would reiterate the point that was made, that we need more than one year of funding at the $250 million level to really tackle this problem in a significant way for the institutions who are involved in this activity.

Could I just make one comment to your comments, Mr. Chairman? I have listened to CNN. I have listened to—I mean, we have a major problem in this country. We are not producing a significant number of well-trained physicians, scientists, Ph.D.s, and the like. And so when you raise the question about research for the National Science Foundation, the question becomes then, who will do the research for the National Science Foundation dollars? Will they be American citizens or will they be people brought in from abroad who will operate the laboratories in our major national universities that you give research dollars to? If the National Science Foundation does not broaden its mission to include how to be effective in producing from out of minority communities, Ph.D.s in physics and biology, and mathematics, and computer sciences, and the like, we are going to have an under-representation that will make our scientific and technical progress dependent upon bringing people from outside the country, and we will fail miserably in providing opportunities for people who live inside this country to participate at the highest level in terms of this activity. So this is not and idle—last night on the CNN program, it said that we cannot protect our country in terms of homeland security and biohazards in an attack because we don't have enough well trained physicians who have good scientific and technical backgrounds and to go into medicine.

Chairman SMITH. I totally agree, but this is your time.

Ms. JOHNSON. I am just listening. I agree with you as well.

Dr. HUMPHRIES. So they need to broaden their mission, and it is not affirmative action. It is national need, security driven.

Chairman SMITH. Ms. Johnson, if you would yield, there are two programs that we have implemented. One is the partnership program that we have authorized $200 million to start an effort of having research grants come in, or applications come in, of how we best can stimulate doing a better job in the K through 12. And then with Tech Talent, encouraging all universities to do a better job in high tech at the university level. And I am sure Director Colwell might comment on that, too. But we will crank your time back to five minutes, Representative Johnson.

Ms. JOHNSON. Thank you very much. I was—let me ask Dr. Fernández, do you have an opinion as to whether—we have a bill that places this program in the Department of Commerce and one for the National Science Foundation. Do you have an opinion of where you think it might work best?

Dr. FERNÁNDEZ. As I indicated earlier, in reviewing the strategic plan, I felt that there was an appropriate place for this program in the National Science Foundation. My institution is part of a consortium in telecommunications that has received funding under the NTIA Act from the Department of Commerce to develop satellite and other telecommunication system. It is called the Hispanic Education Telecommunication System, and we have received funding strictly for infrastructure. I think part of the issue here is that some of these funds and some of these resources really need to be focused also on the development of faculty and on teaching and learning, which is appropriately a responsibility of NSF and not so much the Department of Commerce. I mean, the Department of Commerce doesn't really deal very directly with a lot of institutions of higher learning, or for that matter, K–12.

So if you are talking about community colleges and if you are talking about four-year institutions, including mine, that have some graduate programs, and we hope to develop some of these scientists that, you know, my colleague is talking about, then that is why I felt that NSF was a more appropriate location for this program.

Ms. JOHNSON. So you feel with the institutions where you have been that you have had a fair share, fair opportunity, to participate with the National Science Foundation grant programs?

Dr. FERNÁNDEZ. Some of our faculty have competed and received some funding for that. I have no—I don't have any specific percentages because I haven't looked at that data. We encourage our faculty to apply, and we believe in the peer review process. I think the issue is whether the institutions that are sending these proposals have adequate representation on some of these panels. And often times there is not enough knowledge in these panels about the needs and the circumstances in which these institutions operate.

I have encouraged my faculty to submit their names and resumes, and some of them, indeed, have been invited to be part of panels that end up reviewing applications, but we need to do much more of that because it is an insufficient number.

Ms. JOHNSON. Thank you. Dr. Earvin, would you comment on that?

Dr. EARVIN. I think as the legislation takes place, we will be guided in our response to that question as to which may be the more appropriate agency. There are unique needs at these institutions that we are seeking to address, and some of those needs may more appropriately be addressed in one agency than another. I know, for example, at Commerce, we have worked through the National Oceanic and Atmospheric Administration to deal with capacity building at historically black institutions and minority serving institutions, so there is a capacity within both, I think, agencies to serve the needs, provided that the needs are being served as they are identified under this legislation.

Ms. JOHNSON. Dr. Fennell, do you have a comment?

Dr. FENNELL. Yes. I would offer that I have no aversion to placement in either entity. Notwithstanding, based on the need of the institutions which entity would best be able to facilitate it, I think I would offer a recommendation. And I make specific reference to the fact that sometimes because our HBCUs, in particular, are aged and have a need for building rehabilitation, we would need an agency to be able to provide and support an application process that would allow for brick and mortar and/or building rehabilitation.

Often, because some of our programs are, being a liberal arts institution by makeup and nature, we want to expand the use of technology beyond just the areas of the math, science, and engineering programs to include the liberal arts areas. I think, again, we would also want to look at the idea that wherever the program needs are as specified by the institution be given some full and thorough consideration, so be it a peer review process or advisory body process, we want to take into consideration as to how the need has been identified by the institution to take the priority in terms of funding consideration. And that has been cheered by some. I think the peer review process is essential in that the mission and the history of many of our institutions and those groups that we currently serve, in spite of being in 2003, again, because there are first generations coming, there are adult learners that are coming back to us, we need a process that would be sensitive to and willing to educate those persons in the area of technological developments, not just in the sciences, not just in the area of technology, but again, across disciplines.

Ms. JOHNSON. Thank you. My final question to each of the panelists, have you personally served as a peer on any review panels?

Dr. HUMPHRIES. Yes, I have.

Ms. JOHNSON. And in serving, do you feel that there is good input from——

Dr. HUMPHRIES. Well, certainly, from my experience serving as a panelist in a peer review activity, had ascertained for me all of the concerns that have been expressed here. You can get a fair decision out of the process because you are there and you help explain certain kind of things that people misinterpret as they are reviewing proposals. And therefore, you enhance the opportunity that is a fairer presentation of that proposal and how it is scored happens. And so there is a lot of benefit to having people from a cross section of institutions participate in a peer review process. And when you have only major institution peer reviews dealing with major institutions, they sort of take care of each other. And when you don't have that diversity there, you don't get a clearer picture of the fairness of how that proposal is rated in responding to the issues that are there. So I would recommend that diversity be added, not just racial diversity, but institutional diversity, in terms of looking at the issues of this grant making process that we have in effect. It is highly desirable.

Ms. JOHNSON. Anyone else?

Dr. EARVIN. I share that same perspective. I have served on a number of panels and I can tell you that the deliberations have

been greatly enhanced by having that diversity, and difference, and perspective as we peruse the proposals that are before us.

Dr. FERNÁNDEZ. Years ago, I served on a few panels in the Department of Education to review various programs. I have not been part of any NSF review processes.

Dr. FENNELL. None for NSF. I did some review for NASA proposals. Again, it was a peer established process.

Ms. JOHNSON. Thank you very much, Mr. Chairman.

Chairman SMITH. Just before I call on Representative Forbes, just reacting to Dr. Fennell's comments. I visualize the possibility in this kind of program with these kinds of goals that maybe an MSI that is predominantly a teacher training college might have more long-term results getting some technology equipment into that facility for a better understanding and appreciation of the people that are going to teach more people. The long-term effects might be greater regardless of some researcher or science or math person trying to evaluate that kind of consideration. So in my opinion, this is not just for colleges that are trying to encourage science and math. It is for every person across the population that can go into almost any job, because the understanding, and appreciation, and ability to use technology, regardless of your profession, is going to be very important in our future. So that is my comment. Representative Forbes.

Mr. FORBES. Thank you, Mr. Chairman, and I will be very brief. It would seem to me that just listening to your testimony—and I apologize. I have had to be in and out because we have a markup in another committee, but you have some differences as perhaps where you would like to see the program located among the four of you, but at the same time, there is an agreement for the need for the program and for the need for this kind of funding to overcome some of the digital deficiencies that we have. Is that a fair assessment from—anyone disagree with that comment?

The second question I have is I am always surprised when—I have four children. Three of them, I have attended their colleges when they were doing orientation—at the percentage of students that enter a university or college and change their career path from the time that they enter until when they leave, and the percentages have been staggering. Do you have any idea of what that percentage might be for your respective institutions? Freshmen coming in, what is the average percent that would change their career path or not have it established when they come in and by the time they leave?

Dr. FERNÁNDEZ. I don't know that I can give you a specific percentage, but we do require our students, mostly because of financial aid provisions, that they must declare a major as early as possible. But that doesn't happen until at least sometime in the second year. By the time they reach 60 credits, they must have that, otherwise, they may—we may end up getting in trouble with auditors because of funds.

Significant numbers, a large percentage of students, start in one area and then decide they want to do something else. I mean, I would say half, maybe more than that is typical.

Dr. EARVIN. I would agree that it would be at least half of the students that come to us. Having different notions about careers

and beginning to learn more about those careers once they enter college and what is required for them, students begin to make different kinds of considerations and shift majors. One of the things that we have been concerned about is creating a climate, particularly, for science education, so that students are encouraged to stick it out and stay in those majors. That is critically important. I think that is one of the pipeline issues that we have to address if we are going to address the core issue involved in this legislation.

Mr. FORBES. And that is the essence of my question, really. I have heard some institutions say as high as 70 percent of their students either don't know when they enter as freshmen or change from the time that they were freshmen. And it seems like to me, the two biggest criterion for them in determining where they are going to go is when the interest that they have in a particular subject matter, and also, the job opportunities that are out there for those. And one of the things that I think is important with this bill is it helps to foster both of those by creating job opportunities and also by creating the interest for the students if we do want to encourage people to go into math and sciences. Would you agree with that or feel I am off base on that?

Dr. FENNELL. I think you are on target.

Mr. FORBES. Thank you. Good. Thank you, Mr. Chairman. I don't have any other questions.

Chairman SMITH. Mr. Honda, did you have a question? We have about three minutes?

Mr. HONDA. It won't take that long. Thank you, Mr. Chairman. And I really appreciate our experts here and testifying here. I support the outcome of the study that concludes that, you know, this is a great need out there. My question to you is the focus of the studies have, generally, been around Latinos and African-Americans. My question is, is there room in the bill for inclusion of Asian-Americans? I know that many people who are not from the west coast or have very limited exposure to Asian-American populations, there is a greater assumption, including members of our own communities, that Asians have made it. And it is a false assumption, because when you disaggregate the information, you will find that many of our populations suffer the same kinds of maladies that communities that come from recent immigrants, or who are poverty stricken, or who are just not part of the mainstream as of yet are not part of the studies and they fall out, you know. I am just wondering what your thoughts are relative to APIs [Asian and Pacific Islanders]?

Dr. FERNÁNDEZ. If I may, at my institution we have a small number of Asian students, however, because that is simply the demographics of the borough from which we draw most of our students. However, other units within the City University have large numbers of Asian students, and as a port of entry, New York has a lot of immigrant families, a lot of first generation students coming into our school, and that sounds very similar to the situation you would find in some cities in California. So yes, by all means, these funds would benefit some of these institutions and those students would also profit from that.

Mr. HONDA. Is there—thank you.

Dr. EARVIN. May I respond to that, also?

Mr. HONDA. Sure.

Dr. EARVIN. Representing HBCUs, we have never been closed to anybody who wants opportunity, and if they come to us needing special attention, regardless of their circumstance, we will provide it. So we have a small Asian population at my institution, and many of them come with the same needs that some of the African-American and Hispanic students that we serve, and we treat them all as students and address the needs that they have with the resources that we are able to garner.

Dr. HUMPHRIES. With some reasonable fixed numbers, and for those institutions that are similarly situated as we are by the Asian Pacific Islanders, we wouldn't have any objections to their inclusion in the bill.

Mr. HONDA. Thank you very much. I appreciate that, and as advocates, I think that we have to build that coalition. I guess within the population, if it appears that it is targeting certain populations, but it is not inclusive, or there is no outreach program that says this program is for you, too, I think that that might be something that we can think of in the interim. I appreciate your work and I support it 100 percent in making sure that these kinds of help and, you know, additional kinds of funding that we need in our institutions are extended to all these universities. Thank you very much. Mr. Chairman, thank you.

Chairman SMITH. We have three votes. The Committee will stand in recess for until about 20 minutes after 12:00, and then we will take up our third panel with the Director of the National Science Foundation testifying. My guess is we will finish the vote sometime between 15 minutes after 12 and 20 minutes after 12. And with that, the Committee is in recess.

Mr. HONDA. Mr. Chairman, just a question. When at some point in time in this process are we able to have an amendment to include API in the language, API institutions?

Chairman SMITH. I think it is appropriate to consider amendments and changes in this subcommittee. In two weeks we will be taking this to the full Science Committee for a full markup.

Ms. JACKSON LEE. Mr. Chairman?

Chairman SMITH. Yes?

Ms. JACKSON LEE. I am in markup in Judiciary. Could I get one question into this panel before you adjourn? I think there is about seven minutes on the vote. I am going to have to go back to markup.

Chairman SMITH. Would it be possible to have you, personally—since we only have five minutes until the close of the vote, would it be possible if you personally asked the individual for a minute instead of calling us back. I have, technically, recessed it, but why don't you proceed on the microphone and we will print in the record the response, without objection, when we reconvene?

Ms. JACKSON LEE. Let me just—this is an issue that is very important to me, Dr. Humphries, and I only came to make sure that whatever issues we need to resolve in markup are effectively handled. I am in Judiciary markup at this time and will not be able to come back when this committee reconvenes. So all I want to know is, is this legislation on the right track? Is there something that we can add with respect to amendments to make sure that it

effectively answers the concerns that the historically black colleges have with respect to the digital divide? And also, with respect to the funds being authorized, are we appropriately or sufficiently funding this effort as relates to historically black, and obviously, Hispanic serving, Native American institutions, I assume, are included in this?

And I thank the Chairman for his indulgence. I hope that will be put on the record as well. I thank the Chairman very much for allowing me to ask this question.

Dr. HUMPHRIES. To respond, number one, if we get it funded at $250 million, it is not a one-time funding. It needs to have multi-year funding. The $250 million is a good start. The average size grant should be about $2.5 million, and therefore, that will only cover about 100 institutions. And so there are about 400 institutions involved in this, and so we need to have more money than that. And so $250 million is a good start.

Ms. JACKSON LEE. And as to the reason the bill is for $250 million, a one-time grant, a one-time allotment, or over a period of time?

Dr. HUMPHRIES. I think you would have to—I would be much more comfortable if that were reinforced that this is a multi-year program.

Ms. JACKSON LEE. I got you. I am pulling out for you the issues that I am concerned about. All right. And so I have got that.

Dr. HUMPHRIES. The second thing is that we would like strong language in the bill which assures that the peer review committee will come from the core heart of institutions that is being considered for funding. We want to be judged by a jury of our peers. I mean, it really means what it says, the peers. So we want an honest effort at making sure that the people who look at these proposals come from HBCUs and minority, Hispanics, and minority serving institutions. Okay? We really like the idea of the advisory council, and would want to make sure that there is a good representation by stellar people from our groups on that advisory committee to advise the National Science Foundation or wherever you put this bill with regard to that.

Ms. JACKSON LEE. Let me thank you, gentlemen. I think I am now down to 2½ minutes to be able to get to the Floor to vote. I respect all the witnesses that are here. I won't inquire of all of you. I wanted to clearly get on the record my support for the intent of this legislation, but my desire to make it where it really works for our students, our faculty, and to reemphasize that I believe it is vital that you all are a real part in both the digital divide, homeland security research, and research dealing with issues such as bioterrorism, and of course, medical research. I think that is extremely important, and would like to close simply by saying that I added to the bioterrorism, bioshield legislation, the ability for these types of institutions to collaborate and receive funding for such research. I thank you very much.

[Recess]

Panel III

Chairman SMITH. The Subcommittee will reconvene from recess and proceed back to the work before this subcommittee. And we welcome our third panel and one of the world's greatest leading advocates and administrators for scientific research in the fundamental and basic area, Dr. Rita Colwell. Dr. Colwell, please proceed with your comments.

STATEMENT OF DR. RITA R. COLWELL, DIRECTOR, NATIONAL SCIENCE FOUNDATION

Dr. COLWELL. Mr. Chairman, I really appreciate the opportunity to testify before the Committee on H.R. 2183, the Digital and Wireless Technology Program Act of 2003, and I will add that I do enjoy testifying before your Committee, so I thank you, sir.

Although NSF supports the goal of assisting America's institutions to develop fully the technological infrastructure, and we demonstrate this through a number of ongoing programmatic activities that are aimed at strengthening science and engineering research and education at minority serving institutions, we cannot support H.R. 2183 in its current form. My written testimony, which I would respectfully request be entered into the record, describes——

Chairman SMITH. Certainly, without objection.

Dr. COLWELL. Thank you, sir. It describes in detail some of the issues raised by the bill. And although we fully support the aims of the legislation—and I repeat, we fully support the aims of the legislation—we believe that it may prove a better fit in some ongoing activities in other departments than creating a new effort at NSF. Rather than serving as a resource for providing high bandwidth connections and wireless networks, NSF has a much more appropriate role in finding the most effective way to put technology to work in minority serving institutions.

Mr. Chairman, as you know, one of my goals during my tenure as Director of NSF is to increase representation by underrepresented groups in science, technology, engineering, and mathematics. I believe that we are well on the way to achieving truly vertical and horizontal integration of all those efforts at NSF. But obviously, we can do better. We have been taking a close look over the past two years at improving the participation of minority serving institutions in all of our activities. Although we had anticipated making this announcement as part of our Fiscal Year 2005 budget request in February, let me share with you some of our thinking right now.

The President's Fiscal Year 2004 budget request seeks a significant increase in our funding for the Louis Stokes Alliances for Minority Participation, referred to as the LSAMP program. This program has been singled out as having in place a number of best practices approaches to improving minority science and engineering enrollment and retention. We will also place greater emphasis on the success of the LSAMP efforts in placing students in graduate programs and involving them in other NSF research-related activities. We expect to continue to see healthy growth in the budgets of this very important program. We also look forward to using this model across all of our research and education programs.

It has become clear to me that our efforts at improving the participation of the MSIs, minority serving institutions, in various programs has created a situation where no one person at NSF is responsible for supervising and tracking the individual efforts of our directorates. That is why I am creating a new senior position within my office to oversee our efforts to improve the involvement of underrepresented groups in science, technology, engineering, and mathematics. Now, this position will report directly to me, will be given the authority within NSF to ensure that the individual directorates are held accountable for the various pieces of this effort and will serve as NSF's chief link to the community. I expect to have someone in this position very soon.

In addition, although NSF's efforts at increasing support for minority serving institutions have been successful in the education and human resources programs, we have been lagging behind in this effort in our research and related activities accounts. Therefore, this new position will work with each of the NSF's assistant directors to determine how the MSIs can most effectively participate in our research and related activities, including, but not limited to, activities such as identifying specific opportunities within all directorates that are relevant to MSIs and establishing a plan for increasing the participation of those institutions; providing travel and support funds for professors and students from MSIs to work in summer positions at the NSF supported multi-user facilities; developing a systematic program of travel grounds for professors from MSIs for professional development activities, including supporting MSI faculty attendants at proposal writing workshops; and ensuring greater outreach so that MSIs have the information that they need to be competitive in programs to provide classroom laboratory instrumentation.

The Math and Science Partnership Initiative also serves as an important point of entry for MSIs to the Foundation. We will work with our MSP team to schedule workshops at MSIs to assist them in developing viable partnerships for future competitions.

Mr. Chairman, I see these as first steps in expanding NSF's support for minority serving institutions; they are only first steps. I would like to develop a trusting, mutually advantageous, long-term working relationship between every directorate within the National Science Foundation and the minority serving community, and I believe this new position will do that. I also believe it will put in place the final piece of the puzzle that is needed to ensure complete vertical and horizontal integration of these important programs.

Let me assure you that NSF stands ready to work with the Committee to achieve our common goal of meeting the requirements of our 21st century workforce. Our future economic and national security demands a coherent strategy that will fully utilize all of America's human resource in science and technology.

Mr. Chairman, I appreciate your and your subcommittee's longstanding support of NSF. We are truly grateful. I would be pleased to answer any questions that you may have. Thank you.

[The prepared statement of Dr. Colwell follows:]

PREPARED STATEMENT OF RITA R. COLWELL

Mr. Chairman and Members of the Committee, I appreciate the opportunity to testify before the Committee on H.R. 2183, the Digital Wireless Technology Program Act of 2003. H.R. 2183 would establish a new Office of Digital and Wireless Network Technology at the National Science Foundation to administer a new grant program to "eligible institutions" as defined in the bill, and would provide authorizations of $250 million for each year for the next five fiscal years.

Let me begin by emphasizing that the National Science Foundation is fully committed to assisting America's institutions, including those that serve minorities and women, in developing their technological infrastructure. As I have said before, the U.S. S&T enterprise has failed to cultivate a vast pool of untapped talent among women and minorities. Minorities earn only one-tenth as many S&E doctoral degrees as their white counterparts; and whereas women comprise half of the college-educated workforce, they continue to fill only 10 percent of the country's engineering jobs. The requirements of the Nation's 21st century workforce, and indeed our future economic and national security, call for a coherent strategy that will fully utilize all of America's human resources in science and technology.

The National Science Foundation is leading the way in pursuing such a strategy. I believe that if we work together to strengthen and improve existing efforts that are consistent with the goals underlying this legislation, and to establish new activities that will further these goals, we can make substantial improvements in the educational and research infrastructure of all our colleges and universities, including those that serve populations currently under-represented in science, engineering and technology.

As you know, the National Science Foundation is authorized by the Science and Engineering Equal Opportunities Act

> *to undertake or support a comprehensive science and engineering education program to increase the participation of minorities in science and engineering, and to support activities to initiate research at minority institutions.*

We seek to fulfill this mandate through a comprehensive portfolio of programs that challenge the research and education community to present NSF with ideas, plans, programs, and actions that will result in a demonstrable gain in the number of U.S. citizens from under-represented groups who pursue science, technology, engineering, and math careers at every level—from high school through post-graduate education. Through our merit-review process, we fund the most promising ideas, and we can claim some success in this regard.

Institutions receiving funds through the Louis Stokes Alliances for Minority Participation program (LSAMPs)[1] funded by NSF have produced 174,000 minority Bachelor degrees in science and engineering since 1991. In 2001 alone, the LSAMP institutions produced 21,704 minority S&E graduates—70 percent of all minority S&E baccalaureate graduates that year. Our budget request for FY04 increases funding to the LSAMP program by 23 percent and our Historically Black Colleges and Universities Undergraduate Program by 43 percent. Funding for our Major Research Instrumentation program, which assists in the acquisition or development of major research instrumentation by U.S. institutions and benefits a broad and diverse class of institutions, is increased by 67 percent. In addition, our Workforce for the 21st Century Initiative recognizes the need to increase the number of scientific and technologically literate U.S. citizens in the labor force. One of its principal goals is to broaden participation in science and engineering. In many institutions, including minority-serving institutions, the focus will be on drawing elements from existing NSF programs and challenging collaborators at these institutions to design programs that complement integrated activities at the pre-K–12 and graduate levels to develop an innovative and seamless route of advancement for the students they serve. We are also investing in research to determine the experiences and strategies that are most effective in attracting and retaining students in careers that require fluency in math, science, engineering or technology.

Integrating these proven strategies into any new initiatives is crucial to maintaining momentum and propelling us further along the path toward achieving our agreed-upon objective—to increase the number of graduates, including under-represented minorities, in science, mathematics, engineering, and technology by providing access to leading-edge research and educational-networking technologies to America's institutions of higher education, including minority-serving institutions,

[1] Many of the LSAMP alliances include Minority Serving Institutions. However alliance participants include a broad and diverse group of institutions.

that can demonstrate a plan for using this technology to increase the number of students and graduates, including under-represented minorities, in science.

Although NSF supports the goal of assisting America's institutions to develop their technological infrastructure, as demonstrated through a number of ongoing programmatic activities aimed at strengthening science and engineering research and education at all institutions, including minority-serving institutions, we cannot support H.R. 2183 in its current form. The following describes some of the issues raised by the legislation. We also understand that the Department of Justice is reviewing the legislation for possible Constitutional concerns.

NSF's existing organizational structure, widely recognized for its efficiency and effectiveness, is already adequate to administer programs targeted at ensuring equal access to all institutions, including minority-serving institutions. Adding an Office of Digital and Wireless Network Technology, as proposed in the legislation, would constrain rather than facilitate the integration of research and education programs within the Foundation, and would operate with a mandate that is much more narrow than the broad, integrative approach consistent with our present plans.

Another concern is the inherent tension between the way that the program proposed in H.R. 2183 would be administered and NSF's fundamental operating policies. For example, the proposed program is comparable to our STEP (Tech Talent) Program in that it includes an evaluation component to assess the impact of improving connectivity with the specific outcomes, such as improving the quality of education, increasing the number of students at target institutions who take math, science, engineering, and technology courses, and increasing the number of graduates with majors in these fields. However, the evaluation process does not follow the Foundation's well-regarded merit-review process and award-administration tradition of ensuring that experts in the field are included in the review process.

Similarly, the proposed program would require NSF to fund every single eligible institution that applies, regardless of merit. Although there may very well be value in such an approach with respect to institutions that badly need infrastructure improvement, NSF would not be the right entity to administer it. The legislation is also silent with respect to planning grants. I would encourage you to consider the value of planning grants as an effective and proven way of engaging institutions that have not previously applied for funding or have been unsuccessful. We have found that providing funding to support faculty and administrators to thoroughly consider the long-term costs, commitments, and need to integrate technology throughout their institutions results in proposals for full awards that are much more successful and capable of meeting programmatic goals.

We also note that the President's FY 2004 Budget supports a number of programs in the Departments of Commerce, Education and Agriculture, and elsewhere that already address the goals of H.R. 2183 to provide financial assistance to improve technology instruction and infrastructure at higher-education facilities, including minority-serving institutions.

Furthermore, the authorized spending levels in the bill are simply not realistic. It is NSF's view that the current authorization levels in the bill would set unrealistic expectations within the community that could not be met. It would be nearly impossible to fund anything near the levels currently authorized in the bill.

For example, if this program were fully funded within the FY '04 request it would represent:

- Nearly half (43 percent) of our Computer and Information Science and Engineering account ($584 million in '04);
- More than a quarter (27 percent) of our Education and Human Resources activity ($938 million in '04);
- 22 percent of our requested amount for Tools ($1.112 billion), which is the budget area that provides "broadly accessible, state-of-the-art and shared research and education tools;" or
- 5 percent of our total budget ($5.481 billion).

Mr. Chairman, if this program were appropriated within our existing budget request, we would be obliged to cut drastically some of the very NSF accounts, which I have cited above, that are responsible for tremendous advances in increasing the populations currently under-represented in the Nation's science, engineering and technology fields. Furthermore, we would be forced to cut other areas that this committee cares deeply about, such as our STEP (TechTalent) program, our CyberSecurity efforts, Noyce Scholarships, and possibly the Math and Science Partnership Program.

Rather than serving as a resource for commodity high bandwidth connections and duplicating existing programs, NSF has a much more appropriate role in assessing

the most effective way to integrate emerging technology into research and educational settings in America's institutions, including its minority-serving institutions.

Mr. Chairman, as you know, one of my goals during my tenure as Director of NSF is to seamlessly integrate efforts to increase representation by under-represented groups in science, technology, engineering and mathematics. As my testimony has already indicated, I believe we are well on the way to achieving truly vertical and horizontal integration of these efforts at NSF. But we can do better.

In looking over the range of NSF programs, I am struck by several realities. First, we have in our portfolio a number of programs designed to attract under-represented minorities to the fields of science, technology, engineering and mathematics. We have viewed these as experiments to determine a set of "best practices" that could eventually be adopted—both throughout NSF and in the higher education community.

This is fine as far as it goes. But we need to provide more effective incentives for adopting these best practices—both within NSF and in the educational community at large. One way NSF is addressing the need for greater attention to under-represented groups is by focusing attention on the broader impacts proposed activities in the evaluation of grant proposals. In this regard, we emphasize that, as a matter of policy, NSF returns—without review—*any* proposal for funding that does not separately address broader impacts such as how well a proposed activity broadens the participation of under-represented groups and to what extent it will enhance the infrastructure for research and education in STEM fields.

Second, it is important that we also address diversity needs much more directly. As I have already discussed, demographic reality demands that we work much harder to create a high-tech workforce that truly looks like America. This will require a cadre of professionals, managers and technicians in STEM-related disciplines that are representative of the population.

We have been taking a close look over the past two years at various efforts we could undertake to improve the participation of Minority Serving Institutions across all of our activities. There are several steps we will take, both immediately and across the next five years, to respond to this need. Although we had anticipated making this announcement as part of our FY05 budget request in February, let me share with you some of our thinking now.

There are several steps that will be taken in the near term. As I have mentioned before the President's FY04 budget request seeks a significant increase in funding for the Louis Stokes Alliances for Minority Participation (LSAMP) program. This program has been singled out as having in place a number of "best practices" approaches to improving minority STEM enrollment and retention. We will also place greater emphasis on the success of the LSAMP efforts in placing students into graduate programs and involving them in other NSF research related activities. We look forward to leveraging this success by vertically and horizontally integrating all of our research and education programs, including LSAMP.

That alone, however, is not enough. Mr. Chairman, it has become clear to me that our efforts to integrate programs aimed at increasing the number of students who pursue studies in science, technology, engineering and mathematics at all levels, while successful, have also created a situation where no one person is responsible for supervising and tracking the individual efforts of our directorates. That is why I am creating a new senior position within the Office of the Director to oversee all of our efforts to increase representation by under-represented groups in science, technology, engineering and mathematics. The person in this position will report directly to me, will be given the authority within NSF to ensure that the individual directorates are held accountable for their various pieces of this effort, and will serve as NSF's chief link to the community. I expect to have someone in this position very soon.

In addition, although NSF's efforts at increasing support for Minority Serving Institutions have been successful in our Education and Human Resources programs, we have been lagging behind this effort in our Research and Related Activities accounts. Therefore, the person in this new position will work with each of NSF's Assistant Directors to determine how MSIs can most effectively participate in our Research and Related Activities, including but not limited to activities such as:

- Identifying specific opportunities within all directorates that are relevant to MSIs and establishing a plan for increasing the participation of those institutions;
- Providing travel and support funds for professors and students from MSIs to work in summer positions at NSF-supported multi-user facilities;

- Developing a systematic program of travel grants for professors from MSIs to attend professional meetings, workshops, and other professional development activities;
- Ensuring greater outreach so that MSIs have the information they need to be competitive in programs to provide classroom laboratory instrumentation; and
- Establishing a program of awards to MSIs to support faculty attendance at proposal writing workshops and to provide summer salary awards to enable faculty to write proposals.

The Math and Science Partnership (MSP) initiative should also serve as an important point of entry for MSIs to the National Science Foundation. Many current MSP programs involve school districts serving a significant proportion of minority and disadvantaged K–12 students. I will ask the person in this new position to work with our MSP team to schedule workshops at MSIs to assist them in developing viable partnerships for future Math and Science Partnership competitions.

Mr. Chairman, I see these as first steps in expanding NSF support to MSIs—but only first steps. I want to develop a trusting, mutually advantageous, long-term working relationship between every directorate within NSF and the MSI community, and I believe this new position will do just that. I also believe it will put in place the final piece of the puzzle that is needed to ensure compete vertical and horizontal integration of these important programs.

Let me assure you that NSF stands ready to work with the committee to achieve our common goal of meeting the requirements of our 21st century workforce. Our future economic and national security demands a coherent strategy that will fully utilize all of America's human resources in science and technology.

Mr. Chairman I appreciate your, and your Subcommittee's longstanding support of NSF. I would be pleased to answer any questions that you may have.

BIOGRAPHY FOR RITA R. COLWELL

Dr. Rita R. Colwell became the 11th Director of the National Science Foundation on August 4, 1998. Since taking office, Dr. Colwell has spearheaded the agency's emphases in K–12 science and mathematics education, graduate science and engineering education/training and the increased participation of women and minorities in science and engineering.

Her policy approach has enabled the agency to strengthen its core activities, as well as establish support for major initiatives, including Nanotechnology, Biocomplexity, Information Technology, Social, Behavioral and Economic Sciences and the 21st Century Workforce. In her capacity as NSF Director, she serves as Co-chair of the Committee on Science of the National Science and Technology Council.

Before coming to NSF, Dr. Colwell was President of the University of Maryland Biotechnology Institute, 1991–1998, and she remains Professor of Microbiology and Biotechnology (on leave) at the University Maryland. She was also a member of the National Science Board (NSF's governing body) from 1984 to 1990.

Dr. Colwell has held many advisory positions in the U.S. Government, non-profit science policy organizations, and private foundations, as well as in the international scientific research community. She is a nationally respected scientist and educator, and has authored or co-authored 16 books and more than 600 scientific publications. She produced the award-winning film, *Invisible Seas,* and has served on editorial boards of numerous scientific journals.

She is the recipient of numerous awards, including the Medal of Distinction from Columbia University, the Gold Medal of Charles University, Prague, and the University of California, Los Angeles, and the Alumna Summa Laude Dignata from the University of Washington, Seattle.

Dr. Colwell has also been awarded 26 honorary degrees from institutions of higher education, including her Alma Mater, Purdue University. Dr. Colwell is an honorary member of the microbiological societies of the UK, France, Israel, Bangladesh, and the U.S. and has held several honorary professorships, including the University of Queensland, Australia. A geological site in Antarctica, Colwell Massif, has been named in recognition of her work in the polar regions.

Dr. Colwell has previously served as Chairman of the Board of Governors of the American Academy of Microbiology and also as President of the American Association for the Advancement of Science, the Washington Academy of Sciences, the American Society for Microbiology, the Sigma Xi National Science Honorary Society, and the International Union of Microbiological Societies. Dr. Colwell is a member of the National Academy of Sciences.

Born in Beverly, Massachusetts, Dr. Colwell holds a B.S. in Bacteriology and an M.S. in Genetics, from Purdue University, and a Ph.D. in Oceanography from the University of Washington.

DISCUSSION

Chairman SMITH. Thank you, Dr. Colwell. You speak of the new administrative position that you are instituting at NSF, but as I have expressed some of my concerns to some of the colleges around the country that may have as great a need as a minority serving institution, I guess my interest would be that we don't end up overlooking the need in this area of equipment, and technology, and wiring, if you will, of some of those schools that aren't minority serving institutions. And so I am not sure what the obligation—are you just implementing this position as sort of an affirmative action effort to make sure that we don't overlook the needs of minority serving institutions?

Dr. COLWELL. No, sir. Mr. Chairman, this has been, actually, in the works for some time, because we have learned a couple of years ago as we looked across the Foundation, we found that there were programs for minority serving institutions in each of the directorates, but they weren't connected. They weren't working as a team, if you will. We also felt that the efforts in the education and human resources directorate needed to be linked strongly with the research components of the National Science Foundation. So we have been working toward this direction.

In addition, we have found that we have programs that address, as you well know, K–12 education, and undergraduate institutions, graduate institutions, and even programs for community colleges for continuing students returning to college. But we haven't linked these together. That is, if you have some very bright kids who are in the K–12 programs, we should somehow tag them or encourage them, find a way to make sure that they are aware of and can be introduced to the undergraduate programs like the very successful Louis Stokes Alliance Minority Participation. And that those students who do very well in undergraduate school in the Louis Stokes programs, we should be tracking those students and encouraging them to go into graduate school. So it is an effort that has been underway, and having an individual to ensure connectivity would be very, very effective for the program, for the entire Foundation.

Chairman SMITH. Are you prepared—if not NSF, are you prepared to make a recommendation where this might be administered that might be most appropriate?

Dr. COLWELL. Well, the earlier panel spoke of a technology program in another agency which appears to be much more aligned with what the objectives of this program would be. And I would say that as presently constructed, the program, although extremely important and valuable in intent, and with which we agree, doesn't fit the NSF program structure and culture. It is worthwhile, but it doesn't really fit NSF because the programs we have underway are very effective, and we intend to increase funding for those very successful programs, link them, and do the kinds of activities that NSF does so well.

Chairman SMITH. Relate to some of the members, witnesses on the previous panel suggested that there wasn't the kind of rep-

resentation from small colleges, from MSIs, minority serving institutions, and that lack of representation biased the end results of what grants were approved for what universities.

Dr. COLWELL. We have a difficult problem in that we maintain an electronic database of about 270,000 reviewers, and the potential reviewers are identified from a variety of sources, including applicant suggestions, references attached to proposals, published papers, scientific citation indexes, and similar databases. In addition, when I am traveling to institutions, such as a recent visit, a very wonderful visit, to Tuskegee University, I asked the president and the faculty to send me names and very brief CVs of potential reviewers to be added to the database. And this has been a very important mechanism and the staff do the same.

During fiscal year 2002, about 48,000 reviewers were sent one or more proposals for review; 10,000 reviewers served as panelists; and in all, 54,000 individuals served in a panel, were sent a proposal for mail review or served in both functions, and about 9,000 of these reviewers had never reviewed an NSF proposal before. So we are reaching out. Now, the difficulty we have is that we cannot legally demand or require the reviewers to state whether they are African-American, or Hispanic, or whatever, but they can voluntarily provide that information. And so demographic information was volunteered for only 3,507 of these reviewers; and 1,168, 33 percent of these 3,507 reviewers indicated they are members of an underrepresented group.

Now, the low response rate overall, the many, many reviewers, can be attributed to the inability of NSF to legally require reviewers to provide the demographic information. Because this information is voluntary, we can request it, but we cannot require it. Nevertheless, I think it does give a sample of our—particularly, in recent years, our sincere effort to increase minority participation in panels and as reviewers.

Chairman SMITH. In your evaluation of grants through NSF and the peer review process, there is equipment that certainly has to be considered in who gets what grant. As far as—does the lack of equipment and the mechanics, and machinery, and the plans that maybe some minority serving institutions don't have, is that an obvious discredit or discount in their ability to get grant applications through NSF?

Dr. COLWELL. There is no question that all institutions that do not have the capacity to compete because of lack of instrumentation. We do have the small grants for instrumentation program which is now nearly $100 million, and this is open to all institutions, and the minority serving institutions do compete and are successful.

Chairman SMITH. Is that predominantly based on need, the granting of those grants?

Dr. COLWELL. The need is certainly a component, but as you, yourself, pointed out in comments earlier, sir, we must take into account in the review process the excellence of the idea proposed for the use of the instrumentation, as well as the proposer of the institution being able to accommodate the instrumentation. But need, certainly, is obviously part of it, because if you don't have the instrument, you wouldn't be asking for it. And being able to place

it, to enable as many students as possible to have access to the equipment, of course, is the objective.

Chairman SMITH. How would we go about—I mean, I feel very strong on a results evaluation of whatever we do with taxpayers dollars. How could we discover and find out the needs of some of these universities? I mean, we have had a study on the black serving institutions, and obviously, there is a great need there, but we haven't done such a study, to my knowledge, on other institutions from community colleges, to small state colleges, to private colleges, in terms of their lack of facilities that would accommodate the high tech age that we are approaching.

Dr. COLWELL. You touch on an area where we are deeply interested in making a sincere concerted effort, and that is focusing on the community colleges and the smaller institutions, the four-year colleges, because we have learned that is where the majority, I think about 80 percent of Native Americans, and well over 50 percent of Hispanic, Chicano, African-American students will be found. And obviously, we have got to upgrade the instrumentation, but also, the capability that is to assist in improving the science and math education at these institutions, because they are feeding the future science and technology personnel and workers for the workforce for our country in this 21st century.

Chairman SMITH. What would NSF do to—assuming for a moment that the responsibility for this legislation for helping these particular colleges is not there, what is NSF doing to help in reducing the, if you will, digital divide problem?

Dr. COLWELL. Within the computer science side, the computer and information science and engineering directorate, there are programs that are open to and encouraging for minority serving institutions for infrastructure building, and especially, through the cyber infrastructure program that we are well underway and emphasizing. This is to build connectivity to all institutions, all of the scientific enterprises around the country, that is the colleges and the universities, and especially, those that are not now connected to computing capacity. So that is a program and a major effort for the Foundation, which I think is very, very important and is crucial for connectivity, particularly, for the minority serving institutions.

Chairman SMITH. Expanding on this a little bit, NSF has tried—has programs to encourage greater minority graduates in science and engineering.

Dr. COLWELL. Yes.

Chairman SMITH. Review what that program is for the Committee.

Dr. COLWELL. Well, the Louis Stokes Alliances for Minority Participation is one that we are really very proud of because it has produced 174,000 minority Bachelor's degrees in science and engineering since 1991. And just in 2001 alone, the LSAMP institutions produced 21,704 minority science and engineering graduates, and that was 70 percent of all the minority science and engineering baccalaureate graduates that year, 2001. So our budget request for Fiscal Year 2004 increases the funding for that program by 23 percent, and our Historically Black Colleges and Universities Undergraduate program, another very successful program, by 43 percent.

And so funding for the major research instrumentation program that I just mentioned, which assists in getting the equipment, is going to be increased by 67 percent. So we think these are the programs proven to be effective, they are competitive, and they work. And I think these are the programs we want to enhance.

Chairman SMITH. Thank you. Mr. Forbes.

Mr. FORBES. Thank you, Mr. Chairman. Thank you, Doctor, for appearing here and your testimony. And thank you for your support of the overall goal of what we are trying to accomplish here. One of the questions that I had in reading your written testimony that you submitted for the record is whether or not you are under the impression that the funding for this program would come out of the existing budget for NSF?

Dr. COLWELL. We don't see any evidence of otherwise, and that creates a serious problem.

Mr. FORBES. So your testimony has been based on your belief that the funding for this program would come out of the existing NSF budget?

Dr. COLWELL. Based on the evidence to date, sir, that would be a conclusion that would be warranted.

Mr. FORBES. Okay. If , in fact, the budget, the appropriations were to come on top of the NSF budget, would that change your opinion?

Dr. COLWELL. There is serious difficulties with the program. Frankly, I would rather see a program more attuned to the EPSCoR program for the minority serving institutions. There are some difficulties in that the peer review, as I understand the Chairman's comments, needs to be not just from a single institution, but it needs to be representative of whatever the proposed use and research effort is to be undertaken.

Mr. FORBES. Excuse me. Let me just clarify that. Do you believe additional peer review needs to be in this bill?

Dr. COLWELL. No. I think the NSF peer review works very, very well, extremely well.

Mr. FORBES. And your understanding that we have an advisory board under this bill as opposed to the peer review that you heard testified about?

Dr. COLWELL. Which I do not think is necessary, because we do have a National Science Board which sets policies for the National Science Foundation, and we do have advisory committees for each of the programs. And I would like to point out, actually—I am sorry that Dr. Humphries is not here, but Dr. Humphries and Dr. Badonia, Deputy Director of the NSF, some years ago, before Dr. Badonia was with NSF, he and Dr. Humphries served on the panel that established the Minority Participation Program which has evolved into the Louis Stokes Minority program, and that has proven to be enormously successful.

Mr. FORBES. But let me clarify, you have advisory boards on other programs?

Dr. COLWELL. We have advisory for the director, advisory committees for the directorates and a committee of visitors for the directorates.

Mr. FORBES. And they work well?

Dr. COLWELL. They work well.

Mr. FORBES. You also made the comment in your written testimony that you thought the authorized spending levels in the bill were simply not realistic. Can you tell me what a realistic spending level would be?

Dr. COLWELL. Realistic in the sense of not having any new money.

Mr. FORBES. Okay. Now, I want you to, if you can, tell me what spending levels you think would be appropriate to accomplish these goals that were here. Your statement there was based on the fact that they wouldn't be realistic if they were coming out of your existing budget. Is that right?

Dr. COLWELL. Yes.

Mr. FORBES. But so that wasn't addressed to whether or not the spending levels were appropriate to accomplish the goals of the bill.

Dr. COLWELL. I think that an analysis of the needs of the institutions would be not outside of that which is listed as overall needed, but obviously, the realism of it being appropriated in one fell swoop is unlikely.

Mr. FORBES. Can you tell us what the direct NSF funding to minority serving institutions was over the last decade percentagewise of the budget?

Dr. COLWELL. 3.6 percent of the NSF funds go directly to minority serving institutions.

Mr. FORBES. And do you feel that that was adequate to accomplish the goals that we are talking about here?

Dr. COLWELL. Obviously, I do not, because we are working very hard to improve programs, and also, outreach. That is, we have learned that over the last few years that workshops which we, our staff, hold to assist and advise institutions which have not been successful or have not even applied to NSF before, and therefore, are unaware of the processes involved, that these workshops can be very, very helpful. And so we have had these workshops in states like Alabama and Mississippi, where institutions are located, and at minority serving institutions around the country, to improve their capability of competing.

Mr. FORBES. And Mr. Chairman, if I could just ask one more question? I know my time has expired, but you have written that there were 174,000 degrees that had been given to minorities based on the program that you cited. Can you tell me what the number of those degrees were that came from historically black colleges?

Dr. COLWELL. I will have to get you that precise number.

Mr. FORBES. If you could, and the other question, and you can follow up in writing on this one as well. One of my concerns, also, is we talk about what we are doing in K through 12, but I would like your feeling on how we keep those students involved in math and sciences when they get to historically black colleges if we don't have the technology there to be able to continue to feed that interest and keep them involved in it.

Dr. COLWELL. Technology is critical. There is no question about it. But I think what is more important is to have the connectivity, K–12, with universities. We have established the GK–12 program, and that program has proven to be enormously successful, because it funds graduate students who are pursuing their degrees in science or engineering to spend 20 hours a week not in the under-

graduate classes but actually in the elementary, middle, and high schools, as a source of information, but more importantly, as mentors and role models. And we have found that this is very, very important because it allows these young children to identify with these students who are going on to become engineers and scientists in a way that wouldn't be done just through reading about it in a book.

Mr. FORBES. Thank you, Doctor.

Dr. COLWELL. So these kinds of program are very important.

Mr. FORBES. Thank you, Mr. Chairman.

Chairman SMITH. Mr. Forbes, if you would allow a colloquy between you and I?

Mr. FORBES. Sure.

Chairman SMITH. Where did the $250 million come from, how was that figure derived?

Mr. FORBES. Well, I think that was a figure that came from discussions with the minority serving institutions. And again, as you heard some testimony, it came from averages. I think you could get testimony that would say you would need twice that amount of money. You would also have people that say you could get by with half that amount of money. But we felt that based upon the testimony that we had heard from individuals, that the $250 million allocation was a good start in how we could bridge these gaps that were there. And you heard testimony today that I think was similar to that.

Chairman SMITH. I guess I should—allow me to express some of my concerns. The Federal Government is going to be more and more, if you will, strapped for funds in the future, and I expect that future budgets are going to be very lean as we accommodate our largest deficits in history. We are now 227 years old, and the first 200 years we accumulated $500 billion of debt. Now we are going deeper in debt, $500 billion a year. So if it is true that we are faced with very tight budgets in the future, and NSF and our research effort is going to share in those tight budgets, I would be particularly concerned that an additional responsibility put in NSF would endanger some of our efforts in our partnership effort to promote better K through 12 education in science and math. It could very well jeopardize our Louis Stokes effort that we have in NSF, and certainly, even jeopardize some of our efforts in Tech Talent. So I would be very wary of assigning this additional responsibility to NSF that might endanger some of those existing programs. And currently, it would be my preference that it go into the new administration that we have assigned to Commerce and the Technology Division. Maybe it goes to NIST, but I guess just expressing my personal concerns that we not endanger some of the good programs that we have in NSF, and I think I hear you, Dr. Colwell, saying you agree that that is a potential danger?

Dr. COLWELL. Sir, you have become a very strong advocate, and as a result, you know very well how NSF works. And I do agree with you, sir.

Chairman SMITH. Is there—do you have anything else that you would like to add to the comments of the previous panel?

Dr. COLWELL. No, sir. I think that it has been very valuable to discuss this very important issue, and I would like to assure you

that the programs that we have at NSF we are very proud of and we have no intention of doing anything except strengthening them. Thank you, sir.

Chairman SMITH. Thank you very much for your patience today and for waiting for us to vote. And if there are no other questions, this subcommittee is adjourned.

[Whereupon, at 12:57 p.m., the Subcommittee was adjourned.]

Appendix 1:

Answers to Post-Hearing Questions

ANSWERS TO POST-HEARING QUESTIONS

Responses by Rita R. Colwell, Director, National Science Foundation

Question submitted by Representative J. Randy Forbes

Q1. You have written that there were 174,000 degrees that have been given to minorities based on the program that you cited [Louis Stokes Alliances for Minority Participation]. Can you tell me what number of those degrees were that came from historically black colleges?

A1. The data captured for the Louis Stokes Alliances for Minority Participation (LSAMP) shows in excess of 174,000 baccalaureate graduates since the inception of the program in 1991. In 2001–2002, the most recent reporting period for the program, 5006 degrees were awarded by Historically Black Colleges and Universities (HBCUs) of the 22,057 total degrees awarded in LSAMP. HBCU graduates represents approximately 50 percent of the 9,496 degrees awarded to African American students in LSAMP. During that reporting year 61 HBCUs were in partnerships in the LSAMP Program.

LSAMP STEM Graduates 2001-2002 by Discipline by Race/Ethnicity

	African American	Hispanic	Native American	Pacific Islander	Minority	Total
Agricultural Sciences	357	498	96	19	13	983
Chemistry	456	546	32	12	31	1,077
Computer Science	2,367	1,724	158	129	27	4,405
Engineering	2,474	3,703	309	134	35	6,655
Environmental Science	66	156	35	6	2	265
Geosciences	32	93	13	5	1	144
Life Sciences	3,053	3,461	373	181	14	7,082
Mathematics	562	487	54	15	7	1,125
Physics/Astronomy	129	179	7	5	1	321
Total	**9,496**	**10,847**	**1,077**	**506**	**131**	**22,057**

LSAMP STEM Graduates 2001-2002 by Gender by Race/Ethnicity

Gender	African American	Hispanic	Native American	Pacific Islander	Minority	Total
Male	4,347	5,937	607	280	70	11,241
Female	5,061	4,387	460	223	58	10,169
Unknown	88	543	10	3	3	647
Total	**9,496**	**10,847**	**1,077**	**506**	**131**	**22,057**

Questions submitted by Representative Eddie Bernice Johnson

Q1. After reviewing the summary of Total Awards to HBCUs (FY 2000), I noticed that almost $2.8 billion was given to institutions of higher education (IHE). However, I am somewhat concerned with the column title Awards to HBCU as percent of Total Awards to IHE. It seems that HBCU received just under $36 million, and only 1.29 percent of the total funds given to IHE. Do you find this figure disturbing? How do you intend on increasing funding for HBCU (or MSIs for the matter) to a more representative proportion of the total IHE funding?

A1. NSF agrees that HBCUs and other Minority Serving Institutions (MSIs) have the potential to participate at higher levels within the existing NSF research and education programs. We believe that the potential for increased participation by MSIs in NSF funding hinges on the continued development of research capacity at these institutions.

In support of this effort, we maintain a comprehensive portfolio that includes several significant programs that support research as well as build the research and educational capacity of HBCUs and other MSIs. These programs include:

- The HBCU-Undergraduate Program which has funded 47 awards, a total of $68.9 million since 1998, to improve the quality of undergraduate education in science, technology, engineering, and mathematics (STEM) at HBCUs. NSF has requested a 43 percent increase in the budget for HBCU–UP in FY 2004.
- The Louis Stokes Alliance for Minority Participation (LSAMP) program supports 63 HBCUs in their efforts to increase the numbers of minority STEM baccalaureate graduates. NSF has requested a 23 percent increase in the budget for LSAMP in FY 2004.
- The Centers of Research Excellence in Science and Technology (CREST) program currently provides $8.7 million for state-of-the-art research activities at HBCUs, Hispanic-Serving Institutions (HSIs), and other MSIs.
- The Research Infrastructure for Science and Engineering (RISE) is a relatively new program, which supports the development of research capacity at HBCUs that currently offer doctoral STEM degrees. RISE started with $2.7 in FY 2002 and is now funded with $5 million for FY 2003.

Participation in these and other programs by HBCUs has been significant. For example, since 1998 seventy-one different HBCUs have received research and education funding from NSF. Sixty-six different HBCUs have participated in the *education and human resource* programs at NSF (totaling $252 million since 1998)—an average of 56 awards to HBCUs per year. Fifty-six different HBCUs have also received *research and development* grants from NSF (totaling $92 million since 1998)—an average of 61 awards to HBCUs per year—most of these institutions participate in both research and education programs.

NSF is committed to increasing the participation of HBCUs in all programs within the foundation. We are taking action to leverage our success in these programs by vertically and horizontally integrating all of our research and education programs. For example, building on the portfolio of best practices that has been created in LSAMP, we are developing programmatic linkages to the Alliances for Graduate Education and the Professoriate Program (AGEP) to create a seamless pathway from undergraduate, to graduate, to the professoriate.

Q2. In your view, how should awards be selected under the program established by H.R. 2183? That is, what kinds of criteria should be used and what mechanism should be used to apply the criteria?

A2. Although the proposed program under H.R. 2183 would require funding every single eligible institution that applies, regardless of merit, the National Science Foundation would likely use its well-regarded merit-based peer review procedures to select awards under the program in order to ensure that funds went to high quality projects that were truly ready for implementation. The peer review mechanisms that are in place at the NSF have proven to be valuable tools in the determination of quality and impact of the projects that are funded by NSF. The merit review criteria are: 1) What is the intellectual merit of the proposed activity? and 2) What are the broader impacts of the proposed activity? The Foundation's peer review process and award-administration ensures that diverse experts in the field are included in the review process. Maintaining the quality of the projects under this proposed program would also require the flexibility for NSF to support planning grants. Planning grants have been proven as effective ways to assist institutions to delineate long-term strategies for their own specific institutional development and to improve the quality of proposals.

Q3. Since minority serving institutions vary greatly in their current educational and research capacities and in their financial well-being, how can the program be structured to ensure an equitable allocation of resources among the disparate institutions?

A3. Within our merit review system, the National Science Foundation has several tools in place that can address the continuum of institutional capacity at MSIs. These include planning grants for those that would benefit the most from time and money to plan how best to use the technology funds. In addition, we have a tradition of supporting institutions through targeted technical assistance workshops to help them develop high quality proposals. In this case this technical assistance would include strategies for long term technology planning.

NSF also has extensive experience with programs that serve MSIs that have varying institutional STEM capacity. For example, institutions that are not heavily fo-

cused on research, including community colleges, participate in programs like HBCU–Undergraduate Program and Tribal College-Undergraduate Program, which focus on increasing the numbers of under-represented students participating in STEM and the quality of STEM education. Institutions that are already producing quality STEM research but can contribute even more, participate in Centers of Research Excellence in Science and Technology (CREST) and Research Infrastructure for Science and Engineering (RISE), which help to build the caliber of the research through the establishment of research centers. In addition, we have programs that encourage collaboration between institutions at every level of capacity such as Louis Stokes Alliance for Minority Participation (LSAMP) and the Alliances for Graduate Education and the Professoriate Program (AGEP).

NSF also has plans to create a new senior position within the Office of the Director to oversee all of our efforts to increase representation by under-represented groups in science, technology, engineering and mathematics. The person in this position will also be charged with ensuring *equitable access* to NSF programs by MSIs with varying levels of institutional capacity.

Appendix 2:

Additional Material for the Record

From the issue dated June 27, 2003

Playing Catch-Up

A bill in Congress could give minority institutions new money for computer technology

BY ANDREA L. FOSTER

It's hard for Steve Villanueva, Manager of computer services at Virginia Union University, to fathom that the nearby University of Richmond has 62 people to assist with the development, use, and maintenance of campus technology. Virginia Union, a historically black college with half the enrollment of the University of Richmond, has a computing staff of four.

Mr. Villanueva recently spoke with a technology administrator at Richmond and learned that the institution has not only a help desk for problems with users' machines, but also separate departments to support administrative software, the campus network, and academic technology.

Richmond also has a staff for Web development and a security administrator. The university is a private institution and serves 3,400 students, about 12 percent of whom are members of minority groups.

"I have one person who runs my whole network, maintains the server, and is in charge of desktops," says Mr. Villanueva, who has been working at Virginia Union, a Christian college, for almost four months. The university's information-technology department is made up of Mr. Villanueva, two data-management specialists, and a network engineer.

The technological disparities between Virginia Union and the University of Richmond are representative of a much larger problem. Minority educators have long worried about a technology gap between colleges that serve mostly white students and financially strapped black colleges. Support-staff sizes are only one area of concern. Others include the quality and amount of black colleges' computer equipment and the robustness of their campus networks.

Now federal lawmakers are taking note of the gap and trying to do something about it.

Competition for Grants

On April 30, the U.S. Senate voted 97 to 0 to approve the *Minority Serving Institution Digital and Wireless Technology Opportunity Act of 2003*. The measure would allow colleges that serve primarily black, Hispanic, and American Indian students to share $250 million in technology grants for each of fiscal years 2004 through 2008.

The money, to be made available through the National Science Foundation, could help colleges purchase computer hardware and software, set up new wireless networks, and upgrade existing hard-wired networks. Colleges eligible for the money would compete for grants.

Sen. George Allen, the Virginia Republican who sponsored the bill, said the need for it was underscored in a report on information technology at historically black colleges, issued by the U.S. Department of Commerce in 2000. The report, "Historically Black Colleges and Universities: An Assessment of Networking and Connectivity," was prepared by the National Association for Equal Opportunity in Higher Education (known as NAFEO) and was based on a survey of 80 such colleges.

The report said that most black colleges lagged behind their white counterparts in preparing students for careers in an increasingly technological society.

Among the areas of concern: student access to networking and computing resources, colleges' development of strategic plans for technology, colleges' awareness of network security, and faculty members' use of the Web and instructional software in their courses.

"I am saddened to learn from our research that fewer than 25 percent of our students own their own computing resources," wrote Henry Ponder, the former President of NAFEO, in the report.

"This means that in spite of the best efforts of historically black colleges, students must often wait hours at labs to use computers in order to gain access to the Internet and the World Wide Web," he added.

The Senate bill is now awaiting action in the U.S. House of Representatives, where it was introduced last month by Rep. J. Randy Forbes, a Virginia Republican.

It's no coincidence that Virginia lawmakers have taken an interest in the technological divide that separates white from black colleges. Virginia has five of the 107

historically black colleges in the country: Hampton University, Norfolk State University, St. Paul's College, Virginia State University, and Virginia Union.

The federal money for computer technology in the legislation, however, will not be enough to bring most black colleges up to the level of white colleges.

For example, Virginia Union has a $555,000 information-technology budget this year, about $400,000 of which is federal money from Title III of the Higher Education Act. The University of Richmond has an $8 million technology budget.

Wireless, or Not?

Virginia Union's administrators aren't counting on getting money from the legislation, since a similar bill stalled in Congress last year. However, they say any funds they do get through the legislation would improve the quality of education for students and make the university more competitive.

"I don't know that it will necessarily level the playing field," says Walton D. Meekins, director of information services at the university. "But it will greatly enhance where we are now."

Virginia Union's president, Bernard W. Franklin, has spoken frequently of the need to make his campus technologically advanced. When he was inaugurated in September 2000, he said he envisioned a campus where students could connect to the Internet while sitting under a tree, and where every classroom is a computer lab.

Nearly three years later, that is still just a vision.

In November 2000, Virginia Union was one of the first historically black colleges to set up a wireless network on its campus. The university wanted to be on the cutting edge of technology, says Mr. Meekins. But because only 15 percent of the students own computers, most students rely on about 250 machines in the university's five computing labs to connect to the Internet. That has led some to question the usefulness of the campus-wide wireless network.

At the University of Richmond, seven miles west of Virginia Union, 96 percent of students own computers. Some of Richmond's buildings are connected to a wireless network, but the university is debating whether to make dormitories wireless. Students can use more than 400 Windows and Macintosh machines in computing labs around the campus.

Costly Laptops

More than two years ago Virginia Union considered requiring all students to have their own laptops. For now, that idea has been abandoned. More than 90 percent of the colleges' students receive financial aid, so asking them to spend more than $1,000 each for laptops would be too burdensome, says Mr. Franklin.

"We want to remain fiscally competitive in terms of attracting students," he says.

Virginia Union does provide all 84 full-time faculty members with IBM laptops, however. And when a local computer vendor offered laptops to students at the beginning of the year at a small discount, 80 students took advantage of the program, says Mr. Meekins.

Tuition at the university for the forthcoming academic year is $16,866, including a $310 technology fee.

Unlike Virginia Union, the University of Richmond has no technology fee for students. Technology costs will be included in the $24,940 tuition for the 2003–4 academic year. The university requires only its law students to have laptops.

Despite the technological challenges Virginia Union faces, Mr. Meekins says he is not discouraged. The university is focused on developing "quality students" and "productive members of society," he says.

Mr. Meekins says faculty members and students are especially proud of an instructional tool the university purchased called Videodidact that is available in a computer laboratory in Pickford Hall. It permits students using the machines to see exactly what an instructor is doing on a computer at the front of the room. Virginia Union hopes to expand the technology to other computing labs, says Mr. Meekins.

Even though only a fraction of Virginia Union students own computers, university administrators do not cite equipping students with computers as one of their priorities if the technology bill pending in Congress ends up providing the university with any money.

Instead, the administrators talk about other goals. They want to expand their fiber-optic network, provide training to faculty members and students in the use of technology, have storage space on the network for students' data, build more computing labs, and keep at least one computing lab open 24 hours a day. They also want to purchase course-management software from Blackboard Inc. for organizing online materials.

The University of Richmond, meanwhile, is in the process of upgrading to version 6 of the Blackboard software.

Virginia Union's strategic plan for 2000 through 2005 calls for, among other things, establishing a distance-learning program and creating a teaching-and-learning center for faculty members that would promote technology in the classroom.

One of the college's short-term goals is trying to move the network operating system from the outdated Windows NT 4.0 to Windows 2000. "It's a $30,000 project," says Mr. Villanueva, "We have the software. We need someone to help install it."

Institutions that serve minority groups have a recurring problem with attracting and retaining high-quality technology staff members, says David A. Staudt, director of the Advanced Networking Project With Minority-Serving Institutions. The project works with colleges serving primarily black, Hispanic, and American Indian students to improve Internet connectivity, network technical support, training, and use of the Internet for teaching and research. The program was set up by Educause with a four-year, $6 million grant from the National Science Foundation.

"A lot of these schools are not in prime locations, particularly tribal colleges," says Mr. Staudt. "They're way the heck out there, and it's hard to attract people with the skills needed."

And employees who develop expertise on the job may eventually leave for better paying work, adds Mr. Staudt.

"They get bought off by somebody who will pay them twice as much, or more," he says. "These guys could make as much as some of the presidents of these colleges."

Kathryn J. Monday, vice president for information services at the University of Richmond, and Doug West, the university's director of telecom, media support, and user services, describe the summer on their campus as a busy time for technology improvements. Three-year-old computers are being replaced. And a construction crew is busy installing 10 multimedia classrooms and preparing to install wireless hubs in the new Weinstein social sciences building.

Over the next 18 months, 27 multimedia classrooms will be installed in Gottwald Science Center, adding to the 34 multimedia classrooms already dotting the campus. The library houses six digital-video-production workstations, and a technology center that allows students to produce professional-grade advertising posters.

Virginia Union has no multimedia classrooms.

Richmond's promotional literature says it provides every student with "virus-protection software, space for a personal Web page, and most importantly, space on a file server to store critical documents."

"We also provide access to the latest in hardware, software, and peripherals and assistance in learning how to use this equipment. This ensures that students are always using the most recent technology as they complete their academic assignments," the literature continues.

The university offers a number of other technology amenities, as well. For example, students can check out digital cameras for academic assignments. And Richmond faculty members and students can gain access to the Internet2 consortium's high-speed network through a partnership with Virginia Tech.

At Virginia Union, Mr. Meekins and Mr. Villanueva say they don't know what Internet2 is.

Like Virginia Union, other historically black colleges struggle to keep pace with colleges that serve primarily white students.

About 10 percent of students own computers at Virginia State University at Petersburg, a historically black public institution 27 miles south of Virginia Union. The institution does not have access to Internet2 and is using an outdated administrative-software system. The college has 44 multimedia classrooms, but has had trouble training faculty members in how to use the equipment.

A recent visitor to the campus saw a chemistry professor using a traditional overhead projector and transparency to show students formulas—even though the classroom's multimedia lectern was equipped with a document camera.

M. Hadi Moadab, director of academic technology at Virginia State, says the university's network system is secure. But the same visitor used a machine in one of the computing labs on the campus to connect to the Internet without being prompted for identification. According to network-security experts, requiring all users to have proper identification is a basic tenet of network security.

Virginia State and Virginia Union administrators say they are constantly playing catch up to the latest technological advances that neighboring white institutions can offer.

But it all comes down to dollars, the administrators say.

"When you look at what we're trying to achieve with the funds we have," explains Mr. Meekins, the money is "really not enough."

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108TH CONGRESS
1ST SESSION

H. R. 2183

To establish a digital and wireless network technology program, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

MAY 21, 2003

Mr. FORBES introduced the following bill; which was referred to the Committee on Science, and in addition to the Committee on Education and the Workforce, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

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A BILL

To establish a digital and wireless network technology program, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Minority Serving Institution Digital and Wireless Technology Opportunity Act of 2003".

SEC. 2. ESTABLISHMENT OF OFFICE.

(a) IN GENERAL.—There is established within the National Science Foundation an Office of Minority Serv-

ing Institution Digital and Wireless Technology to carry out the provisions of this Act.

(b) PURPOSE.—The Office shall—

(1) strengthen the ability of eligible institutions to provide capacity for instruction in digital and wireless network technologies by providing grants to, or executing contracts or cooperative agreements with, those institutions to provide such instruction; and

(2) strengthen the national digital and wireless infrastructure by increasing national investment in telecommunications and technology infrastructure at eligible institutions.

SEC. 3. ACTIVITIES SUPPORTED.

An eligible institution shall use a grant, contract, or cooperative agreement awarded under this Act—

(1) to acquire the equipment, instrumentation, networking capability, hardware and software, digital network technology, wireless technology, and infrastructure;

(2) to develop and provide educational services, including faculty development, related to science, mathematics, engineering, or technology;

(3) to provide teacher education, library and media specialist training, and preschool and teacher

1 aid certification to individuals who seek to acquire or
2 enhance technology skills in order to use technology
3 in the classroom or instructional process;
4 (4) to implement joint projects and consortia to
5 provide education regarding technology in the class-
6 room with a State or State education agency, local
7 education agency, community-based organization,
8 national non-profit organization, or business, includ-
9 ing minority businesses;
10 (5) to provide professional development in
11 science, mathematics, engineering, or technology to
12 administrators and faculty of eligible institutions
13 with institutional responsibility for technology edu-
14 cation;
15 (6) to provide capacity-building technical assist-
16 ance to eligible institutions through remote technical
17 support, technical assistance workshops, distance
18 learning, new technologies, and other technological
19 applications;
20 (7) to foster the use of information communica-
21 tions technology to increase scientific, mathematical,
22 engineering, and technology instruction and re-
23 search; and

1 (8) to develop proposals to be submitted under
2 this Act and to develop strategic plans for informa-
3 tion technology investments.

4 **SEC. 4. APPLICATION AND REVIEW PROCEDURE.**

5 (a) IN GENERAL.—To be eligible to receive a grant,
6 contract, or cooperative agreement under this Act, an eli-
7 gible institution shall submit an application to the Direc-
8 tor at such time, in such manner, and accompanied by
9 such information as the Director may reasonably require.
10 The Director, in consultation with the advisory council es-
11 tablished under subsection (b), shall establish a procedure
12 by which to accept and review such applications and pub-
13 lish an announcement of such procedure, including a state-
14 ment regarding the availability of funds, in the Federal
15 Register.

16 (b) ADVISORY COUNCIL.—The Director shall estab-
17 lish an advisory council to advise the Director on the best
18 approaches for involving eligible institutions in the activi-
19 ties described in section 3, and for reviewing and evalu-
20 ating proposals submitted to the program. In selecting the
21 members of the advisory council, the Director may consult
22 with representatives of appropriate organizations, includ-
23 ing representatives of eligible institutions, to ensure that
24 the membership of the advisory council reflects participa-
25 tion by technology and telecommunications institutions,

1 minority businesses, eligible institution communities, Fed-
2 eral agency personnel, and other individuals who are
3 knowledgeable about eligible institutions and technology
4 issues. Any panel assembled to review a proposal sub-
5 mitted to the program shall include members from minor-
6 ity serving institutions. Program review criteria shall in-
7 clude consideration of—
8 (1) demonstrated need for assistance under this
9 Act; and
10 (2) diversity among the types of institutions re-
11 ceiving assistance under this Act.
12 (c) DATA COLLECTION.—An eligible institution that
13 receives a grant, contract, or cooperative agreement under
14 this Act shall provide the Office with any relevant institu-
15 tional statistical or demographic data requested by the Of-
16 fice.
17 (d) INFORMATION DISSEMINATION.—The Director
18 shall convene an annual meeting of eligible institutions re-
19 ceiving grants, contracts, or cooperative agreements under
20 this Act for the purposes of—
21 (1) fostering collaboration and capacity-building
22 activities among eligible institutions; and
23 (2) disseminating information and ideas gen-
24 erated by such meetings.

SEC. 5. MATCHING REQUIREMENT.

The Director may not award a grant, contract, or cooperative agreement to an eligible institution under this Act unless such institution agrees that, with respect to the costs to be incurred by the institution in carrying out the program for which the grant, contract, or cooperative agreement was awarded, such institution will make available (directly or through donations from public or private entities) non-Federal contributions in an amount equal to ¼ of the amount of the grant, contract, or cooperative agreement awarded by the Director, or $500,000, whichever is the lesser amount. The Director shall waive the matching requirement for any institution or consortium with no endowment, or an endowment that has a current dollar value lower than $50,000,000.

SEC. 6. LIMITATIONS.

(a) IN GENERAL.—An eligible institution that receives a grant, contract, or cooperative agreement under this Act that exceeds $2,500,000, shall not be eligible to receive another grant, contract, or cooperative agreement under this Act until every other eligible institution that has applied for a grant, contract, or cooperative agreement under this Act has received such a grant, contract, or cooperative.

(b) AWARDS ADMINISTERED BY ELIGIBLE INSTITUTION.—Each grant, contract, or cooperative agreement

1 awarded under this Act shall be made to, and adminis-
2 tered by, an eligible institution, even when it is awarded
3 for the implementation of a consortium or joint project.

4 **SEC. 7. ANNUAL REPORT AND EVALUATION.**

5 (a) ANNUAL REPORT REQUIRED FROM RECIPI-
6 ENTS.—Each institution that receives a grant, contract,
7 or cooperative agreement under this Act shall provide an
8 annual report to the Director on its use of the grant, con-
9 tract, or cooperative agreement.

10 (b) EVALUATION BY DIRECTOR.—The Director, in
11 consultation with the Secretary of Education, shall—

12 (1) review the reports provided under sub-
13 section (a) each year; and

14 (2) evaluate the program authorized by section
15 3 on the basis of those reports every 2 years.

16 (c) CONTENTS OF EVALUATION.—The Director, in
17 the evaluation, shall describe the activities undertaken by
18 those institutions and shall assess the short-range and
19 long-range impact of activities carried out under the
20 grant, contract, or cooperative agreement on the students,
21 faculty, and staff of the institutions.

22 (d) REPORT TO CONGRESS.—The Director shall sub-
23 mit a report to the Congress based on the evaluation. In
24 the report, the Director shall include such recommenda-
25 tions, including recommendations concerning the con-

1 tinuing need for Federal support of the program, as may
2 be appropriate.

3 **SEC. 8. DEFINITIONS.**

4 In this Act:

5 (1) ELIGIBLE INSTITUTION.—The term ''eligi-
6 ble institution'' means an institution that is—

7 (A) a historically Black college or univer-
8 sity that is a part B institution, as defined in
9 section 322(2) of the Higher Education Act of
10 1965 (20 U.S.C. 1061(2)), an institution de-
11 scribed in section 326(e)(1)(A), (B), or (C) of
12 that Act (20 U.S.C. 1063b(e)(1)(A), (B), or
13 (C)), or a consortium of institutions described
14 in this subparagraph;

15 (B) a Hispanic-serving institution, as de-
16 fined in section 502(a)(5) of the Higher Edu-
17 cation Act of 1965 (20 U.S.C. 1101a(a)(5));

18 (C) a tribally controlled college or univer-
19 sity, as defined in section 316(b)(3) of the
20 Higher Education Act of 1965 (20 U.S.C.
21 1059e(b)(3));

22 (D) an Alaska Native-serving institution
23 under section 317(b) of the Higher Education
24 Act of 1965 (20 U.S.C. 1059d(b));

(E) a Native Hawaiian-serving institution under section 317(b) of the Higher Education Act of 1965 (20 U.S.C. 1059d(b)); or

(F) an institution determined by the Director, in consultation with the Secretary of Education, to have enrolled a substantial number of minority, low-income students during the previous academic year who received assistance under subpart I of part A of title IV of the Higher Education Act of 1965 (20 U.S.C. 1070a et seq.) for that year.

(2) DIRECTOR.—The term "Director" means the Director of the National Science Foundation.

(3) MINORITY BUSINESS.—The term "minority business" includes HUBZone small business concerns (as defined in section 3(p) of the Small Business Act (15 U.S.C. 632(p)).

SEC. 9. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to the Director of the National Science Foundation $250,000,000 for each of the fiscal years 2004 through 2008 to carry out this Act.

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