

Executive Summary of November 2008 SURA IT Program Update

General SURA IT Activities

- SURA IT Steering Group – The SURA IT Steering Group has completed an IT strategic planning effort that focuses on improving the ability of researchers in the SURA region to access and use cyberinfrastructure (CI) services, create a CI outreach program for underserved institutions and investigate ways to improve disaster recovery/business continuity services for SURA's members. A summary is included in BoT briefing books.

SouthEast Regional Optical Network (SERON) Committee

- SERON continues to provide a valuable venue for SURA members engaged in the building and operation of Regional Optical Networks (RONs) and meets regularly by teleconference and in person at Internet2 meetings.

SURAggrid Activities

- The SURAggrid Governance Committee (SGC) has completed a strategic planning document for the SURAggrid program, a summary is included in the BoT briefing materials for this meeting. The SGC is now in the process of implementing new efforts focused on reaching the milestones identified in the SURAggrid strategic plan. A copy of the full SGC strategic plan is available at: <http://sura.org/programs/docs/SURAggridSPlan.pdf>
- Hampton University, Norfolk State University, Rochester Institute of Technology, and University of Georgia have joined the SURAggrid community since the Spring BoT meeting.
- Status of SURAggrid: 35 participating institutions with nearly half contributing computational resources resulting in a pool of 17.9 TeraFlops supporting a variety of applications from participating institutions.
- SURA staff members continue to produce a monthly SURAggrid newsletter. SURAggrid Updates are archived on the SURAggrid website at: http://sura.org/programs/sura_grid_communications.html
- A SURAggrid All-Hands meeting was held in the SURA DC office on October 1st – 3rd.
- The SURAggrid community continues to develop improvements to the SURAggrid infrastructure with current activities including implementation of SURAggrid accounting capabilities and the continued development of access management capabilities for SURAggrid including a SURAggrid Certificate Authority.
- SURA brokered the purchase of a large quantity of used IBM HPC systems for several SURAggrid members resulting in a direct savings of \$4.2M and a significant future increase in the SURAggrid resource pool.

SURAggrid and SCOOP Activities

- SURAggrid continues to provide an HPC environment in support of SCOOP and now supports several coastal ocean model applications capable of running on multiple SURAggrid HPC resources.

Externally Funded Activities

- SURAggrid currently has one funded activity sponsored by Microsoft. We are expecting additional continuing funding (\$50,000) to extend this work into the next calendar year.
- There are currently two NSF proposals that are in review to the STCI and REU Site programs.
- SURA is a training and outreach partner with a national consortium developing a submission to the NSF TeraGrid XD proposal (NSF 08-571). Preliminary proposal is due on November 4 with a full proposal due on June 15, 2009.
- SURA IT has approached the Mellon Foundation seeking funding for CI outreach activities to Historically Black Colleges and Universities (HBCUs), leveraging the SURAggrid program.

SURA Network Infrastructure Activities

- Atlantic Wave Project – fully operational and an important component of the “Ring of the Americas”.
- AT&T Dark Fiber Program Close-Out: The SURA-AT&T GridFiber Collaboration Agreement ended on September 30, 2008. The program resulted in the execution of no cost 20 year Indefeasible Right of Use (IRU) agreements for a total of 3,697 miles (valued at \$1.85M). This included deployment of AT&T dark fiber in Louisiana, Texas, Missouri, Oregon and a connection between Chicago and Seattle serving the northern tier of the US, with advanced network services that would not have been possible otherwise.

IT Program Update for SURA BoT Meeting, Nov. 6-7, 2008

This SURA IT Program Update is part of a package of materials prepared for the Fall 2008 SURA Board of Trustees meeting. These materials include: SURA IT Committee Meeting Agenda, this SURA IT Program Update and Executive Summary, a summary of the IT Committee strategic planning activities, a SURA region statistical profile and a summary of the SURAgrid strategic planning activities.

IT Committee Steering Group Activities

SURA IT Steering Group (ITSG) Composition

The SURA IT Committee utilizes a Steering Committee comprised of 6 representatives from the full SURA IT Committee and a Chair. The Chair and three of the members must be SURA Trustees. The remaining three members of the IT Steering Group are elected by the full IT Committee. The current composition of the SURA IT Steering Group is as follows:

- David Lambert, Georgetown University, Chair (Trustee)
- J.L. Albert, Georgia State University (Trustee) – term expires Fall 2008
- John Mullin, Georgia Institute of Technology (Trustee)
- Richard Newman, Florida Institute of Technology (Trustee)
- Brian Voss, Louisiana State University – term expires Fall 2008
- Non-trustee seat – open
- Non-trustee seat - open
- Don Riley, University of Maryland, SURA President's Designee

Through a nomination and election process the full SURA IT Committee will recommend a slate of individuals to fill open and expiring seats on the ITSG. At the Fall SURA BoT meeting the SURA Board of Directors will be presented with a recommendation for filling the currently open seats on the ITSG.

SURA IT Committee Strategic Planning Activities

On March 19, 2008 the SURA IT Committee Steering Group began a planning process to update the strategic vision for SURA's Information Technology program. This process was conducted through a series of telephone conference calls and meetings that were scheduled over the course of the Spring and Summer of 2008 and culminated in a meeting at the Atlanta Airport on August 28 – 29, 2008. The goal of this process was to produce an updated strategic vision for the SURA IT Program to be shared with the SURA Board of Trustees at their Fall 2008 meeting. While the goal of this strategic planning process was to identify a compelling long term vision for a major new SURA IT initiative, the results were more aligned with a shorter term, incremental plan to build on existing SURA IT initiatives. Three main themes were identified through this process:

- SURA IT should focus on improving the ability of researchers in the SURA region to access and use local, regional and national CI services.
 - This objective maps well onto the current efforts of the SURAgrid program to identify and provide targeted assistance to researchers with CI needs that surpass those available on their campuses.
- SURA IT should develop a program targeted at lowering the barriers to the use of local, regional and national CI services by underserved communities (MSIs, HBCUs, EPSCoR).
 - This objective also maps well onto the current efforts of SURAgrid to developed funded outreach and training capabilities targeted at assisting underserved institutions in the SURA region with access to CI services.
- SURA IT should investigate ways to leverage state and regional political priorities and engage with corporate partners to improve the use of CI services in support of research, emergency response and disaster recovery.
 - This objective maps onto the goals of the SERON (SouthEast Regional Optical Networks) group.

A more complete summary of the IT Committee's recent strategic planning activities is included as a separate report as part of the SURA BoT meeting briefing materials.

Great Lakes Consortium for Petascale Computation (GLCPC)

SURA is part of a small group engaged in the formation of the Great Lakes Consortium for Petascale Computation (GLCPC). This group is comprised of the 28 organizations that participated in the NSF proposal that resulted in the award of the NSF OCI Track 1 award to the National Center for Supercomputer Applications (NCSA) to build a sustained petascale computing environment. The GLCPC is focused on identifying research applications and collaborations that can take advantage of the petascale system (BlueWaters) being deployed by NCSA. SURA's participation in the GLCPC will allow SURA members to participate in workshops and proposal development activities targeted at identifying and enabling researchers interested in scaling their research to a petascale computing environment.

SouthEast Regional Optical Networking (SERON) Group Update

The SERON group is currently chaired by Phil Halstead (CEO Florida LambdaRail) and is comprised of individuals from SURA member schools that are involved in developing state-based and regional optical network services in support of research and education. This group meets every two weeks by conference call and has met in person at the last two Internet2 meetings. These in-person meetings of SERON participants take place at Birds-of-a-Feather (BoF) meetings at I2 members meetings, the last of which was held on Monday, October 13. These SERON BoFs are always well attended and result in lively discussion of topics important to those involved in the development of Regional Optical Networks (RONs). Phil Halstead has focused the group on the following topics:

- **SURA RON Collaboration** – work together to optimize our RONs for the southeastern region and the nation, i.e., develop a shared big picture vision.
- **External Affairs** – Collaborate on having a SERON presence / image / identity with groups such as Southern Governors Association and Southern Growth Policies Board.
- **RONs As “Innovation Backbones”** – Discuss the concept of going beyond research and education networks to include health care, government and Department of Defense.
- **New Economy Strategies** – Collaborate on a regional new economy strategy that uses our linked RONs as the backbone to bring key players together for innovation.
- **Best Practices** – Share best practices and readings such as Storage Magazine's recent article on Clemson's CI strategy to elevate Clemson to a top 20 university and ECAR's “Developing and Extending a Cyber Infrastructure Model.”
- **FCC Rural TeleHealth** – Work together to connect with major federal funding agencies such as NIH, HHS, VA, CDC and others.
- **Internet2-NLR-RONs Cooperation** – Continue to participate in efforts to promote member-driven alignment of I2, NLR and RONs.

SURAggrid Activities

SURAggrid Governance Committee Strategic Planning

On August 19, 2008 the SURAggrid Governance Committee (SGC), which is comprised of individuals elected by the SURAggrid membership, completed a multi-year strategic planning effort. The SURAggrid Governance Committee (SGC) has completed this multi-year strategic plan to provide overall guidance for SURAggrid's continued growth.

The vision and mission for SURAggrid that has evolved from this process represents a maturing of the SURAggrid program and suggests leveraging the SURAggrid infrastructure that has been built over the past several years to create a new focus on community development and researcher engagement.

SURAggrid Vision

Advance cyberinfrastructure enabled research and education driven by collaborative engagement across the SURA region.

SURAggrid Mission

Create and sustain a leadership virtual organization that facilitates collaborative development and use of cyberinfrastructure services in support of the research and education missions of our membership.

The SGC identified the following **five goals** through this strategic planning process:

- 1) Develop a research outreach program to identify new users and new uses for the evolving regional and national computational and collaborative cyberinfrastructure available to the SURA region.
- 2) Plan, manage and support the SURAggrid infrastructure to provide a solid foundation for the evolution of SURA region research and education programs.
- 3) Develop a communications strategy for SURAggrid.
- 4) Develop a sustainability model for SURAggrid.
- 5) Strengthen existing and develop new corporate and organizational partnerships focused on improving regional use of CI services.

A more detailed excerpt of the SURAggrid Governance Committee's SURAggrid strategic plan document (including detailed milestones for each of the stated goals) is included as a separate report as part of the SURA BoT briefing materials. The full SURAggrid Governance Committee strategic plan document is available on the SURA website at: <http://sura.org/programs/docs/SURAggridSPlan.pdf>.

SURAggrid Membership Update

Four institutions joined SURAggrid since the Spring SURA Board of Trustees meeting:

- Norfolk State University and University of Georgia joined SURAggrid as contributing members. Norfolk State University is taking a leadership role in Microsoft Pilot Project by providing hardware, staff resources, and identifying research applications that can benefit from the test bed environment created for this project. The University of Georgia is adding one IBM p630 head node and six IBM p655 (8-way) compute nodes to SURAggrid.
- Hampton University and Rochester Institute of Technology joined SURAggrid as participating members.

SURAggrid members are now required to renew their membership on an annual basis by completing the SURAggrid membership renewal application form, which provides updated contact and voting lead information, reports on the members' previous years SURAggrid activities, and plans for the upcoming year. As a result of the renewal process two inactive participating members were removed by the SURAggrid Governance Committee. The addition of new members and the removal of the inactive members brings the SURAggrid membership to 35.

SURAggrid Resource Pool Update

As of October 2008, resources available through SURAggrid include 2,347 CPUs for a total computational capacity of 17.9 teraflops, with 4.4 terabytes of memory and 43 terabytes of storage.

Several SURAggrid systems were added or upgraded during the past six months. Georgia State added a second system, a 320 processor, 3 teraflop IBM blade center, that was acquired under the SURA-IBM Partnership program. Texas A&M upgraded their Calclab Optiplex cluster from 306 to 582 processors.

Several systems are in the process of being added to the SURAggrid resource pool. The University of Miami purchased a 128 processor IBM Power p575, also through the SURA-IBM partnership program. George Mason University has acquired a 224 processor Dell PowerEdge 1950 Computing Cluster. The University of Georgia is also adding a 48 processor IBM Power p655 system. These three new resources will add approximately 3.3 teraflops of capacity to the existing SURAggrid resource pool.

SURAggrid Applications Update

Currently, twelve applications are running or have run successfully on SURAggrid. SCOOP models, ADCIRC and Wave Watch 3, ran during the 2008 hurricane season and were ported to additional SURAggrid resources. A University of Delaware researcher running the CAM3 climate model was able to accelerate her research through

the use of SURAGrid and presented the research results at the 2008 Association of American Geographers Annual Meeting in Boston. Virginia Commonwealth University's Virtual Parasite Project, running on the SURAGrid IBM p5s at Georgia State University, expanded to resources recently deployed in the SURAGrid Microsoft Distributed HPC test bed. Access to SURAGrid is allowing VCU researchers to significantly increase the number of parasites being modeled. ODU *Options Pricing*, SURAGrid's first financial application, ran during this past fall on the SURAGrid IBM p5 at GSU.

Two applications are in the process of being ported to SURAGrid: Hampton University's *Tokamak Divertor Maps* and NCAT's *ab initio Structure Prediction*. Two new application descriptions were recently submitted: UAB-R, a biostatistics tool, and Florida International University Weather Research and Forecasting (FIU-WRF). Coordination to match the new applications to SURAGrid resources is underway.

The *SURAGrid Teaching Environment* has a pilot activity in progress working with the UFL Grid Appliance as an approach to using SURAGrid to support hands-on student assignments for distributed computing courses without impacting the active research applications supported by SURAGrid. University of Arkansas and University of Florida are collaborating on the pilot. To date, University of Florida provided initial tutorial material on the Grid Appliance and graduate students at the University of Arkansas developed a Grid Appliance lab manual for a High Performance Computing class.

SURAGrid Communications and Outreach

The SURAGrid Update newsletter is being produced monthly as a complement to monthly SURAGrid full group conference calls. Past SURAGrid Newsletters can be found at:

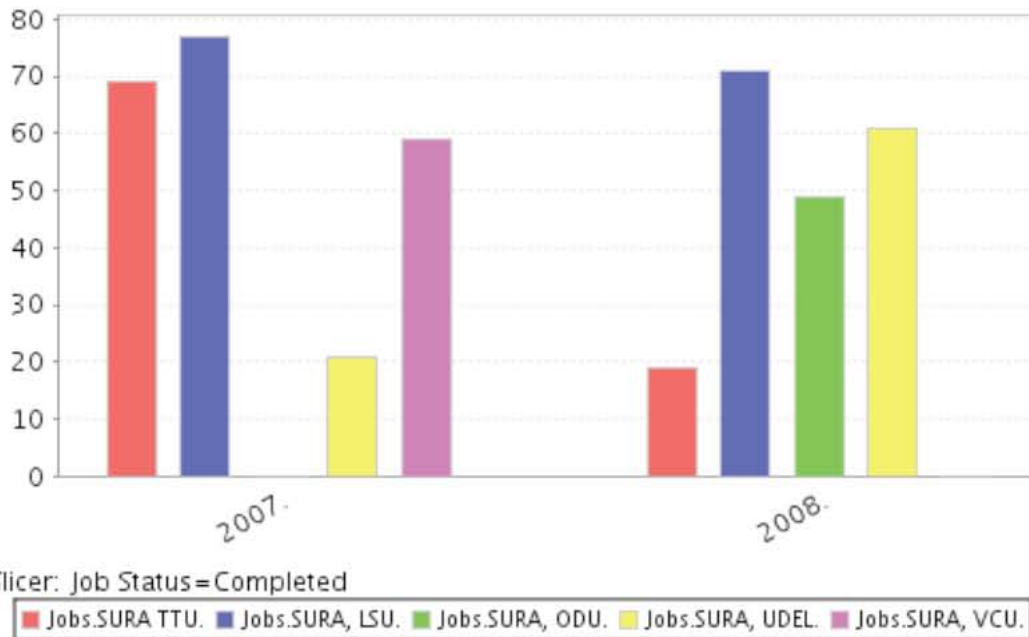
http://sura.org/programs/sura_grid_communications.html. The fall SURAGrid All Hands meeting was held on Oct 1 - 3 in SURAGrid's DC offices. Using the SURAGrid Strategic Plan as a framework, the meeting focused on developing working groups, identifying leads, and aligning many of the current activities and tasks to the goals and milestones identified in the plan.

SURAGrid outreach activities conducted included a tutorial session, entitled "Regional Grid Support for Biomedical Research Applications" at the HealthGrid 2008 conference in Chicago; poster presentations at TeraGrid 2008 and the Internet 2 Fall members meeting; an Access Management paper presentation at the Association of Computer/Information Sciences and Engineering Departments at Minority Institutions (ADMI), Symposium on Computing at Minority Institutions; and presentations at Clemson University and UAB CI-Days. Upcoming outreach activities include SURAGrid On-Ramp presentations in Clemson University, LSU/CCT, RENCI, TACC, and TeraGrid Education booths at SC08. Other SC08 SURAGrid activities include a SURAGrid demo in the Microsoft exhibit hall booth and hosting of a BOF entitled "Traditional & Distributed HPC - What has changed? What remains the same?". SURAGrid slides and visualizations will also be part of slide show in the IBM booth.

SURAGrid Accounting Capabilities

The SURAGrid accounting group is working toward a web-based usage reporting system for SURAGrid resources. The first phase of this effort is leveraging the existing online usage reporting system developed by Georgia State University, (<http://pyxis.gsu.edu:8095/mondrian/testpage.jsp?query=fourhier>) which also allows system administrators at other SURAGrid sites to upload SURAGrid usage data (in predefined SURAGrid usage record scheme). Currently, Louisiana State University and Old Dominion University have generated necessary scripts to extract/convert basic information from IBM load leveler /PBS respectively. A sample usage report from the GSU IBMp5 system is below:

Slicer: [Job Status=Completed]



Expanded SURAGrid Access management

The University of Virginia has added a SURAGrid Certificate Authority (CA) to the access management services being provided to SURAGrid. This CA can provide user and host authentication for SURAGrid “application only” participants, SURAGrid sites that do not have ready access to a CA that can be cross-certified with the SURAGrid Bridge CA, and as an option for guest access. The initial SURAGrid CA is being operated at the relatively low Level of Assurance (LoA) that is the present SURAGrid specification but will serve as a foundation for eventual operation at higher LoAs.

In addition to the SURAGrid CA, UVA expanded the types of authentication that are acceptable for User Site Administrators to create and maintain accounts for access to SURAGrid. Supported access methods include strong authentication using iKey™, InCommon federation ID (<http://www.incommonfederation.org/>), and username/password (until all sites have been transitioned to a stronger authentication method). Access to these newest services is available via a Web interface at <https://www.pki.virginia.edu/sura-bridge/ikey/>. SURAGrid user documentation is in the process of being updated to incorporate these changes.

SURA IT and UVA leads for SURAGrid access management are also in the process of identifying SURAGrid access management milestones for the coming year and are completing initial versions of necessary policy documents (PKI Certificate Policy & Practices Statements).

SURAGrid Coordination with the SCOOP Program

In working with SCOOP for the 2008 hurricane season, SURA IT has facilitated successful implementation of ADCIRC, WW3, and CH3D on multiple SURAGrid machines and multiple cluster platforms. In the previous hurricane season, SCOOP had requested support from SURAGrid for all three SCOOP user scenarios (24x7, event driven, and retrospective). This involved experimenting with various scheduler features and queue configurations in a computational grid environment, using unique features of SURAGrid (SURAGrid bridge certificate authority and SURAGrid user account) to ease implementation and prioritization of the various SCOOP applications. The development focus for the 2008 hurricane season shifted toward completion of a modular SCOOP Application Manager that would provide a coordinated access to SURAGrid using a common workflow architecture. This approach was intended to harden the existing capabilities so that they could continue to be showcased as part of a fundraising initiative that would more closely align Coastal Research and IT in their efforts to support each other.

Progress in this updated direction is currently pending completion of the SCOOP Application Manager (SAM), and SURA IT additions to the SCOOP computational resource pool are toward that task. Current SURA IT focus is on the final stages of completing the "SCOOP Deployment on SURAGrid" document, which provides instructions regarding the installation and testing of SCOOP numerical models on SURAGrid systems. This will provide SCOOP with ongoing and more scalable access to increased and different resources beyond those available from SCOOP partners after their current funding ends.

SCOOP collaboration with SURA IT that can be supported under current SCOOP funding is estimated to end by the end of this calendar year. The contract for IT consultant, Mary Trauner, who has been leading SCOOP deployment for SURA IT, will also be ending during this time. Until additional resources can be found, the following changes in SCOOP-SURA IT interaction are anticipated:

- The deployment of SCOOP applications to SURAGrid will shift to being supported through the same resources and processes as other SURAGrid applications.
- Project-specific SURA IT interaction with SCOOP will be coordinated with the SURA Coastal Research program and focus on co-seeking of external funding, or collaborative activities that can increase funding opportunities.
- Representative(s) from the SURA Coastal Research Program will be encouraged to be proactive in tracking and engaging with SURAGrid with the goal of helping to identify areas where collaboration would be mutually beneficial.

SURAGrid Corporate Partnership Update

The relationship with IBM remains active. With IBM's assistance, SURA arranged for the donation of a used IBM p655 HPC system from the Princeton Institute for Advanced Studies to the University of Georgia. UGA took delivery of the donated system in late May and has added this hardware to their existing IBM p655 system. UGA has since joined SURAGrid as a contributing member adding the donated IBM p655 system to the SURAGrid resource pool.

SURA has also been able to broker the purchase of a significant quantity of used IBM p575+ HPC nodes and systems to augment systems that were purchased by LSU, GSU, TAMU and the University of Miami over the past two years through the SURA – IBM Partnership Program. On Friday, October 17 SURA placed an order for 86 used IBM p575+ nodes (some with racks and high speed interconnect switches). These IBM HPC nodes were purchased by our members through SURA at a 92% discount off the current educational discount price, resulting in a direct savings to our members of over \$4M. These systems will be added to existing IBM systems at these members' sites adding approximately 10 TF of capacity (nearly double the existing capacity) to these existing systems, which will be added to the SURAGrid resource pool.

SURA IT External Funding Activities

Microsoft – SURAGrid Pilot Project

Funded by Microsoft and in collaboration with Norfolk State University (NSU) and University of Kentucky (UKY), SURA is leading a short-term pilot project to establish a distributed Microsoft high performance computing (HPC) test bed in support of academic research. The goals of this pilot are to (1) establish a test bed using Microsoft HPC2008, (2) investigate the integration of Microsoft with other HPC environments, and (3) demonstrate the utility of this environment for supporting academic research. Through the integration of the Microsoft environment with the Globus-based SURAGrid, we hope to broaden the pool of HPC resources available to SURA researchers and to broaden engagement.

Through this project, several applications are being ported to the Microsoft test bed including Virginia Commonwealth University's Virtual Parasite Project (VPP) and University of Illinois at Urbana-Champaign's CyberInfrastructure and Geospatial laboratory (CIGI) geosciences applications.

A second round of funding from Microsoft to expand this pilot project is expected to be finalized in November.

SURAggrid Funding Working Group

The generation of concepts and collective proposal development that can either leverage or support SURAggrid takes place through a variety of mechanisms: SURA staff and/or SURAggrid Governance Committee discussion, ideas brought forward by other SURAggrid participants, and through a SURAggrid Funding Review working group. The latter had been on hiatus pending reorganization of both SURAggrid governance and SURA IT staff but was reconvened this past June. The group has since completed one review cycle of then-current funding programs and deadlines, and recently began another:

- In the first cycle of review, the Funding Review working group reviewed over a dozen opportunities with near-term deadlines (July through Dec 2008). Several of these have graduated to targeted smaller group discussions towards the development of funding proposals; several others were moved to future review cycles for fresh ideas or later deadlines. A detailed summary of this activity, including invitations to participate in proposal developments, was distributed to the full SURAggrid community on September 11, 2008.
- The second cycle of funding review began October 16 and is anticipated to continue into mid-to-late December. During this cycle, the group will be considering funding programs with deadlines from January through May 2009. Action items from the first meeting include tasking out of nine of twenty-one opportunities for preliminary assessment by working group members, updating of a SURAggrid “asset inventory” of resources and strengths towards proposal development, and review of changes to NSF proposal guidelines.

During this same time, two NSF proposals were also submitted by SURAggrid participants, in collaboration with SURA and are still under review:

- Warren Smith/TACC led development and submission (August 14, 2008) of “Collaborative Research: SURA Compute Cloud: A Dynamic Large-Scale Distributed Computing Infrastructure” to the NSF Strategic Technologies for Cyberinfrastructure (STCI) program. This is a two-year project for development and testing of a new, easy-to-use cloud capability in complement to the current SURAggrid. Partners/roles include: TACC (lead developer & project management), UFL (virtualization), UVA (authX) and SURA (user engagement).
- Art Vandenberg/GSU led development and submission (August 18, 2008) of “Advancing Earth Science Research with Collaborative Cyberinfrastructure” to the NSF Research Experiences for Undergraduates (REU) program. This is a three-year program to provide undergraduates with experience on a collaborative research team deploying earth science applications in a grid environment. Partners include GSU, GMU, UNC-C and SURA. University partners will each host REU students working in a contributing specialty area (GMU – science driver; UNC-C – CS/grid programming; GSU – CI implementation/support) with SURA providing liaison & support for the use of SURAggrid.

In addition to these structured community efforts, SURA staff are pursuing the following funding opportunities:

- SURA is a training and outreach partner with a national consortium developing a submission to the NSF TeraGrid XD proposal (NSF 08-571). As part of this proposal SURA will leverage SURAggrid activities and the work we are currently doing with Microsoft to improve knowledge of and access to TeraGrid services. Preliminary proposals are due on November 4 with a full proposal due on June 15, 2009.
- Working with Greg Kubiak the SURA IT staff submitted a two page letter of introduction to Ira Fuchs at the Mellon Foundation on October 8 introducing SURA and the SURAggrid Program. This is an attempt to explore the development of a cyberinfrastructure outreach and support program targeted at Historically Black Colleges and Universities in the SURA region.

Federal Agency Funding Outlook

Sue to provide

NETWORK INFRASTRUCTURE ACTIVITIES

AtlanticWave (A-Wave Update)

AtlanticWave (A-Wave) has been in production since the November Super Computing 2006 event when SURA's investment enabled the establishment of a 10 Gigabit Ethernet wave along the Atlantic rim, from Miami, Florida, to New York City, provisioned by Florida LambdaRail (FLR), from Miami to Jacksonville, and by National LambdaRail from Jacksonville to New York City. AtlanticWave facilitates exchange and peering services for the national and international networks that interconnect at the international exchange and peering points at AMPATH in Miami, MANLAN in NYC, MAX in Washington DC, and Southern Crossroads (SoX)/Southern Light Rail (SLR). AtlanticWave is an integral component of the National Science Foundation (NSF) International Research Network Connections (IRNC) program award to the FIU and CENIC Western-Hemisphere Research and Education Networks – Links Interconnecting Latin America (WHREN-LILA) project. AtlanticWave supports communities that need network resources for research between North and South America, and other countries and continents.

AtlanticWave has become an important resource to support global scientific research collaborations. U.S.-Latin America production research has become increasingly dependent on AtlanticWave. National research and education networks (NRENs) are networks that are national in scope, much like Internet2, National LambdaRail (NLR) and ESnet in the U.S., and one of their primary functions is to operate a national network for the research and education community of their country. The NRENs of Latin America are making very good use of AtlanticWave to peer with Internet2, NLR and ESnet, as well as CANet4 of Canada. AtlanticWave provides NRENs with the flexibility to establish multiple peering relationships across more than one of the A-Wave exchange points. For example, RedCLARA peers with Internet2 in Washington DC and in New York. The following table illustrates the current NREN peering relationships supported by AWave:

Peers	A Location	Z Location
RedCLARA-Internet2	Sao Paulo	Washington, DC
RedCLARA-NLR	Sao Paulo	New York
ANSP-NLR	Sao Paulo	New York
RedCLARA-Esnet (v4)	Sao Paulo	Washington, DC
RedCLARA-Esnet (v6)	Sao Paulo	Washington, DC
RNP-Internet2	Sao Paulo	Washington, DC
RedCLARA-CAnet4	Sao Paulo	New York
RedCLARA-Internet2	Miami	New York

Table 1 NREN-to-NREN peering relationships

A complete list of peering relationships can be found on the AtlanticWave project website at <http://www.atlanticwave.net/network.html>

AWave services are enhancing the Large Hadron Collider (LHC) Compact Muon Solenoid detector research collaborations with South American universities and has significantly increased network connectivity services to the Arecibo radio telescope in Puerto Rico significantly enhancing their ability to participate in the international e-VLBI community.

International Connectivity

The principal tangible activity within the SURA footprint in international connectivity continues to be the AtlanticWave project, as described above.

Outside the SURA footprint, SURA's IT Fellow, Don Riley, continues his involvement in several efforts to provide enhanced network connectivity to underdeveloped regions of the world: China, South Asia (including India), and Africa.

Dr Riley recently co-chaired the annual Chinese American Networking Symposium (CANS), October 20-22, hosted this year at Indiana University in Indianapolis. Planning is now underway for CANS 2009 to be hosted by the China Science and Technology Network (CSTNET) in China.

Dr. Riley continues to participate in various efforts and meetings aimed at improving high speed network connectivity for R&E to India and South Asia. Dr. Riley participates in Internet2 special interest groups focused

on developing regions, including Africa, South Asia, Latin America, and the Caribbean; each of this SIGS held sessions at the Internet2 Fall Member Meeting in New Orleans. Dr. Riley was one of the speakers on the panel on “Emerging Research & Education Networks”.

The African Global Quit Initiative of the IEEAF continues to move forward to take significant new bandwidth into Africa via submarine cable and also improve the terrestrial fiber interconnectivity within and between countries. A particular focus is to assist in development of NRENs (national R&E networks) in each country. Through an IEEAF initiative in partnership with Global Medical Research Exchanges, Inc., IEEAF has obtained dark fiber in Uganda, Burundi and Rwanda, as well as 10 Gbps of capacity on one of the new submarine cable systems that will become operational along the African east coast in the summer of 2009. Current efforts are focused on working with the Research and Education Network of Uganda (RENU) and the Ubuntunet Alliance (www.ubuntunet.net) to develop a network architecture and plan for lighting the fiber to create RENU backbone, interconnecting Uganda universities and other important research sites – including hospital clinics and NIH-funded major research sites. With USAID support, IEEAF conducted a workshop for the Ubuntunet Eastern Cluster in Nairobi, Kenya, October 7 & 8, attended by evolving NRENs from Kenya, Uganda, Rwanda, Tanzania, Malawi, Democratic Republic of Congo, and Sudan. Additional fiber donations will be announced in the near future.

Dr. Riley has been asked by the National Academy of Sciences to co-chair a new Task Group on Digital Knowledge Infrastructure in Developing Countries in the Inter Academies Program on Digital Knowledge Resources and Infrastructure in Developing Countries.

AT&T Collaboration Update

In December of 2003, AT&T and SURA announced the AT&T – SURA GridFiber Collaboration Agreement that provided the nation’s research and education community with access to AT&T’s national optical network infrastructure (NexGen Network) for the development of regional optical network initiatives. This was a five year agreement that expired on September 30, 2008.

Through this agreement SURA has enabled the execution of no cost, 20 year Indefeasible Right of Use (IRU) agreements for a total of 3,697 miles of AT&T fiber optic network facilities. These assets have a market value of \$1.85M and have been made available through SURA to the national academic advanced networking community at no cost. In addition, an IRU for 147 miles of fiber was executed at a specially negotiated rate by the University of Oregon as a result of a purchase of a redundant pair along a route implemented on a no cost IRU route.

The breakdown of the completed IRUs is as follows:

LONI – 284 miles (Longview - Shreveport & Beaumont - Baton Rouge)
LEARN – 244 miles (Dallas - Longview & Houston - Beaumont)
NERO (Network for Education and Research in Oregon) – 147 miles at no cost, 147 miles at the rate of \$500/pair/mi. (Eugene - Portland)
MOREnet – 566 miles (Kansas City - St Louis primary and redundant fibers)
PNWGP / Northern Tier Network – 2455 miles (Seattle - Chicago)

Through this program SURA has helped to provide researchers and students across the country and particularly in the difficult to reach institutions in the northern tier of the US, with advanced network services that would not have been possible otherwise. This has been accomplished through the hard work of a dedicated AT&T project team that has supported this project from inside a dramatically changing AT&T. The SURA IT Committee is recommending that a formal SURA Board of Trustees resolution be approved thanking AT&T for their participation in this program and for making these optical network assets available to the nation’s research and education community.