SURAgrid Survey: Regional Grid Applications & Activities
Summary Report

April 20, 2007

Funded by: NSF Small Grant for Experimental Research (SGER) grant (OCI-054555)

Introduction

SURA is a consortium of 63 leading research institutions in sixteen southern states and the District of Columbia. Established in 1980 as a non-stock, non-profit corporation, SURA serves as an entity through which colleges, universities, and other organizations cooperate with one another and with government and industry in acquiring, developing, and using laboratories and other research facilities, and in furthering knowledge and the application of that knowledge in the physical, biological, and other natural sciences and engineering.

The SURA region represents a unique cross section of the U. S. academic community. With over one third of the US population, the SURA region contains ten of the nation's twenty-five EPSCoR states, 92% of the nation's Historically Black Colleges and Universities (HBCUs) and 22% of the nation's Hispanic Serving Institutions (HSIs). To improve access to and knowledge of high performance and grid computing resources in support of research and education within the region, SURA has undertaken a coordinated program of planning, development, implementation and education targeted at building and developing a regional grid computing infrastructure, SURAgrid.

In the fall of 2006, as part of an NSF Small Grant for Experimental Research (SGER) grant (OCI-054555), SURA conducted a survey of its membership to gain a better understanding of their use of and demand for grid computing in support of research and education activities. This report documents the results of that survey.

Survey Goals

The goal of the survey was to develop a set of data from which to identify applications that might benefit from access to SURAgrid resources or regional collaboration, and to identify a target set of research applications for deployment on SURAgrid. Prior to the survey, SURAgrid's design and development was most heavily influenced by discussions and email exchanges with SURA and SURAgrid participants as well as informal communication and networking at SURA meetings and events. Surveying SURA members through discussions and networking is invaluable and has become a regular practice within SURAgrid as well as other SURA programs and collaborative activities. However, the size and diversity of the SURA membership coupled with the challenge of building grid infrastructure for the broadest higher education community required a more formal approach.

Survey Process

The survey was designed to help SURA understand the breadth and depth of advanced science and research applications in use on its members' campuses. The survey was developed by SURA IT staff and submitted to several external parties for review to help ensure the survey's validity and completeness. In addition to questions aimed at the types of applications in use, the survey explored the extent to which grid technologies are currently deployed at our member institutions (and if so, its nature and support) and their use of other external grids. The survey also included an optional section with questions that focused on the extent to which institutions' teach with and/or about grids.

SURA sent the survey, via email, to the Vice Presidents of Research at the sixty-three SURA member institutions and copied other campus representatives actively involved with SURA IT, HPC, or SURAgrid programs. Thirty-four institutions returned completed surveys, which is a 54% rate of return. The following sections summarize the survey results. Appendix A contains the survey instrument, Appendix B contains the survey data, and Appendix C is a list of the institutions that returned completed surveys.

Summary of Findings

Section 1 of the survey provided a list of research domains by category to which respondents designated as having a low, medium, or high strategic priority. Additionally, respondents could select from the following list the potential benefits of grids for each research domain. Respondents were invited to add research domains; however, no domains were added. Also, respondents could include other benefits as additional comments in section 4 of the survey.

Potential benefit of grids for research domains:

a. Access to increased computational capacity
b. Access to and management of distributed data
c. Access to visualization services
d. Access to physically-separated or unique/specialized resources
e. Improved collaboration for multi-institutional, national and/or international projects

With 68% of respondents marking it high, physics was the domain that most frequently ranked as a high priority on campuses. Physics was followed by a three-way tie between the biological and computer sciences and chemistry, which were each selected by 65% of respondents as having a high strategic priority on their campus. These four domains also were identified by respondents as having the greatest potential to benefit from grids when compared with all other domains. Among this group of research domains, biological sciences was ranked as having the greatest overall potential to benefit from grids across the list of five benefits listed above.

Just below the top ranked research domains, electrical engineering and education were rated as having the next greatest overall potential to benefit from grids, followed by medical sciences. The most likely ways in which electrical engineering could benefit from grids were access to increased computational capacity and improved collaboration for multi-institutional, national and/or international projects. The greatest benefit for education identified by respondents was improved collaboration for multi-institutional, national and/or international projects followed by access to physically-separated or unique/specialized resources and access to visualization services. Access to and management of distributed data was ranked as the most likely way that the medical sciences could benefit from grids, with access to visualization services ranked at just a few percentage points lower in potential.

Table 1 shows the top research domains identified by the survey respondents as high priority and the percent of respondents rating the research domains a high priority.

Table 1: Research Domains Ranking

Rank	Domain	Percent of Institutions Rating Domain a High Priority
1	Physics	68%
2	Biological sciences	65%
	Chemistry	65%
	Computer sciences	65%
3	Education	44%
	Electrical Engineering	44%
4	Medical Sciences	41%

All other research domains were ranked by less than 40% of the respondents as high strategic priority. Astronautical engineering was the domain the least likely to be ranked as a high priority by respondents, and astronuatical engineering was also rated with the lowest potential to benefit from grids, tied with the agricultural and veterinary sciences.

Almost three-quarters of survey respondents have a research grid initiative on their campus and close to 40% are building grids as part of their campus IT infrastructure. Most of these initiatives, however, are in a development/testing stage. The optional comments and the number of grid initiatives identified by respondents, confirm the strong interest in grid technology and the recognition of the benefits by the survey respondents. Some of the comments included concerns regarding the lack of local resources and time available to devote to the development of grids and the deployment of grid-enabled applications. These survey findings are consistent with the findings previously obtained through informal communication and networking with SURA members.

Survey Section 1 Summary -
Research Domains with the Potential to Benefit from Grids

The Research categories and domains used in the survey are based on those used in the National Science Foundation Division of Science and Engineering Statistics publications and data on research and development expenditures (http://www.nsf.gov/statistics/showpub.cfm?TopID=8) within academia in the United States, modified through review by several regional experts for the purposes of this survey. The following is an analysis of the survey results by domain group. A more detailed summary of responses by domain can be found in Appendix B, Section 1.

Environmental Sciences

In this category, geological sciences was ranked as having the greatest strategic priority to survey respondents, with over 50% ranking it at either medium or high priority to their institution. Oceanography was ranked as the least strategic priority to respondents.

The most likely benefit from grids identified by respondents for geological sciences was access to and management of distributed data. Access to visualization services and to physically separated or unique/specialized resources were rated as having the least potential to bring benefit geological sciences.

Life Sciences

Among the life sciences research domains, the biological sciences was ranked as having the greatest strategic priority to survey respondents, with 65% of the respondents ranking it as a high priority for their institution. Almost four-fifths of respondents ranked both access to increased computational capacity and access to and management of distributed data as having the best potential to bring benefit from grids to the biological sciences.

Medical science was ranked as the next highest strategic priority within this domain. Respondents assigned roughly equal potential to the five ways listed in the survey for applications within this domain to benefit from grid technology.

The marine sciences domain was ranked the lowest in terms of strategic priority to respondents, with 46% ranking it as either low or medium for their institution.

Mathematics & Computer Science

Of the two domains in this category, computer science was ranked as having the highest priority with 86% of respondents ranking it at either a medium or high priority. Seventy-six percent of the respondents ranked access to increased computational capacity and improved collaboration for multi-institutional, national and/or international projects as the greatest benefit of girds to the computer sciences. Although access to visualization services and to physically-separated or unique/specialized resources were rated as having the least potential to bring benefit from grids to this category, nearly two-thirds of respondents ranked these as ways that the computer sciences could benefit from grid computing.

Physical Sciences

More than two-thirds of the respondents ranked physics as having the highest priority at their institution, while just under two-thirds ranked chemistry as being of high priority. Within this category, astronomy was ranked as having the least strategic priority by respondent institutions.

Improved collaboration for multi-institutional, national and/or international projects and access to increased computational capacity were ranked consistently across this category as the most likely ways that the domains in the physical sciences category could benefit from grids.

Psychology

Of the two research domains in this category, the biological aspects were ranked as the higher priority at respondent institutions while more than half ranked the social aspects as either a low or medium priority. Improved collaboration for multi-institutional, national and/or international projects was ranked as the most likely way that both the domains in this category could benefit from grids.

Social Sciences

The research domains in this category (anthropology, economics, political science, and sociology) were ranked low in strategic priority as compared to other research domains, with economics receiving the highest percentage as a medium strategic priority. Improved collaboration for multi-institutional, national and/or international projects ranked was ranked as the most likely way for all domains in the social sciences category to benefit from grid computing.

Engineering

Of the research domains in this category, electrical engineering was ranked as having the highest priority among respondent institutions, with 68% of the respondents assigning it a high or medium priority. Biomedical and mechanical engineering were tied for the next highest strategic ranking, with 56% of respondents assigning a high or medium priority to each of these sub-categories. Astronautical engineering was given a low ranking most often, followed by aeronautical engineering.

Electrical engineering had the highest aggregate score for total potential from the ways grids can benefit domain applications, with biomedical engineering a close second. Of all the engineering domains in this category, astronautical engineering had the lowest aggregate score for total potential from the ways grids can benefit domain applications. The most commonly identified benefits from grids for the engineering research domain were access to visualization services, access to increased computational capacity, and improved collaboration for multi-institutional, national and/or international projects.

Other (Education, Arts, Humanities, Medical Services, Pharmacology)

Of the domains in this category, education was ranked as having the highest priority at respondent institutions, while humanities ranked the lowest. Education was also ranked as having the greatest potential to benefit from grid computing, with improved collaboration for multi-institutional, national and/or international project cited as the most likely way this domain could benefit from grid computing.

Survey Section 2 Summary – See Appendix B, Section 2 for more details
Grid Infrastructure on Campus

Almost three-quarters of survey respondents have a research grid initiative on their campus. Close to forty percent of the respondents have campus grid initiatives. Both types of grid initiatives were more likely to be in a development/testing stage than production service.

Research grid initiatives were listed by nearly 75% of respondents as extending to users beyond the institution, while external access to an institution's campus grid was available at 21% of the responding institutions.

Nearly four-fifths of respondents indicated they are interested in collaborating with other institutions to extend the development and use of their research grid; almost half made the same indication regarding their campus grid.

IT staff were most often listed as the personnel type that are active in supporting both campus and research grids. Tied with CS graduate students, CS researchers were the next most commonly listed personnel type active in supporting research grids, but the least often listed as actively supporting campus

grids. After IT staff, CS graduate students were listed most often as the personnel type active in supporting campus grids, followed by CS educators.

Survey Section 3 Summary – See Appendix B, Section 3 for more details
Collaboration with Other Grid Initiatives

SURAgrid is the most common grid in which respondents participate in one or more roles, followed by the Open Science Grid (OSG). Participation in several project or more geographically specific grids (e.g., caBIG, GridChem, BIRN, TIGRE) was also indicated but at lower levels overall.

At 47%, collaborator in usage/support is the most likely role respondents take on in their collaboration with SURAgrid, with collaborator in development being the next most common. Respondents most commonly collaborate in OSG as project partner, followed closely by resource user.

Specific grids listed in this section of the initial survey instrument were SURAgrid, TeraGrid, Open Science Grid, caBIG, GridChem, EGEE, and BIRN. A place for respondents to write in other grid initiatives was also included. When specifying other grids they collaborate in that were not listed in the initial survey document, respondents cited UltraLight, IBM's World Community Grid, Texas Internet Grid for Research and Education (TIGRE), National Center for Biotechnology Information (NCBI) and Brookhaven National Laboratory's Relativistic Heavy Ion Collider (RHIC).

Section 4 Summary –
Additional Comments

Sections 1 through 3 of the survey data summary and the raw data in Appendix B confirmed that there is a high level of interest in grids and recognition of the benefits of grids to research by the survey respondents. The additional comments provided in Section 4 of the survey confirm the interest in grid technology and its benefits, but also raise some of the impediments to realizing the full benefits of the technology. The lack of local resources to devote to the development of grids and the deployment of grid-enabled applications was one of the primary impediments identified to the progress of their grid initiatives. The need for integration across various grid initiatives, and maintaining a balance between technology development and research applications drivers, was also noted.

Section 5 Summary –
Additional Information on Grid Related Activities

This section of the survey collected information about grid-related activities at the respondent institutions. Table 2 on the next page provides a list of grid activities and projects identified by the survey respondents.

Section 6 Summary – See Appendix B, Section 6 for more details
Using Grids in Teaching

The graduate level was the most common level at which both grid-focused modules (35% of respondent campuses) and wholly grid-focused courses (24% of respondent campuses) are being taught. Listed by 35% of respondents, the course instructor was most often cited as the personnel category active in supporting grid use in the classroom, with IT staff and CS department (researchers or staff) tied as the next most common.

Table 2: Grid Initiatives and Projects

Institution	Project Name	URL
Florida Atlantic University	College of Engineering/System Grid technology initiative	URL not provided
	College of Science/System Grid technology initiative	URL not provided
Florida International University	A Grid-Enabled Center for High Energy Physics, Education, and Outreach, CHEPREO	www.chepreo.org
	Cyberbridges	URL not provided
	AMPATH	ampath.net
George Mason University	NASA Atmospheric Science Research – Grid Computing	http://landscan.scs.gmu.edu:8080/
	NASA Geoscience Interoperability	http://landscan.scs.gmu.edu:8080/
	Sun CPU hrs	URL not provided
Georgetown University	GridsWatch	http://www.GridsWatch.com
	caBIG at Georgetown	http://arc.georgetown.edu/cabig/
	IBM's World Community Grid	URL not provided
Louisiana State University	SCOOP	http://scoop.sura.org/
	UCoMS	http://www.ucoms.org/
	Enlightened	http://www.enlightenedcomputing.org/
	LPFS	http://www.cct.lsu.edu/projects/LPFS/
	GridChem	https://www.gridchem.org/
	LONI	http://www.loni.org
	TATRC	http://www.cct.lsu.edu/projects/TATRC/
	IGERT	http://www.cct.lsu.edu/IGERT/
	Cactus	http://www.cactuscode.org/
	SAGA	https://forge.gridforum.org/projects/saga-rg/
Louisiana Tech University	DOSAR	dosar@fnal.gov
Old Dominion University	BioSim	http://www.sura.org/programs/sura_grid_apps.html
	Digital Library Grid	http://128.82.7.230/grid/index-new.html
University of Houston	TIGRE	http://tigreportal.hipcat.net/gridsphere/gridsphere
	THE GRID	http://www.tlc2.uh.edu/THEGRID
	VGRADS	ttp://vgrads.rice.edu/
	ALICE USA	http://nuclear.ucdavis.edu/~jklay/ALICE/
University of Florida	Grid Middleware for Data Mining	www.hpc.ufl.edu
University of Kentucky	Campus Bioinformatics Grid	URL not provided
University of Oklahoma	Linked Environment for Atmospheric Discovery	http://lead.caps.ou.edu/
	D0, ATLAS, Open Science Grid	URL not provided
	Cyberinfrastructure Education for Bioinformatics & Beyond	URL not provided
	NEES	URL not provided
University of South Carolina		URL not provided
Vanderbilt University	REDDnet	http://www.reddnet.org/
	UltraLight	http://www.ultralight.org/
	Open Science Grid (OSG)	http://www.opensciencegrid.org/
	CMS	http://cms.cern.ch/

Appendix A
Survey Instrument

SURAgrid Survey: Regional Grid Applications & Activities

October 2006

Please return your completed survey using one of the following methods:

Enter responses into the document electronically and return via email attachment to: Kate Barzee <kate@sura.org>.

Although email responses are strongly preferred, hard copy responses may be faxed to: 315-593-0718, Attn: Regional Grid Activities Survey.

For questions related to completing or returning the survey, contact Kate Barzee <kate@sura.org>.

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Thank you for your response!

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Institution Name:

Contact information for person completing this survey:

Name: Title:
Email: Phone:

Section 1: Research Domains with Potential to Benefit from Grids

Please provide the following information for each research domain that is represented on your campus. When assessing the potential to benefit from a grid, please consider that applications can benefit from grid technology in a number of ways. Some common ways are:

A. Access to increased computational capacity
B. Access to and management of distributed data
C. Access to visualization services
D. Access to physically-separated or unique/specialized resources
E. Improved collaboration for multi-institutional, national and/or international projects

For any domain for which you are not sure, please provide a contact for that domain in Table A directly below. If you wish to include other domains, insert additional rows at the bottom of the table or enter free-form below.

Categories modified from those used in NSF SRS Publications and Data at http://www.nsf.gov/statistics/showpub.cfm?TopID=8

Research Domain	**Strategic priority for institution** (enter "low", "medium" or "high")	**Potential to benefit from grid technology** (list ways from A through E above, as applicable)
Environmental sciences		
Atmospheric sciences		
Geological sciences		
Oceanography		
Life sciences		
Agricultural sciences		
Biological sciences		
Environmental sciences		
Medical sciences		

Research Domain	**Strategic priority for institution** (enter “low”, “medium” or “high”)	**Potential to benefit from grid technology** (list ways from A through E above, as applicable)
Marine sciences		
Veterinary sciences		
Mathematics & Computer Science		
Mathematics		
Computer sciences		
Physical sciences		
Astronomy		
Chemistry		
Physics		
Psychology		
Biological aspects		
Social aspects		
Social Sciences		
Anthropology		
Economics		
Political science		
Sociology		
Engineering		
Aeronautical engineering		
Astronautical engineering		
Biomedical engineering		
Chemical engineering		
Civil engineering		
Electrical engineering		
Mechanical engineering		
Metallurgy & Materials		
Other (add table rows as needed)		
Education (teaching)		
Arts		
Humanities		
Medical services		
Pharmacology		

If there are researchers that we could contact for more information regarding individual research projects that can benefit as noted above, please provide name, title and contact information: (add rows as necessary**)**

Table A

Contact(s) for individual research projects	
Name/title	**Contact method**

If there are individuals on your campus involved in teaching *with* or *about* grids that we could contact regarding their work, please provide name, title and contact information: (add rows as necessary)

If your campus has such activity, please refer to Section 6: Using Grids in Teaching.

Table B

Contact(s) for those involved in teaching with or about, grids	
Name/title	**Contact method**

Section 2: Grid Infrastructure on Campus

	Campus Grid (as part of campus IT infrastructure)	Research Grid(s)
Does your institution have a grid initiative of this type?	☐ Yes ☐ No	☐ Yes ☐ No
What is the status of this grid initiative?	☐ Development/testing ☐ Production service	☐ Development/testing ☐ Production service
Does use of this grid extend to users beyond the institution?	☐ Yes ☐ No	☐ Yes ☐ No
Is your institution interested in collaborating with other institutions to extend use or development of this grid?	☐ Development ☐ Use ☐ Both	☐ Development ☐ Use ☐ Both

Please indicate which campus personnel are active in supporting each type of grid initiative.

	Campus Grid (as part of campus IT infrastructure)	Research Grid(s)
IT staff	☐ Yes ☐ No	☐ Yes ☐ No
C.S. researchers	☐ Yes ☐ No	☐ Yes ☐ No
C.S. educators	☐ Yes ☐ No	☐ Yes ☐ No
C.S. graduate students	☐ Yes ☐ No	☐ Yes ☐ No
C.S. undergraduate students	☐ Yes ☐ No	☐ Yes ☐ No
Other (please specify)		

If there are individuals that we could contact for more information regarding each type of grid initiative on your campus, please provide name, title and contact information:

For Campus Grid – **(add rows as necessary**)

Name/title	Contact method

For Research Grid(s) – **(add rows as necessary**)

Name/title	Contact method

Section 3: Collaboration with Other Grid Initiatives

Please indicate your institution's involvement in the following grid initiatives. The focus of this is to further understand the interrelationships and mutual connections between the variety of emerging grids, including SURAgrid, to effectively anticipate and plan for future integration. If you wish to include other initiatives, insert additional rows at the bottom of the table or enter free-form below.

	Project Partner	Collaborator-Development	Collaborator-Usage/Support	Provide Resources	Use Resources	Not Involved	Don't Know
SURAgrid							
TeraGrid							
Open Science Grid							
caBIG							
GridChem							
EGEE							
BIRN							
Other							

SURAgrid (SURA's regional grid infrastructure initiative) is a consortium of organizations collaborating and combining resources to help bring grid technology to the level of seamless, shared infrastructure. http://www.sura.org/programs/sura_grid.html

TeraGrid is an NSF-funded open scientific discovery infrastructure that combines leadership class resources at nine partner sites to create an integrated, persistent computational resource. Partner sites include: Texas Advanced Computing Center, National Center for Supercomputing Applications, University of Chicago/Argonne National Laboratory, National Center for Atmospheric Research. http://www.teragrid.org/

Open Science Grid is operated by a consortium of universities, national laboratories, scientific collaborations and software developers. OSG users include those from astrophysics, bioinformatics, computer science, medical imaging, nanotechnology and physics (e.g., ATLAS, CMS). http://opensciencegrid.org/

caBIG™ is the cancer Biomedical Informatics Grid™ being developed under the leadership of the National Cancer Institute's Center for Bioinformatics. It is a voluntary grid to enable the sharing of data and tools and to create a World Wide Web of cancer research. https://cabig.nci.nih.gov/

GridChem (Computational Chemistry Grid (CCG)) is a virtual organization that provides access to high performance computing resources. GridChem is a desktop application that provides an interface to resources necessary to solve quantum chemistry problems using grid technologies. https://www.gridchem.org/

EGEE (Enabling Grids for E-sciencE) is working to provide a seamless grid infrastructure for e-Science users from 32 countries worldwide. Expanded beyond its two original fields (high energy physics and life sciences) EGEE integrates applications from many other scientific fields and is funded by the European Commission. http://www.eu-egee.org/

BIRN (Biomedical Informatics Research Network (BIRN)) is an NCRR initiative aimed at addressing biomedical researchers' need to access and analyze data at diverse sites throughout the country. http://www.loni.ucla.edu/BIRN/

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Other comments or clarifications which you'd like to share regarding your institution's current or intended involvement with other grid initiatives:

Section 4: Additional Comments

If you wish to add comments or provide information that was not covered in this survey, please include it here: (if responding in hard copy and more room is needed, this can be included on an additional page)

Section 5: For More Information

Please provide detail below regarding grid-related activities, applications, projects, research or collaborations on your campus, relevant to the context of this survey and which we could contact for more information. (add rows as necessary)

Activity/Project name:
Activity/project URL:
Contact for more information:

Activity/Project name:
Activity/project URL:
Contact for more information:

Activity/Project name:
Activity/project URL:
Contact for more information:

Activity/Project name:
Activity/project URL:
Contact for more information:

Section 6: Using Grids in Teaching *(Optional; see Table B in Section 1)*

At what level are grid-focused modules integrated with other courses on your campus? (check all that apply)

- ☐ Undergraduate
- ☐ Graduate
- ☐ Other (please specify):
- ☐ None
- ☐ Not sure

At what level are wholly grid-focused course(s) taught on your campus? (check all that apply)

- ☐ Undergraduate
- ☐ Graduate
- ☐ Other (please specify):
- ☐ None
- ☐ Not sure

Which campus personnel are active in supporting grid use in the classroom? (check all that apply)

- ☐ Course instructor
- ☐ IT staff
- ☐ C.S. Department (researchers or staff)
- ☐ Graduate students
- ☐ Undergraduate students
- ☐ Other (please specify):

- ☐ Not sure

Appendix B
Survey Data

(Sections 4 and 5 collected contact data and comments that are summarized in the body of the report)

Section 1: Research Domains with Potential to Benefit from Grids

Please provide the following information for each research domain that is represented on your campus. When assessing the potential to benefit from a grid, please consider that applications can benefit from grid technology in a number of ways. Some common ways are:

A. Access to increased computational capacity
B. Access to and management of distributed data
C. Access to visualization services
D. Access to physically-separated or unique/specialized resources
E. Improved collaboration for multi-institutional, national and/or international projects

For any domain for which you are not sure, please provide a contact for that domain in Table A directly below. If you wish to include other domains, insert additional rows at the bottom of the table or enter free-form below.

		Strategic priority to institution			Potential ways to benefit from grids				
Environmental sciences									
Research Domain		**Low**	**Med**	**High**	**A**	**B**	**C**	**D**	**E**
Atmospheric sciences	Count:	9	7	6	17	15	12	12	15
	Percent:	26	21	18	50	44	35	35	44
Geological sciences	Count:	5	11	8	18	20	15	15	18
	Percent:	15	32	24	53	59	44	44	53
Oceanography	Count:	12	6	4	14	15	11	11	15
	Percent:	35	18	12	41	44	32	32	44
Life sciences									
Research Domain		**Low**	**Med**	**High**	**A**	**B**	**C**	**D**	**E**
Agricultural sciences	Count:	11	1	5	6	6	5	6	7
	Percent:	32	3	15	18	18	15	18	21
Biological sciences	Count:	0	4	22	27	27	23	22	25
	Percent:	0	12	65	79	79	68	65	74
Environmental sciences	Count:	4	8	13	20	22	18	14	20
	Percent:	12	24	38	59	65	53	41	59
Medical sciences	Count:	7	4	14	19	22	21	20	20
	Percent:	21	12	41	56	65	62	59	59
Marine sciences	Count:	12	3	7	12	13	13	12	13
	Percent:	35	9	21	35	38	38	35	38
Veterinary sciences	Count:	11	2	4	6	6	6	5	7
	Percent:	32	6	12	18	18	18	15	21

Mathematics & Computer Science									
Research Domain		**Low**	**Med**	**High**	**A**	**B**	**C**	**D**	**E**
Mathematics	Count:	5	9	13	22	14	13	13	19
	Percent:	15	26	38	65	41	38	38	56
Computer sciences	Count:	0	7	22	26	24	21	21	26
	Percent:	0	21	65	76	71	62	62	76
Physical sciences									
Research Domain		**Low**	**Med**	**High**	**A**	**B**	**C**	**D**	**E**
Astronomy	Count:	10	4	12	19	18	19	18	21
	Percent:	29	12	35	56	53	56	53	62
Chemistry	Count:	1	4	22	27	21	23	20	26
	Percent:	3	12	65	79	62	68	59	76
Physics	Count:		6	23	25	5	23	23	27
	Percent:	0	18	68	74	15	68	68	79
Psychology									
Research Domain		**Low**	**Med**	**High**	**A**	**B**	**C**	**D**	**E**
Biological aspects	Count:	9	5	12	15	14	15	14	16
	Percent:	26	15	35	44	41	44	41	47
Social aspects	Count:	9	9	6	9	13	10	10	15
	Percent:	26	26	18	26	38	29	29	44
Social Sciences									
Research Domain		**Low**	**Med**	**High**	**A**	**B**	**C**	**D**	**E**
Anthropology	Count:	11	4	4	8	12	10	7	12
	Percent:	32	12	12	24	35	29	21	35
Economics	Count:	5	13	6	17	14	13	11	19
	Percent:	15	38	18	50	41	38	32	56
Political science	Count:	8	8	6	10	10	10	11	14
	Percent:	24	24	18	29	29	29	32	41
Sociology	Count:	9	7	6	10	11	12	7	14
	Percent:	26	21	18	29	32	35	21	41
Engineering									
Research Domain		**Low**	**Med**	**High**	**A**	**B**	**C**	**D**	**E**
Aeronautical engineering	Count:	11	4	5	12	8	10	8	12
	Percent:	32	12	15	35	24	29	24	35
Astronautical engineering	Count:	12	1	3	7	5	7	5	6
	Percent:	35	3	9	21	15	21	15	18
Biomedical engineering	Count:	4	6	13	18	16	16	15	19
	Percent:	12	18	38	53	47	47	44	56
Chemical engineering	Count:	8	3	11	15	11	14	11	15
	Percent:	24	9	32	44	32	41	32	44
Civil engineering	Count:	5	8	9	14	12	18	11	13
	Percent:	15	24	26	41	35	53	32	38

Electrical engineering	Count:	2	8	15	21	13	16	15	21
	Percent:	6	24	44	62	38	47	44	62
Mechanical engineering	Count:	4	6	13	18	15	17	12	19
	Percent:	12	18	38	53	44	50	35	56
Metallurgy & Materials	Count:	8	2	9	11	8	10	9	10
	Percent:	24	6	26	32	24	29	26	29
Other									
Research Domain		**Low**	**Med**	**High**	**A**	**B**	**C**	**D**	**E**
Education (teaching)	Count:	2	4	15	7	9	13	13	15
	Percent:	6	12	44	21	26	38	38	44
Arts	Count:	6	6	7	7	7	11	10	12
	Percent:	18	18	21	21	21	32	29	35
Humanities	Count:	9	5	6	5	7	7	8	12
	Percent:	26	15	18	15	21	21	24	35
Medical services	Count:	8	2	9	11	10	12	11	10
	Percent:	24	6	26	32	29	35	32	29
Pharmacology	Count:	6	2	11	12	10	11	10	12
	Percent:	18	6	32	35	29	32	29	35

Section 2: Grid Infrastructure on Campus

	Campus Grid			Research Grid(s)		
Does your institution have a grid initiative of this type?	**Yes**	**Count:**	**13**	**Yes**	**Count:**	**25**
		Percent:	38		**Percent:**	74
	No	**Count:**	**19**	**No**	**Count:**	**9**
		Percent:	56		**Percent:**	26
What is the status of this grid initiative?	**Development/testing**	**Count:**	**12**	**Development/testing**	**Count:**	**20**
		Percent:	35		**Percent:**	59
	Production service	**Count:**	**7**	**Production service**	**Count:**	**10**
		Percent:	21		**Percent:**	29
Does use of this grid extend to users beyond the institution?	**Yes**	**Count:**	**7**	**Yes**	**Count:**	**25**
		Percent:	21		**Percent:**	74
	No	**Count:**	**14**	**No**	**Count:**	**5**
		Percent:	41		**Percent:**	15
Is your institution interested in collaborating with other institutions to extend use or development of this grid?	**Development**	**Count:**	**3**	**Development**	**Count:**	**4**
		Percent:	9		**Percent:**	12
	Use	**Count:**	**0**	**Use**	**Count:**	**1**
		Percent:	0		**Percent:**	3
	Both	**Count:**	**16**	**Both**	**Count:**	**22**
		Percent:	47		**Percent:**	65

Campus personnel active in supporting each type of grid initiative

	Campus Grid			Research Grid(s)		
IT staff	**Yes**	**Count:**	**16**	**Yes**	**Count:**	**22**
		Percent:	47		**Percent:**	65
	No	**Count:**	**4**	**No**	**Count:**	**4**
		Percent:	12		**Percent:**	12
C.S. researchers	**Yes**	**Count:**	**1**	**Yes**	**Count:**	**21**
		Percent:	3		**Percent:**	62
	No	**Count:**	**5**	**No**	**Count:**	**5**
		Percent:	15		**Percent:**	15
C.S. educators	**Yes**	**Count:**	**9**	**Yes**	**Count:**	**15**
		Percent:	26		**Percent:**	44
	No	**Count:**	**6**	**No**	**Count:**	**7**
		Percent:	18		**Percent:**	21
C.S. graduate students	**Yes**	**Count:**	**10**	**Yes**	**Count:**	**21**
		Percent:	29		**Percent:**	62
	No	**Count:**	**7**	**No**	**Count:**	**5**
		Percent:	21		**Percent:**	15
C.S. undergraduate students	**Yes**	**Count:**	**7**	**Yes**	**Count:**	**10**
		Percent:	21		**Percent:**	29
	No	**Count:**	**8**	**No**	**Count:**	**9**
		Percent:	24		**Percent:**	26
Other (please specify)	**Yes**	**Count:**	**4**	**Yes**	**Count:**	**8**
		Percent:	12		**Percent:**	24
	No	**Count:**		**No**	**Count:**	
		Percent:	0		**Percent:**	0

Section 3: Collaboration with Other Grid Initiatives

Please indicate your institution's involvement in the following grid initiatives. The focus of this is to further understand the interrelationships and mutual connections between the variety of emerging grids, including SURAgrid, to effectively anticipate and plan for future integration. If you wish to include other initiatives, insert additional rows at the bottom of the table or enter free-form below.

	Project Partner		Collaborator-Development		Collaborator-Usage/Support		Provide Resources		Use Resources		Not Involved		Don't Know	
SURAgrid	Count:	10	Count:	12	Count:	16	Count:	11	Count:	10	Count:	10	Count:	1
	Percent:	29	Percent:	35	Percent:	47	Percent:	32	Percent:	29	Percent:	29	Percent:	3
TeraGrid	Count:	3	Count:	3	Count:	3	Count:	1	Count:	10	Count:	14	Count:	0
	Percent:	9	Percent:	9	Percent:	9	Percent:	3	Percent:	29	Percent:	41	Percent:	0
Open Science Grid	Count:	12	Count:	6	Count:	7	Count:	7	Count:	11	Count:	11	Count:	0
	Percent:	35	Percent:	18	Percent:	21	Percent:	21	Percent:	32	Percent:	32	Percent:	0
caBIG	Count:	3	Count:	3	Count:	3	Count:	3	Count:	4	Count:	16	Count:	2
	Percent:	9	Percent:	9	Percent:	9	Percent:	9	Percent:	12	Percent:	47	Percent:	6
GridChem	Count:	4	Count:	1	Count:	2	Count:	1	Count:	2	Count:	16	Count:	3
	Percent:	12	Percent:	3	Percent:	6	Percent:	3	Percent:	6	Percent:	47	Percent:	9
EGEE	Count:	2	Count:	2	Count:	0	Count:	1	Count:	2	Count:	17	Count:	3
	Percent:	6	Percent:	6	Percent:	0	Percent:	3	Percent:	6	Percent:	50	Percent:	9
BIRN	Count:	1	Count:	1	Count:	2	Count:	0	Count:	6	Count:	17	Count:	3
	Percent:	3	Percent:	3	Percent:	6	Percent:	0	Percent:	18	Percent:	50	Percent:	9
Other	Count:	2	Count:	2	Count:	2	Count:	1	Count:	3	Count:	4	Count:	0
	Percent:	6	Percent:	6	Percent:	6	Percent:	3	Percent:	9	Percent:	12	Percent:	0
UltraLight	Count:		Count:	1	Count:	0	Count:	1	Count:	1	Count:	0	Count:	0
	Percent:	0	Percent:	3	Percent:	0	Percent:	3	Percent:	3	Percent:	0	Percent:	0
IBM's World Community Grid	Count:		Count:		Count:	0	Count:	1	Count:	0	Count:	0	Count:	0
	Percent:	0	Percent:	0	Percent:	0	Percent:	3	Percent:	0	Percent:	0	Percent:	0
TIGRE	Count:	2	Count:	1	Count:	1	Count:	1	Count:	1	Count:	0	Count:	0
	Percent:	6	Percent:	3	Percent:	3	Percent:	3	Percent:	3	Percent:	0	Percent:	0
NCBI	Count:		Count:		Count:	0	Count:	0	Count:	1	Count:	0	Count:	0
	Percent:	0	Percent:	0	Percent:	0	Percent:	0	Percent:	3	Percent:	0	Percent:	0
RHIC	Count:	1	Count:		Count:	0	Count:	0	Count:	1	Count:	0	Count:	0
	Percent:	3	Percent:	0	Percent:	0	Percent:	0	Percent:	3	Percent:	0	Percent:	0

Section 6: Using Grids in Teaching (Optional; see Table B in Section 1)

At what level are grid-focused modules integrated with other courses on your campus?

	Percent	Count
Undergraduate	12	4
Graduate	35	12
Other (specify)	3	1
None	21	7
Not sure	15	5

At what level are wholly grid-focused course(s) taught on your campus?

	Percent	Count
Undergraduate	3	1
Graduate	24	8
Other (specify)	0	0
None	41	14
Not sure	9	3

	Percent	Count
Course instructor	35	12
IT staff	26	9
CS Dept (researchers or staff)	26	9
Graduate students	21	7
Undergraduate students	3	1
Other (specify)	6	2
Not sure	15	5

Appendix C
Survey Participants

1. Baylor University
2. Christopher Newport University
3. Florida Atlantic University
4. Florida Institute of Technology
5. Florida International University
6. George Mason University
7. Georgetown University
8. Georgia State University
9. Hampton University
10. James Madison University
11. Louisiana State University
12. Louisiana Tech University
13. Oklahoma State University
14. Old Dominion University
15. Texas A&M University
16. The George Washington University
17. The University of Georgia
18. The University of Mississippi
19. The University of Oklahoma
20. Tulane University
21. University of Alabama at Birmingham
22. University of Alabama in Huntsville
23. University of Arkansas
24. University of Florida
25. University of Houston
26. University of Kentucky
27. University of Louisiana at Lafayette
28. University of Maryland
29. University of New Orleans
30. University of North Carolina
31. University of South Carolina
32. University of Texas at Austin
33. Vanderbilt University
34. Virginia Commonwealth University