

MINUTES
of the
THIRD MEETING
of the
SCIENCE, TECHNOLOGY AND TELECOMMUNICATIONS COMMITTEE

September 1-2, 2009
National Museum of Nuclear Science and History
601 Eubank Blvd. SE
Albuquerque

The third meeting of the Science, Technology and Telecommunications Committee was called to order at 10:06 a.m. on Tuesday, September 1, 2009, by Representative Roberto "Bobby" J. Gonzales, chair, at the National Museum of Nuclear Science and History in Albuquerque.

Present

Rep. Roberto "Bobby" J. Gonzales, Chair
Sen. Stephen H. Fischmann, Vice Chair
Rep. Janice E. Arnold-Jones
Sen. Dede Feldman
Sen. Linda M. Lopez
Rep. Jane E. Powdrell-Culbert
Rep. Debbie A. Rodella
Rep. Nick L. Salazar
Rep. Luciano "Lucky" Varela (Sept. 2)
Rep. Richard D. Vigil (Sept. 2)

Absent

Sen. Vernon D. Asbill
Sen. Kent L. Cravens
Sen. Phil A. Griego

Advisory Members

Sen. Mark Boitano (Sept. 1)
Sen. Carlos R. Cisneros (Sept. 2)
Rep. Karen E. Giannini (Sept. 1)
Rep. Ben Lujan (Sept. 1)
Sen. Richard C. Martinez
Rep. Kathy A. McCoy (Sept. 1)
Rep. Danice Picraux
Rep. Don L. Tripp
Rep. Jeannette O. Wallace (Sept. 2)

Sen. William H. Payne
Sen. John M. Sapien

(Attendance dates are noted for those members not present for the entire meeting.)

Staff

Gordon Meeks
Ralph Vincent
Jeret Fleetwood

Tuesday, September 1

The chair welcomed the committee members, who introduced themselves to the audience.

Department of Information Technology Disaster Recovery and Business Continuity Plans

Marlin Mackey, secretary of information technology, and Deputy Secretary Thomas McQuillan described the governance structure of the Business Continuity Steering Committee, its vision and mission, roles and responsibilities of members and its policies and procedures. The committee is composed of Secretary Mackey, Buddy Vaughan, Mr. McQuillan, Joel Matek from the Taxation and Revenue Department (TRD) and Bill Gonzales from the University of New Mexico (UNM). They said that the steering committee is currently reviewing the contract with Mainline Disaster Recovery Systems, LLC, which currently provides for replacement equipment and rental or leasing of additional equipment to the Department of Information Technology (DoIT) within five days of notification of a disaster. It covers all equipment in the Simms Data Center and includes the SHARE system. The contract also provides for capability to recover at an out-of-state location if necessary. The DoIT is moving toward establishing a disaster recovery site for the DoIT and state agencies and for a recovery assessment and feasibility study of redundancy for critical information technology.

The discussion addressed:

- standard protocols for notification of the public of a failure of a system or disaster;
- the number of state agencies on the centralized system;
- the status of financial systems on the DoIT system;
- the lack of a "Hot" backup now;
- the availability of disaster documentation;
- the bandwidth necessary to accommodate the full system; and
- the reason independent elective offices are not under the DoIT's authority.

Geospatial Information Sharing

Mike Baca, DoIT, summarized HJM 81, sponsored by Representative Arnold-Jones, which asked the DoIT to convene a task force to study geospatial information sharing (GIS). He reported that the task force has been created with 29 participating entities. Leading various subcommittees of the task force are Rick Koehler of the Energy, Minerals and Natural Resources Department, Larry Brotman of the TRD, Mike Inglis and Bill Sprick. Mr. Baca said the task force plans to have final recommendations by November 2009. He described nine goals of the state strategic information technology (IT) plan, which includes the reduction of costs of government operations through shared IT application architectures, programs and services, including geospatial. The Geospatial Strategic Plan was completed in August 2009 and included six recommendations: creation of a Geographic Information Office; acquisition of management support; creation of GIS councils and committees; creation of a clearinghouse and metadata portal; a web-based application for easy data access; and development of business plans for data, analysis and policy.

The committee discussed:

- the good work of the task force;
- the role of the supercomputer in geospatial IT;
- the status of a GIS data center and data analysis;
- the DoIT clearinghouse for GIS information for policymakers;
- the Google Earth system that is based on a system for which New Mexico paid;
- public access to data in the supercomputer;
- ownership of state data;
- privacy issues and protection of civil liberties;
- the quality of Albuquerque's GIS system;
- various state GIS services;

A motion was made and the committee approved, without opposition, the minutes from the previous meeting.

- the dangers of aggregation of data for public use;
- quality of web sites of different state agencies;
- the advantages of standardizing the state's web sites;
- the difference between geospatial systems and GIS; and
- the value of geospatial systems for firefighting.

Science, Technology and Telecommunications Stimulus Funding

Secretary Mackey and Stephan Helgesen from the Economic Development Department described the federal stimulus money for broadband deployment to unserved and underserved areas of the state. This is an opportunity to implement high-speed network infrastructures for unserved and underserved communities. Federal competitive grants amount to \$2.5 billion nationally from the Rural Utilities Service of the U.S. Department of Agriculture and \$4.7 billion from the Department of Commerce. New Mexico is guaranteed at least one grant. The grants require between 20 and 50 percent nonfederal matching dollars. The state is applying for a four-year phased grant based on a public/private partnership integrated with other programs to renew the state's economy. There are three rounds of grant applications, so if the state is not successful in the first round, it has more chances. The goal is to achieve basic broadband coverage for all of the state's rural areas. It includes establishment of telecomputing facilities and educational programs at schools, libraries, community centers and other local sites at a cost of \$2.7 million. The state application is 62 pages and was completed on August 26.

The committee discussed:

- Sandia National Laboratories' approach to the state on renewable energy;
- the high potential for a smart grid/green grid;
- Japanese participation in the project;
- the role of the computing applications center;
- creation of between 300 and 600 jobs as a result of the project; and
- installation of smart meters.

Innovative Digital Education and Learning in New Mexico (IDEAL-NM)

Veronica Chavez-Neuman, chief information officer for the Higher Education Department, told the committee that New Mexico is the first state in the nation to create a statewide "eLearning" system covering pre-kindergarten through college and work force continuing education as well. She testified that the IDEAL-NM pass rate was 80 percent for the fall of 2008, 94 percent for the spring of 2009 and 99 percent for the summer of 2009. There were more than 52,000 users as of September 1 enrolled in more than 11,000 courses from 13 campuses across the state. She said that IDEAL-NM is having a positive impact on the environment and state agency budgets. As budgets are cut, travel is reduced, which leads to more usage of eLearning systems for training and conferencing. Surveys via email were conducted to collect data on usage to answer questions about net benefits of reduced travel and fuel use that eLearning enables. She reported that of the 24,000 public employees surveyed, 10 percent responded and more than 90 percent of the respondents support web-based training and conferencing. She concluded by stating that if 10 percent of New Mexico state employees participated, the state could obtain \$1.1 million in environmental impact-based stimulus money. She expects to have twice that many state employees using IDEAL-NM's web conferencing system, saving 20.4 billion British thermal units.

The committee discussed:

- the cost to public schools for eLearning services;
- potential cost savings through IDEAL-NM;
- free access to the portal;
- virtual schools' and charter schools' access to IDEAL-NM;
- the office for state employee training;
- consolidation of online training;
- telemedicine applications;
- co-matriculation among the state's post-secondary institutions;
- a list of participating school districts;
- that survival of independent public school districts may be dependent on the success of IDEAL-NM; and
- the difference between public school curricula requirements and online curricula requirements.

Energy from Algae Biofuels

Jose Olivares, deputy division leader from Los Alamos National Laboratory, and Vimal Chaitanya, vice president for research and graduate studies at New Mexico State University, addressed the committee about U.S. liquid fuel consumption and the potential size of the U.S. market for biofuels. The United States has 230 million automobiles and uses 25 percent of the world's oil. Dependence on foreign oil will increase 30 percent by 2030 at current projection levels. The country's national security depends on increasing the supply of alternative fuels. However, significant increases in plant-based agricultural biofuels would have significant negative effects on the nation's food production. The amount of land required to replace 50 percent of the nation's petroleum distillate consumption with soybean biofuels would consist of the area of a dozen midwestern states and half of Texas. The same amount of energy

replacement by algae-based biofuels would require only a fraction of New Mexico's land area. Algae are more than 40 times more efficient at lipid production than soybeans or corn, and microalgae is a nonfood source having no impact on crop prices or farmland. Other advantages are that algae generate valuable byproducts; can be cultivated in brackish or impaired water; require less energy and fewer resources to produce; and can be cultivated continuously. New Mexico is particularly well suited to hosting a biofuels industry based on algae.

The committee discussed:

- the best locations for algae production;
- a schedule for commercialization;
- the status of algae biofuel companies in New Mexico;
- the acreage needed for algae production;
- algae strains used;
- a comparison of farmland revenues growing algae instead of crops;
- potential environmental impacts;
- leading research institutions in algae energy;
- investors;
- wildlife impacts;
- the definition of lipids; and
- the potential use of algae to clean wastewater.

Wednesday, September 2

Broadband Service to Public Libraries

Susan Oberlander, state librarian, said that public libraries are often the only choice for internet access by community members and are essential for accessing educational, entrepreneurial and employment resources. Teachers assign homework requiring internet use, employers require that job applications be filed online, the unemployed use the internet to search and apply for jobs and government agencies require individuals to go online for some services. Many social functions now rely on streaming media. A single library patron watching a high-definition video can consume nearly all of a 1.5 Mbps connection, leaving patrons using the library's other computers with intermittent or no access. Almost 60 percent of public libraries nationwide are unable to meet bandwidth demands during peak hours of use. New Mexico has 92 public library systems with 119 physical library locations and three state library bookmobiles to serve more than 1.9 million residents. New Mexico libraries are behind the rest of the nation in connectivity and spending per capita. The state library worked with public libraries on two stimulus broadband grants. Ms. Oberlander is requesting the Science, Technology and Telecommunications Committee to write a letter of support for the federal grant to strengthen the computer capabilities of all public libraries.

The committee discussed:

- coordination under the DoIT;
- costs of and responsibility for fiber connections;
- mobile library access;

The committee adopted a motion to support the stimulus application by the libraries.

- cooperation of broadband providers;
- the role of the Office of the Governor;
- the Public Regulation Commission's role;
- federal regulations on broadband;
- job applications required online;
- the role of the UNM;
- a lack of sympathy for applicants by human resources departments;
- incompatibility of different computer systems;
- dependence on donated computers;
- map of broadband access;
- operating costs for computers and internet services; and
- relations with school districts.

Sandia National Laboratories' Sandia Science, Technology and Engineering Overview

Julia Phillips, director of physical, chemical and nanosciences for Sandia National Laboratories (SNL), provided the committee with an overview of science, technology and engineering programs at SNL. She began by reviewing SNL's history and mission and went on to explain that there are six research foundations that support strategic capabilities: computer science; materials research; engineering sciences; microsystems; bioscience; and pulsed power. Ms. Phillips went on to note that SNL's user facilities, which include the Center for Integrated Nanotechnologies (CINT) and the Computer Science Research Institute, help SNL engage researchers internationally. For example, she pointed out that 50 percent of the users of the CINT are foreign nationals. Finally, Ms. Phillips discussed Sandia's Innovation Corridor, which includes facilities such as the CINT and the Joint Computation and Engineering Lab that allow for greater interaction between the lab and other researchers.

Nanotechnology and Solid-State Lighting

Ms. Phillips provided the committee with an overview of SNL's research on nanotechnology and solid-state lighting. She explained that while lighting accounts for a large share of overall energy consumption, it is not particularly efficient. Ms. Phillips went on to note that solid-state lighting is much more efficient than the incandescent bulbs that are currently in use, pointing out that shifting to solid-state lighting could decrease the electricity consumed by lighting by 50 percent by 2025. However, Ms. Phillips noted that solid-state lighting is currently best suited to colored applications, such as stop lights, and explained that using solid-state technology to replace general lighting will require continued breakthroughs.

Next, Ms. Phillips discussed the CINT in greater detail. She explained that the facility is operated by the U.S. Department of Energy (DOE), but emphasized that it is highly collaborative, allowing other researchers access to tools and expertise. Ms. Phillips went on to note that the CINT's focus is on nanoscience integration. For example, she discussed the CINT's work on tracking quantum dots, or extremely small pieces of matter, in living tissue as one of the ways nanotechnology can be applied to other fields.

Questions and comments included:

- partnerships in solid-state lighting between SNL and the City of Albuquerque;
- the ownership of patents for technology developed at the CINT;
- congressional involvement in SNL's mission: the laboratory must compete with other institutions for federal funding;
- an explanation that quantum dots are a collection of a few hundred atoms;
- LED and solid-state lights are still too blue to be used for general lighting purposes; and
- licensing, rather than patenting, some technology developed at the CINT.

Ms. Phillips also provided the committee with an update on the New Mexico Green Grid Initiative, a partnership between both national laboratories in the state, state and local governments to develop power generation and management technology that makes more efficient use of available resources and better meets increasing electricity demands.

National Institute for Nano-Engineering

Justine Johannes, Duane Dimos and Regan Stinnett, all of SNL, provided the committee with an overview of the National Institute for Nano-Engineering (NINE). They explained that partnerships between research institutions such as colleges, national laboratories and private interests have been identified as one of the keys to making major technological breakthroughs and that innovation institutes have been established across the country to help foster such partnerships. Ms. Johannes, Mr. Dimos and Mr. Stinnett indicated that the NINE is a prototype innovation institute whose mission is to develop the next generation of microtechnology and nanotechnology. They noted that the institute was founded in 2006 and now includes over 13 university partners, including Harvard, the Massachusetts Institute of Technology and Rice University.

Ms. Johannes, Mr. Dimos and Mr. Stinnett went on to discuss the NINE's structure and agreements, accomplishments of some of its initial projects, various student summer programs and selection of a new group of three-year projects on which the institute plans to work.

Questions and comments included:

- student summer programs involving students from New Mexico schools;
- difficulty for New Mexico graduates to gain employment with local national laboratories;
- ways the national laboratories can help rural areas of New Mexico;
- the involvement of laboratories with public schools in New Mexico; and
- the need for synergy to develop between the laboratories and education in New Mexico.

Microsystems and Microelectronics

David Myers, principal deputy director for microsystems science, technology and components at SNL, provided the committee with an overview of the microsystem and microelectronics work being done at SNL. He explained that microsystems involve adding

additional functions to microchips, rather than simply packing more transistors onto them. Mr. Myers also discussed the MESA facility, which he explained is a development and production facility for any microsystem component technology that cannot or should not be obtained commercially, such as microsystems used for weapon life extension and satellite systems. He also outlined some of the microsystem partnerships SNL has entered into and some of the projects currently underway, such as viral bio-sensing and electro-needle technologies.

High-Performance Computing and Informatics

Bruce Hendrickson, senior manager for computer science and mathematics at SNL, provided the committee with an overview of the high-performance computing and informatics research being conducted at SNL. Mr. Hendrickson pointed out that SNL is a leader in parallel computing and explained that the field of informatics is growing in importance. For example, Mr. Hendrickson noted that cybersecurity and the military and the environment involve sifting through particularly large amounts of data, and that the algebraic algorithms developed at SNL are showing promise in data mining.

Questions and comments included:

- cultural and legal aspects of data aggregation and mining;
- workloads of the Sandia supercomputer versus that of the one owned by New Mexico;
- other potential applications for data mining; and
- that data exploration allows for understanding of data in a richer way.

Solar Energy and Smart Grid Technology Research

Rush Robinett, senior manager of the energy and infrastructures group at SNL, provided the committee with an overview of renewable energy in New Mexico. He explained that New Mexico has two major renewable sources, wind and solar, and that wind energy has been fairly well exploited. Mr. Robinett went on to explain that solar energy is currently not as viable as wind, particularly because of the dropoff in production and dependability that comes with events such as cloudy days. He noted, however, that SNL is involved in the largest solar energy project in the United States to help address some of the dropoff issues.

Mr. Robinett went on to note that smart grid technology presents another means of managing the dropoffs in solar energy productivity by allowing for management of power grids in real time to better handle peak load demands. He noted that the current lack of a means to store renewable energy means that it cannot be used to satisfy baseload demands, but that asking power users to help manage loads through more efficient power usage helps keep loads lower and more even, rather than peaking at certain times of day.

Questions and comments included:

- storage limitations for renewable energy sources;
- AC and DC power compatibility issues and Texas' use of its own DC power grid preventing the export of some energy from New Mexico to Texas;
- the efficiency of tankless water systems;

- energy consumption rates and the likelihood of changing the behavior of power consumers; and
- that the relatively low cost and high quality of available electricity means higher demand for it.

Technology Partnerships

Hal Morgan, senior manager for industrial partnerships and strategy at SNL, provided the committee with a brief discussion of industrial partnerships involving SNL. He emphasized that technology transfer is a DOE and SNL mission and listed several of the mechanisms available to transfer technology from research applications to production. For example, Mr. Morgan cited a partnership between SNL and Goodyear tires that allows the company to digitally model all of its tire designs before it orders molds for them. Mr. Morgan also noted some of the partnerships between SNL and New Mexico entities, such as helping Giggling Springs in Jemez to use heat generated by area hot springs to heat cabins, saving up to \$2,500 per month in propane costs.

Questions and comments included:

- that barriers standing between SNL and increased work to benefit New Mexicans include regulatory hurdles that hamper energy transmission expansion;
- mechanics of public/private partnerships;
- the use of supercomputers by New Mexico entities; and
- the tendency of research to constantly move in new directions.

There being no further business, the committee adjourned at 1:15 p.m.