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

October 18, 2018
Lobo Rainforest Building
University of New Mexico
101 Broadway Blvd. NE
Albuquerque

October 19, 2018
Village Council Chambers
660 Main St. NW
Los Lunas

The fifth meeting of the Science, Technology and Telecommunications Committee (STTC) was called to order by Senator Michael Padilla, chair, on October 18, 2018 at 9:10 a.m. at the Lobo Rainforest Building at the University of New Mexico in Albuquerque.

Present
Sen. Michael Padilla, Chair
Rep. Candie G. Sweetser, Vice Chair
Sen. William F. Burt
Rep. Kelly K. Fajardo
Rep. Jason C. Harper (10/19)
Sen. Mark Moores
Rep. Debra M. Sariñana (10/18)
Rep. Linda M. Trujillo (10/18)

Absent
Rep. Daymon Ely
Sen. Bill B. O'Neill
Rep. Gregg Schmedes
Sen. William P. Soules
Rep. Monica Youngblood

Advisory Members
Sen. Craig W. Brandt
Sen. Carlos R. Cisneros
Rep. Bill McCamley
Rep. Debbie A. Rodella
Sen. Nancy Rodriguez

Sen. Jacob R. Candelaria
Rep. Stephanie Garcia Richard
Sen. Ron Griggs
Sen. Richard C. Martinez
Sen. Mary Kay Papen
Sen. William H. Payne
Rep. Nick L. Salazar
Sen. Bill Tallman
Rep. Carl Trujillo
Sen. Peter Wirth

Guest Legislators
Sen. James P. White (10/19)
Rep. Alonzo Baldonado (10/19)

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

Staff
Mark Edwards, Legislative Council Service (LCS)
Ralph Vincent, LCS
Sara Wiedmaier, LCS

Guests
The guest list is in the meeting file.

Handouts
Handouts and other written testimony are in the meeting file.

Thursday, October 18 — Albuquerque

Welcome and Introductions
Senator Padilla welcomed everyone to the fifth meeting of the STTC for the 2018 interim and invited members of the committee and staff to introduce themselves.

University of New Mexico (UNM) and UNM Health Sciences Center (HSC) Research Master Plan
Dr. Gabriel P. Lopez, vice president for research, UNM, and Dr. Richard S. Larson, executive vice chancellor, UNM HSC, discussed research objectives, initiatives and funding sources for the UNM Office of the Vice President for Research (OVPR) and the HSC. Dr. Lopez began by sharing that UNM is ranked as a top research university for underrepresented minorities in science, technology, engineering and mathematics (STEM) fields. With the goal of enhancing the capacity, competitiveness and impact of research at UNM, the OVPR assembled a committee of faculty and staff from various colleges to develop a research strategic plan, titled "Research 2020", that will focus on research excellence, human capital, infrastructure, government and corporate relations. He stated that the committee identified three emerging research areas of focus: renewable energy, sociocultural place-based research relating to the Southwest and water in the West.

Dr. Lopez next discussed funding sources and collaboration among research universities and state, federal and private partners. He noted that grants are often contingent upon cost sharing by the state. The OVPR is seeking a legislative appropriation to provide matching funds needed to receive research grants from a public or private source, as was the intention behind Senate Bill (SB) 115 (2018), which did not make it to the floor for a vote. Dr. Lopez emphasized the importance of the relationships between the OVPR and the national laboratories, as the laboratories provide relevant research experience for students and employ many graduates from UNM. He mentioned that these relationships may change in the near future because of new management at the laboratories.

Dr. Lopez highlighted the top ten funding agencies for research at UNM for the past five years, noting that more than one-half of the funding came from federal sources such as the

National Science Foundation (NSF), the U.S. Department of Defense (DOD) and the National Institutes of Health (NIH). He explained that New Mexico is no longer eligible for the NSF's Established Program to Stimulate Competitive Research funding, which is a main factor in the decline of grants being awarded from fiscal year (FY) 2017 to FY 2018. Dr. Lopez noted that research grants and contracts greatly contribute to the overall revenue of UNM. He also noted that the UNM main campus has seen a consistent decline in faculty members in the past few years because there have not been any substantial pay raises.

Dr. Lopez referenced the Grand Challenges Initiative proposed by Dr. Garnett Stokes, president, UNM, which would garner significant funding to enhance the prominence of UNM as a research institution and address critical issues throughout the state and beyond. Dr. Lopez noted some other OVPR-led initiatives to support faculty research efforts, such as grant development workshops and interdisciplinary research centers. He mentioned the significant economic impact of research centers both in creating jobs and generating income for the state.

Dr. Larson then addressed the background, mission, partners and funding trends of the UNM HSC. The HSC is an academic health center that combines research, education and a health delivery system to provide health care to the public and educate health workers. He stated that research projects at the HSC are predominantly disease-focused; signature programs include brain and behavioral illness, environmental health sciences and child health research. To supplement minimal discretionary funds, the HSC has made strategic investments to obtain designation as a National Cancer Institute-Designated Cancer Center and secure the Clinical and Translational Science Award from the NIH. Citing an increase in available grants under the federal Patient Protection and Affordable Care Act (ACA), Dr. Larson highlighted that the HSC has a 58 percent success rate in grants awarded, compared to the national rate of 10 percent.

With numerous research sites across the state, Dr. Larson described all of New Mexico as the HSC campus. The HSC is seen as a leader among other public universities within the Mountain West Research Consortium (MWRC), he said, and it is currently working to broaden these regional partnerships. As a result of public-private partnerships, 25 new companies were started in New Mexico from research at the university. He noted that the HSC is actively working to obtain federal opioid-directed funding and that its top three legislative funding priorities are geriatric care, behavioral and mental health care regarding addiction and child well-being.

Responding to questions from committee members, Dr. Lopez said that SB 115 would have appropriated $1 million from the General Fund to the proposed Research Grants Closing Fund, but the bill did not make it out of committee. He suggested that the state universities work more closely with the national laboratories to provide opportunities for students to become familiar with the setting and with research being conducted and to build connections for future employment. He said that of 12,000 employees at Los Alamos National Laboratory (LANL), less than one-half are New Mexicans and even fewer New Mexicans hold top positions. Due to attrition, the labs will need to hire roughly 4,000 employees in the coming years, and the universities should work with the labs to ensure that New Mexico graduates are receiving the necessary training to fill these positions. He also suggested that the legislature appropriate funding to facilitate this collaboration.

A committee member offered to assist in strengthening collaboration between the state research institutions and LANL and requested further analysis from Dr. Lopez to ensure that UNM students are in the running for these future positions.

In response to further questions from the committee, Dr. Lopez listed various projects funded by the DOD and the U.S. Department of Energy (DOE), including biofuels research, development of fuel cell catalysts, artificial intelligence in manufacturing and U.S. Air Force research projects. Regarding the high level of funding awarded for research at UNM from the Children, Youth and Families Department (CYFD), Dr. Lopez explained that this funding is mostly for training and continuing education courses for CYFD service providers and early childhood educators.

In response to a question about brain-specific research, Dr. Larson shared that in 2016, the HSC opened the Memory and Aging Center, which focuses mainly on Alzheimer's disease and other forms of dementia. He noted that the HSC is currently part of a national effort to map the brain for research in cancer and degenerative diseases. When asked about the decline in faculty at UNM, Dr. Larson said that the HSC is also struggling to retain faculty due to low morale and minimal or no pay raises in the past few years.

A committee member asked about the discrepancy in the success rate of grants being submitted under the ACA. Dr. Larson stated that New Mexico has a success rate of 58 percent, compared to the national average of 10 percent, because the HSC has been building up institutional infrastructure and engaging with students and faculty for the past 10 years to improve and facilitate the funding process. As to the recent $9 million grant awarded to the MWRC for bioscience accelerators, Dr. Larson said that the HSC is currently in the planning phase with the other institutions in the consortium and expects to have a site set up at New Mexico State University by the end of 2019, with similar sites located at each of the partner universities.

FY 2018 Fourth Quarter Information Technology (IT) Project Status Report

Brenda Fresquez, program evaluator, Legislative Finance Committee (LFC), updated the committee on IT projects across state agencies and provided committee members with a report titled "Information Technology Status Report, FY2018 Q4", which summarizes progress of ongoing IT projects for various state agencies and provides a description, estimated cost and status update for each project. In addition, the report provides a quick assessment of a project's budget, schedule and functionality using a color scale of red for projects with significant issues, yellow for projects making progress and green for projects meeting all criteria.

Ms. Fresquez highlighted the CYFD's Enterprise Provider Information and Constituent Services (EPICS) project due to its overall red rating. This multiyear project is intended to consolidate the CYFD's legacy system, known as FACTS, and more than 25 other systems into one enterprise-wide web application and will mainly focus on the Early Childhood Services program. Ms. Fresquez explained a few of the reasons for the overall red rating for the EPICS project, such as a loss of key CYFD IT staff and scaling down of the original scope of the project. She stated that the LFC is concerned that although the CYFD considers the EPICS project complete, it is requesting an additional $30 million to integrate its legacy system into the

enterprise-wide application because it considers this to be a separate project. She noted a few other reasons for agencies with red ratings, which included delays in Department of Information Technology (DoIT) or contract approval, remaining manual processes and a lack of standards or plan.

Responding to questions from committee members, Ms. Fresquez said that the Regulation and Licensing Department (RLD) wants to replace the Construction Industries Division permitting and inspection software (Accela) with an in-house system rather than a commercial off-the-shelf solution, but she said that the current software is still available on the market and works well in other states. She suggested that the RLD and the CYFD collaborate on a comprehensive system. She said that the state should upgrade to the Accela cloud platform rather than replace the current system. She added that the DoIT has been in the process of implementing a statewide cloud policy since the beginning of the current administration.

In response to a question about meeting budget and schedule benchmarks, Ms. Fresquez cited the Taxation and Revenue Department's (TRD's) Severance Tax Replacement Project as a good model for best practices. She listed a few of the reasons New Mexico struggles with IT projects, such as:

- a lack of oversight and accountability;
- high vacancy rates for IT positions across state agencies; and
- the many DoIT policies and procedures that need updating, including the cloud policy.

There was a request for Ms. Fresquez to provide the committee with a report on current IT vacancies in each agency and an update on any progress with the cloud policy.

Meet Olli, Local Motors' Cognitive Low-Speed Autonomous Shuttle

Mitchell Menaker, vice president of global sales and business development, Local Motors Inc. (LM), discussed the background of LM and its latest product, Olli, the world's first self-driving, co-created, electric and cognitive vehicle. Founded in 2007, LM is a ground mobility company that seeks to provide sustainable, accessible transportation for all. Mr. Menaker stated that LM is dedicated to open-source technology and collaboration among industry leaders and has partnered with companies such as Robotic Research, IBM and Allianz Group in the development of Olli. He said that LM is geared toward local development and rapid innovation through small-batch manufacturing of products at a network of microfactories, including locations in Tennessee and Arizona.

Beating out more than 400 other designs, Olli is the result of the Urban Mobility Challenge: Berlin 2030, hosted by LM in 2015 to address the challenge of mobility in dense urban areas. A major advantage of Olli is the adaptable design that allows customers to co-create and customize their vehicles. Olli utilizes light detection and ranging to monitor 360 degrees at all times and is also monitored by a human controller to ensure the safety of passengers. Up to 30 percent of each vehicle is currently manufactured with LM 3D-printed parts, with the goal of increasing to 90 percent by 2020 when the vehicles are ready for commercial sale.

Mr. Menaker then discussed the levels of autonomous driving, ranging from a level zero, which describes vehicles completely operated by the driver without any assistance, to a level five for complete automation, which does not require any human action. He stated that as a result of LM's partnership with Robotic Research, Olli is the first vehicle on the market to achieve complete automation and is the only vehicle in the world to demonstrate obstacle avoidance.

Mr. Menaker noted that with the proliferation of autonomous vehicle (AV) technology, state laws will have to be adjusted to ensure protection and safety of passengers in vehicles that fall in between specifications for low-speed electric vehicles and buses and for now is restricted to private spaces for deployment. He highlighted a few other challenges in bringing Olli to market, such as the current cost of the vehicle, the limited production capacity of the microfactories and potential issues in extreme cold or other inclement weather. Despite negative press of AV collisions, he noted that in all of these incidents, it was the failure of the operator or another vehicle. He said that LM hopes to see Olli deployed in New Mexico by 2020 but will need permits from the Department of Transportation (DOT) or a change in federal policy to meet crash-test requirements and allow for AV access to public spaces.

Responding to questions from committee members, Mr. Menaker stated that Olli:

- could be deployed wherever a human could realistically drive, including at a ski resort or in some snow or rain;
- is predicted to cost around $250,000 per vehicle by the commercial launch in 2020;
- has a fully electric engine, and the commercial models will have a 100-mile range that can be fully charged in roughly three hours;
- will initially be deployed on private campuses;
- can currently achieve a maximum speed of 15 miles per hour but is expected to reach 45 miles per hour for commercial applications;
- is currently being adapted for fixed routes and stops;
- can read light signals; and
- is a consumer-experiential ride and can respond to requests and questions from passengers.

Regarding adopting legislation to allow public access for AVs, Mr. Menaker suggested looking at California, Arizona and Florida for best practices and said that a total of 33 states have already passed legislation. A committee member suggested looking at past legislation that allowed golf carts to drive on public roads as a starting point.

HI-STORE: A Consolidated Interim Storage Facility (CISF) for Spent Fuel in Southeast New Mexico

John Heaton, vice chair, Eddy-Lea Energy Alliance (ELEA), and Gerges Scott, consultant, Holtec International, Inc., provided an overview of the proposed CISF for spent nuclear fuel to be located between Eddy and Lea counties. Mr. Scott discussed the history, experience, technology and manufacturing capabilities of Holtec that make it the best company to take on construction and operation of the CISF.

The need for an interim site arises from the failure of the DOE to fulfill its obligations under the federal Nuclear Waste Policy Act of 1982 to provide long-term storage for spent nuclear fuel. As a result, the DOE has paid over $6.2 billion in taxpayer money to electric utilities to safely store spent fuel at reactor sites, many of which are located near shorelines and densely populated areas. Mr. Scott expressed confidence that the site will be safe, secure, retrievable and temporary. He highlighted features of Holtec's storage technology, site layout and project time line. He noted that the U.S. Nuclear Regulatory Commission (NRC) is expected to complete its review and select an interim site by 2020; pending approval of Holtec's application, construction will start immediately, to be ready to accept the first shipment of canisters by 2023.

Mr. Heaton discussed the background of the ELEA, which was formed through a joint powers agreement among Carlsbad, Hobbs, Eddy and Lea counties to collaborate in economic development efforts in the region. He detailed the process and technology that will be utilized by Holtec to ship and store the nation's spent nuclear fuel, adding that the spent fuel canisters have been tested extensively by Sandia National Laboratories (SNL) for road, rail and sea transport. Noting strong local support for the project, Mr. Heaton cited numerous state and area benefits, from high-paying jobs to incentive payments and capital investment in the state by Holtec. He assured the committee that the ELEA carefully vetted many applicants and considered safety record, history in the nuclear industry, technical expertise and financial strength before choosing Holtec to carry out this project on land purchased by the ELEA, midway between Carlsbad and Hobbs. He said that the CISF is expected to accept at least 10,000 units of spent fuel.

In response to questions from the committee, Mr. Heaton stated that there has been mixed support from the ranchers and neighbors that are closest to the proposed site, with the majority protesting the proposal, but said that the ELEA and Holtec are going into the community to educate people about the project. He stated that seven of the 12 voting members of the Radioactive and Hazardous Materials Committee expressed strong support for the Holtec proposal.

Addressing further questions, Mr. Scott stated that the NRC is the sole regulatory authority of commercial nuclear materials and that it is very serious and diligent about protecting the health and welfare of the public. He said that the NRC received roughly equal amounts of support and dissent for the Holtec proposal during the public comment period.

Cybersecurity Challenges for State Government

Dylan DeAnda, senior director, technical account management, Tanium, Inc.; Shawn Munoz, director, technical account management, Tanium, Inc.; and Tim Howell, director, strategic accounts-government, Tanium, Inc., discussed their company and cybersecurity challenges for state government. Tanium is a security, operations and communications platform that provides cybersecurity solutions for current and future risks to federal and state governments, such as all four branches of the military and the states of Colorado and California.

Mr. Howell emphasized the ever-growing importance, complexity, cost and risk of technology and its role in government, noting that New Mexico is one of the states most at risk

for cyber attacks. He stated that Tanium addresses threat detection and response, providing states with a platform to address IT problems in real time. Mr. DeAnda highlighted the multi-phase approach of the Tanium platform, including identification and monitoring; detection and response; and restoration of services.

Mr. Munoz discussed the internal and external forms of disruption that state governments may face and how governments should respond to these disruptions by focusing on business resilience management to reduce frequency, minimize severity and accelerate recovery. He said that Tanium is able to identify and neutralize threats and restore services within 48 hours due to Tanium's foundational capabilities.

To improve IT health and cybersecurity in New Mexico, Mr. Howell suggested that the state develop statewide, consistent standards for IT resilience; increase budgetary focus on cybersecurity; improve education and visibility for constituents and departments; complete a statewide cybersecurity assessment; and take a platform approach in implementing an IT strategy.

Responding to questions from the committee, Mr. DeAnda suggested that the DoIT should oversee the various agencies and their individual systems and compile them into one uniform system. He said that Tanium is capable of monitoring internal threats, such as stored or remote access to important information by employees, especially during and after layoffs.

Regarding to the 23 percent vacancy rate for positions within the DoIT, Mr. Howell stated that a single, overarching, easily accessible platform is especially important for agencies with limited staff resources. Responding to another question from a committee member, Mr. Howell stated that cyber attacks can pose serious risks beyond financial information and could target personal information as well, potentially affecting law enforcement, the CYFD and other important institutions.

There was a request by a member for Tanium to present to the incoming DoIT administration.

UNM School of Engineering (SOE) Internship Programs

Dr. Edl Schamiloglu, associate dean for research and innovation and special assistant to the provost for laboratory relations, UNM SOE, and Dr. Tariq Khraishi, associate professor, Mechanical Engineering Department, UNM SOE, provided a brief overview of the SOE. Dr. Schamiloglu stated that the UNM SOE is ranked thirty-second in the country and is the most affordable. He shared that a major goal of the SOE is to connect students with internships at companies in their areas of study early in their programs.

Dr. Schamiloglu shared that economic development is a top priority for the SOE. He said that a small portion of SOE funding goes to administrative costs but the majority goes toward attracting companies to host interns. SNL and LANL are looking for more UNM graduates to fill future positions, with LANL specifically looking to fill about 2,000 Ph.D.-level positions over the next few years. Dr. Schamiloglu cited the success of the NSF's STEM Talent

Expansion Program (STEP) in getting undergraduates interested in science and engineering and increasing SOE graduation rates.

Dr. Khraishi then presented a research and public service project to the committee, requesting funding to implement an engineering, technology and computer (ETC) internship program. The ETC program will build on the success of the STEP, which focused on internships and resulted in improved grade point average attainment, retention and graduation rates. Dr. Khraishi provided a copy of his published study on the impact of STEP internships on retention and graduation rates of undergraduate students. He also noted past support by legislators for the STEP and the resulting economic stimulus and job creation in New Mexico.

The goals of the ETC program will include an undergraduate retention rate of 50 students per year and a graduation rate of 12 students per year with STEM degrees. Dr. Khraishi stated that the majority of the budget being requested would fund student internships; the remainder would go to staffing costs for advertisement of the program and recruitment of partner companies and agencies to host interns. He said that the ETC program would only partner with New Mexico corporations and would boost economic development throughout the state.

In response to questions from the committee, Dr. Schamiloglu shared his observation that most students do not want to leave New Mexico but struggle to find high-paying jobs, or sometimes any jobs, in the state. By engaging students in internships at local companies early on, he said that students feel more rooted in New Mexico and gain experience that makes them more viable in the job market. He said that the ETC program would provide students the opportunity to intern with companies in their hometowns, not just Albuquerque. Dr. Khraishi said that any full-time undergraduate student in the UNM SOE would be eligible to apply for the program. He stated that the ETC program is seeking an appropriation of $125,000.

There was a request by a committee member to have female engineers present on STEM opportunities in the SOE and the ETC program to female high school students and a request to provide summer internships for high school students.

Recess

The meeting recessed at 3:34 p.m.

<u>Friday, October 19</u> — Los Lunas

Reconvene

Senator Padilla reconvened the meeting at 9:08 a.m.

Initial Response to Senate Joint Memorial (SJM) 3 (2018): Review of Technical Issues Associated with Opening Roadways to Use by AVs

Charles Remkes, chief, Intelligent Transportation Systems Operations, DOT, shared with the committee the DOT's initial response to SJM 3, which requested that the DOT create and lead an AV committee to review current and developing technology and existing, relevant state policy and then provide a report with policy recommendations for the sale and operation of AVs

in New Mexico. The member agencies of the committee will include the DOT, TRD, DoIT, Department of Public Safety and Public Regulation Commission.

Mr. Remkes discussed the background of AVs. In response to the high rate of crashes resulting from human error, AV technology has rapidly improved and is expected to reduce this rate by roughly 85 percent to 90 percent and would also save up to $190 billion in annual associated national health care costs, reduce pollution and increase mobility options for affected seniors and the disabled community. Mr. Remkes provided the committee with the surface vehicle recommended practice guidelines created by the Society of Automotive Engineers (SAE) and discussed proposed federal legislation. He noted that New Mexico is among 19 states that have not yet enacted AV legislation but added that SJM 3 at least provided a good starting point. He discussed current law, potential issues, anticipated legislative changes and industry projections. He also addressed connected vehicles, insurance concerns and input from the member agencies.

Responding to questions from committee members, Mr. Remkes stated that:

- General Motors and Ford have announced plans for mass production of AVs, to be deployed in designated test sites that are now decided by local jurisdictions rather than the federal government;
- the agriculture community is already using AV test sites;
- the level of autonomy is defined by the level of human interaction required to operate the vehicle, outlined as "dynamic driving task" by the SAE;
- responsibility in the event of an accident is still being discussed, but up to SAE Level 3, human negligence is the clear cause;
- updates to roadways and dedicated short-range communications will be needed for connected vehicles; and
- the Office of Superintendent of Insurance identified three major stakeholders in liability discussions: the insurance industry, trial lawyers and manufacturers.

There was a request from a committee member for a copy of federal legislation regarding AVs.

Development of Anthrax Sensor and Biosample Stabilization

Representative Jason C. Harper, Ph.D., engineer, SNL, presented to the committee on recent work being conducted in his laboratory at SNL. He began by discussing the anthrax sensor designed by his laboratory team to detect anthrax on site. Anthrax is a zoonotic disease that affects humans and animals, but outbreaks are most common in cattle. Between 2005 and 2012, there were 3,057 anthrax outbreaks reported.

Representative Harper referred to the anthrax sensor as a "laboratory in your pocket", a portable device that can detect trace amounts of anthrax without the need for power or pumps and that is easy to use, inexpensive and self-destructing upon completion. The sensor is a step lateral flow assay that received a patent for its novel magnetic-adhesive valves. He noted some of the awards and recognitions that the anthrax sensor has received such as the TechConnect Innovation Award, the R&D 100 designation and *Popular Science* magazine's 100 Greatest

Innovations. Representative Harper briefly mentioned another research project regarding biosample stabilization.

Responding to questions from the committee, Representative Harper said that the anthrax sensor:

- can be used to detect weaponized anthrax;
- is single-use and self-destructing to avoid contamination in the field;
- costs about $30.00 for the materials per unit, but Aquila Technology, an Albuquerque company that licensed technology from SNL, sells each unit for $100 and is hoping to reduce the cost to $40.00;
- is currently being used by the U.S. Department of Homeland Security and U.S. Department of State;
- is being marketed mainly to the agriculture industry;
- will allow for earlier detection and will mitigate loss of crops and life;
- has a shelf life of roughly one year because the proteins and antibodies in the assay will degrade over time but can be kept at room temperature;
- has had very few false negatives and 97 percent to 98 percent specificity; and
- could be commercialized for other bacterial strains, such as black mold or streptococcus.

Tour

The committee toured the Facebook data center in Los Lunas.

Adjournment

There being no further business before the committee, the fifth meeting of the STTC for the 2018 interim adjourned at 4:00 p.m.