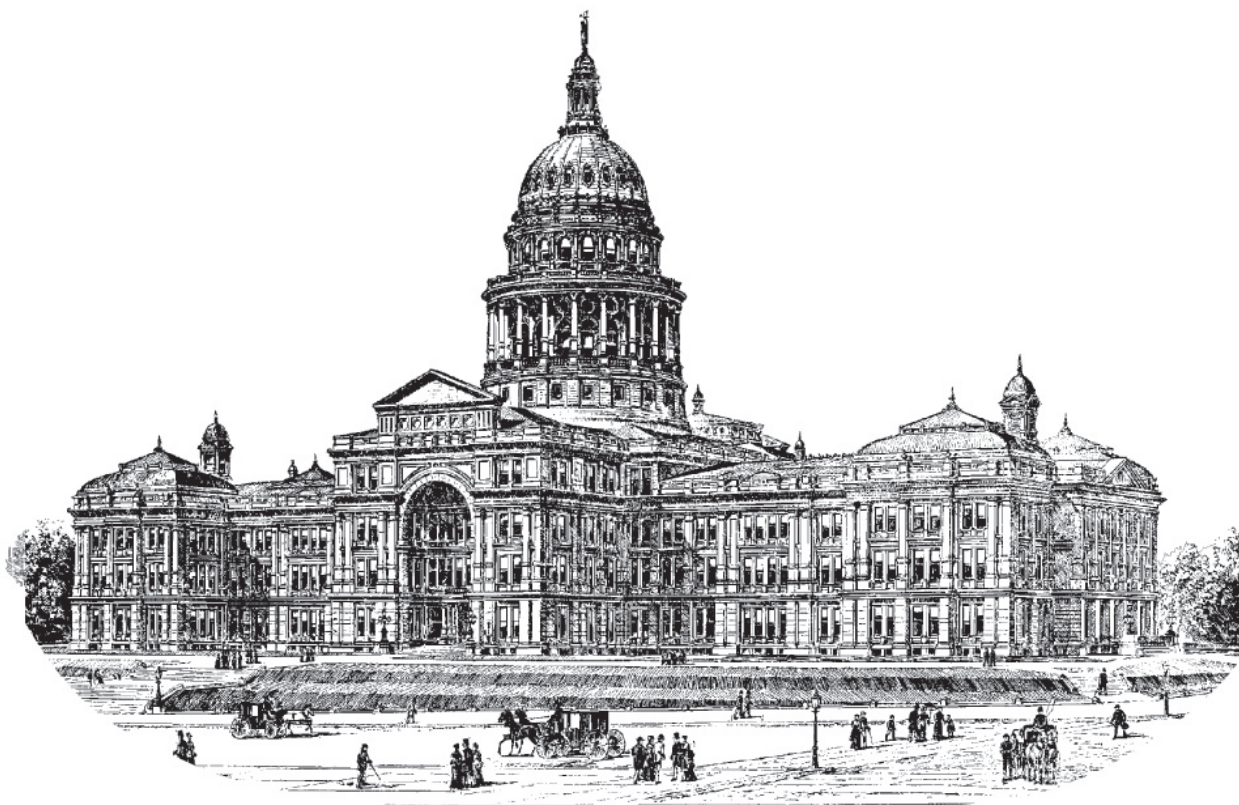




INTERIM REPORT

TO THE 83RD TEXAS LEGISLATURE



HOUSE COMMITTEE ON
TECHNOLOGY
JANUARY 2013

**HOUSE COMMITTEE ON TECHNOLOGY
TEXAS HOUSE OF REPRESENTATIVES
INTERIM REPORT 2012**

**A REPORT TO THE
HOUSE OF REPRESENTATIVES
83RD TEXAS LEGISLATURE**

**AARON PEÑA
CHAIRMAN**

**COMMITTEE CLERK
MARICELA DE LEÓN**



Committee On
Technology

January 4, 2013

Aaron Peña
Chairman

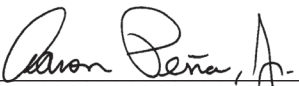
P.O. Box 2910
Austin, Texas 78768-2910

The Honorable Joe Straus
Speaker, Texas House of Representatives
Members of the Texas House of Representatives
Texas State Capitol, Rm. 2W.13
Austin, Texas 78701

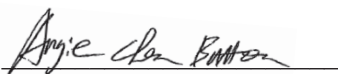
Dear Mr. Speaker and Fellow Members:

The Committee on Technology of the Eighty-second Legislature hereby submits its interim report for consideration by the Eighty-third Legislature.

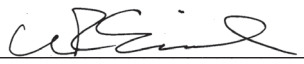
Respectfully submitted,



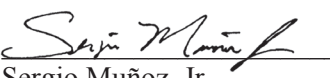
Aaron Peña, Chairman



Angie Chen Button, Vice-Chairman



Rob Eissler



Sergio Muñoz, Jr.

Donna Howard

Angie Chen Button
Vice-Chairman

Members: Rob Eissler, Donna Howard, Sergio Muñoz, Jr.

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INTRODUCTION

At the beginning of the 82nd Legislature, the Honorable Joe Straus, Speaker of the Texas House of Representatives, appointed five members to the renamed House Committee on Technology. The committee membership includes Aaron Peña, Jr., Chairman; Angie Chen Button, Vice Chairman; Rob Eissler; Donna Howard; and Sergio Muñoz, Jr.

During the interim, the Committee was assigned six charges by the Speaker:

- 1) Examine ways to create incentives for technology companies to come to Texas, including the feasibility of public-private partnerships. The study should include: the economic impact of the high-tech industry in Texas and the state's ability to compete with other states for high-tech jobs; examine the state's current areas of differentiated technology research and development and recommend strategies to capitalize on that intellectual property and commercialization; and to include strategies to attract Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) funding to Texas;
- 2) Examine the benefits and financial costs associated with modernizing 911 call centers with the newest technology to connect dispatchers with callers using mobile means of communication in the fastest and most accurate manner possible during a time of emergency;
- 3) Study the impact of federal broadband expansion programs on rural areas in coordination with the Public Utility Commission's evaluation of the state Texas Universal Service Fund and the Federal Communications Commission's national broadband plan;
- 4) Examine methods of cloud computing technology to streamline agency operations and generate greater efficiencies for more cost-effective operations. (*Joint with the House Committee on State Affairs*);
- 5) Monitor the agencies and programs under the committee's jurisdiction and the implementation of relevant legislation passed by the 82nd Legislature.
- 6) Examine human resource policies of state agencies that would integrate the implementation of social media to strengthen the state's workforce.

The Committee wishes to extend its gratitude to the agencies, associations and the individuals who appeared before the committee in public hearings, offered background information and testimony and contributed to the completion of this report. Special appreciation is extended to staff members Maricela De León, Mikael Garcia, Victor Garza, Shaine Mata and Orlando Salinas for their assistance in preparation of this report.

HOUSE COMMITTEE ON TECHNOLOGY INTERIM STUDY CHARGES

- CHARGE ONE** Examine ways to create incentives for technology companies to come to Texas, including the feasibility of public-private partnerships. The study should include the economic impact of the high-tech industry in Texas and the state's ability to compete with other states for high-tech jobs. Examine the state's current areas of differentiated technology research and development and recommend strategies to capitalize on that intellectual property and commercialization. Include strategies to attract Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) funding to Texas.
- CHARGE TWO** Examine the benefits and financial costs associated with modernizing 911 call centers with the newest technology to connect dispatchers with callers using mobile means of communication in the fastest and most accurate manner possible during a time of emergency.
- CHARGE THREE** Study the impact of federal broadband expansion programs on rural areas. Coordinate this review with the Public Utility Commission's evaluation of the state Texas Universal Service Fund and the Federal Communications Commission's national broadband plan.
- CHARGE FOUR** Examine methods of cloud computing technology to streamline agency operations and generate greater efficiencies for more cost-effective operations. *(Joint with the House Committee on State Affairs)*
- CHARGE FIVE** Monitor the agencies and programs under the committee's jurisdiction and the implementation of relevant legislation passed by the 82nd Legislature.
- CHARGE SIX** Examine human resource policies of state agencies that would integrate the implementation of social media to strengthen the state's workforce.
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CHARGE ONE

Examine ways to create incentives for technology companies to come to Texas, including the feasibility of public-private partnerships. The study should include the economic impact of the high-tech industry in Texas and the state's ability to compete with other states for high-tech jobs. Examine the state's current areas of differentiated technology research and development and recommend strategies to capitalize on that intellectual property and commercialization. Include strategies to attract Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) funding to Texas.

BACKGROUND AND INTERIM STUDY

Beginning in the summer of 1958 with the invention of the integrated circuit by Jack Kilby at Texas Instruments, Texas has enjoyed a rich history leading technological innovation. The technology industry remains an integral part our state's economic foundation

Recognizing the importance of technology to the continued success of the state economy, Governor Rick Perry in 2004, established The Texas Industry Cluster Initiative which serves as a Texas model for public private partnerships.

"This cluster initiative is important because for the first time in the history of this state, we will have a coordinated, market-driven economic development strategy that focuses on areas where we have the greatest growth potential and focuses on fostering that potential."

-Governor Rick Perry

The assessment phase of this initiative actively engaged a broad cross-section of over 700 stakeholders throughout the state. Collectively, the findings and recommendations call for strategies to develop a skilled workforce, a competitive education system, and an effective commercialization process for products and technology supported by a highly efficient supply chain.

This cluster initiative identifies Texas' six target industry clusters to include: Advanced Technologies and Manufacturing; Aerospace and Defense; Biotechnology and Life Sciences; Information and Computer Technology; Energy; and Petroleum Refining and Chemical Products. It is evident that technology as a key component to the future success of these industries in the state of Texas. A strong foundation and leadership is essential to strengthening the state's economic development priorities within "Industry, Academia and Government."

On March 30, 2012 the committee met in Austin to take invited testimony to examine ways to create incentives for technology companies to come to Texas, including the feasibility of public-private partnerships. Represented in the invited testimony was the Texas Workforce Solutions, University of Texas at Dallas, Department of Rehabilitation Services Project HIRE, Mission Economic Development Corporation & Economic Development, NASA, University of Texas at Austin, McAllen ISD, Arlington Chamber of Commerce, Access Granted Technology Services, Texas Workforce Commission, Department of Information Resources, Greater Mission Chamber of Commerce, St. Phillips Community College, AT&T - TechNet and The Texas Council for Developmental Disabilities.

COMMITTEE FINDINGS AND RECOMMENDATIONS

Public Private Partnership

The Committee heard testimony from various public and private stakeholders. The Department of Information Resources recognizes the critical role technology plays in government and the economy. To demonstrate this role DIR has been active in engaging with key leaders within the state, institutions of higher education, federal and local governments and private industry to assess needs, develop solutions and stay abreast of critical news and developments. Every odd year DIR establishes a state strategic plan (SSP) for information resource management. This plan establishes statewide direction for using and managing information resources over the next five years. Information was gathered from public and private business leadership and technology stakeholders in April 2011 for the upcoming 2012-2016 plan. More information on the plan may be obtained through DIR official website.

The importance of technological growth in the state cannot be understated. The technology industry was referenced as being "far more diverse and increasingly interdependent that it was just a few years ago¹." The high tech industry is led by companies like Apple, Yahoo, or Google but the importance of application developers like Tabbed Out and DocBookMD, that happen to be Austin homegrown companies, should not be overlooked. Innovative partnerships within the private industry community are what help make ideas become a reality.

A good example of the technology industry collaborating with other industry and state partners for research and development is the AT&T Foundry, an innovative partnership between AT&T, the developer community and Alcatel Lucent. Public policies and private sector initiatives that spur our innovation-driven global competencies are absolutely vital to Texas if it is to remain prosperous².

In the pursuit of establishing private-public partnership the The Texas Workforce Commission (TWC) is a collaborating partner in economic development efforts for the State of Texas. TWC is part of a local/state network coupled with planning and service provisions on a regional level by 28 workforce boards. The state understands global competition is increasingly based on knowledge based talent and the ability to commercialize new technologies into high growth industries. TWC is an active participant in the development of industry-based public-private partnerships and customized training programs offered through the Skills Development Fund.

For example, the completion of the Shuttle program at NASA meant that some 4,000 individuals were left to find new careers. The Gulf Coast Workforce Board established the Aerospace Transition Center in Webster, to assist people in making the transition to other industries. They used innovative approaches that involved social media, web-based "virtual" job fairs, and knowledge based resumes, as opposed to the traditional job title-based resume, to identify key skills needs, offer targeted training and move people quickly into new positions with regional employers. Of the 3,000 workers laid off to date, some 1,800 have been placed in the region. Recognizing that job placement alone underestimated the potential economic impact of the talent and technical know-how the people possess, TWC along with the multitude of public and private sector partners has sponsored a series of "summits" on innovation and technology transfer.

These summits brought together industry executives and JSC senior managers to discuss the possibilities of tech transfer, joint research and building the technical capabilities and reputation of Texas and JSC³.

The Texas Council for Development Disabilities testified before the committee on partnerships and employment opportunities. TCDD is dedicated to improving the lives of over 450,000 Texans with developmental disabilities by encouraging policy change so that people with disabilities have opportunities to be fully included in their communities and exercise control over their lives. Recognizing the importance on capitalizing on technology, TCDD initiated collaboration with private technology companies and people with developmental disabilities to increase the level of creativity involved in the design and marketing of technology. The Working with HEART technology project will create an interactive mobile application to promote competitive employment opportunities in inventory, requisitions, shipping and receiving (and similar jobs) for adults with developmental disabilities. This collaboration between the HEART programs that educates, trains, and employs adults with developmental disabilities and a technology firm, Blue Lance Group, which creates and designs customized application and software.

Economic Impact of the High-Tech Industry in Texas

The impact of the high tech industry to the Texas economy and the state's ability to compete with other states for high tech jobs are crucial to the continued development of the state.

In 2005, the Texas Emerging Technology Fund (TETF) was created by the Texas Legislature with the goal of creating more innovative ideas in Texas and keeping them here, from the laboratory to the marketplace. In the years since, the TETF has been instrumental in shaping the high-tech sectors of the Texas economy, and helped strengthen our state's position as a national leader in job creation. The ultimate goal of the Texas Emerging Technology Fund is the diversification and development of Texas' high-tech economy, because the competitive resource of Texas in the future will be our intellectual property and the entrepreneurial expertise of our population. The TETF has been able to provide Texas with an unparalleled advantage in the research, development, and commercialization of emerging technologies.

In a report by Jones Lang LaSalle on "The High Tech Industry" cites the city of Austin as an established high-tech market. Market factors, a positive business climate, a knowledgeable workforce and other local social factors have led high tech companies to want to do business in Texas. A high profile example that market conditions for the high tech industry are favorable in Texas is the investment Facebook has made in Austin.

"High-tech is a bright spot in an otherwise gray economic picture. Jobs in this industry have grown nearly four times faster than the overall economy during the past 18 months. Cities with large concentrations of high-tech jobs in the growing mobile, search, social media, and cloud computing categories have seen needle moving impacts on office property market fundamentals⁴."

Furthermore, the app based economy and the jobs created are indicative of where the industry is going as mentioned by TechNet. For example, Texas ranks #4 and far behind California. The

investments by AT&T, Verizon and others made in wireless infrastructure and network architecture now allows people to talk, text, email, surf, share, commercialize and socialize ourselves and our businesses online. The economic impact the wireless providers made in the transition from 2G to 3G to 4G LTE network can be measured in job creation of roughly 1.6 million new jobs from April 2007 to June 2011⁵. An analysis by NDN estimates that for each 10 percent increase in the penetration rate of 3G and 4G wireless technologies and devices, more than 231,000 new jobs could be added to the U.S. economy within a year.

The Texas Workforce Commission has established public-private partnerships through various diverse programs from the JSC to institutions of higher education to the Eagle Ford Shale. The economic impacts of these industries to the state are outpacing jobs being lost. TWC has recently issued a Skills Development grant to Lone Star Community College for a consortium of service companies working in the shale to provide training for over 450 employees. Technical course for these specialized manufacturing processes include computer numerical control training, programmable logic controller, and magnetic particle testing⁶. The economic impact on the region for this \$750,000 grant is estimated at more than \$6.6 million.⁷ Skills development grants that support technology sectors of the state's industry clusters include a grant to the Alamo Community Colleges for training at Rackspace in San Antonio. Over 4,000 new jobs were created at Rackspace, and the economic impact of the training in San Antonio and South Texas was over \$134 million.

Texas needs to continue to invest in workforce training, in the development of private-public partnerships and programs like the Emerging Technology Fund in order to remain a leader in the global technology industry.

CHARGE TWO

Examine the benefits and financial costs associated with modernizing 911 call centers with the newest technology to connect dispatchers with callers using mobile means of communication in the fastest and most accurate manner possible during a time of emergency.

BACKGROUND AND INTERIM STUDY

The Commission on State Emergency Communications (CSEC) is an agency of the State of Texas charged with oversight of the Statewide 9-1-1 and Poison Control Programs. The Commission consists of 12 members representing various public and private sector interests. Members are appointed by the Governor, Lieutenant Governor and the Speaker of the House to represent Cities, County Government, and Emergency Communications Districts. Three of the members are ex-officio and represent State Agencies. The Commissioners serve until such time as they are replaced or reappointed.

In 1967, the President's Commission on Law Enforcement and Administration of Justice recommended that a single number be established for reporting emergencies. In 1968, the telephone industry agreed on the digits 9-1-1 as the universal emergency number.

The Commission on State Emergency Communications (CSEC) was created by the 70th Texas Legislature in 1987 to implement and administer 9-1-1 services throughout the state. At that time, certain 9-1-1 emergency communications districts (ECD) and 9-1-1 ECD Municipalities were providing 9-1-1 service within their boundaries. In order to provide 9-1-1 service to all citizens of Texas, the CSEC implemented service to the remainder of the state with a program administered through the twenty-four Regional Planning Commissions (RPC).

The current 9-1-1 system, while working well today, is approaching the end of its useful life. It uses convoluted systems to deliver 9-1-1 calls and location data for landline voice, landline teletype/telecommunications device for the deaf (TTY/TDD), wireless/cellular voice, and VoIP 9-1-1 to the Public Safety Answering Point (PSAP). Each introduction of a new access technology (e.g, wireless) or expansion of system functions (e.g., location determination) requires significant engineering and system modifications.

The Commission on State Emergency Communications (CSEC) Next Generation 9-1-1 Master Plan was developed to communicate the vision of the Texas NG9-1-1 System and the transition effort so that stakeholders may be actively engaged in its development and deployment. It also charts the course of CSEC initiatives and activities on this extensive, multi-year effort to ensure successful transition.

The CSEC requested and received funding for Next Generation Planning in the FY2008-09 Legislative Appropriation Request (LAR). Employing the services of an outside contractor and engaging 9-1-1 stakeholders, three reports were developed as input to CSECs NG9-1-1 Master Plan, FY 2010-11 Agency Strategic Plan, Statewide 9-1-1 Strategic Plan and LAR, and the interim charge by the House Committee on Law enforcement. The reports are:

- Texas NG9-1-1 Needs Assessment report (May 2008);
 - Texas NG9-1-1 System Architecture report (May 2008); and
 - Texas NG9-1-1 System Cost Estimate Report (August 2008).
-

On February 21st, 2012 the committee met in Austin to take invited testimony to examine the benefits and financial costs associated with modernizing 911 call centers with the newest technology to connect dispatchers with callers using mobile means of communication in the fastest and most accurate manner possible during a time of emergency. Represented in the invited testimony were the Commission on State Emergency Communications (CSEC), Capitol Area Council of Governments (CAPCOG), Texas Department of Public Safety (DPS), and Hughes Network Systems.

COMMITTEE FINDINGS AND RECOMMENDATIONS

Next Generation 9-1-1 or NG9-1-1

Currently 9-1-1 service is supported by 3 types of entities: 24 Regional Planning Commissions (RPCs) that manage the state program administered and funded by the Commission on State Emergency Communications (CSEC); 51 Emergency Communications Districts (EDCs) that operate 9-1-1 systems that are independent of the CSEC program; and 26 Municipal Emergency Communication Districts⁸.

Today's 9-1-1 services were built on 1960s technology. Currently, Texas has a limited emergency response because of interoperability; cannot dynamically reroute calls; cannot receive text messages; cannot receive photos or videos; cannot receive crash notification information and cannot share data with other systems. To date there are 240 million 9-1-1 calls per year nationally and 20 million calls per year in Texas. Of the number of calls in Texas, 80 percent of those calls are made by wireless cell phone. Reliability of transfer of calls connects the public to emergency response. Texas has 584 call centers across the state for 9-1-1 calls.

The purpose of the CSEC NG9-1-1 Plan is to ensure the successful transition of all Texas PSAPs from the current 9-1-1 system to the Texas NG9-1-1 System and the management and operation of the system for optimal health and security. The vision of the Texas NG9-1-1 is aligned with the National Emergency Number Association's (NENA) Functional and Interface Standards for Next Generation 9-1-1 Version 1.0 (i3) NENA 08-002 and the U.S. Department of Transportation (USDOT) NG 9-1-1 System Initiative's Concept of Operation.

The Texas NG9-1-1 environment will differ considerably from the current 9-1-1 environment. NG9-1-1 will require an overhaul of all aspects of 9-1-1 from governance to the delivery of services. CSEC will be the planning and implementation coordinating body for the deployment and operation of the Texas NG9-1-1 backbone system. The roles and responsibilities of 9-1-1 stakeholders from PSAPs to state government will likely evolve as NG9-1-1 matures. The CSEC will facilitate the definition of roles and responsibilities of local, regional and state government through stakeholder involvement.

Implementation of NG9-1-1 will entail significant investment, detailed planning, and close cooperation among the public and private sector entities responsible for the operation of 9-1-1 systems. Implementation presents both opportunity and challenge. The opportunity lies in the

ability to enhance a vital public safety service and increase efficiency. The challenge will be able to marshal the resources required to effect the change.

The table below identifies the cost associated with the implementation of NG9-1-1 as testified before the Committee⁹. See below.

Costs for implementing NG9-1-1

ESInet Implementation	\$10.8 million -\$5.4 million NG9-1-1 Federal Grant -\$5.4 million Matching State Funds
ESInet Operation & Maintenance	\$3.3 million requested in LAR for 2012-13 -Revising estimate for 2014-15 LAR

Source: Commission on State Emergency Communication, February 21, 2012

The table below details the benefits of NG9-1-1 in comparison to Today's 9-1-1 and Next Generation 9-1-1. See below.

Benefit of NG9-1-1

Today's 9-1-1	Next Generation 9-1-1
40 year old legacy technology Difficult to adapt to change Proprietary	Future oriented Plug and play Based on open standards
Analogy Fixed-detailed	Digital Dynamic - multi purpose
Primarily voice Limited data capability	Advanced data capability Text, images, crash notification
Local access Limited transfer and back up	Long distance access Expanded transfer and back up

Source: Commission on State Emergency Communication, February 21, 2012

The Texas Department of Safety and Capitol Area Council of Governments are supporters of the NG9-1-1 plan for state integration and implementation to enhance the delivery of 9-1-1 service to Texas citizens. Texas Department of Public Safety has established a partnership with CSEC in obtaining a federal NG9-1-1 grant for the convergence of radio interoperability over NG9-1-1 ESInet network¹⁰.

It is recommended by CSEC and this Committee that NG9-1-1 is needed to modernize 9-1-1 call centers in Texas. Full implementation of NG9-1-1 will be digital, dynamic and multipurpose, enhance interoperability with responders, will include advanced data capability for text and messages; and expanded and flexible transfer and backup. Modernizing the states 9-1-1 system requires an investment to enhance vital public safety services, infrastructure and technology and operation & maintenance.

CHARGE THREE

Study the impact of federal broadband expansion programs on rural areas. Coordinate this review with the Public Utility Commission's evaluation of the state Texas Universal Service Fund and the Federal Communications Commission's national broadband plan.

BACKGROUND AND INTERIM STUDY

In 1987, the Texas Legislature established the TUSF, the Texas equivalent of the Federal Universal Service Fund (FUSF). The current Public Utility Commission of Texas' rules governing Universal Service follow the Federal Universal Service rules. Consumers may have noticed a charge labeled "TX USF Charge" on phone bills. This charge first appeared on customer bills in January 1999. Prior to 1999, TUSF charges were hidden in long distance costs. Today, it is assessed on all Texas local, long distance, pager, wireless, and other telecommunications services. The purpose of the TUSF, as mandated by PURA, is to implement a competitively neutral mechanism that enables all residents of the state to obtain the basic telecommunications services needed to communicate with other residents, businesses and governmental entities¹¹.

Increasing access to broadband services remains a priority for the State of Texas. In 2010 Governor Rick Perry designated the Texas Department of Agriculture (TDA), in consultation with the Texas Public Safety Commission (PSC) and the Public Utility Commission of Texas (PUC), to lead the state's broadband deployment initiatives and specifically represent the interest of all Texans to the National Telecommunications and Information Administration (NTIA).

Texas is a big state with an expansive geography and a diverse and dispersed population. These factors present significant challenges to our state's broadband deployment efforts, and they demand significant levels of investment to extend broadband service to unserved and underserved areas.

On February 21st, 2012 the Committee met in Austin to take invited testimony to study the impact of federal broadband expansion programs on rural areas and coordinate this review with the Public Utility Commission's evaluation of the state Texas Universal Service Fund and the Federal Communications Commission's national broadband plan. Represented in the invited testimony was the Texas Public Utility Commission, Texas Department of Public Safety, Texas Cable Association, Texas Department of Agriculture - Office of Rural Affairs, Texas Library Archives Commission, Connected Texas and Hughes Network Systems.

COMMITTEE FINDINGS AND RECOMMENDATIONS

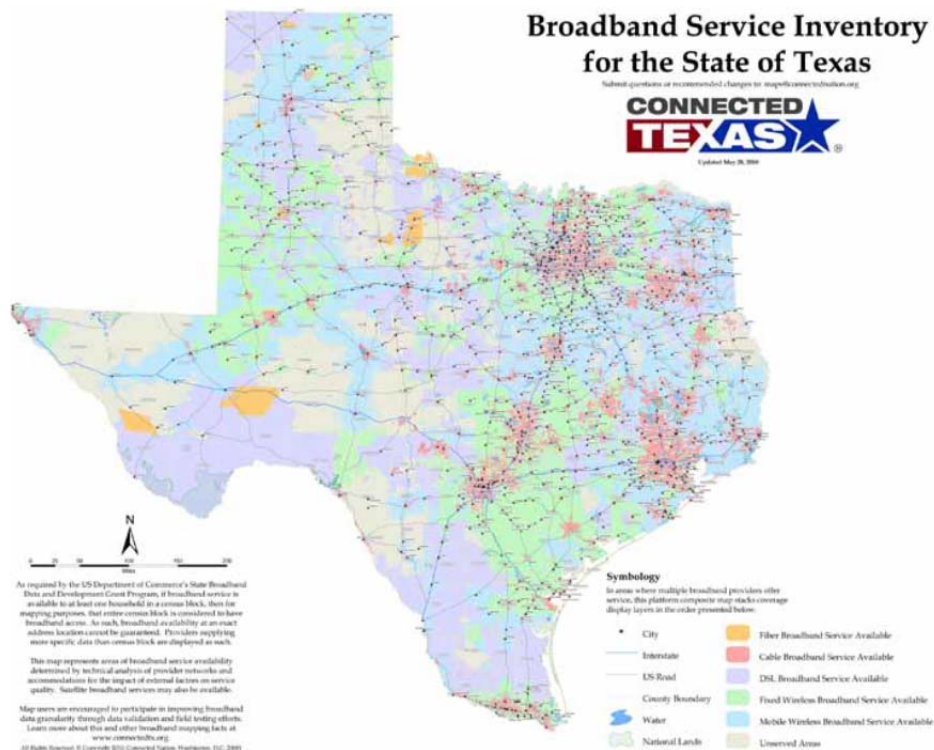
Broadband expansion

For Texas to remain a global powerhouse of production, all Texans need access to high speed internet. In an effort to advance the economic development and improving the quality of life Connected Texas suggests expanding access, adoption and use of broadband across Texas. A Texas businesses with high-speed Internet connections report having median annual revenues \$200,000 more than businesses without broadband¹². Connected Texas, a non-profit organization, is the official Texas State Broadband Initiative, mandated by the Broadband Data Improvement Act of 2008 and funded by the National Telecommunications and Information Agency and the State of Texas. The Texas Initiative is sponsored by the Texas Department of Agriculture and works in partnership with the Texas Broadband Taskforce made up of

representatives from government, education, social services and industry. Connected Texas works with providers and citizens to identify and map the gaps in broadband availability, adoption, and use. Connected Texas guides and supports local broadband planning teams to expand regional broadband access, increase rates of adoption in homes and businesses, and improve digital literacy.

Currently there are an estimated 10 million households unserved by terrestrial broadband services nationwide with an estimated 800,000 in Texas¹³. The number of unserved residents at speeds 768kbps, 6Mbps, and 25Mbps respectively are 630,000; 1,700,000; and 4,400,000.

The original SBDD grant program included two key components: the Broadband Mapping and Planning Programs. In May 2010, Connected Texas produced an inaugural map of the inventory of broadband availability in Texas. Connected Texas collected comprehensive data from broadband providers across the state to create an inventory of the broadband infrastructure in Texas. A key goal was to identify communities and households that remain unserved or underserved by broadband service; this information is essential to estimate the broadband availability gap in the state and understand the scope and scale of challenges in providing universal broadband service to all citizens across the state. The May 2010 Connected Texas broadband map is the first comprehensive inventory of broadband infrastructure in the state. This data can be found in the interactive, online map available at http://connectedtx.org/mapping/interactive_map.php. The inventory will be updated twice yearly with the next upcoming update scheduled for the spring of 2011.



Source: Connected Texas: A Working Report by Connected Texas, March 2011.

In 2001, Connected Texas identified the following accomplishments with respect to broadband expansion. See table below as it depicts 2011 accomplishments and 2012 goals.

2011 Accomplishments	2012 Goals
Convinced numerous broadband providers to supply broadband service to previously unserved communities.	Expansion of broadband mapping and research data to include all broadband sources and more extensive exhibition of key broadband needs in the state.
Assembled a public private partnership between Connected Texas, the Texas State Library and industry leading communication and technology companies to fund a computer distribution incentive and computer/broadband starter kit.	Competition of a series of community technology assessments and actionable plans for resolving identified local broadband needs in the most critical areas in the state.
Data collected and mapped on 81% of state broadband providers.	Establishment of a network of public and private sector organizations and securing their financial support to address recognized broadband issues.
62% of provider's data field validated.	Implementation of a technical assistance program that helps local communities increase broadband access, adoption, and use.
16,634 Community Anchor Institution identified for consideration in future broadband expansion efforts.	

Source: Connected Texas, February 21, 2012.

It is recommended that the state continue to explore opportunities to provide increased access to broadband services to all Texans. The goals laid out by Connected Texas should provide a starting point for policy initiatives for an expansion of broadband services.

CHARGE FOUR

Examine methods of cloud computing technology to streamline agency operations and generate greater efficiencies for more cost-effective operations. (Joint with the House Committee on State Affairs)

BACKGROUND AND INTERIM STUDY

The Committee met at a joint-hearing with the Committee of State Affairs to discuss interim charge #4 on July 10, 2012 in Austin.

CHARGE FIVE

Monitor the agencies and programs under the committee's jurisdiction and the implementation of relevant legislation passed by the 82nd Legislature.

BACKGROUND AND INTERIM STUDY

The Department of Information Resources (DIR) provides statewide leadership and oversight for management of government information and communications technology. The agency was created in 1989 when the Texas Legislature enacted Chapter 2054, Texas Government Code—the Information Resources Management Act. Since that time, the scope of responsibilities increased within Chapter 2054 with the addition of subchapters F, I, J, and K, which address the state electronic Internet portal, and subchapter L that addresses the consolidation of data center services. Two additional sections of the Texas Government Code (TGC) address security requirements (TGC Chapter 2059) and communications technology services (TGC Chapter 2170). TGC Chapter 2059 authorized creation of a network and security operations center and the provision of network security services by DIR for state agencies and others. TGC Chapter 2170 authorized DIR to provide communications services to state agencies.

The Texas Legislature passed bills relating to technology into law during the 82nd Legislative Session (2011). The Texas Department of Information Resources (DIR), through its mission to provide statewide technology leadership and oversight, tracked legislation for technology impact. Once legislation becomes law, it is codified as a statute. Statutes may be located and viewed at Texas Statutes, www.statutes.legis.state.tx.us. DIR composed a technology-related legislation summary that includes bills passed into law only with the exception of vetoed bills. All bills passed during the 82nd Legislative Regular Session except for Senate Bill 1, which passed the First Special Session.

The Emerging Technology Fund (ETF) was created by the Texas Legislature in 2005 at the urging of Gov. Perry to provide Texas with an unparalleled advantage in the research, development, and commercialization of emerging technologies. The Governor has appointed a blue-ribbon ETF Advisory Committee composed of individuals who are industry leaders in Texas, and/or are nationally recognized researchers from Texas' public or private higher education institutions. The appointed members volunteer their time to serve a two-year term. The Committee reviews commercialization and matching grant proposals, and makes recommendations through evaluation processes to the Governor, Lt. Governor, and Speaker¹⁴.

The ETF awards grants in the following three areas: 1) Commercialization awards; 2) Matching Awards; and 3) Research Superiority Acquisition. The goal of the ETF Commercialization Awards is to grow new small businesses and existing businesses to accelerate new products and services to the marketplace. Through these investments, the goal is to ensure a vibrant economy for Texas and a global leadership position. Commercialization awards provide selected, early-stage investments in new, technology-based, private entrepreneurial entities that collaborate with public or private institutions of higher education in Texas, and which, if successful, may provide significant economic benefit to the state. The ETF Research Superiority Acquisition goal is to bring the best and brightest researchers in the world to Texas. This enables our Texas academic institutions to continue to build expertise in key research areas, attract and encourage students to pursue advanced degrees in math, sciences, and engineering, and provide an invaluable resource to the community, especially fostering innovation and commercialization in our companies.

On March 30th, 2012 the committee met in Austin to take invited testimony on the agencies and programs under the committee's jurisdiction and the implementation of relevant legislation passed by the 82nd Legislature. Represented in the invited testimony was the Office of the Governor Perry - Emerging Technology Fund (ETF) and the Department of Information Resources (DIR).

COMMITTEE FINDINGS AND RECOMMENDATIONS

Department of Information Resources

On November 2011, DIR submitted a preliminary report in the agency's Sunset Review. Their DIR Self-Evaluation Report to the Sunset Commission may be viewed online at www.dir.texas.gov. In Texas state government, the Sunset process is the regular assessment of the need for each state agency and its operations. Through this process, the state seeks to identify and eliminate waste, duplication, and inefficiency in government agencies. A 12-member Sunset Advisory Commission reviews the policies and programs of more than 150 state agencies and questions the need for each agency; looks for duplication of other public services or programs; and considers changes to improve each agency's operations and activities. Agencies under Sunset typically undergo review once every twelve years¹⁵.

While DIR went through the Sunset process in FY2011 during the 82nd legislative session, a gubernatorial veto of the Sunset Bill (HB 2499) resulted in another Sunset review scheduled for FY2013. The Self-Evaluation Report (SER) is considered the “kick-off” to an agency’s Sunset review. As a mandated report, the SER requires responses to specific questions and allows the agency to make additional comments. DIR submitted its Self-Evaluation Report to the Sunset Advisory Commission on November 1, 2011. The Commission will begin its review of DIR in August 2012, and has tentatively scheduled the first public hearing on DIR for December 18–19, 2012. The Commission's decision for DIR is expected at its January 9, 2013 meeting.

DIR has served in a leadership role to facilitate the state’s economic competitiveness through its ability to deliver quality information resources commodities and services at the lowest prices and best value for state and local government as well as the K–12 public and higher education systems. On July 6, 2012 DIR updated its Agency Strategic Plan for Fiscal Years 2013-2017 biennial plan, this plan presents DIR’s internal strategic goals, directions, and outcomes to various audiences including state leadership, the general public, the agency’s customer base, and agency employees.

DIR also updated the Committee on its operations from 2011 to present year 2012. In 2011, DIR established the Internal Audit Department. DIR established the Internal Audit department. The 82nd Legislature enacted HB 1504 (82R), effective June 17, 2011, which changed statutory references from “TexasOnline” to “state electronic Internet portal.”

In August, DIR began implementing legislation from the 82nd Legislative Session, as well as issues included in the agency’s most recent Sunset review. DIR is committed to implementing those Sunset recommendations that were not subject to the veto of HB 2499 and that the agency has authority to execute.

In September 2011, DIR created the Cyber Security Education and Economic Development Council, as provided by Senate Bill 988, to facilitate public and private partnerships to improve the infrastructure of the state's cyber security operations, develop strategies to accelerate the growth of the cyber security industry, and encourage cyber security organizations to "call Texas home."

In October 2011, DIR created the Statewide Information Security Advisory Committee (SISAC) as part of the statewide IT Enterprise Security and Risk Management program. The purpose of the committee is to foster collaboration among state agencies on the issue of information security.

In December 2011, DIR completed the reprocurement for TEX-AN services resulting in 10 vendors being awarded contracts providing multiple telecommunications-based services. As a result of the reprocurement, DIR customers now experience expanded services, lower pricing, and greater visibility into their telecommunication services.

Texas.gov received the following recognitions: Gold Screen Award, Technology Solutions Award, ClearMark Award, Best of Texas, GovMarks Awards, Best Fit Integrator, Best of the Web and Interactive Media Awards.

In March 2012, DIR completed the reprocurement of the Data Center Services contracts with three new service providers. This new DCS service delivery model provides increased flexibility to allow state agencies to adjust services to better manage their costs with greater visibility into how services are delivered.

DIR began a public-private partnership pilot to compare cloud services from multiple providers and provision those services through a central self-service portal. The self-service portal or marketplace that offers these cloud services is called the Texas Cloud Self-Service Portal. This portal, the cloud services it provides access to, and the business and technical infrastructure that supports it, are collectively named the Pilot Texas Cloud Offering. The pilot program is designed to drive improvements into the pricing model and the business processes for public entities. It has also allowed DIR to implement legal, operational, and governance conditions for cloud services.

To date in 2012, Texas.gov has received the following recognitions: the ClearMark Award and the International Association of Business Communicators – Austin.

Emerging Technology Fund

Jonathan Taylor, Director of the Texas Emerging Technology Fund testified before the committee to provide information on the recent report of awards made to companies through the TETF. The report may be found at governor.state.tx.us/ecodev/etf/. In summary, six years after its creation, the Texas Emerging Technology Fund is hard at work in laboratories throughout the state and on display in marketplaces across the world, pointing the way to the future of our economy as well as the future of the ways we'll live, work, diagnose and heal.

TETF companies can be found seeking and refining life-saving cancer vaccines and treatments; developing better body armor for our peace officers and members of our armed forces; improving computer server and cell phone technology; coming up with new ways for doctors to monitor and diagnose patients at home; and making our food supply safer and our water cleaner. These investments have helped spark promising ventures in all of these areas of technology, and many more, while drawing the attention – and dollars – of venture capitalists realizing the value and potential of the projects backed in Texas. These ventures have proved these innovative efforts can happen here, and compete with economies in the Northeast, the Pacific Coast and the rest of the world.

TETF investments have also energized and vastly expanded research at Texas' institutions of higher learning, attracting world-class researchers and their research teams from all corners of the globe, and leveraged more than \$762 million in additional funding to fuel research throughout Texas. The TETF investments also build on S.B. 275, passed by the Legislature in 2003, which required the Governor's Economic Development and Tourism Division to identify key industries that would be the engine for job creation and economic development in the 21st Century, and to focus state resources on the development and expansion of those industries. TETF investments have been made in each of those identified clusters: the semiconductor industry; information and computer technology; microelectromechanical systems; manufactured energy systems; nanotechnology; and biotechnology. The benefits of the TETF, already demonstrated in terms of investment activity and expanded research, continue to show value.

CHARGE SIX

Examine human resource policies of state agencies that would integrate the implementation of social media to strengthen the state's workforce.

BACKGROUND AND INTERIM STUDY

Social media is the accepted name of interactive online media that allows visitors to interact with each other. Prior to the common acceptance, the industry referred to interactive online media as Web 2.0 or New Media. Social media was nothing new when it became popular with the general public.

Prior to what is now accepted as social media, there were online forums and listservs. Amazon integrated social interaction in their website by permitting buyers to rate and comment on their purchases, even allowing users to interact with each other. The next development in social media consisted of blogging. Online community managers moderated forums or their own blogs, where readers could leave comments.

The big change in what drives our current version and understanding of social media is that the tables are turned so that the average user is not just a consumer of online content; they are also the content producers. Websites have made it extremely easy for the average person to create online content, which was something only highly technical people could do. Today, websites that allow users to post their own photos, videos, text, or audio are the ones that are booming. Some examples of these are Facebook, Google +, Youtube, LinkedIn, and many more.

Another development that has popularized social media is the dramatic improvement in what mobile phones are able to do. It has been less than ten years since mobile phones have had the capacity to email, browse the web, or even take a sharp photo with autofocus, let alone record video. It is only in recent years that mobile devices could upload photos and video at 3G and 4G speeds.

This simplification of online media production is often called the democratization of technology, or the commoditization of technology. What used to require special knowledge in file transfer, embedding, design, and Internet protocols now only requires a subscription to a free or paid service, and an app or web browser.

This low barrier is what also makes social media a matter of Human Resources concern for any organization, including Texas agencies. Social media has benefitted and strengthened many private organizations through improved collaboration, sharing, and communication. Social Media has also been at the center of controversy when used poorly.

The Technology Committee met on May 17, 2012 at 10 am to hear invited testimony from state agencies exploring social media, including testimony from a staffing professional in the private sector. The committee's goal was to determine the current status of social media usage in state agencies and to determine if any best practices have emerged.

COMMITTEE FINDINGS AND RECOMMENDATIONS

Social Media

Prior to the hearing, the committee was aware that several agencies were already using social media. The state's website, Texas.gov maintains a list of social media links for the various agencies at the following address:

<http://www.texas.gov/en/Connect/Pages/social-media.aspx>

What was not clear, however, was what guidance the agencies were using to manage their social media presence.

The Committee heard from Tom McCarty from Texas Workforce Commission and Eva Esquivel from Workforce Solutions Alamo. They both have roughly the same audiences; consist of job seekers and employers. The Texas Workforce Commission has as an additional audience the local workforce offices, such as Workforce Solutions Alamo.

These agencies mainly use social media to attract visitors to their websites where they have job listings, forums, and advice on how to seek employment or employees. Their objective is to connect employees and employers whose needs match.

Both the state and regional employment agencies manage their social media presence centrally. They do not open up the official accounts to agency employees who are not in their public communication offices. For this reason, content on their accounts is deliberate and safe.

The committee did inquire about any instances in which the use of social media introduced risk to the agencies, such as a constituent being vulgar or revealing private information. Both the state and regional agencies report that such an instance has not occurred; but, they do have a policy to address the incident should it occur. We will address the risks of social media later in this report.

The next witness was Chad Lersch from the Department of Information Resources. Mr. Lersch informed the Committee that his office was leading a group of twenty-seven agencies and two universities in an effort to develop consistent social media guidelines, which had just been published prior to the hearing. They were also in the process of developing a Social Media Toolkit that agencies could use to develop their social media policies¹⁶.

The Social Media Guidelines publication is available at:

<http://www.dir.texas.gov/management/socialMedia/Pages/guidelines.aspx>

Having been through the process of developing the guidelines, DIR was able to give an overview of the process each agency should undergo before delving into social media. Their three areas of focus are strategy, content, and operations.

Strategy

The first step is to conduct a thorough analysis of the agency's business needs to derive the best mix of social media channels to meet their mission. This way, an agency can avoid jumping on the social media bandwagon for the sake of being on social media.

Content

In the Content deliberations, the group realized that there is large variance in the social media needs from agency to agency. Thus, they could not establish a one-size-fits-all approach. This affects what online channels an agency may choose, and what content they will produce to push through those channels.

Operations

Finally, in Operations, the group provides guidance on how agencies will mitigate the risks of social media previously mentioned. The risks inherent in social media include network security, privacy concerns, and legal exposure to issues involving copyright infringement, harassment, discrimination, and statutory requirements such as accessibility.

Network security is a serious concern when it comes to social media. Malware and Trojan viruses have been known to propagate through social media. Opening up agency firewalls to social media sites introduces a risk that multiplies with every single employee and every single social media network they use. The Communications offices that handle social media typically have a separate computer dedicated to social media that is not connected to the agency network in case of a malware infection or other breach. Eva Esquivel from Workforce Solutions Alamo testified that she maintains two computers in her office, one for work, and another off the network just for social media work.

Beyond the technical headaches such malware would cause to an agency network, there is also the potential to expose sensitive information. The problem could come from outside bad actors seeking to infiltrate the network by targeting agency employees with malware, or it could come from within. An employee who has not been briefed on social media policy or simply ignores it could use social media channels to communicate with constituents, other agencies, or publicly with sensitive information.

In this, Dane Reese¹⁷, President of STARK Talent, a recruiting agency, added other concerns from the private sector, such as lost productivity from using social media during work hours, and additional stress on the IT networks from the additional web browsing when using social media. He further added that if an employee behaves badly on the Internet, it's almost impossible to make it go away.

DIR's Social Media Guidelines take into account that bad judgment can have a damaging effect on the agency, the employee, constituents, and ultimately the taxpayers who would pay for legal costs associated with the error. For this reason, the guidelines mostly apply to the official online presence of the agencies; we have not begun to address social media usage by staff who are not a part of the Communications offices of the agencies. There was little discussion on how

employees should conduct themselves on their private accounts.

What further complicates matters in establishing a social media policy is that all interaction is conducted on websites owned by private companies that do not have the same legal requirements state agencies do. This makes records retention and discovery very difficult for the agencies as the websites do not provide easy ways to report on activity for specific timelines. Private websites are also not legally required to make their website accessible to the blind or otherwise impaired as agency websites are.

Finally, the Terms of Service for social media sites typically apply to individual accounts and do not address the needs and circumstances of government agencies. DIR, along with their counterparts in other states, have been working with social media sites to develop Terms of Service for state agencies.

Employees and Social Media

Chad Lersh of the Department of Information Resources and Dane Reese of STARK Talent both testified that employers must make adjustments to workplace policies to accommodate the upcoming Millennial generation workforce, those who are currently under the age of 30. Unlike previous generations, Millennials expect to stay connected to their networks in the workplace. They are accustomed to being constantly connected with their peer and family networks.

Furthermore, they routinely and easily circumvent workplace networks by using their own technology devices to stay connected, whether they are mobile phones or laptops. In the face of such constant electronic presence, there is no clear distinction between an employee's personal and professional life. For this reason, some of the risks mentioned previously may still affect the agencies when an employee misbehaves on personal time.

Lersch and Reese stressed the importance of reviewing social media policies with all employees so that they clearly understand and make clear to their personal networks that they do not speak on the agency's behalf. Human Resources should also make clear what are terminable offenses and what will result in other disciplinary actions. There was even the suggestion that before even getting to that point, it would make sense to review a potential new hire's social media presence to ensure that they are not a risk to the agency.

Most of the testimony revolved around mitigating risks and how agencies can reach out to the public. The final witness, Jeff Clark from Tech America, made a couple of suggestions to improve the performance of the agencies using social media. The first suggestion was that agencies could adopt technology that would allow constituents to provide ratings to agency departments as feedback to help them make improvements on their delivery of services. This way agency staff will know what they are doing right and what could be improved.

Along those lines, Chad Lersh of the DIR mentioned that they have had success using GetSatisfaction.com to improve their interaction with their audiences. GetSatisfaction is a customer service oriented website that could assist Texas agencies in the goal of improving delivery of services as suggested by Jeff Clark¹⁸.

Clark also suggested the possible creation of an internal social network for the State of Texas accessible only to employees. This would enable staff from the different agencies to collaborate on projects and maintain professional relationships across agency boundaries. Such a social network would leverage the natural tendencies of employees who are accustomed to being constantly connected and collaborating with others online.

Clark's final suggestion was that social media offers a great opportunity for data mining. State agencies could search for data regarding public sentiment on certain topics, find out where citizens are dissatisfied with their local agencies, and other useful information.

One issue that Chairman Peña asked of the witnesses, which tangentially falls within the Committee's charge, is whether any guidelines exist for elected officials. Specifically, his concern is that there is no guidance on whether elected officials should post to their personal accounts using state computers and the state network. Whereas an elected official could post official updates relating to his or her office, there may also be occasions where a post is purely self-promotional, bordering on campaign-related. Or even personal posts using state property. The Chairman offered that his office opted to use private computers to post promotional and campaign-related updates, even if it was to the same account used for official announcements. The criteria used in determining which computer to use was the intent of the message. But, Chairman Peña would like to see some guidance for legislators and their staff.

The Technology Committee finds that the Department of Information Resources has made a good start to establishing guidelines that agencies may use in creating social media guidelines. It is the committee's recommendation that the legislature update the Texas Government Code, Texas Administrative Code, and Public Information Act with updated definitions related to social media, and also add a requirement that Texas agencies establish a social media policy using guidance from the Department of Information Resources. Care should be taken to not specify what the social media policies should be, only that a policy exist and the employees be required to review the policy upon employment and whenever updates are made. This way, DIR has time to refine their guidelines and social media toolkit.

Most of the testimony heard by the committee regarding social media revolved around restricted access and control of the message coming out of state agencies. In this sense, there was strengthening of the agencies' Communications offices, but little strengthening of the state's workforce. Quite the opposite, the general sense was that agency employees should not use social media in any official capacity whatsoever. The exception was testimony by Jeff Clark of Tech America who suggested creating a private social network for state agencies

The committee recommends further study on determining the feasibility of creating a private social network that is accessible only from state agency networks. Part of the study should determine what functionality would be most useful and appropriate for project collaboration, communication, and sharing among individuals at the various state agencies so that the Texas Government can be effective in its attempt to be efficient and enhance productivity for the State.

Appendix A

Interim Charge # 1

Testimony by Karen Robinson, Executive Director, Department of Information Resources, March 30, 2012.

Testimony by Leslie Ward, AT&T TechNet Member Company, AT&T TechNet, March 30, 2012.

Testimony by Doug Ridge, Director of Employer Initiatives, Texas Workforce Commission, March 30, 2012.

Testimony by Roger A. Webb, Executive Director, Texas Council for Developmental Disabilities, March 30, 2012.

Testimony by Leigh Ann Godinez, Transition Rehabilitation Counselor III, Department of Aging and Rehabilitative Services, March 30, 2012.

Testimony by Hector Requenez, Access Granted Technology Services, March 30, 2012.

Testimony by Katherine Filut, Disability Navigator, Texas Workforce Solutions, March 30, 2012.

Testimony by Kathryn Packard, JSC SBIR Technology Infusion Manager, NASA, March 30, 2012.

Testimony by Shekar Rao, VP & CTO, Center for Innovation, Arlington Chamber of Commerce, March 30, 2012.

Testimony by Alex Meade, Chief Executive Officer, Mission Economic Development Council, March 30, 2012.

Testimony by Matt Ruszczak, President and CEO, The Greater Mission Chamber of Commerce, March 30, 2012.

Testimony by Dr. Bruce Gnade, Vice President for Research, University of Texas at Dallas, March 30, 2012.

Testimony by Dr. Bob Peterson, Vice President for Research, University of Texas at Austin, March 30, 2012.

Testimony by Haydar Sahin, St. Phillips Community College, March 30, 2012.

Testimony by Dr. James Ponce, Superintendent, McAllen ISD, March 30, 2012.

Interim Charge #2

Testimony by Kelli Merriweather, Executive Director, Commission on State Emergency Communications, February 21, 2012.

Testimony by Bill Buccholtz, CSEC Presiding Officer, Commission on State Emergency Communications; Executive Director of Bexar Metro 9-1-1; President of the Texas 9-1-1 Alliance, February 21, 2012.

Testimony by Betty Voights, Executive Director, Capitol Area Council of Governments, February 21, 2012.

Testimony by Gregg Obuch, Director of Emergency Communications, February 21, 2012.

Testimony by Todd Early, Deputy Assistant Director, Texas Department of Public Safety, February 21, 2012.

Testimony by Skylor D. Hearn, Assistant Director, Law Enforcement Support, Texas Department of Public Safety, February 21, 2012.

Testimony by Anthony Bardo, Assistant Vice President of Government Solutions, Hughes Network Systems, February 21, 2012.

Interim Charge #3

Testimony by Todd Early, Deputy Assistant Director, Texas Department of Public Safety, February 21, 2012.

Testimony by Rick Rhodes, Assistant Commissioner, Texas Department of Agriculture, February 21, 2012.

Testimony by Pam Whittington, Director of Competitive Markets Division, Public Utility Commission, February 21, 2012.

Testimony by Dale Laine, President, Texas Cable Association, February 21, 2012.

Testimony by Anthony Bardo, Assistant Vice President of Government Solutions, Hughes Network Systems, February 21, 2012.

Testimony by Don Shirley, Executive Director, Connected Texas, February 21, 2012.

Testimony by Peggy D. Rudd, Director and Librarian, Texas State Library and Archives Commission, February 21, 2012.

Joint - Interim Charge #4

Testimony by Stuart McKee, Microsoft, July 10, 2012.

Testimony by Paulina Orlikowski, Hewlett Packard, July 10, 2012.

Testimony by Justin Freeman, Rackspace US, Inc., July 10, 2012.

Testimony by Gary Gordier, Texas Department of Motor Vehicles, July 10, 2012.

Testimony by James LeBas, Texas Cloud Computing Association, July 10, 2012.

Testimony by Carl Marsh, Department of Information Resources, July 10, 2012.

Testimony by Karen Robinson, Department of Information Resources, July 10, 2012.

Testimony by Ellen Rubin, Verizon, July 10, 2012.

Testimony by David Slayton, Office of Court Administration, July 10, 2012.

Testimony by Jan Uhrich, Dell, July 10, 2012.

Interim Charge #5

Testimony by Jonathan Taylor, Director – Emerging Technology Fund, Office of Governor Perry, March 30, 2012.

Testimony by Karen Robinson, Executive Director, Department of Information Resources, March 30, 2012.

Interim Charge #6

Testimony by Tom McCarty, Director of External Relations, Texas Workforce Commission, May 17, 2012.

Testimony by Eva Esquivel, Public Information Officer, Workforce Solutions Alamo, May 17, 2012.

Testimony by Chad Lersch, Assistant General Counsel, Department of Information Resources, May 17, 2012.

Testimony by Dane Reese, President, STARK Talent, May 17, 2012.

Testimony by Jeffrey Clark, President of Government Affairs, Tech America, May 17, 2012.

ENDNOTES

¹ Testimony by Leslie Ward, AT&T TechNet Member Company, AT&T TechNet, March 30, 2012.

² Testimony by Leslie Ward, AT&T TechNet Member Company, AT&T TechNet, March 30, 2012.

³ Testimony by Doug Ridge, Director of Employer Initiatives, Texas Workforce Commission, March 30, 2012.

⁴ Report by Jones Lang La Salle, Fall 2011, http://www.us.am.joneslanglasalle.com/ResearchLevel1/National_High-Tech%20Industry_Office%20Outlook.pdf.

⁵ Testimony by Leslie Ward, AT&T TechNet Member Company, AT&T TechNet, March 30, 2012.

⁶ Texas Workforce Commission, November 26, 2012. <http://www.twc.state.tx.us/svcs/funds/sdfintro.html>

⁷ Testimony by Doug Ridge, Director of Employer Initiatives, Texas Workforce Commission, March 30, 2012.

⁸ Testimony by Kelli Merriweather, Executive Director, Commission on State Emergency Communications, February 21, 2012.

⁹ Testimony by Kelli Merriweather, Executive Director, Commission on State Emergency Communications, February 21, 2012.

¹⁰ Testimony by Betty Voights, Executive Director, Capitol Area Council of Governments, February 21, 2012.

¹¹ Testimony by Pam Whittington, Director of Competitive Markets Division, Public Utility Commission, February 21, 2012.

¹² Testimony by Don Shirley, Executive Director, Connected Texas, February 21, 2012.

¹³ Testimony by Anthony Bardo, Assistant Vice President of Government Solutions, Hughes Network Systems, February 21, 2012.

¹⁴ Testimony by Jonathan Taylor, Director – Emerging Technology Fund, Office of Governor Perry, March 30, 2012.

¹⁵ Testimony by Karen Robinson, Executive Director, Department of Information Resources, March 30, 2012.

¹⁶ Testimony by Chad Lersch, Assistant General Counsel, Department of Information Resources, May 17, 2012.

¹⁷ Testimony by Dane Reese, President, STARK Talent, May 17, 2012.

¹⁸ Testimony by Jeffrey Clark, President of Government Affairs, Tech America, May 17, 2012.
