



University of New Mexico

The Southwest Telehealth Access Grid

An Integrated Interstate Network of Networks Model for Telehealth

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May 7, 2007

FCC Rural Health Care Pilot Program, Docket # 02-60





THE UNIVERSITY OF NEW MEXICO
HEALTH SCIENCES CENTER

HSC Controller's Office

May 4, 2007

TO WHOM IT MAY CONCERN:

Please accept this application entitled Southwest Telehealth Access Grid (TAG) on behalf of the University of New Mexico Health Sciences Center in response to WC Docket No. 02-60. Listed below is pertinent institutional information:

Institutional Legal Name: Regents of the University of New Mexico

DUNS #: 868853094

Federal Entity Identification Number: 85-6000-642

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We look forward to the opportunity to work with the Federal Communications Commission.

Thank you,

Rena Vinyard, Manager
PreAward Administration



Southwest Telehealth Access Grid: An Integrated Interstate Network of Networks Model for Telehealth

Executive Summary

The Southwest Telehealth Access Grid (TAG) is an integrated interstate network of networks built upon the extensive experience of key participants in rural telemedicine and rural healthcare in New Mexico, Arizona and the Southwest Indian Health Service (IHS) Telehealth Consortium and associated Tribes. This Grid creates the platform to more effectively share, distribute and coordinate telemedicine clinical services, educational and training programs among the healthcare provider organizations across the region, along with their associated human resources, thus more easily and effectively filling the gaps in meeting the health care needs of the rural communities throughout the network. Through Internet2 (I2) and the National Lambda Rail (NLR), this regional TAG network of networks, which is greatly facilitated and enhanced by the current USF Rural Healthcare program and the newly announced FCC Rural Healthcare Pilot Program, will enable our participating hospitals, clinics, and educational institutions to partner with peers throughout the United States to improve healthcare delivery and education via telemedicine.

We propose to extend and leverage existing and planned statewide networking infrastructure initiatives and investments to create this telehealth access grid of rural healthcare telemedicine systems and integrate the high-speed Internet backbones offered by I2 and NLR with appropriate security and quality of service. This regional network infrastructure, augmented by regional and municipal hubs, also serves as the basis for our strategic plan for efficiently and cost effectively aggregating the specific needs of health care providers.

The TAG will significantly enhance our capacity to deliver critical rural healthcare services throughout the region. It is anticipated that 200 additional rural community sites will be added as the Southwest TAG develops. The grid will not only better support day-to-day telemedicine transactions among the participating agencies, but also provide a system that can be quickly transitioned during emergencies to support telehealth and other high priority traffic in the event of a natural or man-made disaster. It is important to note that much of the backbone design and deployment of the proposed network is already in place. The existing infrastructure allows us to direct our efforts, with a high likelihood of success, to address the primary issues of rural network connectivity, reliability and appropriate redundancy.

This proposal expands the ongoing work of the primary regional Telehealth alliances. These alliances have been fundamental to planning, implementing and coordinating a unified Telehealth network in New Mexico and Arizona.

Unique aspects and specific aims of this telehealth access grid are the following:

- 1) Develop an interstate regional network of networks telemedicine grid in Arizona and New Mexico that includes Indian Health Service (IHS) and Tribal facilities in the Navajo, Albuquerque, Phoenix and Tucson Areas of the IHS and associated Tribal communities
- 2) Extend and integrate existing statewide networking initiatives and investments including I2 and NLR in New Mexico and Arizona
- 3) Create a platform to more effectively share, distribute and coordinate telemedicine clinical services, and educational and training programs, among the healthcare provider organizations across the region, thus more easily and efficiently fill the gaps in meeting the healthcare needs of the rural communities throughout the network
- 4) Perform network design studies and modeling that insure the best investment in the enhanced telemedicine infrastructure and allow iterative improvements through ongoing simulation, testing, evaluation, development, and utilization
- 5) Incorporate security, improved reliability, quality of service, and appropriate redundancy that can support disaster recovery

The Telehealth Access Grid will integrate high-speed communication backbones with rural telemedicine networks enhancing capacity to support heavy data traffic and large files, as well as provide alternative pathways for data transfer. By connecting hundreds of communities, healthcare facilities, and their providers, TAG will support a broad spectrum of telehealth applications that serve rural communities and their citizens and address gaps in access to critical healthcare needs.

Designed as a phased two-year project, phase 1 will incorporate the network design studies, modeling and initial deployment to enhance the wide area networks and connections to I2 and NLR, which in turn will establish the basic infrastructure for the regional grid. Los Alamos National Laboratory, in conjunction with the University of New Mexico Department of Electrical and Computer Engineering, will advise and collaborate with the network design and deployment team to create a model of the network design. This model will be used to provide feedback to the network design group and to simulate the effects on the network from major disaster scenarios. Based on the ongoing evaluation, modeling and simulation, phase 2 will refine the TAG infrastructure, fill in gaps, and add more sites or networks as appropriate.

In conclusion, this TAG initiative is designed to serve as a model for developing a sustainable integrated nationwide telehealth network that supports and expands rural healthcare services while offering an immediate and efficient access grid in the event of a regional or national emergency.

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Proposal Checklist

- ☒ The organization that is legally and financially responsible for the conduct of activities. (Page 5 & 33)
- ☒ The goals and objectives of the proposed network. (Page 7)
- ☒ An estimate of network costs for each year. (Page 40)
- ☒ A description of how for-profit network participants will pay their fair share of the network costs. (There are no for-profit network participants.)
- ☒ The financial support source and anticipated revenues that will pay for costs not covered by the fund. (Page 40)
- ☒ A list of the healthcare facilities included in the network. (Page 5 & Appendix 1)
- ☒ The addresses and RUCA codes for each healthcare facility participating in the network. (Appendix 1)
- ☒ Previous experience developing and managing telemedicine programs. (Page 27)
- ☒ The project management plan outlining
 - Leadership (Page 5 & 33)
 - Management Structure (Page 33)
 - Work Plan (Page 33 & Appendix 1)
 - Schedule (Page 38 & Appendix 1)
 - Budget (Page 40)
- ☒ A description of how the telemedicine program will be coordinated through the state and region. (Page 27)
- ☒ How the network will be self-sustaining once established. (Page 53)

Lead Organization and Participants

Lead:

The University of New Mexico (UNM) Offices of the CIO and the UNM Health Sciences Center for Telehealth and Cybermedicine Research (CfTH & CMR) are the lead organizations for the Southwest Telehealth Access Grid (TAG).

Other Participants:

University of New Mexico (UNM)

Center for Disaster Medicine (CDM)

Carrie Tingley Hospital (CTH)

Center for High Performance Computing (CHPC)

Electrical & Computer Engineering (ECE)

New Mexico Institute of Mining and Technology (NMIMT)

New Mexico State University (NMSU)

State of New Mexico

Department of Health (DOH)

Los Alamos National Laboratory (LANL)

Southwest Indian Health Service (IHS)

Albuquerque Area IHS

Navajo Area IHS

Phoenix Area IHS

Tucson Area IHS

Arizona Telemedicine Program (ATP)

Holy Cross Hospital (HCH) *private not for profit*

Presbyterian Medical Services (PMS) *private not for profit*

Sangre de Cristo Community Health Partnership (SDCCHP) *private not for profit*

The Telehealth Access Grid (TAG)

Telehealth is healthcare delivered, at a distance, using communications networks and information technologies. The concept is particularly applicable to rural communities, where access to healthcare services are often limited, affecting the health and welfare of the citizens, the community as a whole, and their economic viability and development.

New Mexico and Arizona, large rural states in the Southwest, represent many of the issues related to the potential benefits and challenges in developing a Telehealth System to serve its rural communities. Through our experiences, successes, failures and lessons learned, we have developed approaches to overcoming barriers to adoption and sustainability of Telehealth applications, including the establishment of partnerships with economic development projects in our state. Many of these hands-on experiences are applicable to other rural Telehealth programs and should be considered in strategic planning, implementation and maintenance, particularly during times of high demand and need for health services for the underserved within a complex, dynamically changing and challenging environment.

The major telecommunications stakeholders in this proposal will play a critical role in bridging serious healthcare gaps through the development of adequate, affordable broadband infrastructure to communities in their territory. This proposal leverages to a large extent existing statewide and regional network infrastructure and investments already in place. Most importantly, the Telehealth Access Grid (TAG) we propose creates the platform to more effectively share, distribute and coordinate telemedicine clinical services, educational and training programs among the healthcare provider organizations across the region, along with their associated human resources, thus more easily and effectively filling the gaps in meeting the health care needs of the rural communities throughout the network.

This model can be significant for the citizens of the communities it will serve. It will assist in the development of a sustainable network of networks that can support telehealth and other critical applications for education, government and business, thus addressing the necessary infrastructure required for enhanced economic development. As affordable broadband is put into place, consumers will have access to healthcare services in their home, workplace and local medical facilities. While this grid can operate in a normal standard mode to support many ongoing telehealth activities and transactions 24/7, it will also be available to immediately switch to emergency mode in the event of a natural disaster, critical public health issue, or terrorist event. Because of the unique challenges of our region, this successful Telehealth Access Grid will serve as a model for the rest of the nation and world.

TAG Goals and Objectives

The TAG goals are to:

1. Integrate existing high speed communication regional networks, such as I2 and NLR, to enhance rural health care telemedicine networks.
2. Leverage existing statewide and regional networking infrastructure initiatives and investments.
3. Create a platform to more effectively share, distribute and coordinate telemedicine clinical services, and educational and training programs, among the healthcare provider organizations across the region, thus more easily and efficiently fill the gaps in meeting the healthcare needs of the rural communities throughout the network;
4. Develop a reliable, secure, sustainable, Quality of Service (QoS) enabled telemedicine network of networks.
5. Provide a network that is available for emergency preparedness and disaster response in a timely, effective and efficient manner.
6. Provide a network that can support the rapid movement of large amounts of data and support effective interaction between participants within the network.

The TAG objectives are to:

1. Enhance provision of telemedicine services to rural communities.
2. Improve connectivity to rural sites receiving telemedicine services.
3. Significantly expand the number of connected sites in the region.
4. Make available appropriate redundancy for disaster recovery and QoS.
5. Provide the necessary support for high quality communication.
6. Offer a unique approach for the delivery of rural healthcare through the use of telemedicine.

In the page that follows is a matrix of all the TAG partners and their areas of expertise in Telemedicine and Networking.

FCC Rural Healthcare Pilot Program Participant Expertise

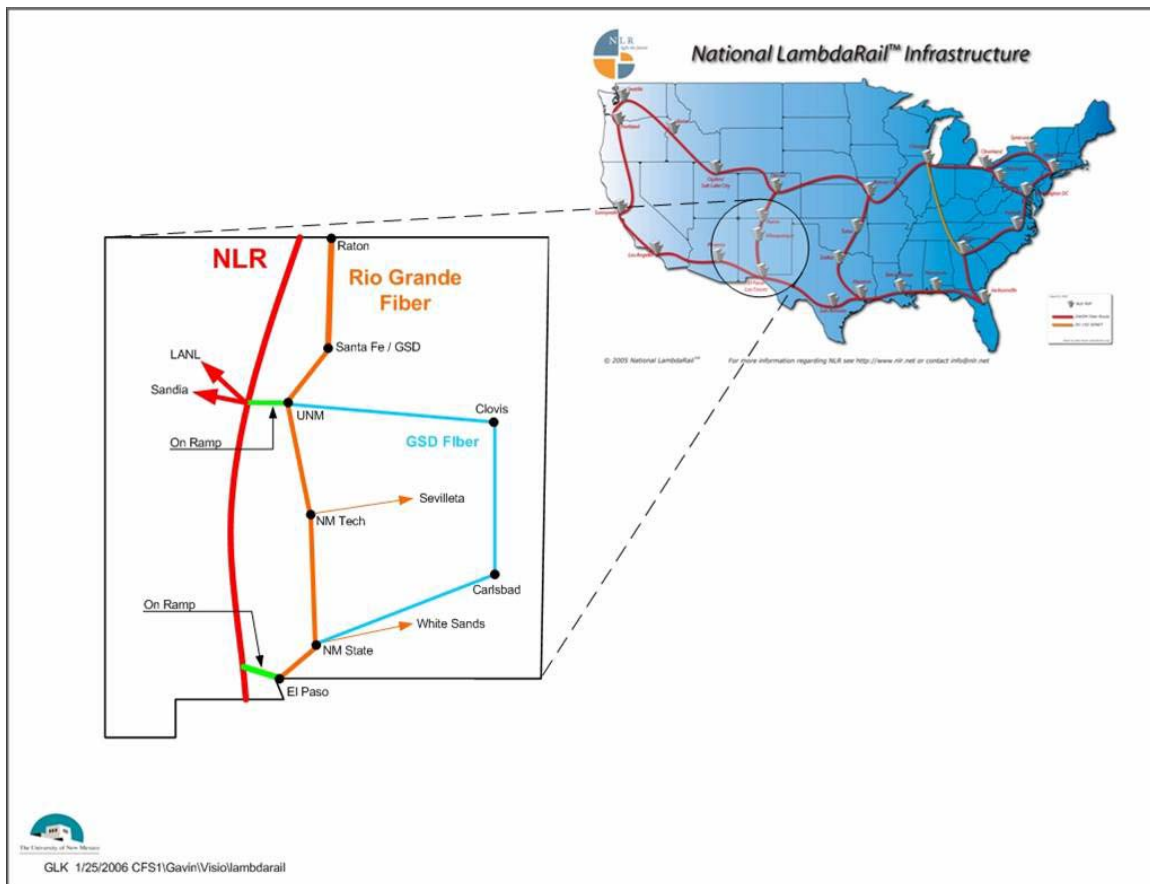
	Telemedicine Projects	Large IT Projects	Telehealth Services	Rural Healthcare	Provide Technical Support	Multiple Technical Services to Rural America	Disaster Telehealth Services	Disaster Response	Designing Innovative Networks	Homeland Security	Modeling Security	Pandemic Large-scale Projects	High-speed Flu Modeling	Diverse Populations	Managing Backbone Service	Collaborative Multimillion Dollar Projects	Diverse Stakeholders	Network Management & Monitoring
UNM																		
Center for Telehealth	x		x	x	x	x	x	x				x	x	x	x	x		
Health Science Center Library and Informatics Center	x	x					x	x				x	x	x	x	x		
Center for Disaster Medicine	x		x	x		x	x		x	x			x	x	x	x		
Carrie Tingley Hospital	x		x	x		x			x				x	x	x	x		
Office of the CIO		x	x		x		x	x	x	x		x	x	x	x	x	x	
Center for High Performance Computing		x			x			x	x	x	x		x	x	x	x	x	
Electrical & Computer Engineering		x					x	x	x	x	x	x	x	x	x	x	x	
New Mexico Institute of Mining and Technology		x			x			x	x	x	x		x	x	x	x	x	
New Mexico State University		x	x		x			x	x	x	x		x	x	x	x	x	
New Mexico Department of Health	x	x	x	x	x	x		x					x	x	x	x	x	
Los Alamos National Laboratory	x	x					x	x	x	x	x	x	x	x	x	x	x	
Indian Health Service																		
Albuquerque Area IHS	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	
Navajo Area IHS	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	
Phoenix Area IHS	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	
Tucson Area IHS	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	
Arizona Telemedicine Program	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	
Holy Cross Hospital	x		x	x	x	x		x	x				x	x	x	x	x	
NM Telehealth Alliance	x	x	x	x	x	x						x	x	x	x	x	x	
Presbyterian Medical Services	x	x	x	x	x	x	x	x				x	x	x	x	x	x	
Sangre de Cristo Community Health Partnership	x	x	x	x	x	x	x	x				x	x	x	x	x	x	

Networking Goals and Objectives

The infrastructure of a project this size requires the combined knowledge of experts in infrastructure technology. Participating infrastructure networking agencies and institutions in this proposal include the University of New Mexico (UNM), New Mexico Institute of Mining and Technology (NMIMT), New Mexico State University (NMSU), State of New Mexico Department of Health, UNM Electrical and Computer Engineering, and Los Alamos National Laboratories (LANL).

If funded, UNM, NMSU, and NMIMT will bring together an efficient, professionally managed core network of facilities that will maximize network performance and lower connection costs by using existing aggregation points of networks. Currently, NLR Points of Presence (POP) already exist in Raton, NM, Albuquerque, NM and El Paso, TX/Las Cruces, NM (joint New Mexico/Texas POP). Service levels for each POP are:

- El Paso/Las Cruces Services: 10-gigabit Ethernet, OC192 lambda, National Exchange Fabric, Dedicated FrameNet, Collocation Services, Cross Connections
- Albuquerque Services: 10-gigabit Ethernet, OC192 lambda, National Exchange Fabric, Dedicated FrameNet, Collocation Services, Cross Connection, Routable IP (planned).
- Raton Services: 10-gigabit Ethernet, OC192 lambda, Collocation Services, Cross Connection.



This core network of facilities and combined expertise will ensure an infrastructure that maximizes the number of connected areas and institutions throughout the southwest area in an efficient and cost-effective manner.

UNM, NMSU, and NMIMT will continue working on a formal design study in collaboration with the rural healthcare providers to build on and leverage existing statewide networking initiatives. The final design will be approved by all participating agencies. We will use the following criteria to guide the network design:

- Leverage existing networks and current infrastructure projects
- Minimize costs through volume purchases
- Identify network segments that can be provided by purchase of dark fiber or digital microwave instead of leased circuits
- Leverage existing NLR and I2 connectivity and provide redundancy through connections to NLR or I2
- Design an adaptable network that can easily support a wide array of telehealth applications
- Provide long term sustainability through initial capital investment with low recurring costs
- Greatly enhance bandwidth and throughput to accommodate any and all telehealth applications
- Create scalability and ease of adding new connections
- Leverage use of existing national operating centers (NOC) and management facilities to monitor and ensure QoS and reliability
- Maintain industry standard network reliability

Ongoing goals are to expand existing optical network to the South East, North West and North central quadrants of the State of New Mexico to support Telehealth. The Major Universities are building a high capacity fully diverse and redundant fiber ring as its major backbone. This backbone network will have two interconnect locations with NLR and Internet2, one in Albuquerque, NM and one in El Paso Texas. Additional fiber initiatives will extend the high capacity backbone through the southeast, northeast and northwest regions of the State. The State-owned digital microwave network can easily be integrated to the fiber backbone to extend high bandwidth services throughout the state as part of phase 2 (year 2). The Major Universities are working with the local Telecom providers to establish peering sites to interconnect local services to the State own network. Through the partnership with the local providers and or the State owned network we will be able to extend into the rural areas to connect government agencies and rural telehealth sites.

If there is a disaster, because the network is owned by the State through the major Universities and not a public network, the critical traffic would be prioritized over non critical traffic so that there would not be any delays of information to emergency responders or medical facilities. The major backbone, being diverse and redundant, would continue to operate if there is a natural disaster that affected the network at any location along the fiber path.

While both UNM and NMSU maintain their own large telephone networks, the State of New Mexico operates the second largest phone system in the state. As history has shown during historic disasters such as 911 or hurricane Katrina, critical phone systems can be destroyed or rendered inoperable. Recently, the Virginia Tech shootings have shown that mass hysteria cripples

both voice and data networks. As part of phase 2, the TAG project puts New Mexico in a position to deploy a private, redundant telephone system that can alleviate problems that plague public systems during disasters.

It is the intent of the planned design study in year 1 to eliminate overlap in existing network designs described in this proposal in order to maximize performance and reduce the overall cost of implementation. The purpose of this study phase is to reduce the actual expenditure of capital requested in this proposal. Along with the above stated criteria, different modalities will be investigated such as Wireless Mesh Networks (WMN), microwave, free space optics, and others. Once the formal design is complete, existing work plans, schedules, and budgets will be revised, and implementation will begin.

Network Architecture Strategic Plan

The proposed network architecture is based on the following assumptions regarding the state's telecommunications infrastructure:

1. Costs will increase and availability will decrease with greater distance from the Rio Grande Corridor.
2. Local municipalities may have a greater range of connectivity options.
3. Dedicated long-haul, high bandwidth circuits are limited and costly.
4. Much of the long-haul infrastructure is being put into place by UNM, NMSU and NMIMT.

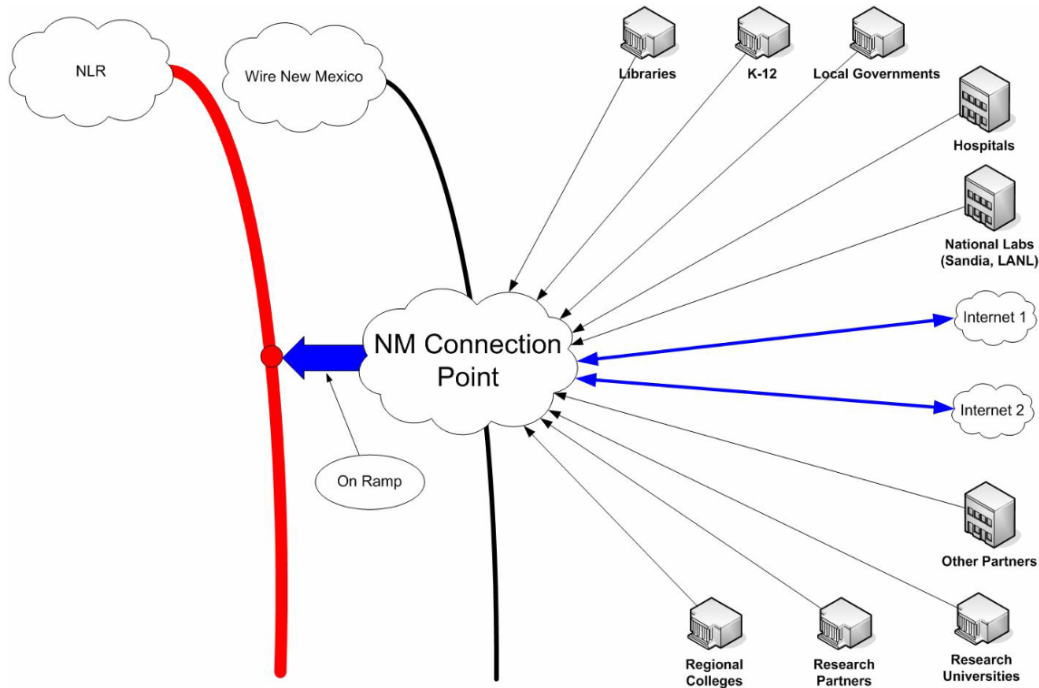
The strategic plan for efficiently and cost effectively aggregating the specific needs of health care providers is based on the following concepts:

Regional Optical Network. The partnerships between NMSU, NMIMT, and UNM on the Rio Grande Fiber Project and other networking projects (i.e., the Albuquerque Metro Area Fiber and the New Mexico Governor's Wire New Mexico initiative to create Regional Networks) will create a Regional Optical Network.

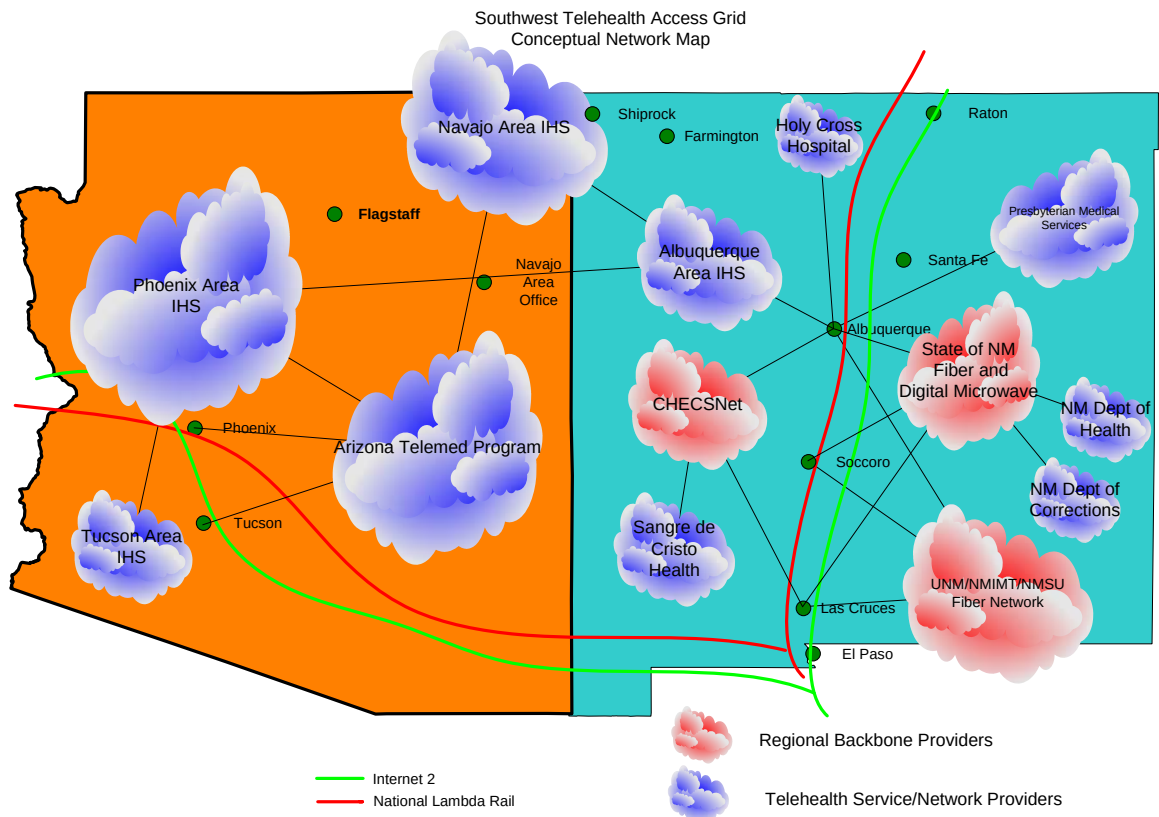
Regional Hubs are major institutional entity that serves as an aggregation point for regional network connectivity. A regional hub supports a high capacity connection to the state's network and would likely provide network connectivity to municipal hubs within the region. These regional hubs would be interconnected using a meshed or ringed topology and would serve two purposes: 1) reducing support requirements and 2) simplifying disaster recovery.

Municipal Hubs are an entity within a municipality that serves as a local aggregation point for area network connectivity. The municipal hub connects to a regional hub and allows municipal entities to take advantage of connectivity options that are locally available to connect to their local hub. This approach leverages vendor competition at the local level and allows for the creation of a municipal network for education or state government. The municipal hub may also serve as a regional hub in certain situations.

Collocation/Shared Application. Hubs may also serve as collocation sites, where appropriate, to reduce network congestion on limited bandwidth connections. By strategically locating application servers at hub sites, backbone traffic is reduced. This approach also lends itself to shared application hosting, further reducing support costs.



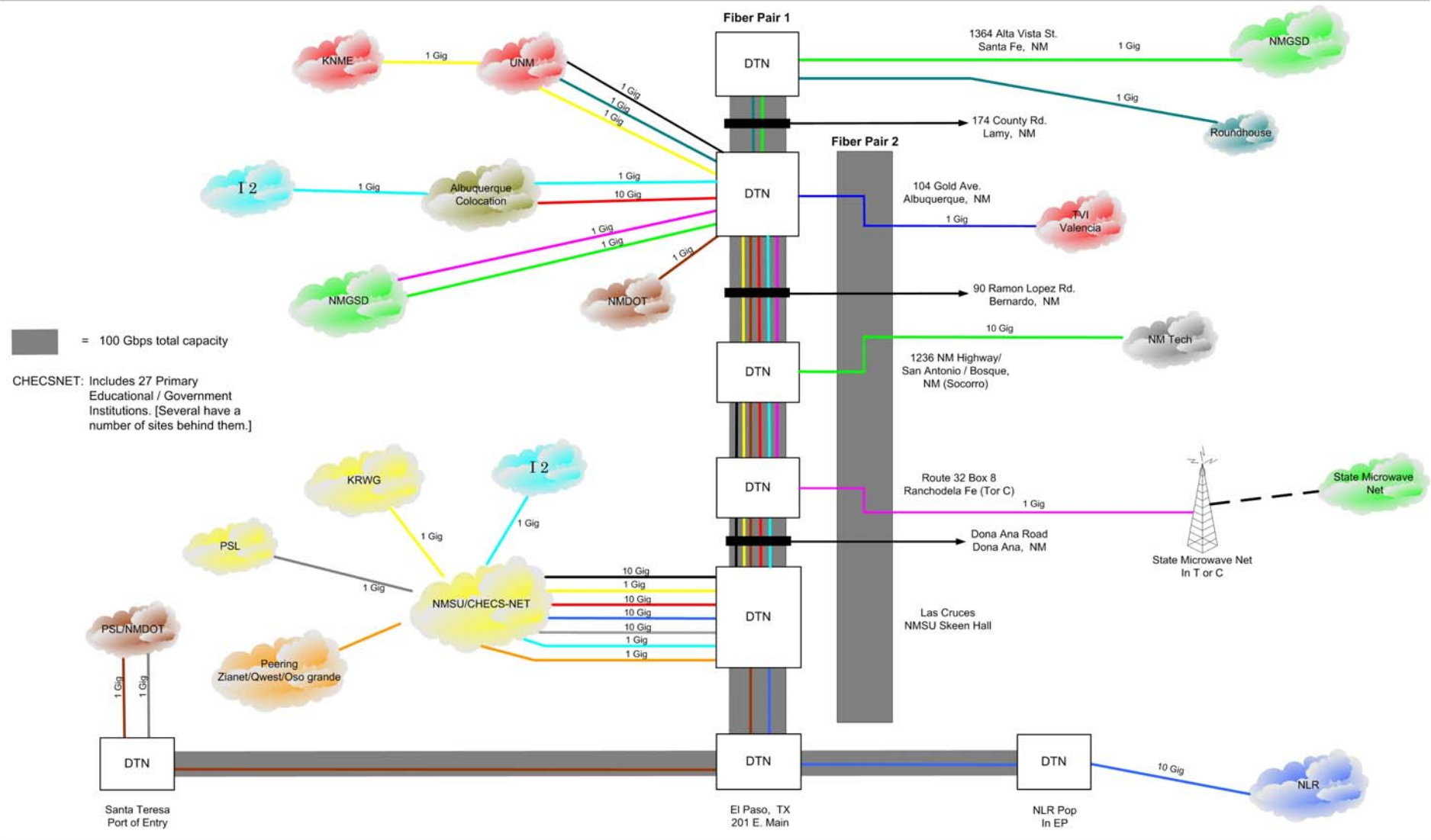
Connection of the regional networks will be done by regional hubs which would be an educational entity that serves as an aggregation point. A regional hub would support a high capacity connection to the state network and be responsible for providing network connectivity to municipal hubs in the region, allowing resources to be focused on supporting one major network pipe instead of multiple small pipes. The municipal hub would connect to a regional hub, allowing municipal entities to take advantage of connectivity options that are locally available to connect to their local hub. This approach leverages vendor competition at the local level and creates a municipal network of sites.



Backbone Network Architecture

New Mexico State University
Information and Communication Technologies
Telecommunication & Networking Services
NM LambdaRail OEO DWDM Network Design

Revision Date: April 1 2005
Modified by: David Fraga



Experience Designing, Developing, and Managing High-Speed Networks

University of New Mexico, New Mexico Institute of Mining and Technology (NMIMT) and New Mexico State University (NMSU)

The University of New Mexico (UNM), New Mexico Institute of Mining and Technology (NMIMT) and New Mexico State University (NMSU) oversee the operation of expansive and reliable campus, statewide and national networks that interconnect higher education, public education, government and national laboratories to commodity and research networks. These include a state fiber network, the Internet (I1), I2 and NLR. The network includes rural higher education campuses, agricultural experimental stations, Tribal networks, research parks and the Albuquerque and Las Cruces metro areas. Many telehealth services use these networks.

Existing statewide networking partnerships include CHECSNet, New Mexico Lambda Rail (NMLR), Sandoval County Broadband, General Services Division of NM State Government (GSD), Internet to the Hogan (ITTH) and the Rio Grande Optical Network. These networks are interconnected at aggregation points, or “GigaPops,” in the southern, central, and northern regions of New Mexico. Each POP is managed and maintained by professional network engineers 24/7. The depth and breadth of this operational responsibility has built up knowledge and expertise to support any proposed networking initiatives. The facilities use extensive electronic networking monitoring, including load balancing and intrusion detection, to oversee this “network of networks.” A minimal investment would be required to monitor the new rural telehealth sites.

UNM Electrical and Computer Engineering

UNM Electrical and Computer Engineering (ECE) is doing research to enable seamless communication between mobile and stationary devices across multiple networks and through heterogeneous communication environments. Their approach, which is funded by National Science Foundation under the FIND initiative, is based on a transient mobile network in which all communications occur between persistently identified entities. Such a network, which is mobile and ubiquitous in nature, allows entities to form and associate themselves with coordinated ad-hoc networks that are provided the means to integrate almost seamlessly with each other. Architecturally, all entities (devices, services, processes, threads) are represented as digital entities addressable via persistent identifiers. ECE’s approach leads to simplified network operations, management and provisioning, by placing all aspects of network administration into a common information management framework. This allows the overall architecture to maintain addressing and communications inter-connectivity while extensive implementation-level disruptions are carried out at the lower levels of the implementation and to adapt naturally, the incorporation of existing and future communication mechanisms and technologies.

ECE is in the early phases of designing this new type of network under the NSF Future Internet Design (FIND) initiative. The architecture has been prototyped on top of wireless mesh networks (WMN), which are particularly interesting because of their ability to operate in pure ad-hoc mode or to include some infrastructural components, making them suitable for a multitude of applications that can not be directly supported by other wireless networks such as cellular, ad hoc, and wireless sensor networks as well as

standard IEEE 802.11. Broadband home networking, community and neighborhood networking, health and medical networking, emergency and disaster networking are some examples of application where mesh networks are currently being used. ECE's prototype allows convergence of the heterogeneous mesh networks through inter-working providing a seamless service to individual network entities. Users and entities in general are securely and persistently identified on the network. Dynamic and extensible network management and service provisioning is achieved using mobile agents. These characteristics, in addition to seamless mobility, provide the user with a novel networking experience and a broader innovation space.

Existing Networking Infrastructure Initiatives of Participating Institutions and Agencies

A secure, reliable, and robust statewide communications network is an infrastructure element required for the success of New Mexico education, government, and economic development. The CHECS Education Technology Consortium (CHECS ETC), in which the primary networking infrastructure providers also collaborate, addresses the computing and communication issues associated with higher education including health sciences and telemedicine applications; it works increasingly with the New Mexico Office of the CIO, NM General Services Division, and other state agencies to effectively leverage strategic communications resources like the NM digital network. CHECS-Net provides statewide intranet and network services to educational institutions in the state. Its higher level services deliver greater value at lower costs than the member institutions can obtain on their own. Services provided include bulk connectivity pricing, NOC support, and access to research networking (i.e., I2, Lambda Rail).

Currently, UNM is on the Board of the National Lambda Rail high-speed research network, and CHECS-Net operates a high-speed connection to I2 Abilene research network in partnership with Los Alamos National Laboratory. CHECS-Net was one of the first sponsored educational groups to join Internet 2.

Key goals and strategies of CHECS ETC and CHECS-Net are to:

- Provide creative solutions for last mile connectivity issues. One of New Mexico's biggest challenges is the availability of affordable high-speed communication services. When limited to dial-up connections, people must spend valuable time accomplishing tasks that high-speed Internet users can do in seconds, such as downloading a PDF or sending a photograph. Limited dial-up connections make sending radiological images and other large graphic files impossible. With slow Internet connections, even simple tasks can be difficult to complete. Without reliable access to broadband in rural areas, e-services will be unavailable where the need is greatest. The major issue is the lack of last mile connectivity. One solution may involve innovative partnerships with local governments, carriers, or others. Nonetheless, the most appropriate connection technologies for the given area of the state must be selected. Factors in these decisions include cost, reliability, and support infrastructures.
- Construct strong partnerships to build a robust statewide network and coordinate resources through universities and other state agencies.
- Work with the State CIO, the Public Education Department, and the Higher Education Department to align strategies and leverage investments.
- Jointly negotiate with vendors and develop better procurement mechanisms for shared infrastructure.
- Share connectivity to high-speed research networks, including NLR and I2. Over time, these networks will not only serve educational/research institutions, but facilitate economic development. Optical networks will become an essential part of the networks, since capacity is dramatically increased to benefit areas such as telemedicine.
- Promote New Mexico's networking infrastructure needs by providing coordinated services to member institutions and by providing seamless access to networking technologies that support statewide educational networking.

- Provide a variety of services in response to constituent requirements. Services include technical support, connectivity consultation, network monitoring and analysis, network quality of service, and centralized media technologies support

The State of New Mexico has a significant challenge. It ranks 45th in per capita income, resulting in significant resource constraints, and it is geographically large, but sparsely populated, with a limited telecommunications infrastructure. To cope with these demographic and economic challenges, it is imperative that partnerships be established to foster improvement within the state network.

An example of a partnership strengthened through CHECS is the Rio Grande Corridor Fiber Project. The money for the long-term lease of the fiber was provided by NMSU and NMIMT, and the Dense Wave Division Multiplexing equipment was provided by New Mexico GSD. This collaboration provides a 100 gigabit layer, one network with different layers, and three networks for various business applications from Santa Fe to El Paso.

Another collaborative partner is the NM Department of Transportation (NMDOT), which has right-of-way access across much of the state. NMDOT needs a communication infrastructure for dynamic message signs, weather sensing, and traffic measurements. With these partnerships, parties can align their needs and leverage their resources to reduce costs.

TAG Network Modeling

One goal of this proposal is to develop a general approach for analysis and design of secure, reliable networks with a given functionality applicable to local as well as national size networks for disaster relief. This goal is very hard to achieve without detailed analysis of different network architectures as well as modeling and simulations of appropriate real life scenarios.

Working in conjunction and in parallel with the Network Design Team will be a subteam responsible for creating a model of the network design. This team will consist of UNM Center for High Performance Computing and UNM Electrical and Computer Engineering in consultation with Los Alamos National Laboratory (LANL). The goals of network modeling are to:

- Provide feedback to the network design group for year 2.
- Simulate the effects on the network of major disaster scenarios:
 - Pandemic flu
 - Large forest fire
 - Severe earthquake
- Provide redundancy and support surge capacity recommendations based on simulation results.
- Provide a model that incorporates the Layer 1, 2 and 3 aspects of the network to be able to model the effectiveness of QoS, load balancing, routing protocols and MPLS during disaster scenario.
- Provide simulation using different redundancy techniques and connection modalities.(i.e. wireless, microwave, satellite, free space optics.....)
- Produce generalized network modeling techniques that could be applied to any national, regional or global network.

Los Alamos National Laboratory (LANL) will assist and collaborate with the network modeling team, adding extensive experience with large-scale simulations. In recent years, this experience has been applied to national security problems including large-scale pandemics, analysis of the national energy grid, and terrorist threats. In these examples a large number of units are interconnected in a network that evolves in time. Agent-based models have been indispensable for understanding the dynamics of these networks. Please see Appendix C for details about this methodology.

TAG Network Engineering Plan

Network Components and Security Implementation

The proposed TAG network will ultimately provide the capability to enable secure telemedicine communications with an appropriate QoS level per application between regional network participants through their dedicated regional networks as well as Internet 2/NLR. The ability to implement QoS along with secure communications through a national healthcare network backbone is critical to the future development of telemedicine services, both for routine telemedicine operations and for disaster response using telemedicine technologies. The TAG network will be comprised of many different autonomous networks linking via a common core backbone at its inception. A standards based approach to networking is critical to achieving interoperability amongst TAG networks and national healthcare partners. The use of standard encryption technologies combined with the capability to enforce different qualities of service for data flowing across encrypted channels, at local, regional and national backbone levels, is key to and facilitative of widespread acceptance, success and utilization of inter-organizational real-time telemedicine interactions and of inter-organizational electronic health record information exchanges, radiology and video teleconferencing.

There are three components of the disaster response network, and each of them has different security requirements. The first is the network itself, that is, the “layer one” connectivity between the health services locations. “Layer one” consists of leased circuits and owned networks. For this proposal, we will assume that the network will consist of insecure, disparate networks meaning that we cannot, and should not, enforce complex security protocol at this level. Not enforcing “layer one” security allows the greatest flexibility in connecting telehealth applications to the network with minimal effort.

The next component is the interconnectivity between the sites, for example, multipoint video services, radiology images and widespread database sharing. In these cases, security may or may not be required, but if it is, we propose to use available security protocols and technologies. The network design should supply the needed security requirements and specifications.

Finally, there is the application level of the network. This would include applications that are shared between two or more sites that provide a specific function, for example map sharing, private point-to-point video communication, or transmission of sensitive data. In these cases, we would again use currently available technologies for authentication, authorization and encryption. At this level, stricter auditing would be needed because classified information could most likely be transmitted at this level. Again, the network design should supply the needed security requirements and specifications.

Standards-based encryption methodologies, such as advanced encryption standards (AES), will be used to secure data transmissions over networks. The specific implementations of encryption will vary somewhat depending on if the encryption is handled at the application or network level.

Security Issues with the Rio Grande Optical Network

There are two basic areas of concern in the network security. One is the issue of ensuring the network infrastructure is secure. The other concern is the integrity of the data.

The network itself is a system of fiber optic cables and devices that transmit the data. Physical and logical access to these facilities is limited to a need-to-know basis. Termination occurs in secured buildings. All major aggregation points have 24x7x365 security staff deployed. All data equipment access is limited to the secure methods of access and known personnel. This is up to or beyond the standards of commercial carriers.

As for data integrity the cooperative nature of the participants in the Rio Grande Optical Network (RGON) provides an added natural layer of security. The participants are known to each other and related by mutual business purposes. Access to this network is only allowed through the secured networks of the participants.

In traditional networking, the responsibility for data integrity lies with those organizations that send and receive the data. Commercial carriers do not provide additional security without special contractual agreements and associated costs. For example, during natural disasters voice and data systems are jammed with citizens attempting to determine information about the disaster. If in the event of a disaster the University of New Mexico sends critical data to the local first responders through a commercial carrier, that data has no sense of priority. In the RGON network, the cooperative nature of the participants allows for prioritization that better serves the public as a whole.

Since most termination points exist on State of New Mexico property, the participants have the option of installing security monitoring devices that would not be possible with commercial networking. This means that encryption verification and intrusion detection can occur at the most efficient point in the traffic flow. One way to understand the impact that information security can have is to think of a computer virus epidemic as a tsunami. In commercial networking, the tsunami rages over commercially carried Internet and is blocked at the firewall that is at the doorstep of the customer. This may prevent common viral or denial of service attacks from entering the customer network. However, service is normally slowed to a crawl until the huge wave of traffic subsides. This doesn't occur until the source of the intrusion is brought under control. In the private RGON network, security monitoring systems can stop the intrusion at the point of ingress or egress.

Since UNM already operates a network operating center, extending the monitoring and encryption verification can be done without needing additional staff and or infrastructure. Some enhancements of the current systems will be required. The network features Multi-protocol Label Switching (MPLS), which allows the private network of any participant to extend to any geographical point on the network without compromising the level of security normally associated with an isolated facility.

Participants in the RGON network are familiar with confidentiality issues. They deal with the regulation of financial practice outlined in Sarbanes Oxley and used by the Social Security Administration, the Internal Revenue Service, and others. Nearly every participant deals with the Health Information and Portability Act (HIPAA) on some level. Many law enforcement organizations that will benefit from this network must comply with the requirements of federal rules regulations for high density drug trafficking areas (HIDTA).

All these organizations currently enforce their own local security and then send the data over unsecured public accessed networks. Commercial carriers in New Mexico send data to hub locations in other states. Senders use encryption to ensure that the information will not be viewed on its journey to the destination. All these organizations hope that commercial carriers will somehow get their critical information to its destination in the event of a disaster, even though there is no prioritization of data on the public Internet. The RGON network ensures high speed data transfer on a network that can verify encryption, prioritize critical data, and better serve the tax payer.

Telehealth Alliances/Telehealth Provider Goals and Objectives

Through our experiences, successes, and lessons learned, we have developed approaches to overcoming barriers to adoption and sustainment of telehealth applications, including the establishment of partnerships with New Mexico and regional telehealth providers and alliances, as well as, economic development projects in our state. Many of these hands-on experiences are applicable to other rural telehealth programs and should be considered in strategic planning, implementation and maintenance, particularly during times of high demand and need for health services for the underserved within a complex, dynamically changing and challenging environment.

Telehealth alliances are maturing in a manner that provides a platform for collaboration, forming public-private partnerships, sharing resources, and developing an interoperable “network of networks.” Although telehealth offers the promise to improve access to critical healthcare services and positively impact economic development in rural communities, the vast diversity of populations and the wide spectrum of our healthcare delivery system demand partnerships of many stakeholders in order to effectively and efficiently use telehealth technologies and achieve sustainability. Developing partnerships with key stakeholders can provide a network of networks that preserves individual organizational autonomy but, at the same time,

- 1) Provides a framework for mutually beneficial collaboration,
- 2) Develops standards for interoperability and operations,
- 3) Shares experiences and technical or clinical expertise,
- 4) Establishes best practices and recommends common guidelines for telehealth program decision making,
- 5) Addresses issues that impact the entire network operations and its sustainability,
- 6) Serves as an intrastate, interstate and international point of contact, as well as
- 7) Facilitates meeting specific participating organization requirements for well-defined needs and provides access to services delivered by recognized centers of excellence.

Finally, regional alliances assist in coordinating state and federal resources or grants for telehealth in a manner that best meets the needs of stakeholders, avoids unnecessary duplication, strengthens the opportunities to obtain and maintain those resources, and facilitates their use effectively and efficiently. Regional alliances include the Four Corners Telehealth Consortium—New Mexico, Arizona, Colorado, and Utah, which has been in existence for several years and provides innovative telehealth services and research to that remote portion of the country.

Telehealth Provider Goals and Objectives

1. The Center for Disaster Medicine will expand available networks to allow for connectivity to a broader audience of learners. Because the CDM participates in emergency planning and event response through many of internal programs, it would explore the utility of an expanded and formalized telehealth network that could be relied upon as part of a redundant communication system during a disaster or large public health emergency. The project would go forward with the full collaboration of the New Mexico Department of Health, the New Mexico Hospitals and Health Systems Association, the New Mexico Primary Care Association, and the EMS regional offices.
2. The SW Indian Health Service collaborative's goal is to create a network-to-network connection among healthcare teams and rural Indian communities has been costly or difficult to implement. Although the Indian Health Services for Albuquerque, Navajo, Phoenix, and Tucson Areas have access to some regional telehealth specialists, inadequate connectivity between regional telecommunication networks has hampered the ability to deliver telemedicine clinical and educational services. If funded, secure I2 access for both telemedicine service providers and regional Indian healthcare teams will result in expanded regional use of existing telemedicine services while permitting growth of healthcare delivery in the region. A multistate telemedicine service menu will enable Indian health teams in Arizona, Nevada, New Mexico, and Utah to locate service providers for telemedicine service delivery who are appropriate to each team's needs, existing referral patterns, and budgets. A second "fail-over" point of access to I2 from the IHS WAN in Rockville, MD, will be established in year 2 to enable expansion of telemedicine service delivery to Indian health facilities outside the southwest IHS Areas.
3. The Navajo Area IHS (NAIHS) program goals with respect to the FCC Rural Healthcare Pilot Program are to upgrade its existing wide area network infrastructure to enable increased security and redundancy of telemedicine communication via a mesh topology and to implement modern quality of service technologies critical to telemedicine communications. By implementing modern telecommunications carrier class network backbone technologies, NAIHS will be well positioned to interoperate with regional network partners via national high-speed backbone networks such as I2 and NLR. NAIHS plans to create a high speed platform with I2 as the backbone for telemedicine (x-ray reads, x-ray consults, and head trauma); reduce contract health service costs to minimize potential relocation of patients outside the NAIHS service area; and enable increased security and redundancy of telemedicine communications by creating a Mesh WAN topology capable of disaster recovery and resilience; install carrier class router at NAO with security bundle feature, and ISR routers and LAN switching fabric at service units, health centers and health stations.
4. The Albuquerque Area IHS Office is to connect to I2 along with the Indian Health Service Navajo, Phoenix, and Tucson Areas. This means upgrading our current routers to ensure a secure and reliable device that can support the various types of protocols required for connecting to I2. The outcome will provide an avenue to expand our telehealth services in a secure and efficient manner to our Business Partners, and it will present the opportunity for our remote locations to access

health, technical and administrative support services.

5. The Arizona Telemedicine Program plans to upgrade its existing wide area network infrastructure to enable increased security of telemedicine communications and to implement modern quality of service technologies critical to telemedicine communications. By implementing modern telecommunications carrier class network backbone technologies, ATP will be well positioned to interoperate with regional network partners via national high-speed backbone networks such as Internet2 or NLR. ATP plans to use its existing connectivity to I2 through the University of Arizona to link with regional or national peers to enable telemedicine services and research. As part of TAG, ATP will collaborate, via I2/NLR and potentially other networks, with other TAG participants in the modeling, testing and deployment of network communications architectures and services tailored for optimal use of telemedicine communications during times of disaster or emergency.

ATP, through funding granted to University Medical Center by Blue Cross and Blue Shield of Arizona, currently has 2 operational spoke sites, Southeast Arizona Medical Center, and Copper Queen Hospital, and 1 operational hub site, University Medical Center in Tucson, utilizing telemedicine technologies to provide trauma care. Real-time video connectivity and real-time vital sign monitoring of trauma patients in the rural communities of Douglas and Bisbee, Arizona now provides a critical link for these communities to access trauma specialist care on a 24x7x365 basis. Both of these communities qualify for and are enrolled in the current USF Rural Healthcare program for their leased line connections that are used to facilitate this care. ATP will be enabling 3 additional sites in Sierra Vista, Benson, and Nogales, Arizona by June 2007, and another 4 sites are planned to come online later this year. In addition, ATP, through funding granted to the Arizona Department of Health Services, is working with that department and the Arizona Burn Center to establish 24x7x365 access via telemedicine to burn specialists at the Arizona Burn Center for 11 separate hospital ERs this year. The development of these additional 24x7x365 critical care services, adding to a longstanding 24x7x365 teleradiology capability available to ATP members, is directly in line with the goals of the FCC pilot program. FCC pilot program funding will enhance ATP's capability to enable these types of services at additional network member locations, both existing and new. FCC pilot program funding will also be key to ATP's ability to build appropriate levels of network redundancy in the future for all critical care services.

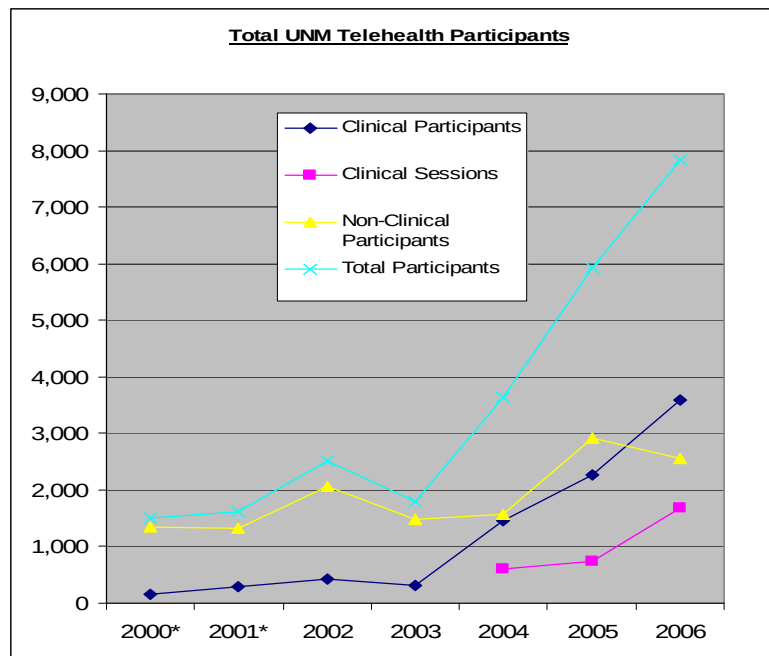
It is critical that these types of vital critical care capabilities be developed at state and regional levels as operational service offerings to establish a base of service providers experienced at delivering critical care services via telemedicine technologies on a 24x7x365 basis. Establishing this base of service providers within a state or region is critical to being able to effectively deliver a coordinated disaster response via telemedicine, as disasters can strike at any time.

6. The Sangre de Cristo Community Health Partnership (SDCCHP) has a well-established network of behavioral health providers integrated within 35 healthcare facilities and maintains 20 telehealth sites across the state of New Mexico. Funding would allow SDCCHP to increase access to, and quality delivery of, substance abuse and mental health screening, intervention, treatment and referral services to rural areas. While maintaining its current infrastructure, SDCCHP would expand best clinical practice services to additional areas of the state and eventually create a statewide system for substance abuse and mental health prevention, intervention, and treatment; provide clinical supervision of the SBIRT Behavioral Health Counselors (BHC); conduct psychiatric patient clinical consultations, and provide continuing professional clinical education to BHCs and partner site clinical providers and staff.
7. Presbyterian Medical Services (PMS) will link its network to external providers and networks. External networks include the NM Telehealth Alliance, Project Echo, Project Reach, and Emergency Response teams. PMS will also connect all clinical and Head Start sites to a backbone network with sufficient bandwidth to support telehealth, emergency response, educational and certification programs. Our goals include upgrading bandwidth and network throughput, implementing network monitoring, intrusion detection, and implementing highly secure network access points and protocols to ensure compliance with best practices, HIPAA, and other applicable regulations.
8. Holy Cross Hospital will upgrade its existing network infrastructure to implement modern quality of service technologies critical to telemedicine communications and enable increased security of these communications. By implementing modern telecommunications carrier class network backbone technologies, HCH will be well positioned to interoperate with regional network partners via national high-speed backbone networks to connect all HCH clinical sites to a backbone network with sufficient bandwidth, to support telehealth, emergency response, educational and certification programs, link HCH's network to external providers and networks, and upgrade bandwidth and network throughput.
9. UNM Carrie Tingly Hospital will establish 10 new telemedicine links over a two-year period to deliver behavioral medicine services to children and youth in rural areas. Pediatric Behavioral Medicine services are sorely lacking in rural areas in the state of New Mexico. Funding of the TAG network will allow UNM to assess the barriers to establishing links and provide solutions for overcoming these barriers as well as evaluate the use of telemedicine among healthcare providers in these rural areas.

Experience Developing and Managing Telemedicine Programs

Now in its 12th year of operation, the **UNM Center for Telehealth (CfTH) and Cybermedicine Research** has increased the number of clinical services, educational programs and administrative activities delivered to rural New Mexico via telemedicine. Over this time period, the use and interest in telehealth technology has increased dramatically, reflecting a widespread acceptance of its value. Sixteen health science center (HSC) departments used teleconference equipment to access sites throughout New Mexico, the United States, and the world. In Fiscal Year 2005-06, 7,698 people participated in telehealth conferences. The UNM HSC conducted a total of 1,670 clinical telehealth sessions, which is a 129% increase from the previous fiscal year. Of these sessions, 128 were direct patient encounters and 1,542 were case reviews.

UNM HSC Telehealth Usage 2000 - 2006								
Category	Fiscal Year Ending							Total
	2000*	2001*	2002	2003	2004	2005	2006	7 year Totals
Clinical Participants	157	283	436	313	1,462	2,274	3,596	8,499
Clinical Sessions					600	730	1,678	3,000
Non-Clinical Participants	1,348	1,331	2,075	1,492	1,582	2,924	2,550	13,206
Total Participants	1,505	1,614	2,511	1,805	3,644	5,928	7,824	24,705



* Data includes best estimate of videophone use by patient/ non-patient participants, a time period when that specific information was not collected.

In FY 2006, the Center for Telehealth used two technology platforms (interactive televideo and videophone) to deliver telemedicine services to 27 communities in 21 of New Mexico's 33 counties. The Center provided consultation or training to 31 UNM departments, programs, and outside organizations and agencies. Over 21 UNM Health Sciences Center departments or programs were able to extend their services to remote areas of the state using telemedicine. Clinical services delivered in FY 2005 include adult and child psychiatric consults, pediatric behavioral medicine, nutritional consults, early childhood developmental evaluations; autism consults, occupational therapy, physical therapy, speech and language pathology consults; substance abuse screening and counseling, and pediatric cardiology, pediatric neurology, and Hepatitis C case consults.

Since its beginning, CfTH has been instrumental in laying the groundwork for developing a statewide telehealth network through pioneering efforts. In 2001, CfTH realized it would not be possible to develop a comprehensive statewide telehealth network using its own resources; other healthcare organizations and stakeholders were reluctant to do business exclusively with the UNM HSC and wanted to develop their own systems using internal resources. Barriers to collaboration related to stakeholder perceptions around relinquishing control and not having individual needs met, particularly in the current competitive healthcare market. Dr. Dale Alverson began discussions with other organizations outside UNM, which resulted in the formation of the New Mexico Telehealth Alliance. This non-profit organization became the "neutral territory" for developing public-private and community partnerships. Its inception created a partnership with key stakeholders to provide a "network of networks" that preserves individual organizational autonomy, avoids unnecessary redundancy, and creates an economy of scale. Please see.

UNM Center for Disaster Medicine

The UNM Center for Disaster Medicine (CDM) is headed by Dr. Michael Richards, an emergency physician and associate professor in the UNM School of Medicine. Additional staff include professionals in the fields of emergency medicine, emergency nursing, community planning, emergency preparedness law, veterinary medicine, disaster medicine, and public health. The CDM supports community disaster preparedness through applied disaster research, healthcare disaster planning, emergency preparedness training for responders, and disaster field services. Faculty members provide medical direction for the Emergency Medical Services Bureau and the Bioterrorism Hospital Preparedness Program for the New Mexico Department of Health (DOH). Through this relationship with DOH, the CDM has participated in the development of the New Mexico Modular Emergency Medical System (NM-MEMS) and advanced the adoption of this framework throughout the state via educational presentations to healthcare and community leaders and strategic planning sessions.

The CDM has a long history of response to medical disasters. It sponsors one of the most active disaster medical assistance teams (NM-DMAT-1) in the National Disaster Medicine System with 19 major deployments since 1989. Team deployments include Hurricane Hugo in 1989, the Northridge Earthquake in 1994, the World Trade Center terrorist attack in 2001, and Hurricanes Katrina and Rita in 2005. CDM also provides the medical direction and pharmaceutical support for the New Mexico Urban Search and Rescue Taskforce and sponsors the Albuquerque Medical Reserve Corps.

SW Indian Health Service Consortium: Albuquerque, Navajo, Phoenix, Tucson Areas

Many Indian Health Service (IHS) and Tribal facilities in the four participating IHS Areas are very experienced with telemedicine. Facilities in Arizona, New Mexico, Nevada, and Utah report growing experience in telemedicine clinical services, distance learning, and administrative program planning via videoconferencing. Noteworthy uses of telemedicine to date include radiology, dermatology, retinal screening, cardiology, and mental health as well as other types of telemedicine modalities.

Through the existing FCC Rural Health Program administered by the Universal Service Administration Corporation, the IHS Albuquerque, Navajo, Phoenix, and Tucson Areas have made significant investments and improvements in telecommunication infrastructure. Such regional Indian health network “build-outs” to many rural Indian health communities in the region make the Southwest IHS Areas ideal partners for a regional, multistate project utilizing the network-to-network connectivity of I2.

The Albuquerque, Navajo, Phoenix, and Tucson IHS Areas provide ongoing technical and administrative support for infrastructure development related to telemedicine clinical services, distance learning, and program planning via videoconferencing. A regional Telehealth Access Grid will significantly enable Indian Health Service providers in New Mexico, Arizona, Nevada, Utah, and Colorado to identify specialists experienced in telemedicine service delivery and effectively connect communities in need with vital specialist resources.

The Navajo Area Indian Health Service

The Navajo Area Indian Health Service (NAIHS) has experience with developing and managing telemedicine program partnerships and collaborations with the Arizona Telemedicine Program (ATP), the Regents of the University of New Mexico, for its public operation known as the Health Sciences Center, School of Medicine, Department of Neurosurgery and University Hospital (UNMHSC), and “Internet to the Hogan” proof of concept in bringing connectivity to the most remote areas on the Navajo Nation. (This was demonstrated at Shiprock, New Mexico.)

These partnerships and collaborations involve Memorandum of Understanding (MOU), Memorandum of Agreement (MOA), FISMA Clearance, Non-disclosure, Interconnection Service Agreement (ISA), Section 508 Compliance, and Business Partner Agreement (BPA). These partnerships and collaborations have involved the following WAN / LAN infrastructure considerations and infrastructure build outs:

- Dedicated Telemedicine WAN circuits accommodating the payload transmission of NAIHS X-Ray DIACOM image files for Reads and Consults.
- Dedicated Telemedicine Routers.
- VLAN of LAN traffic at Service Units, Health Centers, and Health Stations.

The Albuquerque Area Indian Health Service

The Albuquerque Area IHS site transmits images to the Albuquerque Indian Health Center, ACL Hospital (X-ray images), Jemez Health Center (all images sent to PACS), Dulce Health Center (all images sent to PACS), Zuni Indian Hospital (all images sent to PACS), and Mescalero Indian Hospital (X-ray images). Albuquerque Area IHS utilizes and supports 7 televideo systems for supporting TeleBehavioral Health Consults.

Tucson Area Indian Health Service

The Tucson Indian Health Service CIO previously served as the CIO of the Navajo Area IHS and Director of Information Resource Management at the Phoenix Area IHS, working collaboratively with hospital and healthcare center staff in developing telehealth network infrastructure in support of connectivity to the Arizona Telemedicine Network. The Tucson IHS provided technical and administrative support for infrastructure development for telemedicine clinical services, distance learning, videoconferencing and modalities to include; radiology, dermatology, retinal screening, cardiology, and mental health.

The Arizona Telemedicine Program

The Arizona Telemedicine Program (ATP) was created in 1996 as a ground-breaking partnership between the Arizona State Legislature and the Arizona Health Sciences Center in Tucson. This 8-site pilot project has evolved into one of the largest and most successful comprehensive telemedicine programs in the world.

ATP has succeeded in creating partnerships among a wide variety of not-for-profit and for profit healthcare organizations and has created new interagency relationships within state government. Functioning as a “virtual corporation,” the ATP is creating new paradigms for healthcare delivery. It is recognized as one of the premier programs at the UA College of Medicine and has received numerous awards at the national level for its research and innovations in telemedicine.

The economics of telemedicine are especially noteworthy:

- The Arizona Department of Corrections saved over \$1 million by avoiding costly prisoner transports to regional medical centers.
- Over \$100,000 has been saved by reducing the need for psychiatrists to travel to dozens of rural communities.
- Reduced air transports of patients injured in automobile accidents has saved hundreds of thousands of dollars.
- Expensive medical air transports of Native American patients have been drastically reduced.
- Radiology is available 24/7 in many rural communities, an unprecedented level of service.
- With the creation of Ultraclinics™, it now takes 4 hours instead of weeks for a woman in Arizona to receive a complete breast exam, from time of biopsy to consultation, with an oncologist. Men can receive the same turn around time for prostate exams. Additional disease categories will soon be implemented.

Over 275,000 Arizonans have received health care services by telemedicine. Quality of service is high and routinely accepted by both service providers and patients. Services are available in 60 subspecialties of medicine, surgery, pediatrics, psychiatry, radiology, pathology, and many others. Over 100 telephysicians and telenurses have provided services over the network.

Sangre de Cristo Community Health Partnership

The Sangre de Cristo Community Health Partnership (SDCCHP) manages and maintains two telehealth networks: One is the Substance Abuse and Mental Health Service Administration's Center for Substance Abuse Treatment (SAMHSA CSAT), Screening, Brief Intervention, Referral and Treatment (SBIRT) Project; the other is the NM Department of Health's Office of School and Adolescent Health (OSAH) for development, training and maintenance of 18 school-based health centers across the state.

The SAMHSA CSAT SBIRT network consists of 20 sites each equipped with videoconferencing capability over an IP network involving T-1 lines into each facility. The OSAH network is in its initial phase of implementing the 18 sites, and also involves T-1 lines into each facility.

Presbyterian Medical Services

The diversity of services delivered by Presbyterian Medical Services (PMS) includes primary medical, oral and behavioral health care; affordable access to pharmacy services; home care; hospice; senior center programs; homeless and school-based special population services; services for the developmentally challenged, including those with traumatic brain injury; and early childhood development services, including Early Head Start and Head Start. PMS currently operates 82 individual program sites in 38 community locations throughout New Mexico, serving the counties of San Juan, Taos, McKinley, Cibola, Catron, Socorro, Luna, Rio Arriba, Sandoval, Santa Fe, Torrance, Quay, Eddy, Lincoln, and Otero.

PMS has telemedicine (broadly referred to as telehealth, including telepsych) programs in progress and is actively expanding these services. It is currently interacts with Project Echo (for training and education of providers in treating Hepatitis C) and Project Reach (children's counseling). PMS is also partnering in providing Post Traumatic Stress Disorder (PTSD) assessment and referral services and is expanding investment in and commitment to telepsych services, in partnership with Value Options. In addition to external partners, PMS has developed significant in-house expertise in telehealth services offered between our internal sites. Besides the obvious benefit of being able to offer professional services to sites that would have previously gone without this expertise, PMS has found that one of the significant benefits of having an infrastructure that supports telehealth services is that it is able to monitor outcomes, supervise treatment and schedule follow-up remotely.

Holy Cross Hospital

Holy Cross Hospital (HCH) and its non-profit healthcare partners provide primary medical and emergency services, affordable access to pharmacy services; diabetes case management, prenatal care and infant health; child preventive care and case management for children with special healthcare needs; family health, and early childhood development services.

HCH and its partners are in the process of developing and expanding these services through the information technologies intended to meet the healthcare needs of residents in the most remote locations of our service region, which includes Taos, Rio Arriba, Colfax, Mora and Union Counties in New Mexico. We are currently working with:

- HCH Rural Health Clinic in Penasco to provide comprehensive primary health services for outlying areas of the service region
- Enchanted Circle Health Outreach for Kids to improve access to preventive care for children and case management for children with special healthcare needs
- First Born Program to improve prenatal care and infant health
- Collaborative Action for Taos County Health to create a single point of entry and establish a disease management continuum of care within the county
- Radiology Upgrade Project includes digitizing imaging in Radiology. By upgrading the hospital's radiology services, we will help physicians to diagnose and treat patients anywhere, especially if they travel to urban hospitals. Digital radiology images can be sent via the Internet and any physician can access a patient's prior radiology images stored in Holy Cross Hospital's databanks.

University of New Mexico Health Sciences Center Carrie Tingley Hospital.

The Pediatric Behavioral Medicine service has been providing telemedicine services across the state and into Arizona for 7 years. It has linked to hospitals, schools, clinics, and individual homes across the state as well as Indian Health Service in Chinlee, AZ. The program has experience using T1, videophone, and Webcam based technology and has one psychologist dedicated to managing the system and working with the CfTH.

TAG Project Management Plan

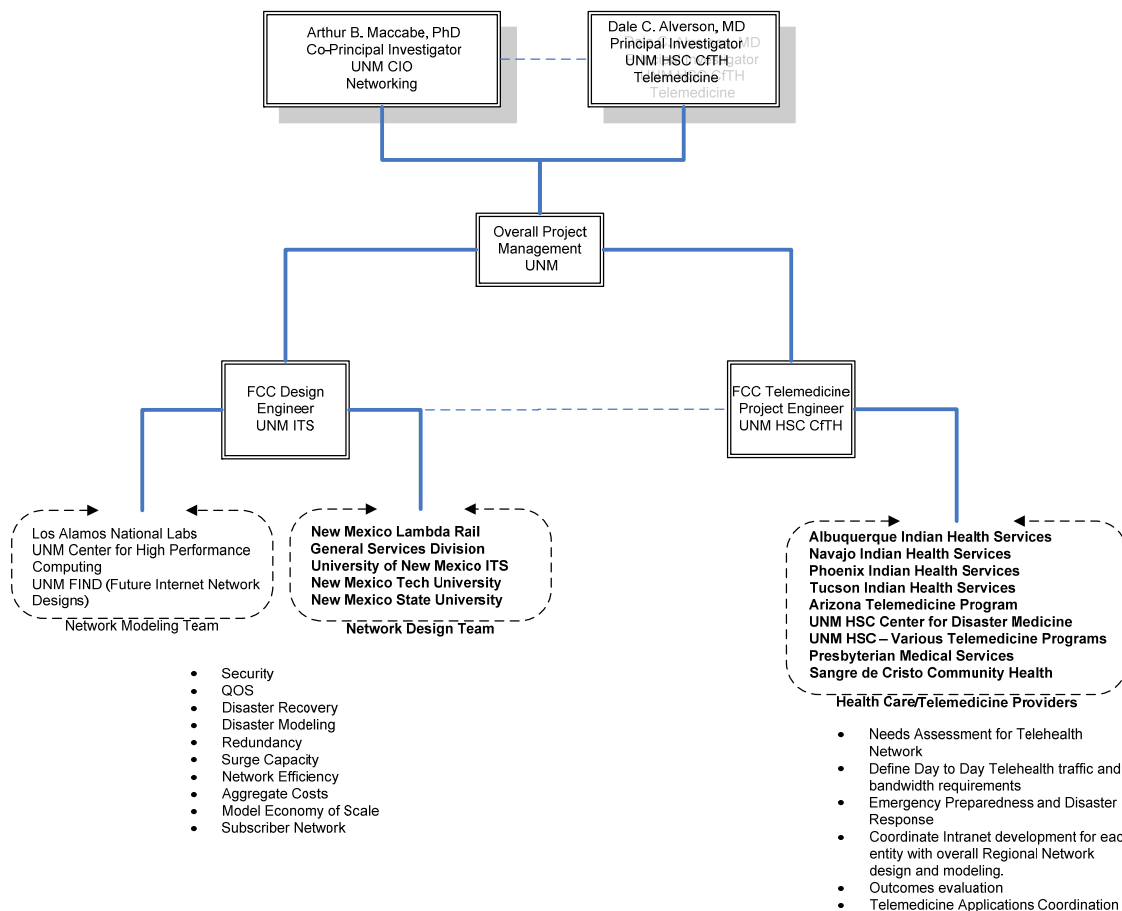
The Center for Telehealth & Cybermedicine Research (CfTH) will be the primary agency responsible for managing the FCC Pilot Program. Dale C. Alverson, MD, will be the principal investigator. Barney Maccabe, UNM CIO, will be the co-principal investigator.

The University of New Mexico will manage the financial responsibilities for the Pilot Program, ensure all documentation and forms under the normal rural healthcare program are properly submitted to the FCC, and implement standard grant management policies and procedures required by UNM.

The Center will coordinate efforts of the network design studies involving all parties and ensure that a detailed design is submitted on time. UNM Offices of the CIO will provide technical project management for statewide networking infrastructure components of the program and integration with current and planned statewide networking infrastructure initiatives. Upon completion of the design studies, the Center will ensure that detailed project plans and schedules are developed and implemented on time, reporting back to the FCC on project completion and milestones.

The CfTH currently acts as a coordinating center throughout the State of New Mexico and the southwest region for telemedicine activities and will continue to do so under this program. The Center's Telemedicine Project Engineer will coordinate with the network design studies group and network modeling team and provide a telemedicine needs assessment to both. The Center will also coordinate new and on going technical telemedicine needs with the implementation of new network infrastructure. Please see the FCC Pilot Program Project Management chart below.

FCC Pilot Program Project Management Plan



Specific Participant Project Management

UNM, NMSU, NMIMT

The universities and the State of New Mexico General Services Department will continue their existing partnership to provide project management and collaborative leadership to achieve the goals and objectives of the proposal. Their partnership has formal memoranda of understanding (MOU), and they work together to discuss, plan and implement statewide projects. Work plans are developed by members of the state and universities and are approved by a steering committee of the State and the Universities as well as the New Mexico Lambda Rail not-for-profit corporation. The work plan will be to connect rural areas to the nearest GigaPop enabling statewide as well as national network connections. Areas will be prioritized based on cost, network capability available, and relevance to the goals of the project.

The management of the New Mexico Lambda Rail Initiative will be done by an independent non-profit organization formed by the three New Mexico research universities. To encourage participation, a very cost-effective pricing strategy is being implemented that will cover membership fees and the operational costs for non-commercial traffic.

UNM Center for Disaster Medicine

The staff of the Center for Disaster Medicine will provide expert consultation to the project regarding the New Mexico emergency response structure and operations, federal requirements and guidelines for training and education of healthcare and public health professionals, and federal requirement and guidelines for communication and incident management during disasters.

In the event of a disaster or large scale emergency, CDM will participate with the NM Department of Health and other emergency management agencies in the provision of Just-in-Time training to health professional and emergency responders. This training will be augmented by the increased broadband capability of CDM funded by the Telehealth Access Grid project and will be integrated into the expanded network develop in New Mexico for rural telehealth.

Albuquerque, Navajo, Phoenix, and Tucson Areas Indian Health Service

In 2006, the IHS Albuquerque, Navajo, Phoenix, and Tucson Areas signed a regional Memorandum of Understanding (MOU) for collaboration activities related to telehealth. This MOU reinforces multiple years of regional partnership between the four IHS Areas in telemedicine project development. Noteworthy information-sharing and project planning has occurred through the regional collaboration within the Indian Health Service known as the IHS Southwest Telehealth Consortium. This Consortium will continue to provide project support and oversight for the regional IHS Area participation in the FCC Pilot Program. The Albuquerque Area Indian Health Service will fiscally represent the 4 IHS Areas for this project.

Each respective IHS Area will also support its own regional telemedicine network and activities via the existing administrative and clinical infrastructure and leadership of those Areas. Previous regional IHS and Tribal experience working with the Universal Service Administration Corporation in support of the Navajo, Phoenix, and Tucson Areas infrastructure expansion and development will be applicable to this Pilot Project..

Navajo Area Office of Indian Health Service

The Navajo Area IHS is under United States IHS, which is under the parent organization Department of Health and Human Services (DHHS). The leadership component can be traced to the CIO of IHS, Dr. Theresa Cullen and the IHS Southwest Telehealth Consortium (Phoenix, Albuquerque, Tucson, and Navajo Area Offices). These leadership vessels meet routinely throughout the Fiscal year.

The project management will be largely the responsibility of LCDR Michael J. Belgarde with the brain trust of IHS Office of Information Technology (OIT), IHS Network Operations Security Center (NOSC), Arizona Telemedicine Program (ATP), and Federal Contractor Awardees. (See Appendix 1-8)

Tucson Area Indian Health Service

The Tucson Indian Health Service will provide technical and administrative oversight of current telehealth infrastructure and future FCC Rural Health Care Pilot Program for the Tucson Area IHS. Their previous experience in working with the USDA's Universal Service Administration in support of the Navajo, Phoenix, and Tucson Areas infrastructure expansion and development will be applicable to this Pilot Project. (See Appendix 1-23)

Albuquerque Area Indian Health Service

Albuquerque Area Indian Health Service will support its own regional telemedicine network and activities via the existing administrative and clinical infrastructure/leadership. Sustaining Internet2 access once established will be supported by IHS Technical staff up to the "edge" of the Indian Health Service Network. (See Appendix 1-2)

Arizona Telemedicine Program (ATP)

ATP has a well defined organizational structure with the Director, Co-Director, Medical Director, and Associate Directors at its helm.

With FCC Rural Health Pilot program funding, ATP will purchase the specified equipment (see budget and equipment spreadsheets for ATP) and deploy it to network core sites in Tucson, Phoenix and Flagstaff as well as selected remote sites most in need of upgraded WAN and firewall equipment. This is the first phase of a multi-year plan to upgrade the ATP network backbone to modern carrier level service capabilities, including the ability to encrypt private WAN transmissions and to transition away from the current ATM network core. ATP does not have sufficient funding resources to do the entire upgrade in the first year.

ATP personnel will be trained on Juniper routing and firewall hardware and software and will install and configure the network equipment. ATP personnel have extensive internetworking and network firewall experience and have the ability to transition to a new routing platform. ATP currently supports a multivendor network architecture and has achieved operational interoperability amongst Juniper, Cisco, Marconi, Riverstone, HP and others. Implementation of the core equipment would take approximately 90-120 days following the award of this FCC proposal. This would allow time for training, testing and cutover to the new core routing hardware. Implementation of the edge firewall/routing equipment would take approximately 180 days from the award date to complete for all locations. Additional time is needed for the edge equipment to allow for coordination of deployment with sites that will receive the upgraded equipment. ATP staff will implement the new core routing equipment. The network is currently, and will continue to be, pro-actively monitored on a 24x7 basis with automated notifications of outages

and problem conditions sent to on-call staff. ATP's existing network monitoring and configuration management software will work with the new core and edge network equipment.

In addition to the equipment requested in year 1, ATP is seeking funding to cover the costs of leased lines for telemedicine networking that are not currently eligible for the USF program due to lack of rurality. A net cost reduction for leased line services will result for the ATP backbone and for some ATP sites that do not currently qualify for USF since they are not in a rural area, but are in some cases paying substantially more than the current USF standard rate for leased line services. ATP or its members are currently funding the leased lines for which FCC subsidy is requested. ATP will manage the implementation of any new leased line services that may be implemented as a replacement for existing services if a different carrier is awarded the contract through the USF bidding process. (See Appendix 1-27)

ATP Plans for Year 2

In year 2, ATP will purchase the specified equipment (see budget and equipment spreadsheets for ATP) and deploy to network core sites in Tucson, Phoenix and Flagstaff, as well as to selected remote sites that are most in need of upgraded WAN and firewall equipment. This is the second phase of a multiyear plan to upgrade the ATP network backbone to modern carrier level service capabilities and to transition away from the current ATM network core. ATP does not have sufficient funding resources to do the entire upgrade in the first year. Implementation of the core equipment would take approximately 60-90 days following the award of this FCC proposal in year 2. The year 2 core equipment is a modular add-on to the year 1 equipment providing ATP with the ability to aggregate leased line connections via the new core routing equipment vs. the current ATM layer 2 core network that now provides WAN aggregation for ATP. The equipment specified in year 2 will allow ATP to migrate most of its spoke leased line connections off of ATM in preparation for a complete migration off of the ATM network core in year 3. Implementation of the T1 modules on the edge equipment acquired in year 1 will take approximately 180 days following the year 2 award. Additional time is needed for the edge equipment to allow for coordination and travel. ATP personnel will handle the installation of the T1 interfaces at the remote sites..

Sangre de Cristo Community Health Partnership

Sangre de Cristo Community Health Partnership (SDCCHP) has in place the professional staff and industry contacts to continue management of the current telehealth initiatives as well as any proposed expansion initiatives. (See Appendix 1-43)

Presbyterian Medical Services (PMS)

Since this Pilot Project is heavily focused on technical infrastructure, PMS's overall project will be managed by the Information Services (IS) Department, headed by their Chief Information Officer (CIO). Business and Clinical oversight will be provided by Vice President of Clinical Affairs, Director of Behavioral Health, and Director of Children's Services. Compliance oversight will be provided by the PMS Vice President and Corporate Council and by the Compliance Officer. PMS System Directors and Site Administrators will be involved at the detailed implementation phases of the project. (See Appendices 1-35).

Upon being awarded the grant, PMS will:

- Align our overall objectives, project scope and activities with our partners in the Pilot Project;
- Establish a PMS executive project team, including the individuals above;
- Conduct detailed site surveys, and develop a plan to connect our sites in order of priority, taking into account synergies and lead times;
- Participate in network modeling activities with other grant partners;
- Participate in the development of standards for interoperability between networks, including monitoring and security;
- Assist in the development, and issuance of an RFP, as required, for network and equipment;
- Identify key points of network connectivity with our grant partners;
- Develop a detailed project plan, including specific expenditures, personnel assignment, and key milestones;
- Track and report progress both internally and to the Executive Committee.

Holy Cross Hospital

Holy Cross Hospital's (HCH) overall project will be managed by the Information Technology Director who will work with the HHC Technology Committee, Collaborative Action for Taos County Health Board of Directors, Enchanted Circle Health Outreach Board of Directors and the First Born Program Advisory Committee. Compliance oversight will be provided by the HCH Compliance Officer.

HCH's approach will be to align with our partners to complete tasks. Many tasks will be achieved by individual entities, all working in alignment with the goal of a comprehensive HIT system. We will operate from a multi-disciplinary Quality Improvement Team that includes our partners, Director of Imaging, IT Director, Rural Clinic Managers and HCH CFO. This team will be responsible for the administration of the overall grant and will provide oversight, high level prioritization, conflict resolution and status reporting. Please see Appendices (1-33).

Upon being awarded the grant, HCH will:

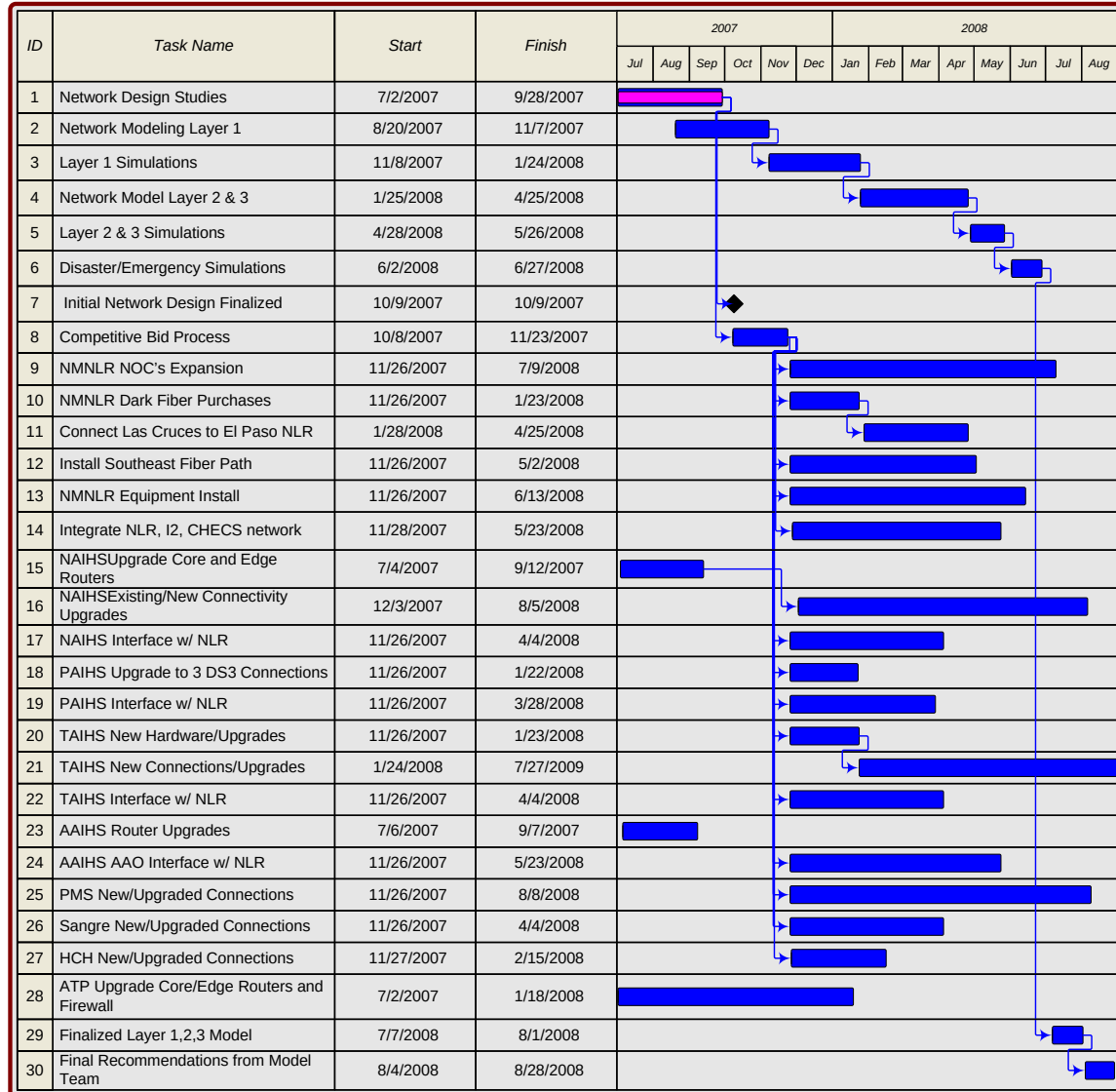
- Establish a Quality Improvement Team;
- Conduct detailed readiness site surveys and develop a plan to connect our sites by level of readiness;
- Participate in network modeling activities with other grant partners;
- Participate in the development of standards for interoperability between networks, including monitoring and security;
- Identify key points of network connectivity with our grant partners;
- Develop a detailed project plan, including specific expenditures, personnel assignment, and key milestones;
- Commence training for deployment of system;
- Track and report progress both internally and to the Quality Improvement Team.

UNM Carrie Tingley Hospital

The Senior Clinician and Associate Professor of Pediatrics at the University of New Mexico Health Sciences Center Carrie Tingley Hospital will lead their participation in the Pilot Project. He will direct purchase and delivery of Web cameras and laptops and ensure adequate equipment and software are obtained; assist in identifying, initiating, and scheduling of the five new sites in both the first and second years of the project and oversee the construction, delivery, and summary of data in the use of telemedicine for each year.

Overall Timeline

TAG Overall Project Timelines



Financial Management Plan/Budgets

The University of New Mexico (UNM) has the depth and breadth of experience required to manage grants of significant dollar value. (UNM) has the following policies and procedures in place to assure compliance with Federal, State, and local fiscal requirements. See attached documents:

- Organizational Structure
- Chief Information Officer – Arthur B. Maccabe, PhD (Co-PI of this grant)
- Actual Current Fund Revenue - \$1,224,700,000
- Actual Current Fund Expenditures - \$1,070,900,000
- Contract and Grant Awards - \$298,600,000
- Contract and Grant Expenditures - \$13,800,000
- Financial Services – Controller Administration
- Centers and Institutes – Center for Telehealth
- US Department of Education – Designation as Hispanic-Serving Institution
- UNM History, Mission, and Organization
- Responsibility and Accountability for University Transactions
- Cost Accounting Standards
- Cost Sharing on Sponsored Projects

The Center for Telehealth and Cybermedicine Research will assure that the portion of the grant relative to funding telehealth programs will be managed appropriately. Dr. Dale Alverson, Medical Director, Regents Professor and Principal Investigator has extensive expertise in the field of telemedicine and the opportunity for costs savings through the dissemination of healthcare through telemedicine. The Center's Associate Director, Mary Ann Scott, manages the day-to-day activities of the Center. Ms. Scott has the following acquired skills applicable to the successful implementation of this project:

- over twenty years of experience with telemedicine
- expertise required for strategic planning and budget management
- successful implementation of technically complex projects
- understanding of scientific engineering and emerging technologies
- communication skills required for diverse stakeholders
- ability to foster collaboration and build strong teams
- experience with academic institutions
- experience with Federal Agencies and Laboratories
- work ethic required for day-to-day management of large projects

The University has the expertise to manage the financial interests of this diverse team of participants and assure a seamless interface for excellent work flow leading to successful implementation of targeted goals which will result in a successful pilot project for FCC – one which can become a model for the entire country.

FCC Rural Healthcare Pilot Program

Participant Name	Year 1			Year 2		
	Budget	Match	Total	Budget	Match	Total
UNM:						
CfTH	281,500	0	281,500	162,000	0	162,000
ITS / Office of the CIO	2,250,000	0	2,250,000	0	0	0
NMNLR 3 Universities	2,900,000	1,400,000	4,300,000	3,100,000	1,400,000	4,500,000
ECE	581,435	0	581,435	0	0	0
Indian Health Service						
Albuquerque Area	169,830	29,970	199,800	0	0	0
Navajo Area	1,605,000	240,000	1,845,000	625,000	170,000	795,000
Southwest Consortium	167,620	29,580	197,200	157,420	0	157,420
Tucson Area I.H.S	192,000	28,800	220,800	130,000	19,500	149,500
Total	8,147,385	1,728,350	9,875,735	4,174,420	1,589,500	5,763,920

Participant Name	Year 1			Year 2		
	Budget	Match	Total	Budget	Match	Total
Subawards:						
Arizona Telemedicine Program	449,699	147,217	596,916	429,167	144,138	573,305
Holy Cross Hospital	85,000	12,750	97,750	20,000	3,000	23,000
PMS	1,131,400	202,500	1,333,900	673,600	158,900	832,500
Sangre de Cristo	221,850	36,153	258,003	228,660	0	228,660
Total	1,887,949	398,620	2,286,569	1,351,427	306,038	1,657,465

Total UNM and Subawards	10,035,334	2,126,970	12,162,304	5,525,847	1,895,538	7,421,385
		17%			26%	

Organization Name: **Center for Telehealth**

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	Router for CDD, CDM	\$23,500				
	Total Hardware Costs	\$23,500	\$0	\$0	\$0	\$23,500
Software						
	Total Software Costs	\$0	\$0	\$0	\$0	\$0
Connectivity	T1 line for CDD, CDM	\$18,000				
	Total Connectivity Costs	\$18,000	\$0	\$0	\$0	\$18,000
Network Design	Network Design Studies	\$75,000		\$45,000		\$120,000
	Total Network Design Costs	\$75,000	\$0	\$45,000	\$0	\$120,000
Network Deployment	Project Deployment	\$87,000		\$72,000		\$159,000
	Network Engineering Deployment	\$60,000		\$45,000		\$105,000
	Total Network Deployment Costs	\$147,000	\$0	\$117,000	\$0	\$264,000
Other	Travel	\$10,500				\$10,500
	Materials and Supplies.	\$7,500				\$7,500
	Total Other Costs	\$18,000	\$0	\$0	\$0	\$18,000
Total All Cost Categories		\$281,500	\$0	\$162,000	\$0	\$443,500

Organization Name: **Information Technology Services (ITS) / Office of the CIO**

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	New/Upgrade Fiber Switching Equipment	\$1,000,000				
	Total Hardware Costs	\$1,000,000	\$0	\$0	\$0	\$1,000,000
Software	New Network Operating Center Software	\$200,000				
	Total Software Costs	\$200,000	\$0	\$0	\$0	\$200,000
Connectivity	Infrastructure Build outs, Fiber Builds	\$1,000,000				
	Total Connectivity Costs	\$1,000,000	\$0	\$0	\$0	\$1,000,000
Network Design	Network Design Studies	\$50,000				
	Total Network Design Costs	\$50,000	\$0	\$0	\$0	\$50,000
Network Deployment						
	Total Network Deployment Costs	\$0	\$0	\$0	\$0	\$0
Other						
	Total Other Costs	\$0	\$0	\$0	\$0	\$0
Total All Cost Categories		\$2,250,000	\$0	\$0	\$0	\$2,250,000

Organization Name: NMNLR - 3 Universities (UNM, NMSU, NM Tech)

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware UNM-\$500,000, \$600,000 NMSU-\$300,000, \$500,000 NM Tech-\$200,000	Budget-Upgrades to existing equipment, new optical routers, Switches, cabling; Match-Optical Equipment, Routers, Switches					
Total Hardware Costs		\$1,000,000		\$1,100,000		\$2,100,000
Software UNM-\$200,000 NMSU--0- NM Tech--0-	Budget-Enhance current Monitoring software Match-Monitor Software (Monitoring Centers at NMSU and UNM)					
Total Software Costs		\$200,000	\$300,000		\$200,000	\$700,000
Connectivity UNM-\$500,000, \$500,000 NMSU-\$550,000, \$1,000,000 NM Tech-\$250,000, \$500,000	Budget-First year enable backbone to remote sites, 2nd year more sites Match-Percentage of NLR, I2, and Fiber and Conectivity Costs		\$500,000 \$200,000 \$400,000	\$500,000 \$1,000,000 \$500,000	\$500,000 \$200,000 \$400,000	\$1,500,000 \$1,400,000 \$1,300,000
Total Connectivity Costs		\$1,300,000	\$1,100,000	\$2,000,000	\$1,100,000	\$5,500,000
Network Design UNM-\$100,000 NMSU-\$100,000 NM Tech--0-						
Total Network Design Costs		\$200,000	\$0	\$0	\$50,000	\$250,000
Network Deployment UNM-\$100,000 NMSU-\$50,000 NM Tech-\$50,000	Installation, site travel and testing					
Total Network Deployment Costs		\$200,000	\$0	\$0	\$50,000	\$250,000
Other						
Total Other Costs		\$0	\$0	\$0	\$0	\$0
Total All Cost Categories		\$2,900,000	\$1,400,000	\$3,100,000	\$1,400,000	\$8,800,000

Organization Name: Electrical & Computer Engineering

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware						
Total Hardware Costs		\$0	\$0	\$0	\$0	\$0
Software						
Total Software Costs		\$0	\$0	\$0	\$0	\$0
Connectivity						
Total Connectivity Costs		\$0	\$0	\$0	\$0	\$0
Network Design	Network Design Studies, Modeling and Simulations	\$500,000				
	Disaster evaluation-network impact	\$81,435				
	Work in collaboration with LANL					
Total Network Design Costs		\$581,435	\$0	\$0	\$0	\$581,435
Network Deployment						
Total Network Deployment Costs		\$0	\$0	\$0	\$0	\$0
Other						
Total Other Costs		\$0	\$0	\$0	\$0	\$0
Total All Cost Categories		\$581,435	\$0	\$0	\$0	\$581,435

Organization Name: Indian Health Service - Albuquerque Area

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware						
	Fiber Connection Between AIH and UNM	21,250				
<u>AIH Router</u>						
	Cisco 3845	\$ 14,000.00				
	DS3 module	\$ 5,000.00				
	Fiber Module (need 2 modules)	\$ 10,000.00				
	AIH Router Total	24,650				
<u>AAO Router</u>						
	Cisco 3845	\$ 14,000.00				
	DS3 Module to AIH	\$ 5,000.00				
	DS3 Module to to Verizon	\$ 5,000.00				
	WICs to T1 Need 14 WICS (14x700)	\$ 9,800.00				
	AAO Router Total	28,730.00				
	8 Service Units (Need 8 Cisco 3845's)	8 x \$14000 = \$95,200				
Total Hardware		169,830	29,970	0	0	199,800
Total Software		0	0	0	0	0
Total Connectivity		0	0	0	0	0
Total Network Design		0	0	0	0	0
Total Network Deployment		0	0	0	0	0
Total OtherCosts		0	0	0	0	0
Total All Cost Categories		169,830	29,970	0	0	199,800

Individual Budget for FCC Order

Organization Name: Indian Health Service - Navajo Area

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	Upgrade cored and edge routing and firewall equipment first year Second year, additional core network upgrades and network edge device upgrades					
	Total Hardware Costs	\$855,000	\$144,000	\$0	\$0	\$999,000
Software	No software					
	Total Software Costs	\$0	\$0	\$0	\$0	\$0
Connectivity	Seeking to cover costs of backbone and spoke private line services that are not eligible under previous USF Rural Healthcare funding restrictions that limited eligibility to rural areas					\$0
	Total Connectivity Costs	\$500,000	\$57,600	\$500,000	\$100,000	\$1,157,600
Network Design						\$0
	Total Network Design Costs	\$250,000	\$38,400	\$125,000	\$70,000	\$483,400
Network Deployment						
	Total Network Deployment Costs	\$0	\$0	\$0	\$0	\$0
Other						
	Total Other Costs	\$0	\$0	\$0	\$0	\$0
Total All Cost Categories		\$1,605,000	\$240,000	\$625,000	\$170,000	\$2,640,000

Organization Name: **Indian Health Service - 4 Southwest Areas - Internet 2 Connectivity**

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	IHS WAN Router and Network Edge Equipment					
	Total Hardware Costs	\$17,000	\$3,000	\$17,000	\$0	\$37,000
Software						
	Total Software Costs	\$0	\$0	\$0	\$0	\$0
Connectivity	Circuit installation from IHS WAN to Albq Internet 2 Connector	\$44,200				\$44,200
	Annual charges of GigE circuit from IHS to Internet 2 Connector	\$29,070		\$29,070		\$58,140
	Shared annual Internet2 Connector fees - Albuquerque	\$34,000		\$34,000		\$68,000
	Shared annual Internet2 Connector fees - DC			\$34,000		\$34,000
	Total Connectivity Costs	\$107,270	\$18,930	\$97,070	\$0	\$223,270
Network Design						
	Total Network Design Costs	\$0	\$0	\$0	\$0	\$0
Network Deployment						
	Total Network Deployment Costs	\$0	\$0	\$0	\$0	\$0
Other	Internet 2 annual membership fee	\$22,100		\$22,100		\$44,200
	Internet 2 annual support costs	\$21,250		\$21,250		\$42,500
						\$0
	Total Other Costs	\$43,350	\$7,650	\$43,350	\$0	\$94,350
Total All Cost Categories		\$167,620	\$29,580	\$157,420	\$0	\$354,620

Individual Budget for FCC Order

Organization Name: Indian Health Service - Tucson

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	Upgrade routing and WAN network equipment in first year, additional network upgrades second year					
	Total Hardware Costs	\$50,000	\$7,500	\$50,000	\$7,500	\$115,000
Software	No software					
	Total Software Costs	\$0	\$0	\$0	\$0	\$0
Connectivity	Need Fiber and expanded bandwidth connectivity to San Simon and San Xavier facilities San Simon, \$48,000 for fiber and connectivity in first year, \$32,000 for connectivity second year San Xavier, \$94,000 for fiber and connectivity in first year, \$48,000 for connectivity in second year					
	Total Connectivity Costs	\$142,000	\$21,300	\$80,000	\$12,000	\$255,300
Network Design						
	Total Network Design Costs	\$0	\$0	\$0	\$0	\$0
Network Deployment						
	Total Network Deployment Costs	\$0	\$0	\$0	\$0	\$0
Other						
	Total Other Costs	\$0	\$0	\$0	\$0	\$0
Total All Cost Categories		\$192,000	\$28,800	\$130,000	\$19,500	\$370,300

Organization Name: Arizona Telemedicine Program

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	Upgrade cored and edge routing and firewall equipment first year					
	Second year, additional core network upgrades and network edge device upgrades					
Total Hardware Costs		\$231,449	\$34,717	\$210,917	\$31,638	\$508,721
Software	No software					
Total Software Costs		\$0		\$0		\$0
Connectivity	Seeking to cover costs of backbone and spoke private line services that are not eligible under previous USF Rural Healthcare funding restrictions that limited eligibility to rural areas					
Total Connectivity Costs		\$218,250	\$112,500	\$218,250	\$112,500	\$661,500
Network Design						
Total Network Design Costs		\$0		\$0		\$0
Network Deployment						
Total Network Deployment Costs		\$0		\$0		\$0
Other						
Total Other Costs		\$0		\$0		\$0
Total All Cost Categories		\$449,699	\$147,217	\$429,167	\$144,138	\$1,170,221

Organization Name: **Holy Cross Hosptial**

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	Purchase New Routers/Upgrade existing					
	Total Hardware Costs	\$25,000	\$3,750	\$0		\$28,750
Software	NOC Monitoring Software					
	Total Software Costs	\$15,000	\$2,250	\$5,000	\$750	\$23,000
Connectivity	Connections (T1) to 4 rural clinics					
	Total Connectivity Costs	\$20,000	\$3,000	\$5,000	\$750	\$28,750
Network Design						
	Total Network Design Costs	\$15,000	\$2,250	\$0		\$17,250
Network Deployment						
	Total Network Deployment Costs	\$10,000	\$1,500	\$10,000	\$1,500	\$23,000
Other						
	Total Other Costs	\$0	\$0	\$0		\$0
Total All Cost Categories		\$85,000	\$12,750	\$20,000	\$3,000	\$120,750

**Organization
Name:**

Presbyterian Medical Services

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware	Budget-\$18,000 per site – upgrades to existing equipment, new routers, Switches, cabling; second year maintenance charges at 20% Match-Hardware, maintenance second year					
Total Hardware Costs		\$686,000	\$54,500	\$329,200	\$10,900	\$1,080,600
Software	Encryption software for transmissions, \$1000 per site					
Total Software Costs		\$47,000	\$0	\$6,000	\$0	\$53,000
Connectivity	\$7200/site * 47 sites (average blended rate)					
Total Connectivity Costs		\$338,400	\$148,000	\$338,400	\$148,000	\$972,800
Network Design						
Total Network Design Costs		\$0	\$0	\$0	\$0	\$0
Network Deployment	Installation, site travel and testing					
Total Network Deployment Costs		\$60,000	\$0	\$0	\$0	\$60,000
Other						
Total Other Costs		\$0	\$0	\$0	\$0	\$0
Total All Cost Categories		\$1,131,400	\$202,500	\$673,600	\$158,900	\$2,166,400

Organization**Name:** Sangre de Cristo Community Health Partnership

Budget Category	Description	Year 1 Budget	Year 1 Match	Year 2 Budget	Year 2 Match	Total
Hardware						
	Total Hardware Costs	\$0	\$2,875	\$0	\$0	\$2,875
Software						\$0
						\$0
						\$0
	Total Software Costs	\$0	\$0	\$0	\$0	\$0
Connectivity	Connectivity Fees for Pecos 2000/Month (very remote area)	\$24,000		\$24,000		\$48,000
	Connectivity Fees for one additional site TBD @ 500/Month	\$6,000		\$6,000		\$12,000
	Connectivity for current 20 SDCCHP Telehealth Sites	\$160,000		\$176,000		\$336,000
	Total Connectivity Costs	\$190,000	\$28,500	\$206,000	\$0	\$424,500
Network Design						
	Total Network Design Costs	\$0	\$0	\$0	\$0	\$0
Network Deployment	2xRouters (Incl.Installation and setup)	\$7,590				\$7,590
	2x Managed Fast Ethernet Switches	\$1,600				\$1,600
	Total Network Deployment Costs	\$9,190	\$1,379	\$0	\$0	\$10,569
Other	Single Point of Maintenance Contact for all 22 telehealth sites					
	Total Other Costs	\$22,660	\$3,399	\$22,660	\$0	\$48,719
Total All Cost Categories		\$221,850	\$36,153	\$228,660	\$0	\$486,663

Future Sustainability

Overall sustainability of the TAG will depend upon a high volume of utilization and quality of telemedicine services that meet the defined health care needs of the rural communities, their providers and patients within the region. Continued adoption and investment in the Grid by the rural communities and the health care provider organizations will be based on perceived and demonstrable value in improved access, more effective distribution and sharing of health care services. Furthermore, objective evidence of improvements in health outcomes will justify the continued investment, as well as reimbursement by third party payers for health services provided via telemedicine over the Grid. Sharing the TAG among many stakeholders and avoiding silo systems also offers the economy of scale to assist in maintaining this network of networks. In addition, if the TAG proves to offer enhanced reliability, QoS, security, surge capacity, and appropriate redundancy that provides means for disaster recovery, local, state, and federal agencies will more likely provide additional resources and funding to maintain the Grid so that the system will be in place to meet the needs for homeland security, emergency preparedness and disaster response.

The TAG also offers cost savings to the health care system through improved sharing of resources, effective distribution and access to health services that lead to decreased travel costs for patients, families and providers. Further, this enhanced access can provide improvements in continuity of care that provides prevention of subsequent complications and more expensive health services, particularly for patients with chronic disease. Those values will lead to continued sustainability and integration of telemedicine into the health care system.

Arizona Telemedicine Program

The Arizona Telemedicine Program has budgeted for the matching funds described in the budget request. The network upgrades and enhancements that are requested will not only increase the capacity of the Arizona Telemedicine Program's role as a telemedicine network service provider, but will additionally increase security and make it more cost effective for new network members to join and connect to the network.

ATP has been in operation over 10 years and has a successful and sustainable network membership based business model already in place. These enhancements and upgrades will bolster that ATP network and position it to grow as the demand for telemedicine services increases. For purposes of this proposal, ATP has only budgeted for two initial years of the FCC Pilot program. In subsequent years, ATP expects to apply for additional infrastructure funding to further expand and strengthen its regional network through the addition of redundancy and higher speed connections to accommodate increased demands for 24/7 network telemedicine services. Each year of proposed equipment upgrades stands independently as an operational improvement to the ATP network infrastructure that can be built upon in future years. The leased line portion of the proposed budget will relieve ATP and its members from the high costs of leased line services in support of telemedicine and will potentially allow ATP to accelerate the pace of network improvements in future years of the FCC pilot program by allowing ATP to apply for funds that are now devoted to leased line costs for infrastructure improvements.

University of New Mexico Health Sciences Center Carrie Tingley Hospital

The links will be fully self-sustaining for as long as the computers, Web cameras, and software are functional. Links between sites will be maintained as part of the direct communication needs of each site. Warranty on the laptops should help cover the cost of computer failure. Funding to replace outdated equipment might be needed in the future.

Presbyterian Medical Services

PMS' staff can absorb the support of the additional sites and services, but our biggest challenge will be the cost of ongoing maintenance charges for the network. PMS is requesting an additional \$513,600 in the second year to offset hardware and network maintenance expenses. We believe we can approach sustainability of the improved network by allowing PMS to extend our service offerings and become more attractive to payers. Increasing services and encounters will raise productivity and improve our revenue and our ability to cover increased expenses related to network maintenance and connectivity. PMS will be in an improved position to respond to Pay-for-Performance (P4P) initiatives by extending the reach of our providers across our service area. A robust telehealth-enabled network will give us the ability to apply for grants, contracts, and funding to provide services such as childhood obesity counseling, diabetes, cardiovascular risk reduction, and other critical areas of treatment.

UNM, NMSU, NMIMT

The current, low speed network is already self-sustaining. We intend to purchase dark fiber and equipment with one-time, capital funding to eliminate the monthly fees for some of the existing circuits. The savings will be used to offset the increases in maintenance and long haul (e.g., I2) costs. All of the network backbone and a majority of the connected sites will use this approach. A draft business plan has been developed to recover costs of connectivity. This plan will be completed and implemented based on available capital funding for the network expansion. The new network would only lease circuits where dark fiber was not available. This lower cost approach enables us to continue the self-sustaining model. Ultimately, the ongoing costs of the network are borne by customers using the new services. Our experience has shown that rural areas will readily pay for service that they could not otherwise obtain.

Albuquerque, Navajo, Phoenix, and Tucson Areas of the Indian Health Service

Sustaining I2 access beyond the two-year pilot period is a challenge. Similar to the existing FCC Rural Health Program, the Pilot Program establishes funding support for broadband I2 access that would otherwise be unaffordable for participating IHS Areas and regional IHS/Tribal facilities. The IHS Southwest Telehealth Consortium will carefully monitor project development and regional improvements in access to care. Ongoing analysis will help determine the potential for continuance of regional I2 access beyond the pilot funding period. Importantly, I2 access for Southwest Tribal and IHS facilities will be standardized from the "edge" of the IHS WAN in Albuquerque and Rockville, MD. Such standardized access will offer benefit to other IHS and Tribal facilities nationally. Based on experience gained with Internet2-based network-to-network connections for enhanced telemedicine service delivery, Indian health facilities in the southwest and across the country may elect to develop a cost-sharing model that will permit project continuance beyond the pilot period.

Tucson Indian Health Service

Tucson area network will be 100% self-sustaining. I2 connectivity along with local circuit access will continue to be funded and supported beyond the two-year pilot period. Along with the existing Universal Service funded circuits, the Pilot Program establishes funding support for Internet2 access that would otherwise be extremely costly to IHS Areas and facilities. This Area IHS will monitor the project and assess improvement for enhanced access to health care resources to IHS and Tribal facilities.

UNM Center for Disaster Medicine

The UNM Center for Disaster Medicine will integrate the improvements in telehealth capacity created in this project into its overall mission. This will include continued participation in telehealth-supported education and training of health professionals in New Mexico and Arizona, funded by a broad base of local and federal sources. The increased capacity will create additional opportunities for funding for both training and emergency response by CDM.

Evaluation Plan

Analysis Approach

Historical Controls to Demonstrate Positive Change

The evaluation of the model for the network of networks will begin once the model itself has been developed and tested from a software development/modeling perspective regarding its reliability. Model development will take a significant portion of the first funding year, so the majority of the model evaluation with respect to how well it predicts the actual behavior and progress of the network and its node sites will take place towards the end of year one and during the second year of funding. It is important to note that the types of predictions the model is going to make regarding network usage, connection of new sites and changes in types of activities over the network (e.g., addition of new clinical specialties at a given site) are longitudinal in nature. They are likely to start taking place once the network of networks is in place, but actual success or failure of the various activities will only be apparent over the period of a few years.

One of the main variables we are concerned with is the number of new sites that will be added to the network as a result of the planned improvements. Each of the project participants has developed plans (as described earlier) to implement a certain number of sites during the proposed period. This can be considered the “expected” number of new sites. At the end of year 1, we can then determine exactly how many sites were successfully added to the network. This can be considered the “observed” number of new sites. The expected and observed can be compared for statistically significant differences using a Chi-Squared analysis. In this case, our goal is actually to demonstrate no significant difference between the expected and observed number of new added sites since that would mean we have reached our goal successfully. For sites that are not connected in the proposed time frame we will analyze commonalities or how they may be dissimilar. This will allow pre-planning to avert similar situations for sites proposed in year two.

In order to facilitate the evaluation of network usage, connection of new sites and changes in types of activities over the network longitudinally, we need to collect, organize and analyze historical control data on which to base our future comparisons. Therefore, during the first year of funding we will collect network use data from all of the participating sites (initial efforts have already begun). For example, most of the current sites carry out a variety of network activities including the provision of clinical consultations (i.e., telemedicine) using both store-and-forward and real time modes, educational broadcasts (i.e., continuing medical education, medical technologist training program), and various administrative activities related to these and other network activities. To form a set of baseline data, we will collect data from the previous one-year period for each site regarding the type of activities it conducts. As much detail as possible will be collected. For example, for the telemedicine consultations we will, for each site, determine the percent of real time vs. store-and-forward consultations; what clinical specialty the consults were in (e.g., dermatology, radiology, psychiatry); how long each

interaction lasted, and which physicians were involved at each site and so on. Standard summary statistics (e.g., mean, median, standard deviation, range) will be used to characterize the previous one-year baseline condition.

Since it will be important to understand the existing variability at each site, we can also carry out more advanced analyses of the data. For example, in the Arizona Telemedicine Program (ATP) we have analyzed fluctuations in case volume using a technique called Statistical Process Control (SPC). This is a technique used to evaluate whether a process, such as telemedicine case referral rates, vary within prescribed control limits. If something changes within the process, such as the implementation of a network of networks connecting a site to a host of other sites and opening up new referral paths, the analysis can track those trends and identify the points of departure from past (i.e., baseline) behavior.

Figure 1 shows the type of graphical representation that an SPC analysis can provide. It tracks the case referral behavior of one of the ATP sites over a period of almost two years. It can be seen that although there are fluctuations over time, the site referral volume stays within the two dotted lines. The dotted lines represent the accepted control limits (as a function of the standard deviation). Hypothetically, we could imagine setting up the network of networks and opening a new referral path for this site. The data points may exhibit the same minor fluctuations for a couple of months, but as the site explores the new referral potentials, their volume may suddenly increase and the data points will start to fall more and more often above the top dotted line. We could then develop a criterion that says if a site exhibits at least three continuous months outside of the prescribed limits, it is now operating at a new level of performance that was a result of the intervention made possible by the network of networks.

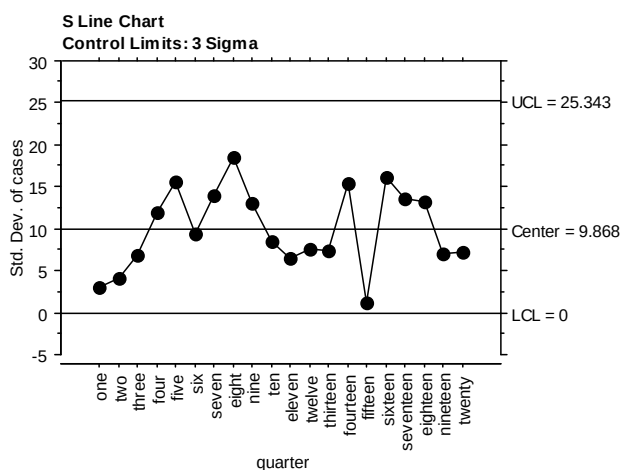


Figure 1. An example of the graphical output from SPC analysis showing how a site can vary over time without exceeding prescribed upper and lower limits of “normal” fluctuation.

Looking for points of change longitudinally will serve as one of the methods to evaluate the impact of the network of network on the participating sites’ activity levels. Case referral volume is only one example of a parameter that we can evaluate. The model will serve as the basis for determining which parameters we will evaluate.

To compare the model predictions with actual site activity, we will also have to wait for the network of networks to be in place and activity to be initiated. Once this occurs, however, we can proceed to evaluate how well the model predicted the behavior at a given site. There are a number of ways to approach this analysis. The easiest one is to compare the predicted and actual parameter behaviors using Chi-Squared analysis. This compares the predicted behavior with what actually occurs and determines whether the difference between them is significant or not. In our case we would actually be trying to support the null hypothesis that there are no differences between what is predicted by the model and what happens—the model was accurate. There are more sophisticated techniques than the Chi-Squared analysis that we can use that take into account inherent correlations between the data sets rather than simply comparing the two distributions as if they were essentially independent. We will explore these methods as well to get the best characterization of agreement between the predicted and actual data as possible.

References

Krupinski EA, Hughes AM, Barker GP, Lopez AM, Weinstein RS. Fluctuations in telemedicine case volume: correlation with personnel turnover rates. *Telemed J & e-Health* 2003;9:369-373.

Future Plans

As the Southwest TAG is being deployed, the modeling methodology and ongoing simulation that uses the evolving model can:

1. Identify potential gaps in the telehealth services provided,
2. Predict problem areas,
3. Provide a platform for determining the most appropriate solutions to close those gaps, and
4. Perform demonstration exercises to further validate the functionality of the network.

Potential problems such as choke points, weaknesses in reliability or quality of service, potential breaks in security, potential surge capacity during an emergency, prioritization of traffic, disaster recovery and effective redundancy can be identified and provided for. Ongoing testing and evaluation will be aimed at continued quality improvements.

It is anticipated that 200 additional rural community sites will be added as the Southwest TAG develops. Additional clinical, education and training activities will be integrated into the rural healthcare program addressing defined needs to enhance community health. These efforts will be coordinated with existing participating organizations, such as the New Mexico Telehealth Commission, the New Mexico Telehealth Alliance, the Arizona Telehealth Program, the Four Corners Telehealth Consortium (Arizona, Colorado, Utah and New Mexico), the Southwest IHS Telehealth Consortium, the NM Departments of Health, state emergency preparedness and homeland security organizations. The Primary Care Associations, state Hospital Associations and similar groups working with healthcare issues and employment of telehealth will be asked to participate. It is anticipated that other stakeholder organizations, such as the Veterans Administration, and private healthcare providers will join. These collaborative rural telehealth programs will likely include expansion and development in specific areas, such as 1) provision of post traumatic stress disorder and traumatic brain injury training programs and treatment for veterans and their families; 2) stroke prevention, education, acute intervention and rehabilitation; 3) trauma triage and stabilization; 4) oral health programs; 5) extension of pediatric sub-specialties; and 6) perinatal and maternal programs to improve the outcomes of pregnancy, to name a few. The SW TAG will be shared across the region to provide a reliable broadband infrastructure. It will also provide a platform for sharing provider resources and effectively distributing limited resources and health expertise.

This project will provide valuable collaboration between multiple divisions of the three universities involved, state agencies, IHS, and national laboratories. This infrastructure enhancement will support the integration of a more robust telehealth platform to support the NIH Clinical and Translational Science Centers (CTSC) and “T2” bedside to community and research efforts. SW TAG can also be used for health information exchange during both normal and emergency situations to better manage critical health issues and respond to emergencies or disasters.

As the TAG evolves, it will integrate approaches to improved network operations, management of traffic, reliability, authentication, and security that best serves the entire network. Foremost among these is firewall transversal in a manner that avoids compromised security within the individual organizational networks. Additional protocols will be developed to deal with surge capacity and emergency mode operations that may involve data traffic prioritization.

This electronic highway supporting rural healthcare will likely require ongoing subsidies from government sources to maintain and upgrade the telehealth grid, as private investment may be unable to provide the entire level of support needed to sustain this system. Approaches to aggregating resources and allowing multiple applications that include not only health, but also education, business and government activities that utilize the grid, can provide the economy of scale and ultimate volume of use that will justify the sustainment of this broadband network of networks as an affordable platform for rural healthcare services.

As this pilot program is deployed, tested, evaluated and iteratively improved, it is anticipated that the model can be broadened to develop the design for a national network. In the future, the SW TAG could be linked to other successful regional or state networks as plans develop to build out an appropriate national system that supports rural telehealth and ensures a reliable system is in place for responding to a national emergency or disaster.

An expanded regional and national network would further integrate the high speed backbones of Internet2 and NLR as an electronic “Interstate communication highway” analogous to our national transportation grid. As a further extension of this SW TAG that is comprised of border states and Mexico, the networks could be extended to address border health issues and link to other international peering points to enable more rapid interaction, knowledge sharing, and effective mitigation related to global health issues, such as HIV/AIDS, tuberculosis or pandemic influenza.

Along with connecting non-profit healthcare organizations, SW TAG will connect with hospital emergency rooms and level I & II trauma centers; the Center for Disaster Medicine will coordinate training efforts for disaster response. Please refer to Appendix 7. for a complete list of proposed sites for future expansion.

The TAG taskforce teams will continue to direct and monitor the build-out and implementation of the project. Those teams include a network engineering, design, modeling and simulation team; a telehealth services team, and an evaluation team.

Appendix

1. TAG Network Engineering Plan
 - Overall Project Gant Chart
 - Site Lists
 - Geo-graphic maps
 - Network map
 - Project Timelines
- 2 Financial Management Expertise
- .
3. Network Modeling Methodologies
4. Existing Resources/Biosketches and Resumes
5. Letters of Commitment
6. Future Sites
7. Letters of Support

Appendix 1

Project Timelines, Site Lists, Network Maps, Geographic Area of Coverage Maps

Albuquerque Area IHS

Year 1

- Comply with Federal Acquisition Requirements (FAR)
- Author a Performance Based Scope of Work (PBSOW) for Mesh WAN topology Hardware (HW)
- Compete the PBSOW for a Contractor
- Coordinate with partnerships, collaborations and the brain trust
- Purchase Cisco equipment for WAN / LAN
- Perform Upgrade to core and edge equipment (USAC)
- Complete Network Design Phase I

Year 2

- Complete Network Design Phase II

ABQ Area IHS

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Denver</u>	CO								
		Denver Indian Health and Family	3749 S King St.	80236	(303) 781-4050		56K		1
<u>Ignacio</u>	CO								
		Ignacio PHS Indian Health Center	P.O. Box 889	81137	(970) 563-4581	YES	T1		10.5
		Southern Colorado Ute Service Unit	P.O. Box 778	81137	(970) 563-4581	YES	T1		10.5
<u>Towaoc</u>	CO								
		Towaoc PHS Indian Health Center	General Delivery	81334	(970) 565-4441	YES	T1		10.3
<u>Albuquerque</u>	NM								
		SIPI Dental Clinic	P.O. Box 67830	87193	(505) 346-2306		T1		1
		Albuquerque PHS Indian Hospital	801 Vassar NE	87106	(505) 248-4093		T1		1
		1st Nations	5608 Zuni Road SE	87108	(505) 262-2481		T1		1
<u>Bernalillo</u>	NM								
		Sandia Health Clinic	P.O. box 6008	87004	(505) 867-4487		64K		1
		Santa Ana Health Clinic	P.O. Box 37	87004	(505) 867-2497		128K		1
<u>Canoncito</u>	NM								
		Canoncito	PO Box 3398	87026	(505) 833-3811.		T1		2
<u>Cochiti</u>	NM								
		Cochiti Health Clinic	P.O. Box 105	87072	(505) 465-3018		256K		4
<u>Dulce</u>	NM								
		Jicarilla Service Unit	P O BOX 187	87528	505-759-3291	YES	T1		10
<u>Espanola</u>	NM								
		Santa Clara Health Center	RR5, Box 446	87532	(505) 753-5039		128K		4

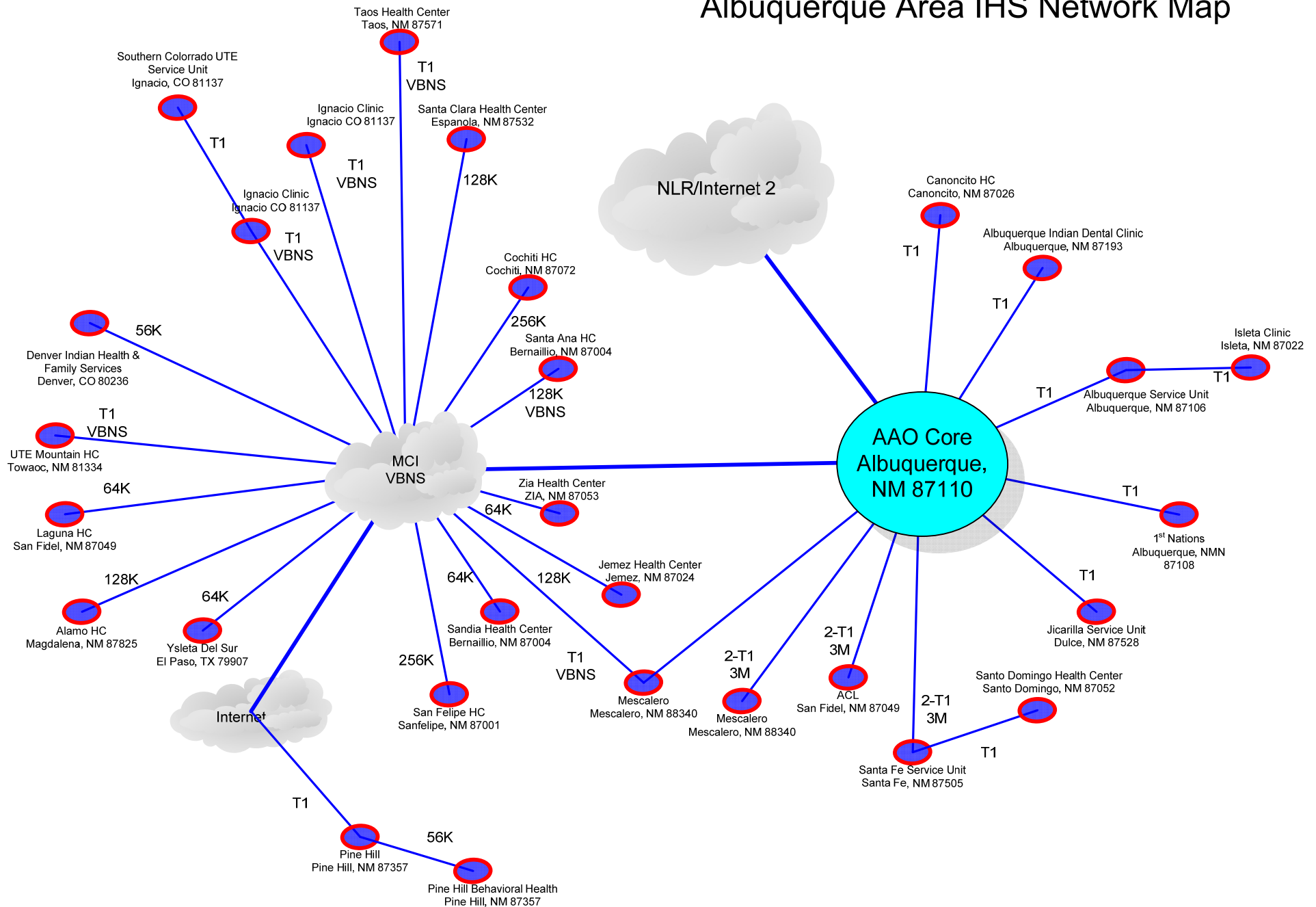
ABQ Area IHS

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data	Proposed Data	RUCA Code
							Connection	Connection	
<u>Gallup</u>	NM								
		Wingate	PO BOX 1337	87035	505-722-1000		T1		2
<u>Isleta</u>	NM								
		Isleta Health Clinic	P.O. Box 580	87022	(505) 869-3200		T1		1
<u>Jemez</u>	NM								
		Jemez Health Clinic	P.O Box 256	87024	(505) 834-7413		None		2
<u>Magdalena</u>	NM								
		Alamo Health Center	HWY 169 N MAGDALENA	87825	(505) 854-2626		128K		10.6
<u>Mescalero</u>	NM								
		Mescalero PHS Indian Hospital	PO BOX 210	88340	505-464-4441	YES	T1		10.6
<u>Pine Hill</u>	NM								
		Pine Hill Indian Health	P.O. Box 310	87328	(505) 775-3271		56K		9.2
<u>San Felipe</u>	NM								
		San Felipe Health Clinic	P.O. box 4344	87001	(505) 867-6527		256K		2
<u>San Fidel</u>	NM								
		Acomita-Canoncito Laguna	P.O. Box 130	87049	(505) 552-5300	YES	2 T1		5
<u>Santa Fe</u>	NM								
		Santa Fe PHS Indian Health	1700 Cerrillos Rd.	87501	(505) 983-6243	YES	2 T1		1
<u>Santo Domingo</u>	NM								
		Santo Domingo Health Center	P O BOX 340	87052	505-465-2996		None		2
<u>Taos</u>	NM								
		Taos PHS Indian Health Center	P.O. Box 1956	87571	(505) 758-4224	YES	T1		4

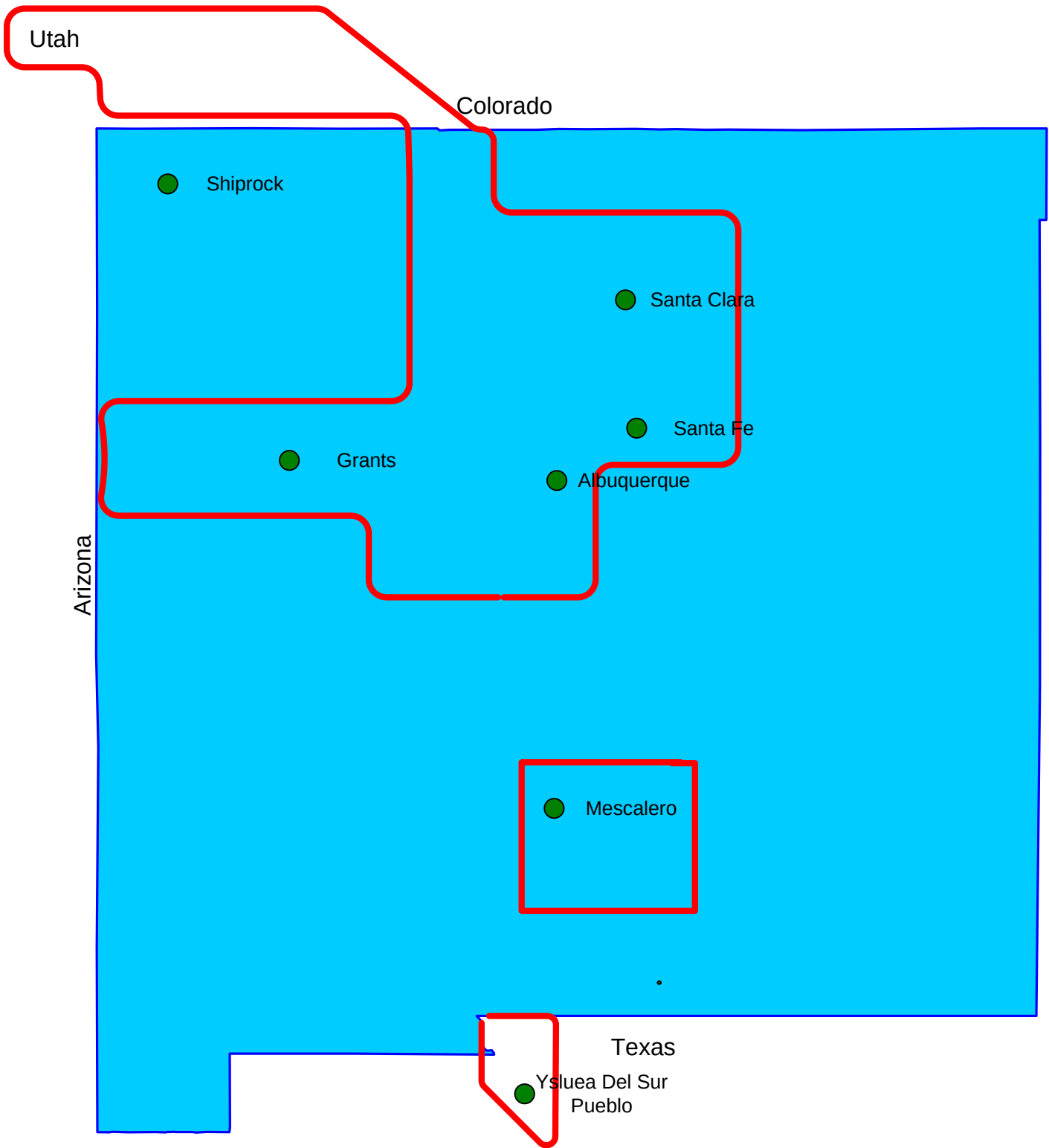
ABQ Area IHS

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data	Proposed Data	RUCA Code
							Connection	Connection	
<u>Zia</u>	NM	Zia Health Clinic	155 Capital Square	87053	(505) 867-5258		64K		2
		Zuni Phs Indian Hospital	PO BOX 467	87327	505-782-4431	YES	2 T1		5
<u>El Paso</u>	TX	Ysleta del Sur	P.O. Box 17579	79907	(915) 859-7913		64K		1

Albuquerque Area IHS Network Map



Albuquerque Area IHS Geographic Area of Coverage



Navajo Area Indian Health Service project timeline

Year 1

- Comply with Federal Acquisition Requirements (FAR)
- Author a Performance Based Scope of Work (PBSOW) for Mesh WAN topology Hardware (HW)
- Complete the PBSOW for a Contractor
- Coordinate with partnerships, collaborations and the brain trust
- Purchase Cisco equipment for WAN / LAN
- Order leased circuits
- Enroll leased circuits with the Universal Service Administration Company (USAC)
- Complete Network Design Phase I

Year 2

- Complete Network Design Phase II
- Order leased circuits
- Enroll leased circuits with the Universal Service Administration Company (USAC)

Navajo Area IHS

						Current Data		Proposed Data	
		Site Name	Address	Zip Code	Phone #	Current Video	Connection	Connection	RUCA Code
<u>CHINLE</u>	AZ	Kayenta Health Center	P.O. Box 368	86033	928-697-4232		DS3		7
		Chinle Comprehensive Health Care	P.O. Box "PH"	86503	928-674-7001		DS3		7
		Fort Wingate Dental	Exit 33 State Road 400	87313	505.722.1440		T1		10.5
<u>Dennehotso</u>	AZ	Dennehotso Health Station	US 160	86535	602-658-3215		T1		8
<u>Dikon</u>	AZ	Dilkon Health Center	Hwy 60	86047	928.657.3800		T1		7
<u>Dinnebito</u>	AZ	Dinnebito Health Center	Highway 87	86040	601-283-5011		T1		9
<u>Flagstaff</u>	AZ	NACA Family Health Center	1500 East Cedar Ave. - Suite	86004	928..773.1245		T1		1
		NACA Health Center	1500 E. Cedar Ave., Suite 26	86004	928-773-1245		T1		1
<u>Ft. Defiance</u>	AZ	Fort Defiance Hospital	P.O. Box 649	86505	928-729-8000		2 DS3		7.4
<u>Leupp</u>	AZ	Leupp Health Station	Hwy 15 (Leupp Schools	86535	928.686.6567		T1		8
<u>Pinon</u>	AZ	Pinon Health Center	Navajo Route 4	86510	602-725-3220		2T1		10
<u>Rock Point</u>	AZ	Rock Point Health Station	US 191	86545	602-659-4282		T1		10.6
<u>Sanders</u>	AZ	Nahata'dziil (Sanders) Clinic	P.O. Box 125 (Chiihto Blvd.	86515	928.688.5600		T1		10.4

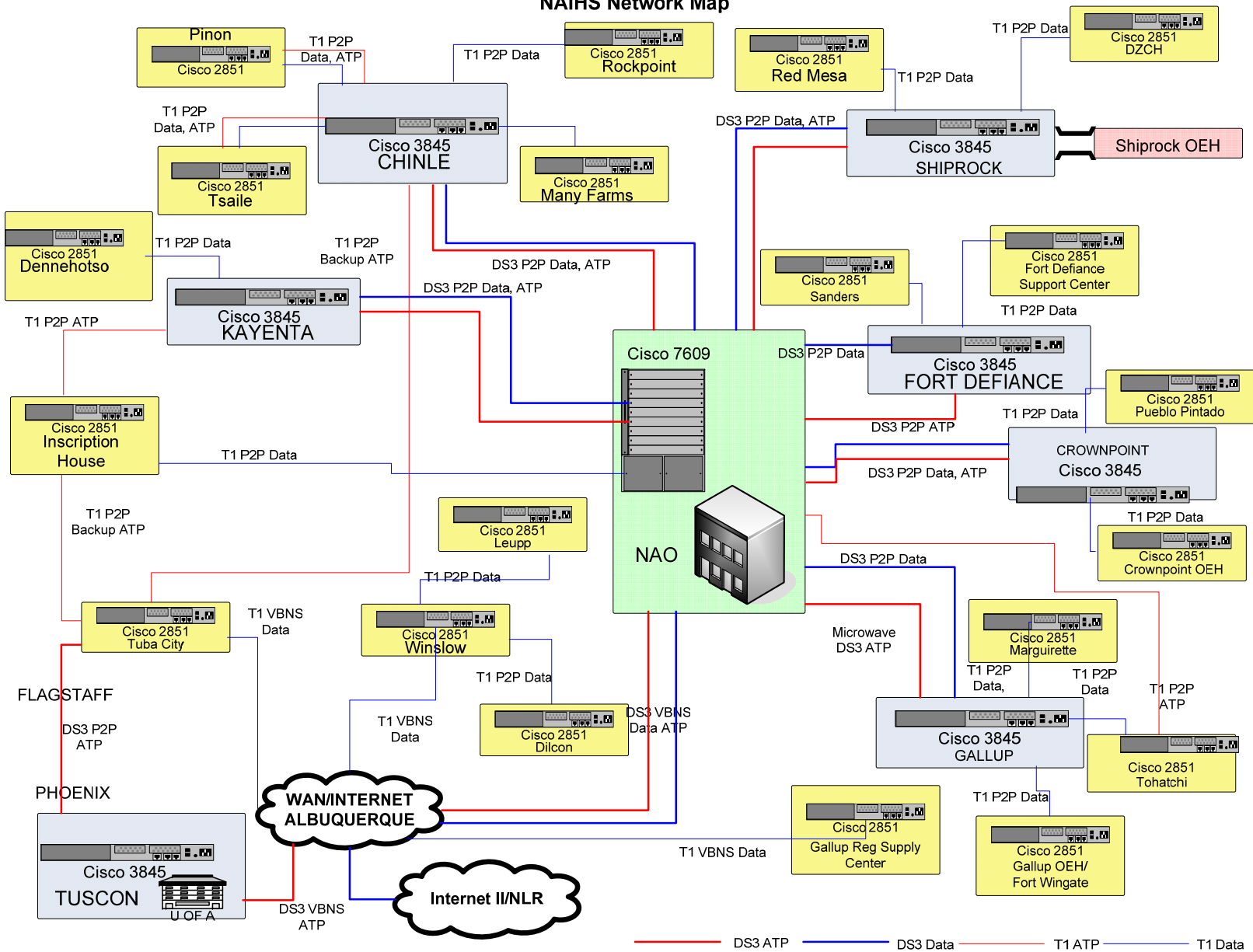
Navajo Area IHS

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Shonto</u>	AZ	Inscription House Health Center	P.O. Box 7379	86045	928-672-3049		2T1		7.3
<u>Teec Nos Pos</u>	AZ	Teec Nos Pos Health Station	US 160 & US164	86514	602-656-3294		T1		10.4
<u>TSAILE</u>	AZ	Tsaile Health Center	P.O. Box 467	86556	928-724-3600		2T1		10.6
<u>Tuba City</u>	AZ	Tuba City Indian Medical Center	P.O. Box 600, 167 North	86045	928-283-2501		T1		7.3
<u>Winslow</u>	AZ	Winslow Health Center	P.O. Drawer 40, 500 North	86047	928-289-4646		T1		7
<u>Bloomfield</u>	NM	Dzilh Na O Dith Hle	6 Road 7586	87413	505-632-1801		T1		2
<u>Crownpoint</u>	NM	Crownpoint Health Care Facility	P.O. Box 358 Hwy Junction	87313	505-786-5291		2 DS3		10.5
<u>Gallup</u>	NM	Gallup Indian Medical Center (GIMC)	516 E. Nizhoni Blvd	87301	505-722-1740		2 DS3		4
<u>Pueblo</u>	NM	Pueblo Pintado Health Center	BIA Rd. 9	87013	505-655-3301		T1		10.4
<u>Shiprock</u>	NM	Northern Navajo Medical Center	US HWY 491	87420	505-368-5181		2 DS3		7.3
<u>Thoreau</u>	NM	Thoreau Clinic	15 Navarre St (PO Box	87323	505-862-7417		T1		10.5

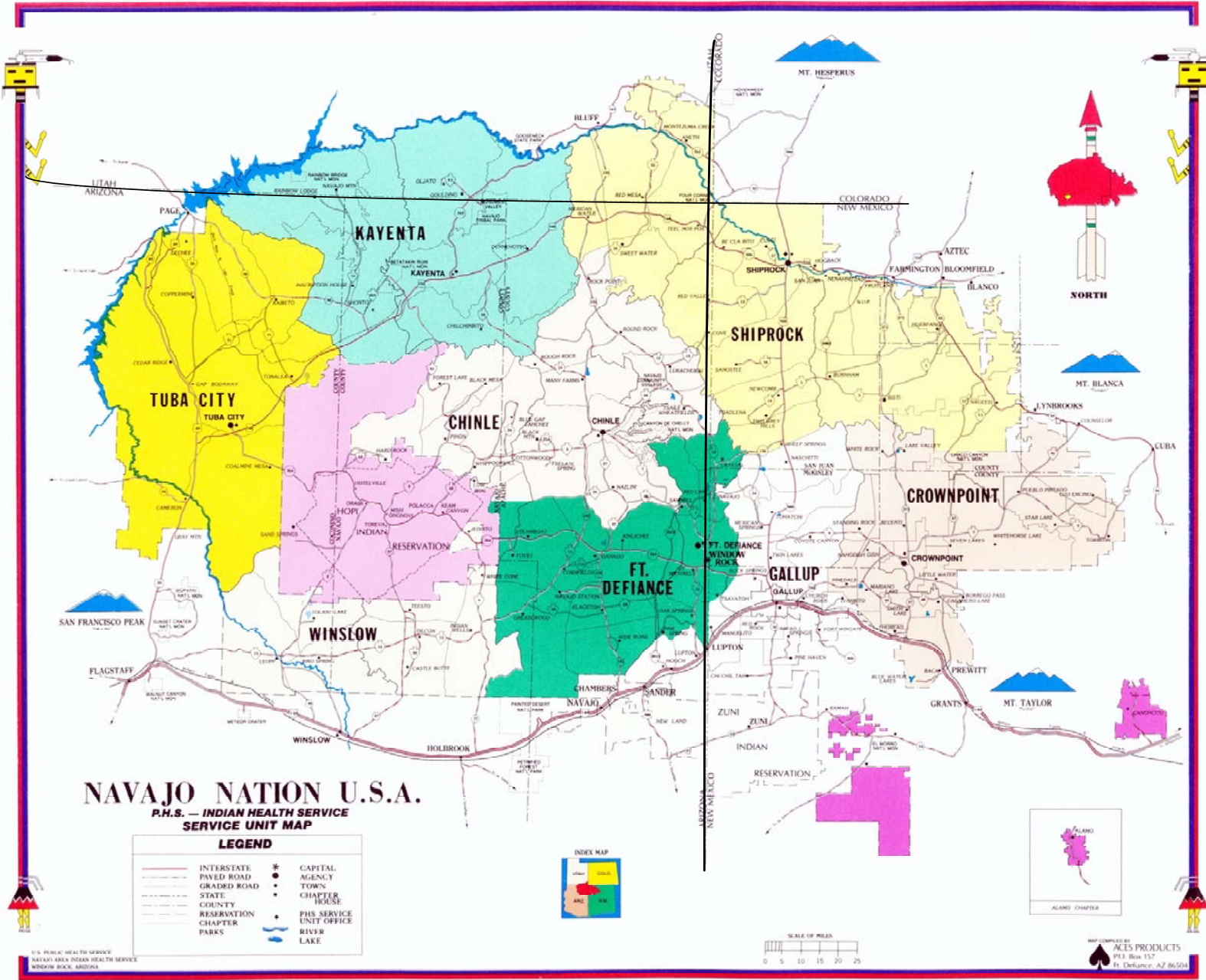
Navajo Area IHS

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Toadlena</u>	NM	Toadlena Health Station	P.O. Box 160 Hwy.491	87419	505-722-9411		T1		10.5
<u>Tohatchi</u>	NM	Tohatchi Health Center	PO Box 142	87325	505-733-2244		2 T1		5

NAIHS Network Map



Navajo Area IHS Geographic Area of Coverage



Year 1

- Comply with Federal Acquisition Requirements (FAR)
- Author a Performance Based Scope of Work (PBSOW) for Mesh WAN topology Hardware (HW)
- Complete the PBSOW for a Contractor
- Coordinate with partnerships, collaborations and the brain trust
- Purchase Cisco equipment for WAN / LAN
- Order leased circuits
- Enroll leased circuits with the Universal Service Administration Company (USAC)
- Complete Network Design Phase I

Year 2

- Complete Network Design Phase II
- Order leased circuits
- Enroll leased circuits with the Universal Service Administration Company (USAC)

Phoenix Area IHS

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Camp Verde</u>	AZ								
		Yavapai Apache Health Center	2121 West Reservation Loop	86322	602.263.1200		T1		10.5
<u>Cibecue</u>	AZ								
		Cibecue Health Center	2 West 3rd Street	85911	928. 338-3541		T1		7
<u>Flagstaff</u>	AZ								
		Native American Cardiology Program	1215 N. Beaver Street, Suite	86004	602-779-6734	YES	T1		1
<u>Ft Mc Dowell</u>	AZ								
		Ft MC Dowell PIMC (Wassaja	16240 North Ft. McDowell	85264	480.836.8513		T1		10.1
<u>Guadeloupe</u>	AZ								
		Guadeloupe Tribal Health Clinic	9405 South Avenida De	85283	520.879.5813		T1		1
<u>Parker</u>	AZ								
		Parker Indian Hospital IHS Service	Agency Road	85344	928-669-3217	YES	T1 x 2		7
<u>Peach Springs</u>	AZ								
		Peach Springs Health Center	943 Hualapai Way	86434	928-669-3217	YES	T1		5
<u>Phoenix</u>	AZ								
		PIMC Aztec Building	1616 East Indian School	85016	602.263.1200		T1		1
		Phoenix Indian Medical Center	4212 North 16th Street	85016	602.263.1200	YES	T1 x 5	DS3	1
		Phoenix Area Office	40 North Central Avenue	85004	602-364-5280	YES	DS3		1
		Western Area District Office OEH	10631 South 51st Street	85044	480-592-0091		T1		1
<u>Pinetop</u>	AZ								
		Eastern Arizona OEH Office	674 White Mountain	85935	928- 338-3541		T1		7
<u>Polacca</u>	AZ								
		Hopi Health Care Center Service Unit	Mile Marker 388, Highway	86042	928.737-6050	YES	T1 x 2	DS3	10

Phoenix Area IHS

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Sacaton</u>	AZ	Desert Visions Regional Treatment	198 South Skill Center Road	85247	888.431.4096	YES	T1		10.4
		Hu Hu Kam Memorial Hospital Gila	Skill Center Road & Seed	85247	602.528.1288	YES	T1 x 2		10.4
<u>San Carolos</u>	AZ	San Carlos Hospital Service Unit	Cibecue Circle	85550	928.475-2371	YES	T1 x 2		8
<u>Scottsdale</u>	AZ	Salt River Clinic	10005 East Osborn Road	85256	602.263.1200	YES	T1		1
<u>Second Mesa</u>	AZ	Hopi Guidance Center	Toreva Road (3 mi. N. of	86043	928.737-6050		T1		10
<u>Supai</u>	AZ	Havasupai Clinic	South of Grand Canyon	86435	928-669-3217		VPN tunnel		10.4
<u>Whiteriver</u>	AZ	WhiteRiver Service Unit	State Route 73 @ mile	85941	928- 338-3541	YES	T1 x 4	DS3	7
<u>Havasus</u>	CA	Chemehuevi Health Clinic	1970 North Palo Verde	92363	928-669-3217		T1		7
<u>Needles</u>	CA	FT Mohave Indian Health Center	500 Merriman Street	92363	760.629.4679		T1		7
<u>Winterhaven</u>	CA	Ft Yuma Indian Hospital Service Unit	1 Indian Hill Road	92283	760.572.4175	YES	T1		1
<u>Duckwater</u>	NV	Duckwater Shoshone Tribe	511 Duckwater Falls Road	89316	775 863-0222		T1		10
<u>Elko</u>	NV	Elko Southern Band Health Clinic	515 Shoshone Circle	89801	775-738-2252	YES	T1		4

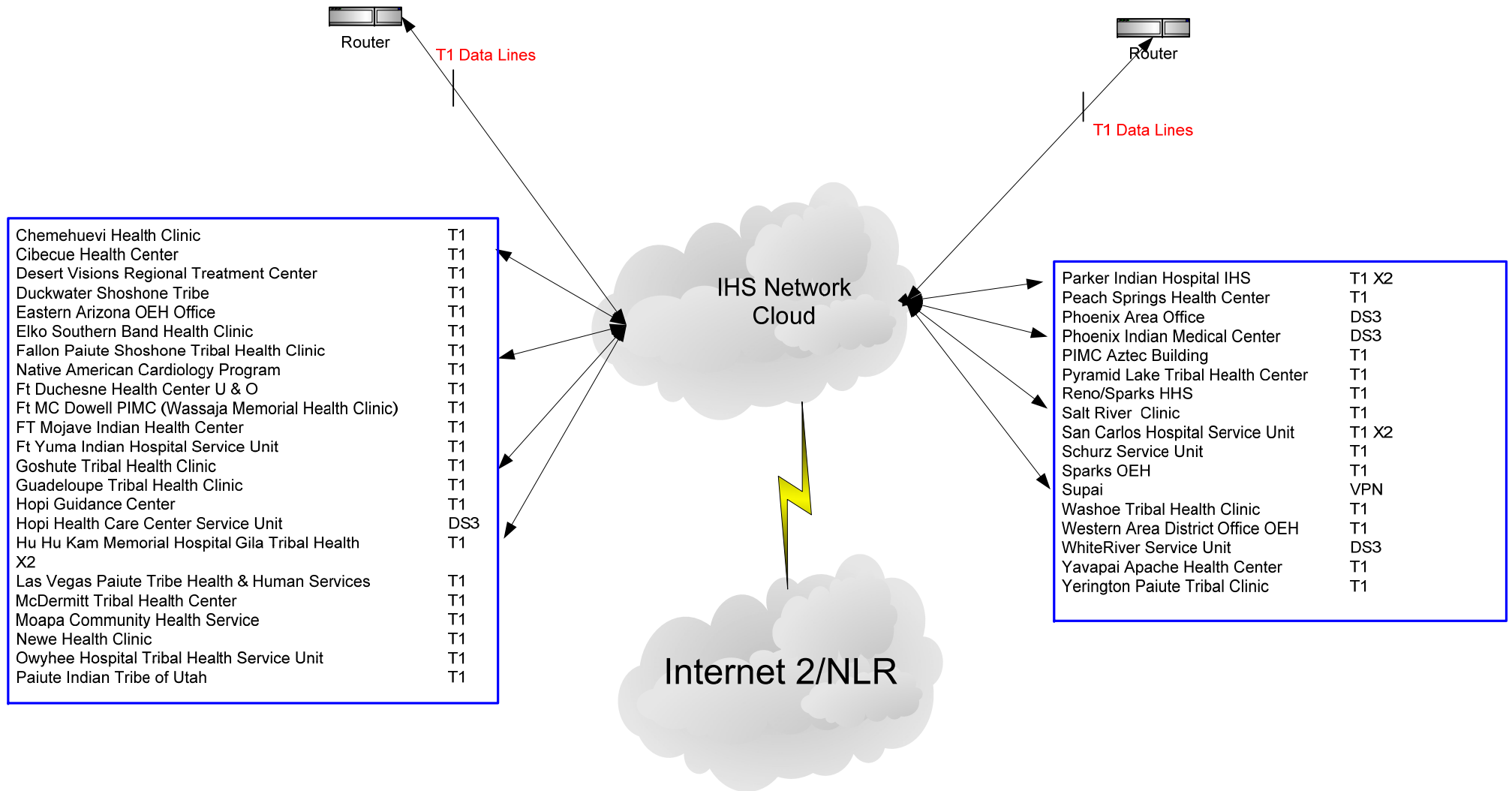
Phoenix Area IHS

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Ely</u>	NV	Newe Health Clinic	400"A" Newe View	89301	775.289.4133		T1		7
<u>Fallon</u>	NV	Fallon Paiute Shoshone Tribal Health	1001 Rio Vista Drive	89403	775-423-3634		T1		4
<u>Garderville</u>	NV	Washoe Tribal Health Clinic	1559 Watasheamu Rd.	89460	775-265-4215	YES	T1		4.2
<u>Las Vegas</u>	NV	Las Vegas Paiute Tribe Health &	6 Paiute Drive	89106	702.386.3926		T1		1
<u>McDermitt</u>	NV	McDermitt Tribal Health Center	112 North Reservation Road	89420	775-784-5327		T1		8
<u>Moapa</u>	NV	Moapa Community Health Service	10 Lincoln Street	89020	702.865.2700		T1		10
<u>Nixon</u>	NV	Pyramid Lake Tribal Health Center	705 Highway 446	89424	775 574-1018		T1		2
<u>Owyhee</u>	NV	Owyhee Hospital Tribal Health	Highway 225	89831	775.757.2403		T1		10.5
<u>Reno</u>	NV	Reno/Sparks Health & Human Service	Reservation Road	89502	775.329.5162		T1		1
<u>Schurz</u>	NV	Schurz Service Unit	2 Hospital Road	89427	775-784-5327		T1		6
<u>Sparks</u>	NV	Sparks OEH	1395 Greg Street, Suite 101	89431	775-784-5327		T1		1

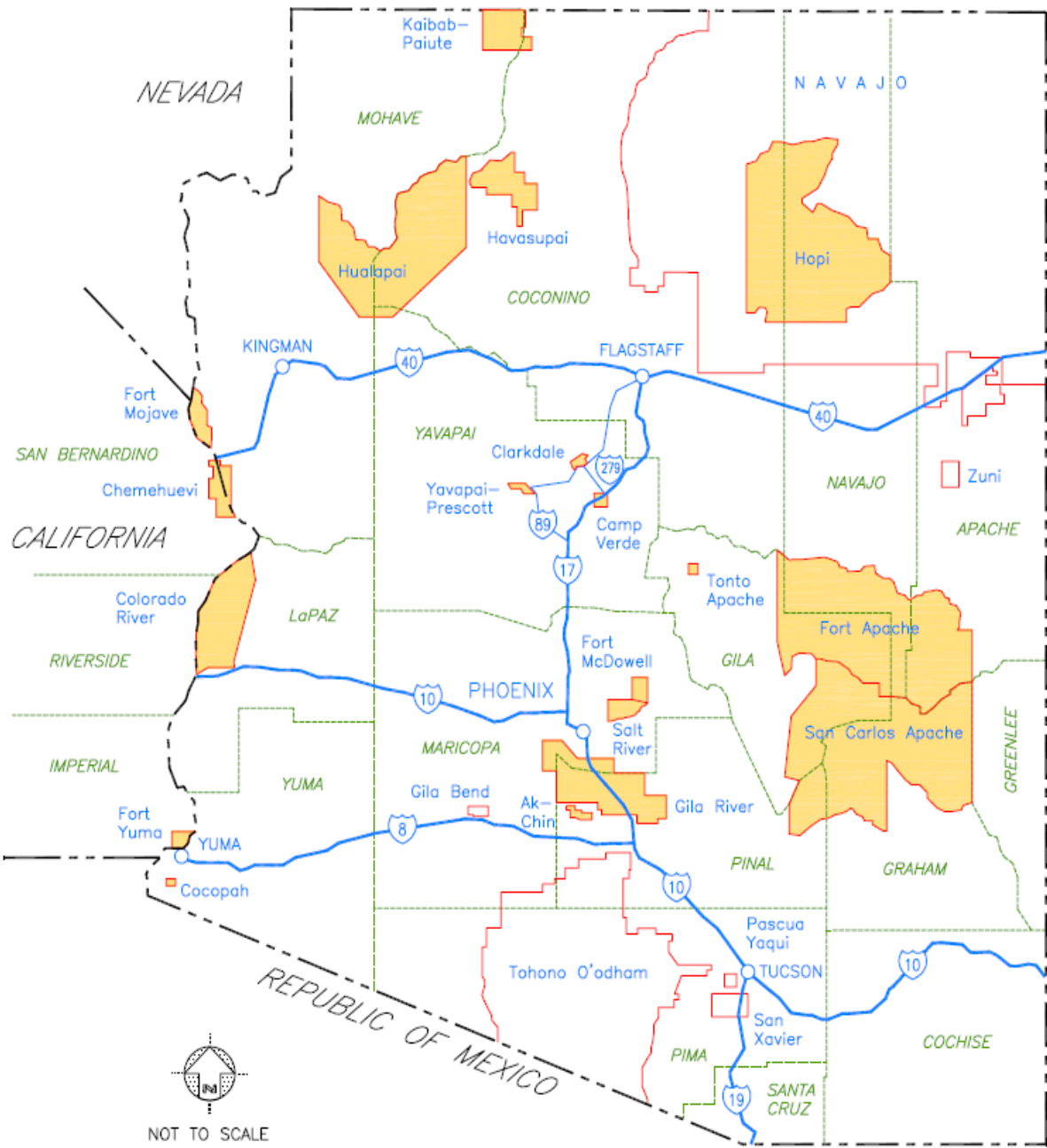
Phoenix Area IHS

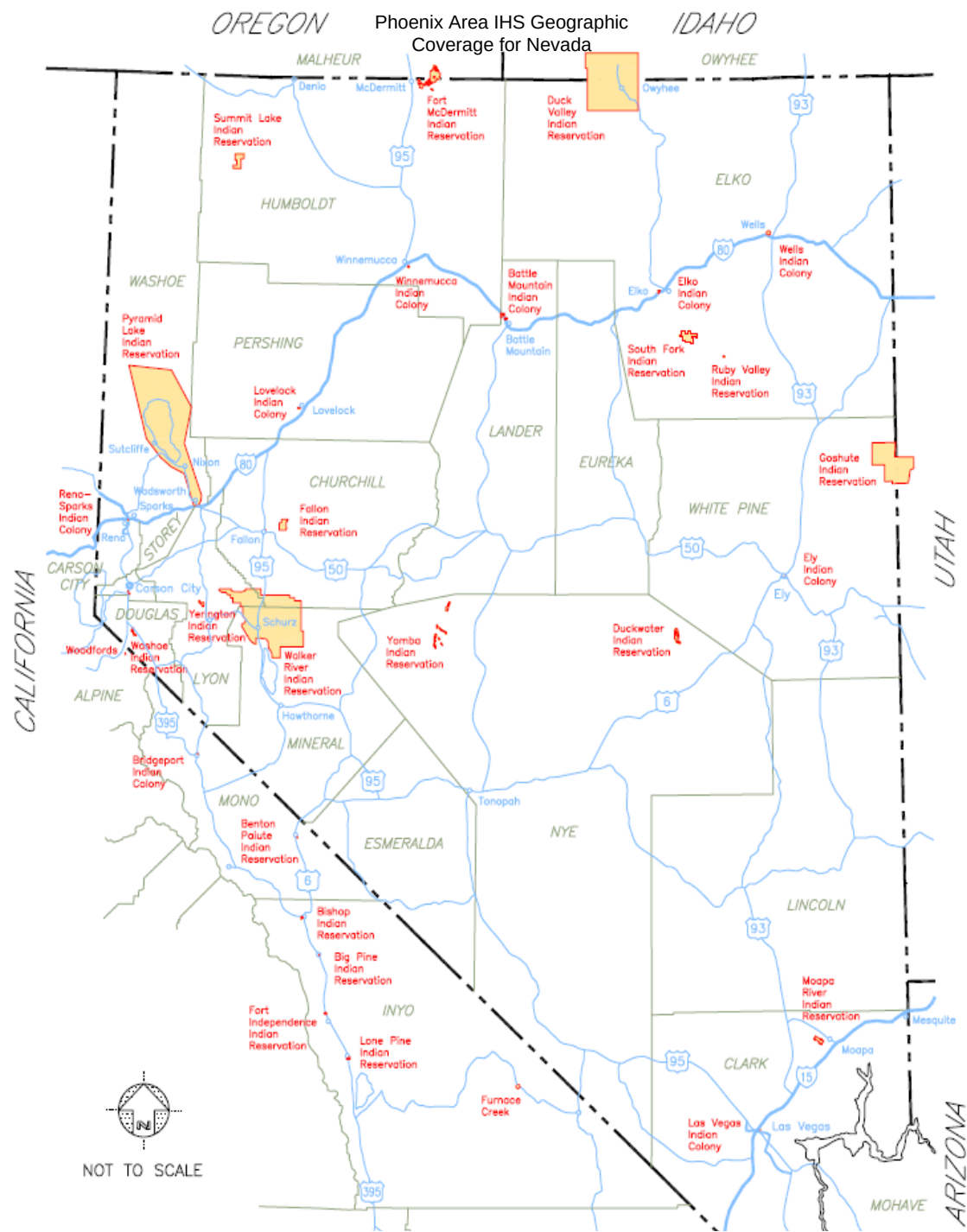
		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Yerington</u>	NV	Yerington Paiute Tribal Clinic	171 Campbell Lane	89447	775 463-3335		T1		7
<u>Cedar City</u>	UT	Paiute Indian Tribe of Utah	440 North Paiute Drive	84720	435.586.1112		T1		4
<u>Ft Duchesne</u>	UT	Ft Duchesne Health Center U & O	2 Miles South of	84026	435-725-6853	YES	T1		10.6
<u>Ibapa</u>	UT	Goshute Tribal Health Clinic	PO Box 6104	84034	435-234-1138.	YES	T1		10.6

Phoenix Area Indian Health Service

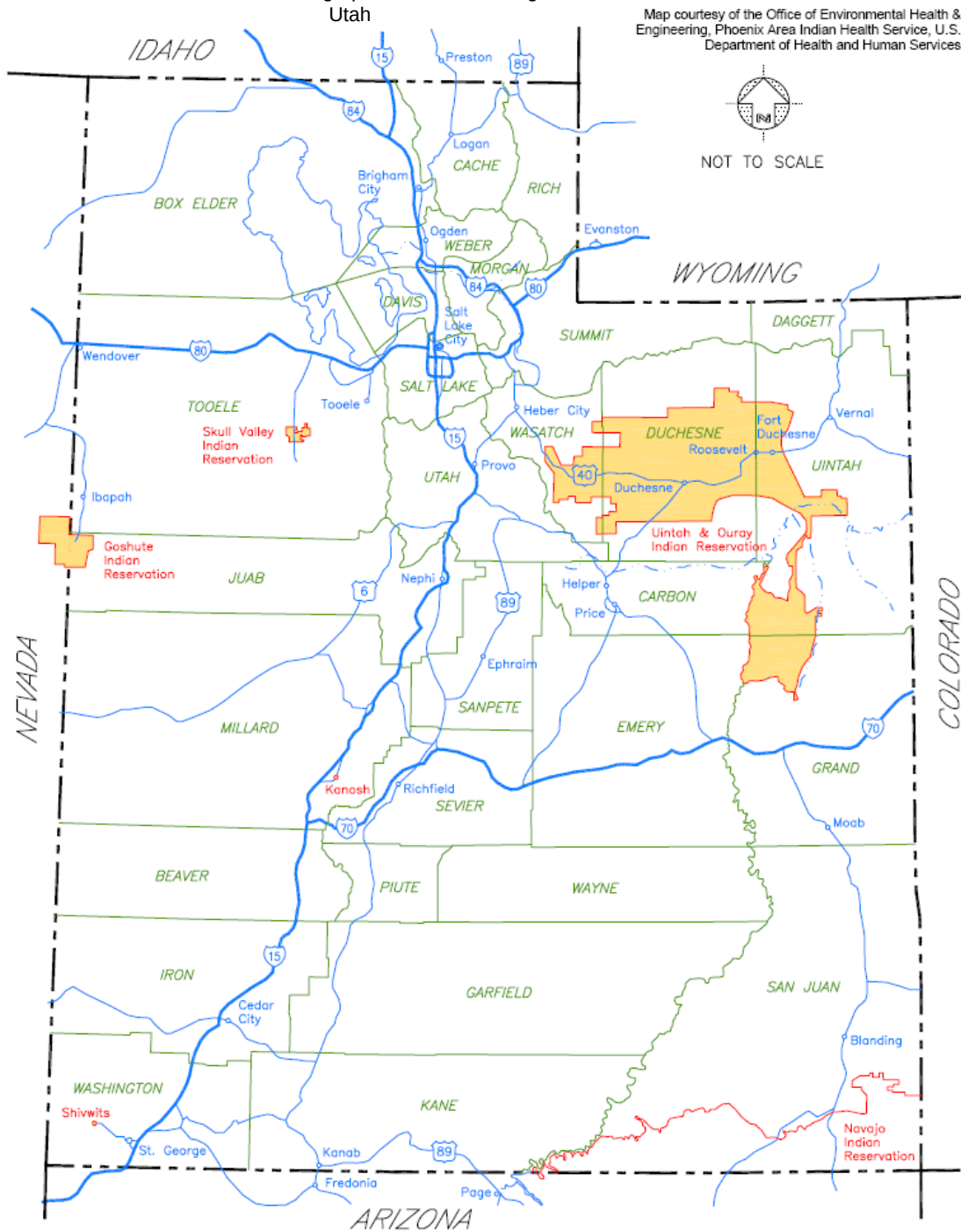


Pheonix Area IHS Geographic Coverage for
The State of Arizona





Pheonix Area IHS Geographic Area of Coverage for Utah



Tucson Area IHS Project Timeline

Year 1

- Comply with Federal Acquisition Requirements (FAR)
- Author a Performance Based Scope of Work (PBSOW) for Mesh WAN topology Hardware (HW)
- Complete the PBSOW for a Contractor
- Coordinate with partnerships, collaborations and the brain trust
- Purchase Cisco equipment for WAN / LAN
- Order leased circuits
- Enroll leased circuits with the Universal Service Administration Company (USAC)
- Complete Network Design Phase I

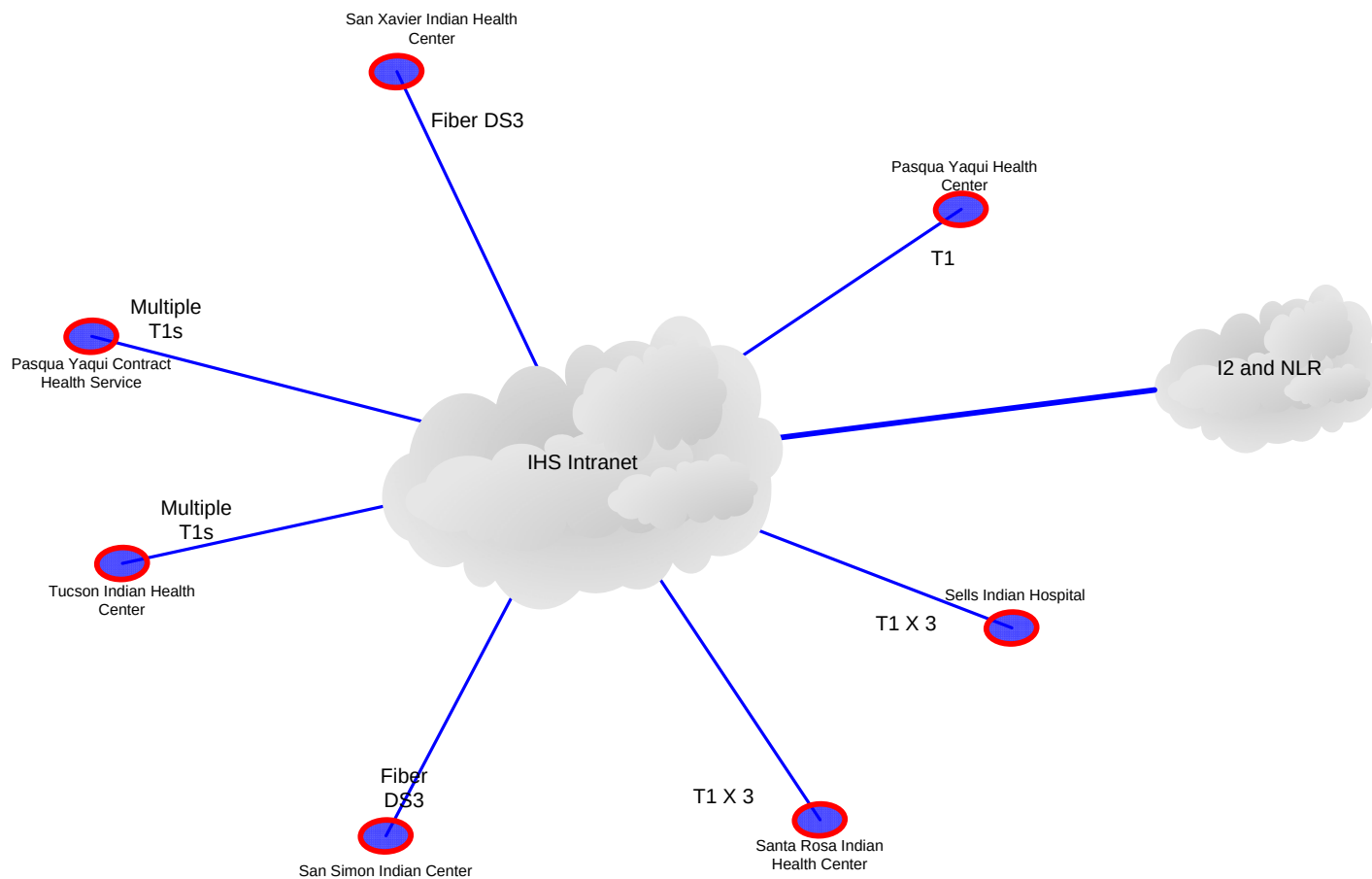
Year 2

- Complete Network Design Phase II
- Order leased circuits
- Enroll leased circuits with the Universal Service Administration Company (USAC)

Tucson Area IHS

<u>San Simon</u>	AZ	San Simon Indian Health Center (to	Tucson-Ajo highway 86	85632	Opening in July 07	Planned	Non	Fiber DS3	10.6
	AZ	Santa Rosa Indian Health Center	Star Route, Box 71	85634	520-361-2261		Fractional T-1	Multiple T-1s	10.4
<u>Sells</u>		Sells Indian Hospital	P.O. Box 548	85634	520-383-7200	Yes	3 bundled T-1s		10.4
	AZ	Pasqua Yaqui Health Center	7490 S. Camino de Oeste	85746	520-883-5020		Fractional T-1	T-1	1
<u>Tucson</u>		Tucson Indian Center	97 East Congress Street	85701	520-884-7131		Fractional T-1	Multiple T-1s	1
		Pasqua Yaqui Contract Health Service	300 West Congress Street	85701	520-295-2568		Fractional T-1	Multiple T-1s	1
		San Xavier Indian Health Center	7900 S. J. Stock Rd.	85746	520-295-2406	Yes	3 bundled T-1s	Fiber DS3	1

Tucson Area IHS



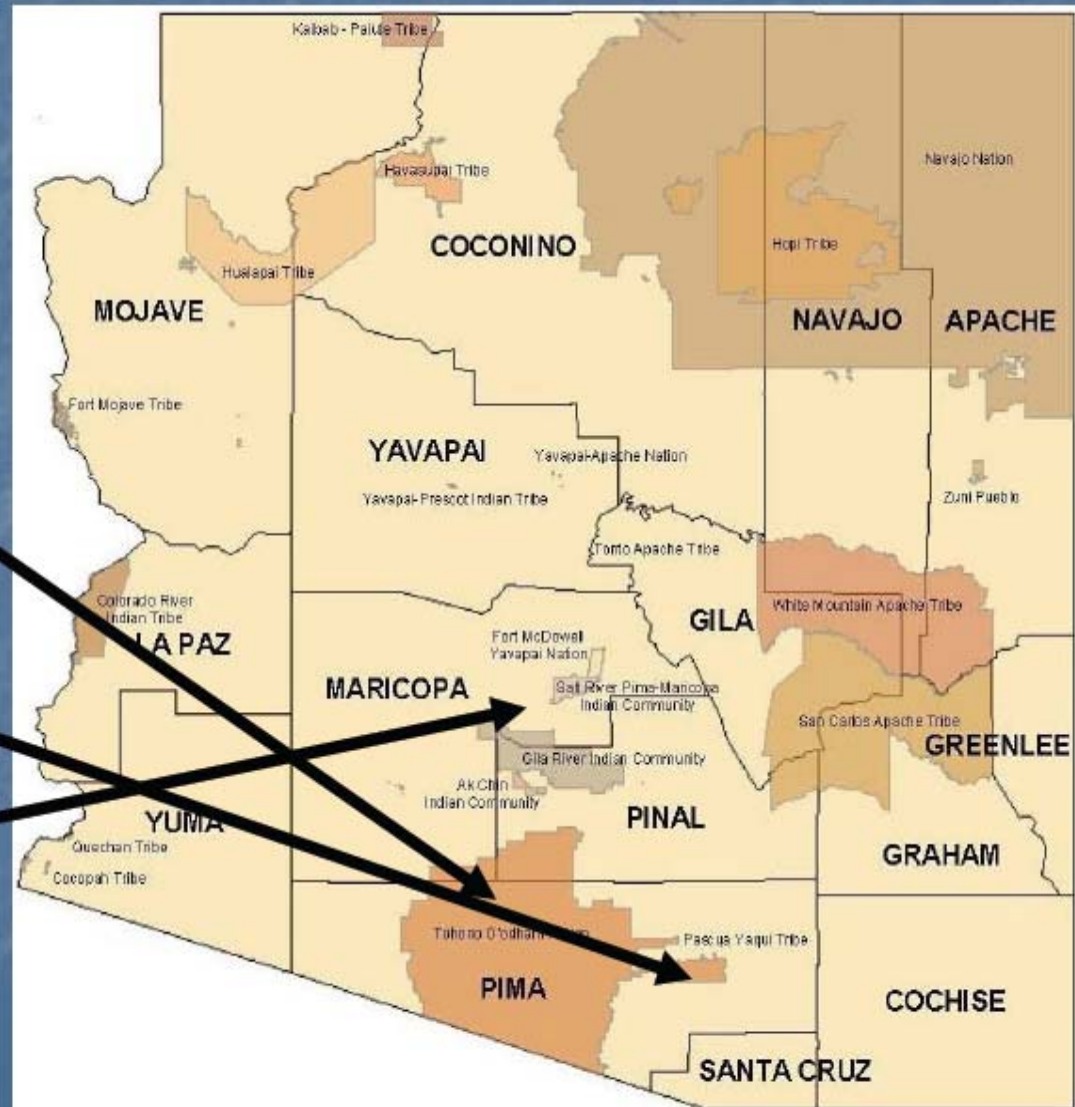
★ Tucson Area ★

■ Tucson Area works with:

1. Tohono O'odham Nation (TON)

2. Pascua Yaqui Tribe (PYT)

Guadalupe community



Arizona Telemedicine Program (ATP) Estimated Schedule

- Overall estimate is approximately 6-8 months from the time the grant is awarded.
- First Quarter:
 - Establish Quality Improvement Team
 - Develop overall project plan, meeting schedules, communications plan
 - Develop individual entity work plans
 - Identify requirements for competitive bidding
 - Prioritize sites and interconnection points
 - Develop acceptance criteria and criteria for success
 - Site Readiness Surveys
 - Equipment readiness
 - Competitive Bids for equipment, network services
 - Purchase equipment upgrades
 - Establish protocols for network interconnection
- Second Quarter:
 - Complete bidding process
 - Contracts
 - Implement Core upgrades
 - Implement Edge/Firewall upgrades
- Third Quarter:
 - Perform necessary testing
 - Report back to USAC on completion



Hospital/Clinic Sites ARIZONA

The Arizona Telemedicine Program connects with network member organizations through direct connections, network to network connections, virtual private network connections and dial-up c
Connectivity Type Legend:

Direct leased line connection to site
Connected via network to network connection
Virtual private network connection via Internet
Dial-up connection

FCC Rural Health Pilot Connectivity - Scope of network improvements

Core Network Upgrades will benefit all organizations that utilize the network.

Sites where ATP would deploy FCC funded network edge equipment in year 1 of the FCC Rural Health Care pilot program are in bold and italics.

	Site	Address	City	State	Zip	County	Video	Data	RUCA 2000	Phone Number
1	ADHS-CRS	150 N. 18th Ave.	Phoenix	AZ	85017	Maricopa	X		1	602-542-1860
2	Arizona Foundation for the Eye	1800 E. Van Buren St.	Phoenix	AZ	85006	Maricopa		X	1	602-251-3400
3	Benson Hospital	450 S Ocotillo	Benson	AZ	85602	Cochise	X	X	7	520-586-2261
4	Canyonlands Community Health Care	827 Vista Avenue	Page	AZ	86040	Coconino		X	7	928-645-9675
5	Carondelet St Joseph' Hospital - The Villa	6627 E Carondelet Dr.	Tucson	AZ	85711	Pima	X	X	1	520-873-6548
6	Carondelet St Mary's Hospital	1601 W. St. Mary's Rd.	Tucson	AZ	85745	Pima	X	X	1	520-872-3000
7	Carondelet Holy Cross Hospital	1171 W Target Range Rd	Nogales	AZ	85621	Santa Cruz	X	X	4	520-285-3000
8	Cobre Valley Community Hospital	5880 South Hospital Drive	Globe	AZ	85501	Gila		X	4	928-425-3261
9	Copper Queen Hospital	101 Cole Dr	Bisbee	AZ	85603	Cochise	X	X	1	520-432-5383
10	Flagstaff Medical Center (ADHS-CRS & NACP)	1200 N. Beaver St.	Flagstaff	AZ	86001	Coconino	X	X	1	928-779-3366
11	Gila Health Resources Clinic	401 Burro Alley	Morenci	AZ	85543	Greenlee	X	X	7	928-865-9184
12	Good Samaritan Regional Medical Ctr - Banner Health	1111 E. McDowell Road	Phoenix	AZ	85006	Maricopa	X	X	1	602-239-2000
13	Healthwest Yuma PET Center	1951 W. 25th St. #G	Yuma	AZ	85364	Yuma		X	1	928-314-4800
14	Kindred Hospital	355 N. Wilmot Road	Tucson	AZ	85711	Pima		X	1	520-584-4500
15	Havasu Regional Medical Center	101 Civic Center Lane	Lake Havasu City	AZ	86403	Mohave		X	4	928-855-8185
16	Kingman Regional Medical Center	3269 Stockton Hill Road	Kingman	AZ	86401	Mojave		X	4	928-757-2101
17	Maricopa Medical Center	2601 E. Roosevelt	Phoenix	AZ	85016	Maricopa	X	X	1	602-344-5011
18	Mariposa Community Health Center	1852 N. Mastick Way	Nogales	AZ	85621	Santa Cruz	X	X	4	520-281-1550
19	NAIHS Area Office	Highway 264 and Muzzie Lane	Window Rock	AZ	86515	Apache	X	X	7	928-871-5838
20	NAIHS Chinle	Highway 191 and Hospital Drive	Chinle	AZ	86503	Apache	X	X	7	928-674-7001
21	NAIHS Ft. Defiance	Highway 12 and Bonito Dr	Ft. Defiance	AZ	86504	Apache	X	X	7	928-729-8372
22	NAIHS Inscription House	1 Mile North of Highway 98	Shonto	AZ	86054	Coconino	X	X	9	928-672-3000
23	NAIHS Kayenta Service Unit	Highway 163	Kayenta	AZ	86033	Navajo	X	X	7	928-697-4000
24	NAIHS Pinon Health Station	264 Main Street	Pinon	AZ	86510	Navajo		X	10	928-725-9820
25	NAIHS Tsaile	Route 264 and Route 12	Tsaile	AZ	86556	Apache	X	X	10	928-724-3600
26	NAIHS Winslow Health Center	500 N Indian Avenue	Winslow	AZ	86047	Navajo	X	X	7	928-289-6196
27	North Country Community Health Center	2500 N Rose Street	Flagstaff	AZ	86004	Coconino		X	1	928-213-6100
28	PAIHS Cibecue Health Center	2 West Third Street	Cibecue	AZ	85911	Navajo		X	8	928-332-2560
29	PAIHS Desert Visions Reg. Treatmnt Ctr.	198 S. Skill Center Rd.	Sacaton	AZ	85247	Pinal	X		7	928-562-3801
30	PAIHS Fort Yuma PHS Indian Hospital	1 Indian Hill Road	Winterhaven	CA	92283	Imperial	X	X	10	760-572-4218
31	PAIHS Gila Crossing Health Center	51st avenue and beltline	Laveen	AZ	85339	Maricopa	X	X	2	520-550-3829
32	PAIHS-Hopi Healthcare Center	Milepost 388, Highway 264	Polacca	AZ	86042	Navajo	X	X	2	928-737-6000
33	PAIHS Phoenix Area Office	40 N. Central Ave. #605	Phoenix	AZ	85004	Maricopa	X	X	1	602-364-5276
34	PAIHS Parker	Agency Road	Parker	AZ	85344	La Paz	X	X	7	928-669-2137
35	PAIHS Phoenix Indian Medical Ctr	4212 N. 16th Street	Phoenix	AZ	85016	Maricopa	X	X	1	602-263-1200
36	PAIHS San Carlos	Cibecue Circle	San Carlos	AZ	85550	Gila	X	X	9	928-475-2371
37	PAIHS Supai Indian Health Station	Main Street	Supai	AZ	86435	Coconino		X	10	928-448-2203
38	PAIHS Whiteriver Service Unit	State Rte 73, Milepost 342	Whiteriver	AZ	85941	Navajo	X	X	8	928-338-4911
39	Payson Regional Medical Center	807 S. Ponderosa	Payson	AZ	85541	Gila	X	X	10	928-472-1268
40	Sage Memorial Hospital	Route 264 and US 191 South	Ganado	AZ	86505	Apache	X	X	10	928-755-3411
41	Scottsdale Healthcare	9003 E. Shea Boulevard	Scottsdale	AZ	85260	Maricopa	X		1	480-323-3000
42	Sierra Vista Regional Health Center	300 El Camino Real	Sierra Vista	AZ	85635	Cochise	X	X	4	520-458-2300
43	Southeast Arizona Medical Center	2174 Oak Ave	Douglas	AZ	85607	Cochise	X	X	4	520-364-7931
44	Southwest PET Institute	3503 N. Campbell Ave.	Tucson	AZ	85719	Pima		X	1	520-321-4057
45	St Elizabeth of Hungary Clinic	140 W. Speedway Blvd.	Tucson	AZ	85705	Pima	X	X	1	520-628-7871
46	St. Joseph's Hosp. & Med. Ctr & ADHS-CRS	350 W. Thomas Rd.	Phoenix	AZ	85013	Maricopa	X	X	1	602-406-3000
47	Tuba City Regional Health Care Corp	167 N. Main St	Tuba City	AZ	86045	Coconino	X	X	2	928-283-2501
48	Tuba City - Cameron Chapter House	Highway 89	Cameron	AZ	86020	Coconino	X	X	2	928-679-2323
49	Tuba City - Tonalea Chapter House	Highway 160	Tonalea	AZ	86044	Coconino	X	X	3	928-283-3430
50	Tucson Heart Hospital	4888 N. Stone Ave.	Tucson	AZ	85704	Pima		X	1	520-696-2328
51	UA COPH RHO Mobile Clinic - Amado	28720 S Nogales Hwy	Amado	AZ	85645	Pima	X	X	2	None - Mobile
52	Tucson Med. Ctr - Children's Clinics ADHS-CRS	2600 N. Wyatt Dr.	Tucson	AZ	85712	Pima	X		1	520-324-3340
53	University Medical Center	1501 N. Campbell Avenue	Tucson	AZ	85719	Pima	X	X	1	520-694-0111
54	UPH Alvernon Clinic	707 N. Alvernon Way	Tucson	AZ	85711	Pima		X	1	520-322-3800
55	UPH Hospital at Kino	2800 E. Ajo Way	Tucson	AZ	85713	Pima	X	X	1	520-874-2000
56	Urological Associates Of Southern Arizona PC	6325 E Tanque Verde Rd	Tucson	AZ	85715	Pima		X	1	520-955-0649
57	Verde Valley Medical Center	269 S. Candy Lane	Cottonwood	AZ	86326	Yavapai	X	X	4	928-639-6000
58	White Mountain Regional Medical Ctr	118 S. Mountain Avenue	Springerville	AZ	85938	Apache	X	X	7	928-333-4368
59	Yuma Regional Med. Center ADHS-CRS	2400 Avenue A	Yuma	AZ	85364	Yuma	X		1	928-344-2000

ADHS-CRS – Arizona Department of Health Services Children's Rehabilitative Services NACP – Native American Cardiology Program
NAIHS – Navajo Area Indian Health Service PAIHS – Phoenix Area Indian Health Service UPH – University Physicians Healthcare



Arizona County Health Departments

	Site	Address	City	State	Zip	County	Video	Data	RUCA 2000	Phone Number
1	Cochise County Health Department	1415 Melody Lane, Bldg A	Bisbee	AZ	85603	Cochise	X		7	520-432-9400
2	Graham County Health Department	921 Thatcher Blvd.	Safford	AZ	85546	Graham	X		4	928-428-3250
3	Pima County Health Department	130 W Congress B Level	Tucson	AZ	85701	Pima	X		1	520-798-0600
4	Yavapai County Community Health Services	1090 Commerce Dr	Prescott	AZ	86305	Yavapai	X		1	928-771-3122
5	Yavapai County Community Health Services	10 S. Sixth St	Cottonwood	AZ	86326	Yavapai	X		4	928-639-8130
6	Yuma County Health Department	2200 W 28 th Street	Yuma	AZ	85364	Yuma	X		1	928-317-4625

Arizona TeleBehavioral Health Net Telehealth Sites

The following sites comprise the **Arizona TeleBehavioral Health Network** and can be linked by video to any video sites on the **Arizona Telemedicine Program** network through an interconnection between the two networks at the Northern Arizona Behavioral Health Authority (NABHA) administrative office in Flagstaff. Additional telebehavioral health sites are located at the University of Arizona and the Arizona Department of Corrections.

	Site	Address	City	State	Zip	County	Video	Data	RUCA 2000	Phone Number
NABHA-Northern Arizona Behavioral Health Authority										
1	NABHA	1300 S. Yale Street	Flagstaff	AZ	86004	Coconino	X		1	928-214-2163
2	Apache Behavioral Health Services	249 W. Ponderosa Dr.	Whiteriver	AZ	85941	Navajo	X		8	928-338-4811
3	Community Behavioral Health Svcs	463 South Lake Powell Blvd.	Page	AZ	86040	Coconino	X		7	928-645-5113
4	Community Behavioral Health Svcs	850 E. Highway 89	Fredonia	AZ	86022	Coconino	X		10	928-643-7230
5	Community Counseling Centers	211 E. Third Street	Winslow	AZ	86047	Navajo	X		7	928-524-6701
6	Community Counseling Centers	105 North Fifth Avenue	Holbrook	AZ	86025	Navajo	X		7	928-524-6126
7	Community Counseling Centers	2550 Show Low Lake Rd	Show Low	AZ	85901	Navajo	X		7	928-537-2951
8	Little Colorado Behav. Health Ctrs	470 W. Cleveland	St. Johns	AZ	85936	Apache	X		7	928-337-4301
9	Little Colorado Behav. Health Ctrs	50 North Hopi	Springerville	AZ	85938	Apache	X		7	928-333-2683
10	Mohave Mental Health Clinics	1743 Sycamore Ave.	Kingman	AZ	86401	Mohave	X		4	928-757-8111
11	Mohave Mental Health Clinics	3505 Western Ave.	Kingman	AZ	86401	Mohave	X		4	928-757-8111
12	Mohave Mental Health Clinics	2187 Swanson	Lake Havasu City	AZ	86403	Mohave	X		4	928-855-3432
13	Mohave Mental Health Clinics	1145 Marina Blvd.	Bullhead City	AZ	86442	Mohave	X		8	928-758-5905
14	Verde Valley Guidance Clinic	8 E. Cottonwood Street	Cottonwood	AZ	86326	Yavapai	X		4	928-634-2236
15	West Yavapai Guidance Clinic	642 Dameron Drive	Prescott	AZ	86301	Yavapai	X		1	928-445-5211
16	West Yavapai Guidance Clinic	3343 N. Windsong	Prescott Valley	AZ	86314	Yavapai	X		1	928-778-6605
17	Ariz. Council of Human Service Providers	2100 N. Central Avenue	Phoenix	AZ	85004	Maricopa	X		1	602-252-9363
18	Arizona State Hospital (ASH)	2500 E. Van Buren	Phoenix	AZ	85008	Maricopa	X		1	602-220-6169
19	Mingus Center	636 N. Main St.	Cottonwood	AZ	86326	Yavapai	X		4	928-639-4440
20	Mingus Center	3161 N. Windsong	Prescott Valley	AZ	86314	Yavapai	X		1	928-759-9978
Cenpatco Behavioral Health of AZ										
21	Cenpatco Behavioral Health of AZ	1501 W. Fountainhead, Ste 295	Tempe	AZ	85282	Maricopa	X		1	314-725-4706
22	Cenpatco Behavioral Health of AZ	495 N Pinal Parkway #103	Florence	AZ	85232	Pinal	X		4	480-458-8613
24	Community Intervention Associates (CIA)	3802 W 16th St	Yuma	AZ	85366	Yuma	X		1	928-376-0026
25	SW BH Rim Guidance Center	404 W. Aero Drive	Payson	AZ	85541	Gila	X		4	928-474-3303
27	EXCEL Child Services	3250 E. 40th St.	Yuma	AZ	85364	Yuma	X		1	928-341-0335
CPSA-Community Partnership of Southern Arizona										
28	Community Partnership of So. Arizona	4575 E. Broadway	Tucson	AZ	85711	Pima	X		1	520-325-4268
29	CPSA Training Center	2502 N. Dodge	Tucson	AZ	85716	Pima	X		1	520-618-8842
30	CPSA Country Club	600 S. Country Club	Tucson	AZ	85711	Pima	X		1	520-618-8842
31	Casa de Esperanza	780 S. Park Centre Ave.	Green Valley	AZ	85614	Pima	X		5	520-625-2273
32	CODAC	3100 N. 1st Ave.	Tucson	AZ	85719	Pima	X		1	520-327-4505
33	COPE Behavioral Services, Inc.	101 S. Stone	Tucson	AZ	85701	Pima	X		1	520-205-4372
34	Intermountain Ctrs for Human Dev.	7820 E. Broadway, Suite 100	Tucson	AZ	85710	Pima	X		1	520-721-1887
36	La Frontera	502 W. 29th St.	Tucson	AZ	85713	Pima	X		1	520-884-9920
37	Marana Health Clinic	13644 N. Sandario Rd.	Marana	AZ	85653	Pima	X		2	520-682-4111
38	Providence of Arizona, Inc.	620 N. Craycroft	Tucson	AZ	85711	Pima	X		1	520-748-7108
39	Pantano Behavioral Health Services	5055 E. Broadway, C-104	Tucson	AZ	85711	Pima	X		1	520-623-9833
40	CPSA-Sierra Vista	999 E. Fry Blvd., Ste 109	Sierra Vista	AZ	85635	Cochise	X		4	520-417-9430
41	SEABHS-Sierra Vista	185 S. Moorman	Sierra Vista	AZ	85635	Cochise	X		4	520-458-3932
42	SEABHS-Benson	590 S. Ocotillo Ave.	Benson	AZ	85602	Cochise	X		7	520-586-7080
43	SEABHS-Benson	611 W. Union St.	Benson	AZ	85602	Cochise	X		7	520-586-0800
44	Southeastern AZ Psych Health Facility	470 S. Ocotillo Ave.	Benson	AZ	85602	Cochise	X		7	520-586-7737
45	SEABHS-Nogales	32 Blvd del Rey David	Nogales	AZ	85621	Santa Cruz	X		4	520-281-9189
46	SEABHS-Douglas	1701 N. Douglas Avenue	Douglas	AZ	85607	Cochise	X		4	520-364-1286
47	SEABHS-Safford	680 Eighth Street	Safford	AZ	85546	Graham	X		4	928-428-4550
48	SEABHS-Bisbee	214 Bisbee Rd.	Bisbee	AZ	85603	Cochise	X		7	520-432-7751
49	So. Arizona Mental Health Corp (SAMHP)	2502 N. Dodge, Suite 190	Tucson	AZ	85716	Pima	X		1	520-622-6000



Arizona Correctional Telemedicine Sites

The Arizona Telemedicine Program Network provides network connections to Arizona Department of Corrections sites and Pima County jail sites. Network to network connections facilitate connectivity with Arizona Department of Juvenile Corrections Sites and Maricopa County Correctional Health Services sites.

Site	Address	City	State	Zip	County	Video	Data	RUCA 2000	Phone Number
Arizona Department of Corrections									
1 AZ DOC Director's Office and ADC Inmate Health Services	1601 W. Jefferson St.	Phoenix	AZ	85007	Maricopa	X	X	1	602-542-5179
2 ASPC Douglas	Route 191 and Airport Drive	Douglas	AZ	85608	Cochise	X	X	4	520-364-7521
3 ASPC Eyman	SMUII, 4374 E. Butte	Florence	AZ	85732	Pinal	X	X	4	520-868-0201
4 ASPC Florence	P.O. Box 3867	Florence	AZ	85732	Pinal	X	X	4	520-868-4011
5 ASPC Lewis	26700 S. Hwy 85, PO Box 70	Buckeye	AZ	85326	Maricopa	X	X	2	623-386-6160
6 ASPC Perryville	2014 N Citrus Rd	Goodyear	AZ	85336	Maricopa	X	X	2	623-853-0304
7 ASPC Safford	896 S. Cook Road	Safford	AZ	85548	Graham	X	X	4	928-428-4698
8 ASPC Tucson	10000 S. Wilmot Rd.	Tucson	AZ	85734	Pima	X	X	2	520-574-0024
9 ASPC Yuma	7125 E. Juan Sanchez Blvd.	San Luis	AZ	85349	Yuma	X	X	2	928-627-8871
10 ASPC Winslow	2100 South Highway 87	Winslow	AZ	86047	Navajo	X	X	7	928-289-9551

Site	Address	City	State	Zip	County	Video	Data	RUCA 2000	Phone Number
Arizona Department of Juvenile Corrections									
1 ADJC Central Office	1624 W. Adams	Phoenix	AZ	85007	Maricopa	X	X	1	602-542-4302
2 Adobe Mountain Secure Care Facility	2800 West Pinnacle Peak Rd	Phoenix	AZ	85085	Maricopa	X	X	1	623-869-9050
3 Black Canyon Secure Care Facility	24601 North 29th Ave	Phoenix	AZ	85085	Maricopa	X	X	1	623-780-1303
4 SW Reg. Juv. Corrections Complex	26701 South State Route 85	Buckeye	AZ	85326	Maricopa	X	X	2	623-386-8000
5 Catalina Mtn Secure Care Facility	14,500 North Oracle Road	Tucson	AZ	85738	Pima	X	X	1	520-818-3484
6 Tucson Parole Office	151 S. Tucson Blvd	Tucson	AZ	85716	Pima	X	X	1	520-324-0610

Site	Address	City	State	Zip	County	Video	Data	RUCA 2000	Phone Number
Maricopa County Correctional Health Services									
1 Administrative Offices	111 W. Monroe St., Suite 900	Phoenix	AZ	85003	Maricopa	X	X	1	602-506-0897
2 Avondale Booking Station	920 E. Van Buren	Avondale	AZ	85323	Maricopa	X	X	1	602-876-0322
3 Madison Jail Intake	225 W. Madison	Phoenix	AZ	85003	Maricopa	X	X	1	602-876-0322
4 Mesa Booking Station	1840 S. Lewis St.	Mesa	AZ	85210	Maricopa	X	X	1	602-876-0322
5 Durango Jail	322 W. Gibson Lane	Phoenix	AZ	85009	Maricopa	X	X	1	602-876-0322
6 Towers Jail	3127 W. Gibson Lane	Phoenix	AZ	85009	Maricopa	X	X	1	602-876-0322

Site	Address	City	State	Zip	County	Video	Data	RUCA 2000	Phone Number
Pima County Institutional Health*									
1 Pima County Adult Detention Center	1300 W. Silverlake Rd.	Tucson	AZ	85713	Pima	X	X	1	520-547-8176
2 Pima County Ajo Jail	1249 N Well Rd	Ajo	AZ	85321	Pima	X	X	7	520-547-8539

*includes UPH Hospital at Kino (see Hospital/Clinic site listing)



Arizona School Telehealth Sites

The Arizona Telemedicine Program Network provides network connections to the following schools:

Site	Address	City	State	Zip	County	Video	Data	RUCA 2000	Phone Number
1 Grey Hills High School	Warrior Drive	Tuba City	AZ	86045	Coconino	X		2	928-283-6271
2 Lowell Elementary School	1121 S. Third Ave.	Phoenix	AZ	85003	Maricopa	X	X	1	602-257-3904
3 Sopori Elementary School	5000 W. Arivaca Rd.	Amado	AZ	85645	Pima	X	X	2	520-398-2239
4 Tuba City High School	Warrior Drive	Tuba City	AZ	86045	Coconino	X		2	928-283-1045



Health Sciences Education and Research Sites

From its location at the University of Arizona in Tucson, the Arizona Telemedicine Program originates videoconferencing throughout the facilities of the Colleges of Medicine, Nursing, Pharmacy and Public Health. Many videoconferences are available through streaming video at <http://video.biocom.arizona.edu/video/>. Additionally, the Arizona Telemedicine Program connects to the following health sciences education and research sites:

Site	Address	City	State	Zip	County	Video	Data	RUCA 2000	Phone Number
1 Arizona Simulation Technology and Education Center	1501 N Campbell Room 4307	Tucson	AZ	85719	Pima	X	X	1	520-626-8585
2 NAU College of Health Professions	Bldg 66	Flagstaff	AZ	86011	Coconino	X		1	928-523-7009
3 Native American Cancer Research Partnership - UA	1527 E. Mabel Street	Tucson	AZ	85721	Pima	X		1	520-626-0260
4 Native American Cancer Research Partnership - NAU	Bldg 3	Flagstaff	AZ	86011	Coconino	X		1	928-523-7009
5 T-Health Institute	600 E Van Buren Bldg 2	Phoenix	AZ	85004	Maricopa	X	X	1	602-827-2019
6 University of Arizona College of Medicine Phoenix	600 E Van Buren Bldg 1	Phoenix	AZ	85004	Maricopa	X	X	1	602-827-2019
7 Yavapai College	1100 E Sheldon St	Prescott	AZ	86301	Yavapai	X		1	928-772-5001



Western Region Hospital/Clinic Sites

The Arizona Telemedicine Program Network provides network connections to Arizona Department of Corrections sites and Pima County jail sites. Network to network connections facilitate connectivity with Arizona Department of Juvenile Corrections Sites and Maricopa County Correctional Health Services sites.

Site	Address	City	State	Zip	County	Video	Data	RUCA 2000	Phone Number
1 PAIHS Southern Bands Health Center	515 Shoshone Circle	Elko	NV	89801	Elko	X		4	775-738-2252
2 PAIHS Schurz Service Unit	Drawer A	Schurz	NV	89427	Mineral	X		6	775-723-2345

Site	Address	City	State	Zip	County	Video	Data	RUCA 2000	Phone Number
1 NAIHS Crownpoint Hospital	2 Hospital Road	Crownpoint	NM	87313	McKinley	X	X	10	505-786-5291
2 NAIHS Dziłth-Na-O-Dith-Hle Health Center	6 Road 7586	Bloomfield	NM	87413	San Juan		X	2	505-632-1801
3 NAIHS Gallup Indian Medical Center	516 Nizhoni	Gallup	NM	87301	McKinley		X	4	505-722-1000
4 NAIHS Northern Navajo Medical Ctr	Hwy North 666	Shiprock	NM	87420	San Juan	X	X	2	505-368-6185
5 NAIHS Tohatchi Health Center	Hwy North 666	Tohatchi	NM	87325	McKinley		X	5	505-733-8100

Site	Address	City	State	Zip	County	Video	Data	RUCA 2000	Phone Number
1 PAIHS Ft. Duchesne	2 Miles South of Bottlehole	Ft. Duchesne	UT	84026	Uintah		X	10	435-722-5122
2 Intermountain Shriners Hospital	1275 Fairfax Rd	Salt Lake City	UT	84103	Salt Lake	X		1	801-536-3500

NAIHS – Navajo Area Indian Health Service

PAIHS – Phoenix Area Indian Health Service

UPH – University Physicians Healthcare

Holy Cross Hospital

						Current Data	Proposed Data	
	Site Name	Address	Zip Code	Phone #	Current Video	Connection	Connection	RUCA Code
<u>Taos</u>	NM							
	Holy Cross Hospital	1397 Wiemer Road	87571	505-548-2742			T1	4
<u>Penasco</u>	NM							
	Penasco Clinic	#24Highway 73	87553	(505) 537-5069			T1	10.5
<u>Taos</u>	NM							
	Frist Born Program	118 Estes Rd, Suite G	87571	(505) 535-4384			T1	4
<u>Taos</u>	NM							
	Enchanted Circle Health for Kids	123 Cruz Alta Road	87571	505-542-8384			T1	4

HCH Estimated Schedule

- Overall estimate is approximately 1 year from the time the grant is awarded.
- First Quarter:
 - Establish Quality Improvement Team
 - Develop overall project plan, meeting schedules, communications plan
 - Develop individual entity work plans
 - Identify requirements for competitive bidding
 - Prioritize sites and interconnection points
 - Develop acceptance criteria and criteria for success
- Second Quarter
 - Site Readiness Surveys
 - Equipment readiness
 - Competitive Bids for equipment, network services
 - Purchase equipment upgrades
 - Establish protocols for network interconnection
- Third Quarter:
 - Complete bidding process
 - Contracts
 - Develop vendor rollout schedules
 - Site work, including personnel and systems readiness
- Fourth-Fifth Quarter
 - Upgrading network sites and connecting all the locations will take approximately eight months from the time competitive bidding is complete.
 - Deployment training
 - Test network interconnections
 - Progress reports, course correction
- Sixth Quarter
 - Review and assess
 - Report Progress
 - Plan for next two years

PMS Estimated Schedule

- Overall estimate is approximately 11 months from the time the grant is awarded.
- Month 1:
 - Establish Governance
 - Develop overall project plan, meeting schedules, communications plan
 - Develop individual entity work plans
 - Identify requirements for competitive bidding
 - Prioritize sites and interconnection points
 - Develop acceptance criteria and criteria for success
- Month 2:
 - Site Surveys
 - Equipment readiness
 - Competitive Bids for equipment, network services
 - Purchase equipment upgrades
 - Establish protocols for network interconnection
- Month 3:
 - Complete bidding process
 - Contracts
 - Develop vendor rollout schedules
 - Site work
- Month 4-10
 - PMS estimates that the overall project of upgrading our network sites and connecting all the locations will take approximately six months from the time competitive bidding is complete.
 - Test network interconnections
 - Progress reports, course correction
- Month 11
 - Review and assess
 - Report Progress
 - Plan for second year

Presbyterian Medical Services Head Start Site

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Aztec</u>	NM	Head Start - San Juan, Aztec	805 Maddox Ave	87410	505-334-8541		NONE	T1	1
<u>Bernalillo</u>	NM	Head Start - Sandoval, Bernalillo	100 Ricardo Lane	87004	505-771-0647		48K muxed	T1	1
<u>Bloomfield</u>	NM	Head Start - San Juan, Bloomfield	310 La Jara St.	87413	505-634-3843		48K muxed	T1	2
<u>Chimayo</u>	NM	Head Start - Santa Fe, Chimayo	State Rd. 98, #205A	87522	505-351-2266		NONE	T1	4
<u>Cuba</u>	NM	Head Start - Sandoval –Cuba	50 County Road	87013	505-289-3211		NONE	T1	10.4
<u>Espanola</u>	NM	Head Start - Santa Fe, Arroyo Seco	1840 N. Highway 285	87506	505-747-3353		NONE	T1	2
<u>Estancia</u>	NM	Head Start - Torrance, Estancia	600 Tenth Street	87016	505-384-2302		48K muxed	T1	2
<u>Farmington</u>	NM	Head Start - San Juan, Cottonwood	5888 Highway 4	87401	505-632-7887		NONE	T1	1
		Head Start /Early H S-Farmington,	900 S Carlton Ave	87401	505-327-7940		48K muxed	T1	1
		Little Feet CDC	375 Sky View Mesa #86A	87401	505-327-6885		28K muxed	T1	1
<u>Kirtland</u>	NM	Head Start - San Juan, Kirtland	5 Road 6575	87417	505-598-0113		NONE	T1	1
<u>Moriarty</u>	NM	Early Head Start - Torrance, Moriarty	704 Union St.	87035	505-832-2588		48K muxed	T1	2
		Head Start - Torrance, Moriarty	615 Union St.	87035	505-832-2588		NONE	T1	2

Presbyterian Medical Services Head Start Site

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data	Proposed Data	RUCA Code
							Connection	Connection	
<u>Mountainair</u>	NM								
		Head Start - Torrance, Mountainair	109 Sunset	87036	505-847-0547		28K muxed	T1	10.4
<u>Nambe</u>	NM								
		Head Start - Santa Fe, Nambe	State Rd. 503 #189	87506	505-455-3151		NONE	T1	2
<u>Pena Blanca</u>	NM								
		Head Start - Sandoval, Pena Blanca	P.O. Box 1398, No. 778	87041	505-465-2092		NONE	T1	2
<u>Rio Rancho</u>	NM								
		Head Start - Sandoval, Rio Rancho	32 Unser Blvd	87124	505-891-5162		28K muxed	T1	1
<u>Santa Fe</u>	NM								
		Head Start - Santa Fe, Valle Vista	08 Las Lomas Dr	87508	505-424-4438		NONE	T1	2
		La Comunidad de los Ninos	1121 Alto St	87501	505-820-1610		28K muxed	T1	1
		Head Start - Santa Fe, Sweeney	501 Airport Rd	87507	505-474-5244		NONE	T1	1
		Head Start - Santa Fe, Manderfield	1150 Canyon Rd.	87501	505-982-4484		48K muxed	T1	1
		Head Start /Early H S-Santa Fe, Tierra	3908 Paseo del Sol	87507	505-438-4165		NONE	T1	1

Presbyterian Medical Services

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Santa Fe</u>	-								
		Teen Health Center, SF High School /	2100 Yucca Road BLDG F-	87505	(505) 467-1081		768K Muxed	T1	1
<u>Artesia</u>	NM								
		Artesia Health Resources / PMS	1105 Memorial Drive	88210	(505) 746-9848	YES	768K Muxed	T1	4
<u>CARLSBAD</u>	NM								
		Carlsbad Family Health Center / PMS	2013 San Jose Blvd.	88220	(505) 887-2455	YES	768K Muxed	T1	4
		PMS/CARLSBAD SCHOOL BASED	3000 N. CHURCH	88220	(505) 234-3319		768K Muxed	T1	4
<u>Cerrillos</u>	NM								
		Ortiz Mountain Health Center / PMS	08A Main Street	87010	505-471-6266		768K Muxed	T1	2
<u>Cloudcroft</u>	NM								
		Sacramento Mountain Medical / PMS	102 Highway 82	88317	(505) 682-2542		768K Muxed	T1	2
<u>Counselor</u>	NM								
		Counselor Clinic / PMS	9837 US HIGHWAY 550	87018	(505) 289-3291		None	T1	10.4
<u>Cuba</u>	NM								
		Ojo Encino Clinic / PMS	#2 OJO ENCINO ROAD	87013	(505) 731-2284		768K Muxed	T1	10.4
		Torreón Clinic / PMS	2500 HIGHWAY 197	87013	(505) 289-3291		768K Muxed	T1	10.4
		Checkerboard Area Hlth System	6349 US HIGHWAY 550	87013	(505) 731-2268	YES	None	T1	10.4
<u>DEMING</u>	NM								
		DEMING HEALTH CENTER	205 E. HEMLOCK STREET	88030	(505) 546-4663	YES	768K Muxed	T1	4
<u>Estancia</u>	NM								
		Esperanza Family Health Center	903 C 5th Street	87016	(505) 384-2777	YES	768K Muxed	T1	2
<u>FARMINGTON</u>	NM								
		San Juan County Adolescent RTC	851 Andrea Drive Suite 4,	87402	(505) 564-4804		768K Muxed	T1	1
		Farmington Com Health ADMIN	608 Reilly	87401	(505) 326-9149	YES	768K Muxed	T1	1

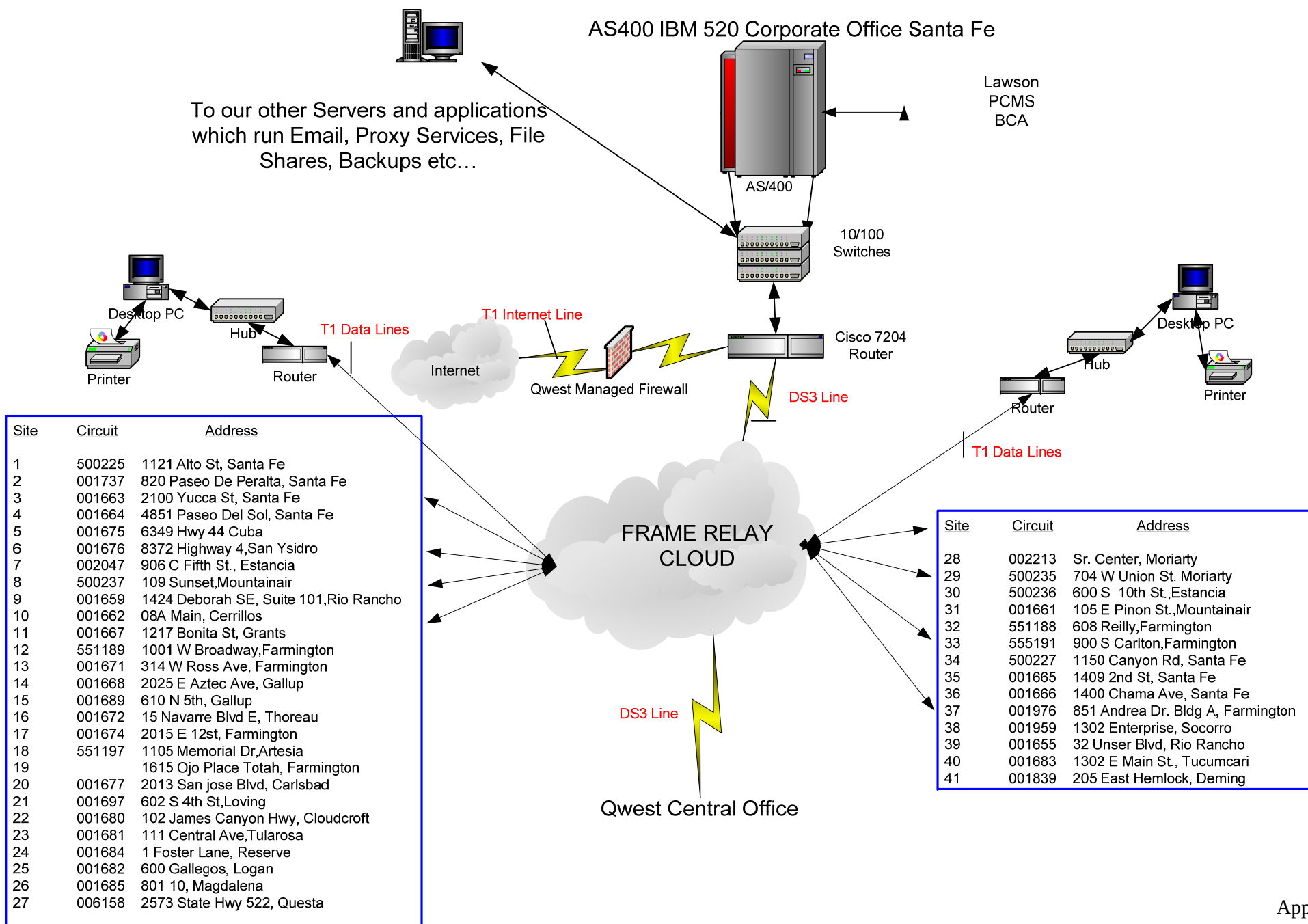
Presbyterian Medical Services

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>FARMINGTON</u>	NM								
		Farmington Com Health Center / PMS	1001-D West Broadway	87401	(505) 326-9149	YES	768K Muxed	T1	1
		Total Behavioral Health Authority /	1615 Ojo Ct.	87401	(505) 324-5855	YES	768K Muxed	T1	1
<u>Gallup</u>	NM								
		WNMMG Gallup Clinic / PMS	610 N. 5th Street	87301	(505) 862-7417	YES	768K Muxed	T1	4
		WNMMG Behavioral Health Gallup /	2025 East Aztec	87301	(505) 863-3120	YES	768K Muxed	T1	4
		PMS/ GALLUP TEEN HEALTH	1055 RICO STREET	87301	(505) 863-3821		768K Muxed	T1	4
<u>Grants</u>	NM								
		WNMMG Grants Clinic / PMS	1217 Bonita Ave	87020	(505) 862-7417	YES	768K Muxed	T1	4
<u>Jemez Pueblo</u>	NM								
		Jemez Springs Clinic / PMS	8372 HIGHWAY 4	87024	(505) 834-0802		768K Muxed	T1	2
<u>Logan</u>	NM								
		Logan Family Health Center / PMS	600 Gallegos Street	88426	(505) 487-5488		768K Muxed	T1	10.6
<u>Loving</u>	NM								
		Loving Health Center / PMS	602 S. 4th Street	88256	(505) 745-3573		768K Muxed	T1	5
<u>Magdalena</u>	NM								
		Magdalena Area Health Center / PMS	801 Tenth Street	87825	(505) 854-3162		768K Muxed	T1	10.6
<u>Mountainair</u>	NM								
		Mountainair Family Health Center /	105 East Pinon Street	87036	(505) 847-2211	YES	768K Muxed	T1	10.4
		PMS/ THE MUSTANG HEALTH	901 W. 3RD STREET	87036	(505) 847-2271		768K Muxed	T1	10.4
<u>Quemado</u>	NM								
		Quemado Clinic / PMS	Lopez Ave.	87829	(505) 773-4610		None	T1	10
<u>Questa</u>	NM								
		Questa Health Center / PMS	2573 State Highway 522	87556	(505) 586-0331	YES	768K Muxed	T1	10.2

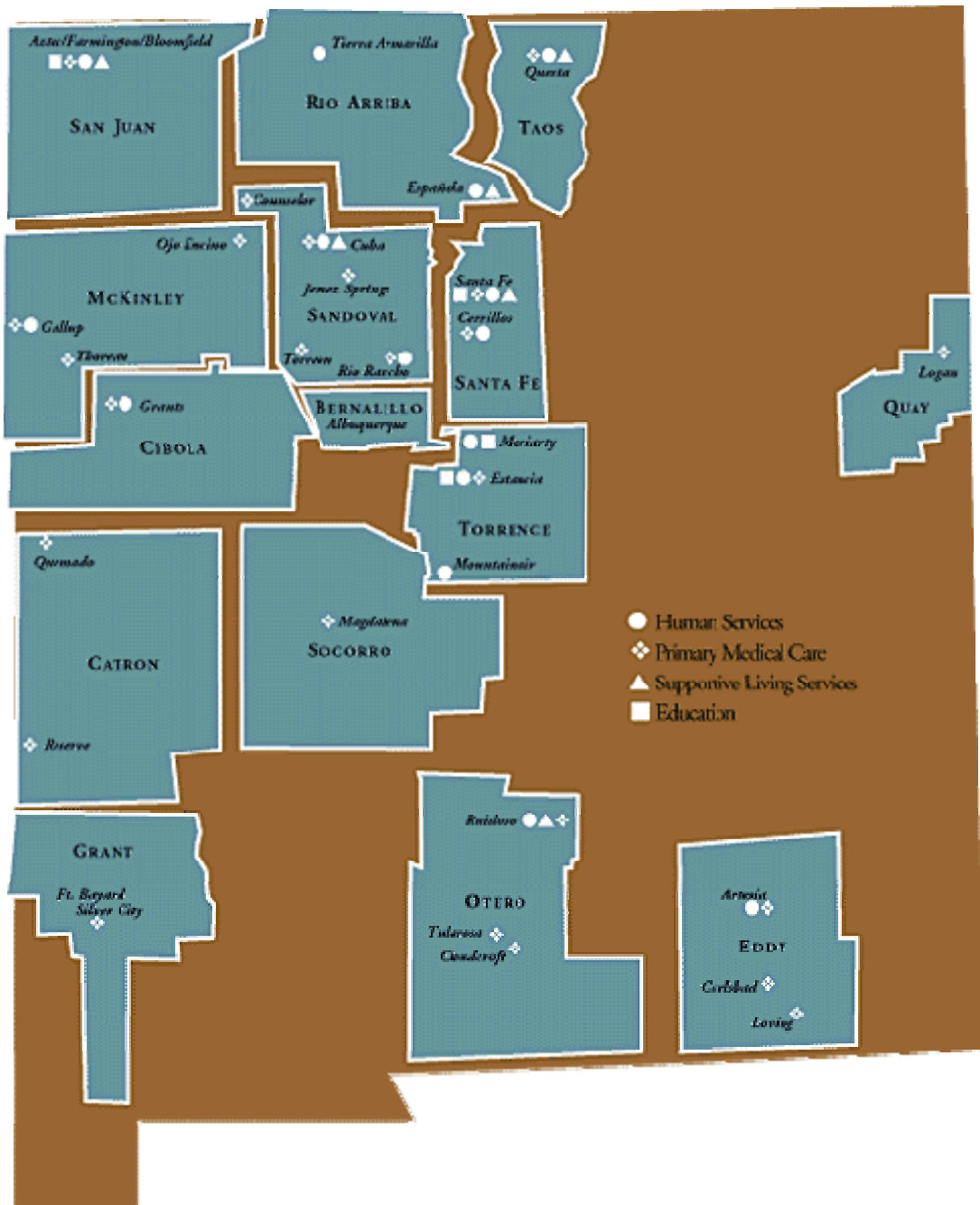
Presbyterian Medical Services

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Reserve</u>	NM	Catron County Med Center / PMS	1 Foster Lane / PO Box 710	87830	(505) 533-6456	YES	768K Muxed	T1	10
<u>Rio Rancho</u>	NM	Rio Rancho Family Health Center	1424 Deborah SE Suite 101	87124	(505) 896-0928	YES	768K Muxed	T1	1
<u>SANTA FE</u>	NM	Santa Fe Community Guidance	820 Paseo de Peralta	87505	(505) 986-9633		768K Muxed	T1	1
		College of Santa Fe / PMS	1600 St. Michael's Drive La	87505	(505) 995-9550		768K Muxed	T1	1
		SF Community Guidance Center	820 Paseo de Peralta Suite	87501	(505) 986-9633		768K Muxed	T1	1
		SF Community Guidance Center/ Care	2052 Galisteo St.	87504	(505) 473-6574		768K Muxed	T1	1
<u>SOCORRO</u>	NM	Socorro Community Health Center /	1300 Enterprise	87801	(505) 835-4444	YES	768K Muxed	T1	7
<u>Thoreau</u>	NM	WNMMG Thoreau Health Care / PMS	18 Navarre Blvd.	87323	(505) 862-7417	YES	768K Muxed	T1	10.5
<u>Tucumcari</u>	NM	Quay County Primary Care / PMS	1302 East Main Street	88401	(505) 461-2200		768K Muxed	T1	7
<u>Tularosa</u>	NM	Tularosa Medical Center / PMS	111 Central Avenue	88352	(505) 585-1250		768K Muxed	T1	5
<u>Springer</u>	NM	SOUTH CENTRAL COLFAX	615 Prospect Ave	87747	(505) 483-2443		768K Muxed	T1	10

Presbyterian Medical Services Network Diagram



Presbyterian Medical Services Area of Coverage



Year 1

- Comply with Federal Acquisition Requirements (FAR)
- Author a Performance Based Scope of Work (PBSOW) for Mesh WAN topology Hardware (HW)
- Complete the PBSOW for a Contractor
- Coordinate with partnerships, collaborations and the brain trust
- Purchase Cisco equipment for WAN / LAN
- Order leased circuits
- Purchase and Install routers for two sites
- Enroll existing and new leased circuits with the Universal Service Administration Company (USAC)
- Complete Network Design Phase I

Year 2

- Complete Network Design Phase II
- Order leased circuits
- Enroll leased circuits with the Universal Service Administration Company (USAC)

Sangre De Cristo Community Health/SBIRT

						Current Data	Proposed Data	
	Site Name	Address	Zip Code	Phone #	Current Video	Connection	Connection	RUCA Code
<u>Albuquerque</u>	NM							
	First Choice - South Valley	2001 Centro Familiar Blvd	87105	(505) 873-7400	YES	T1		1
	IHS - ABQ Admin	2301 Crerry Tree Lane	87105	(505) 873-0651	YES	T1		1
	NM Technet - ABQ	5921 Jefferson NE	87109	505-247-1345	YES	T1		1
<u>Anthony</u>	NM							
	LCDF - Anthony	855 N Main	88021	(505) 882-5706	YES	T1		1
<u>Chaparral</u>	NM							
	LCDF Chaparral	510 Lisa	88081	(505) 824-0820	YES	T1		2
<u>Dulce</u>	NM							
	IHS - Dulce	12000 Stone Lake Rd.	87528	505-248-4106	YES	T1		10
<u>Edgewood</u>	NM							
	First Choice	8 Medical Center Rd.	87015	505-261-3406	YES	T1		2
<u>Espanola</u>	NM							
	Santa Clara Health Center	Rr5 Box 446	87532	(505) 753-9421			T1	4
	HCNNM Admin - Espanola	620 Coronado St.	87532	505-579-4255	YES	T1		4
<u>Grants</u>	NM							
	PMS - Grants	217 Bonita St.	87020	(505) 862-7417	YES	T1/DS1		4
<u>Las Cruces</u>	NM							
	LCDF Admin - Las Cruces	1100 South Main	88005	(505) 526-1105	YES	T1		1
	LCDF East Mesa - Las Cruces	8600 Batan Memorial East	88011	(505) 373-9202	YES	T1		1
<u>Las Vegas</u>	NM							
	HCNNM - Las Vegas	P.O. Box 9000	87701	505-425-6788	YES	T1		4
<u>Lordsburg</u>	NM							
	HMS - Lordsburg	500 Demoss St	88045	505-542-8384	YES	T1		7

Sangre De Cristo Community Health/SBIRT

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Pecos</u>	NM	Pecos High school	P. O. Box 368	87552	(505) 757-4720			T1	2
<u>Raton</u>	NM	Public Health	226 E 4th. Ave	87740	505-445-3601	YES	T1		7
<u>Santa Fe</u>	NM	Sangre de Cristo Health Partnership	1441 S. St. Francis Dr.	87505	505-983-8011	YES	T1		1
<u>Silver City</u>	NM	HMS - Silver City	114 W 11th St.	88031	505-388-1511	YES	T1		4
<u>Taos</u>	NM	Public Health - Taos	P.O. Box 250	87575	505-758-2073	YES	T1		10
		Taos Public Health Center	1400 Weimer Road	87571	(505) 758-2073	YES	T1		4
<u>Zuni</u>	NM	Zuni Community Health Center	P.O. Box 467	87327	505-728-5723	YES	T1		5

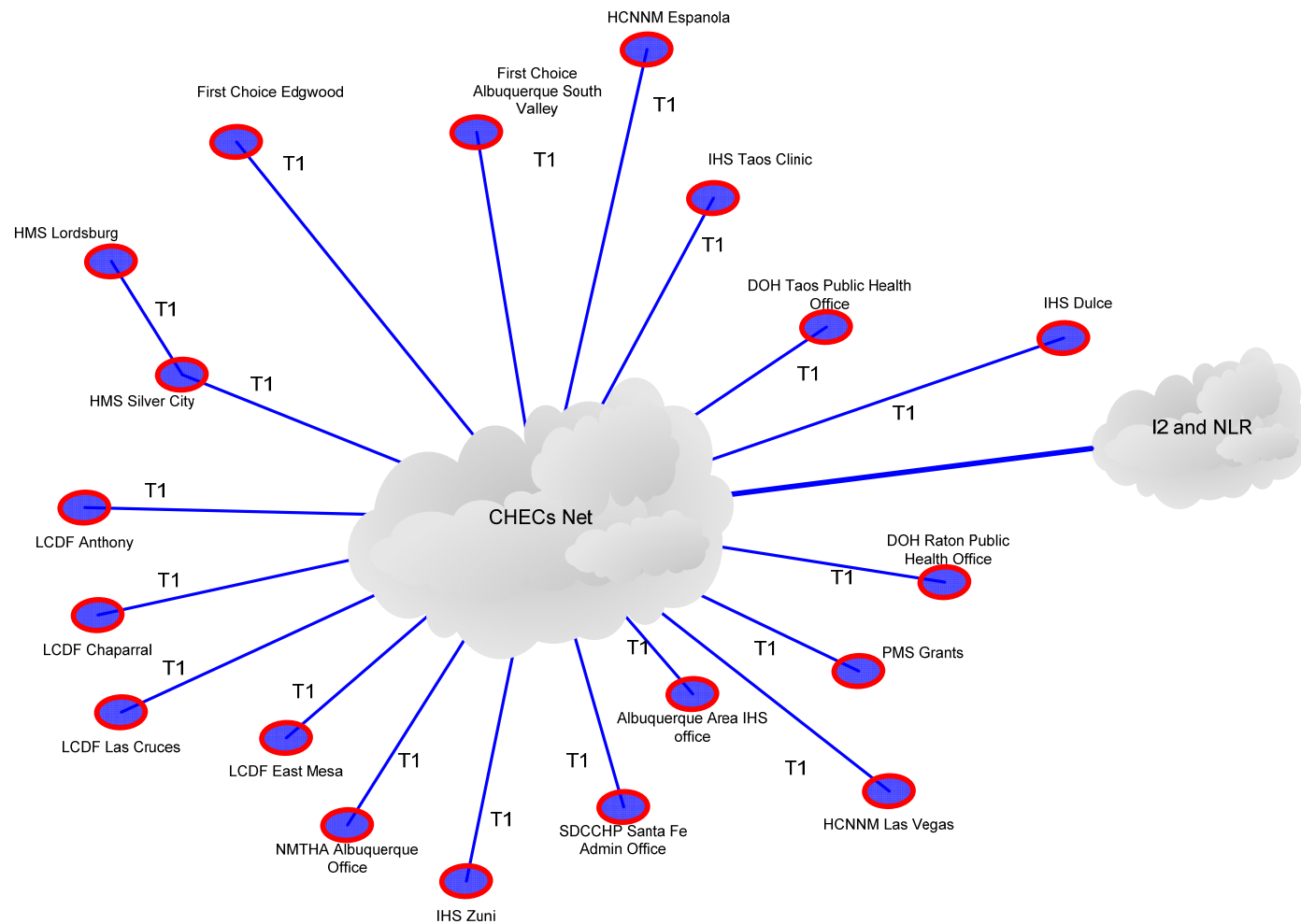
SBIRT/DOH School Based Health

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Shiprock</u>	NM	Shiprock Career Preparatory	West Hwy 64	87420	505) 368-4984	YES	T1		7.3
<u>Silver City</u>	NM	Silver City High School	3200 North Silver Street	88061	505-388-1563	YES	T1		4
<u>Taos</u>	NM	Taos Middle School	235 Paseo Del Canon E	87571	505) 737-6000	YES	T1		4

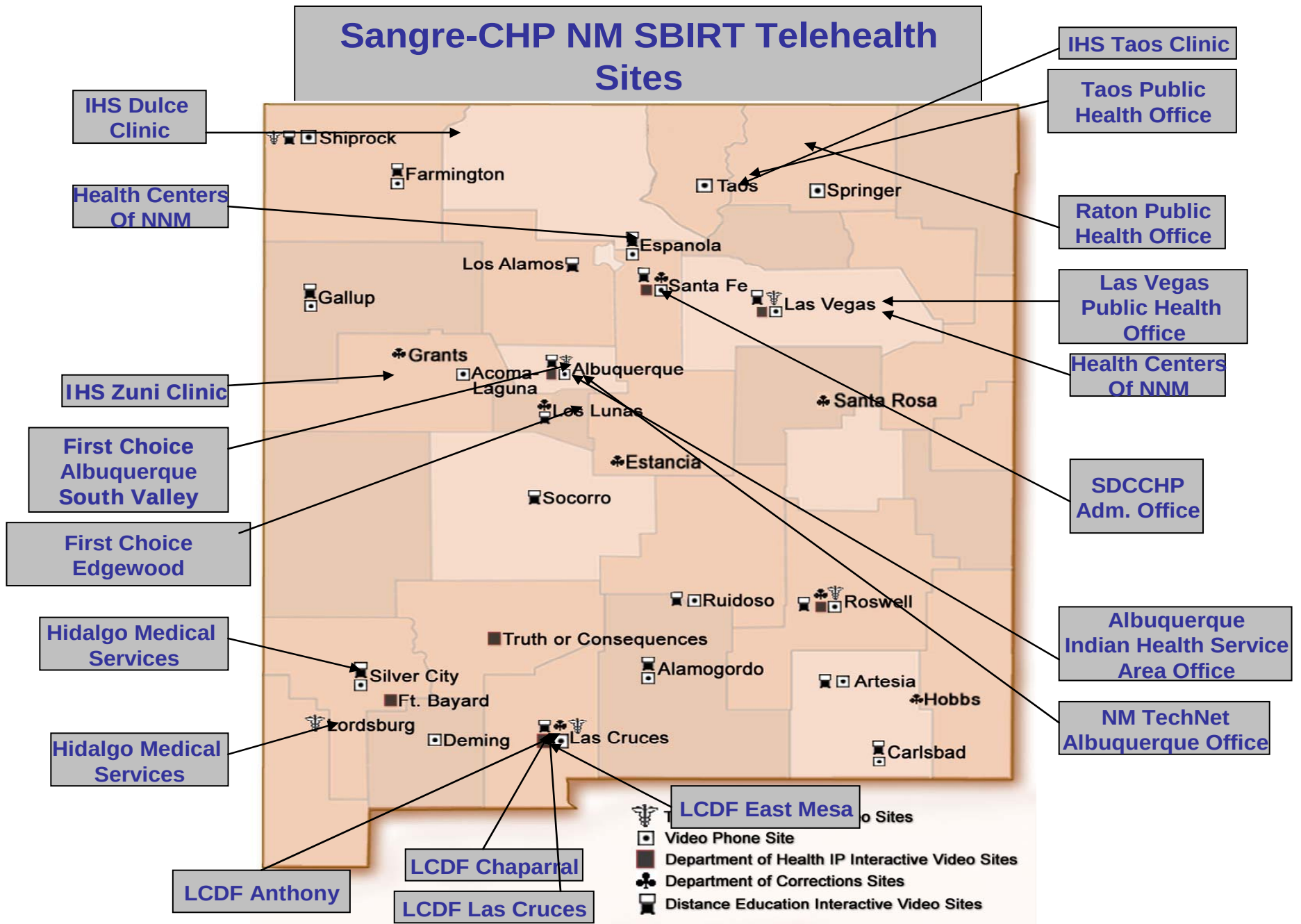
SBIRT/DOH School Based Health

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Belen</u>	NM	Belen High School	1619 W Delgado Ave	87002	(505) 966-1300	YES	T1		4.2
<u>Carlsbad</u>	NM	Carlsbad High School	3000 W Church St	88220	505) 234-3319	YES	T1		4
<u>Cuba</u>	NM	Cuba Middle School	50 County Road 13	87013	505) 289-3211	YES	T1		10.4
<u>Des Moines</u>	NM	Des Moines High School	1 Frances St.	88418	505) 278-2611	YES	T1		10
<u>Dulce</u>	NM	Dulce High School	P.o. Box 547	87528	(505) 759-3282	YES	T1		10
<u>Espanola</u>	NM	Espanola CV Middle School	1111 El Llano Road	87532	(505) 753-7357	YES	T1		4
<u>Gadsden</u>	NM	Gadsden High School	Route 1, P. O. Box 268	88021	505) 882-6300	YES	T1		1
<u>Gallup</u>	NM	Gallup High School	1055 Rico St,	87301	(505) 721-2500	YES	T1		4
<u>Las Vegas</u>	NM	West Las Vegas High School	157 Moreno St	87701	(505) 426-2500	YES	T1		4
<u>Pojoaque</u>	NM	Pojoaque High School	1574 State Road 502	87506	(505) 455-2234	YES	T1		2
<u>Santa Rosa</u>	NM	Santa Rosa High School	717 S 3rd St	88435	(505) 472-3422	YES	T1		7

Sangre de Cristo Community Healty Partnership/SBIRT Network Map

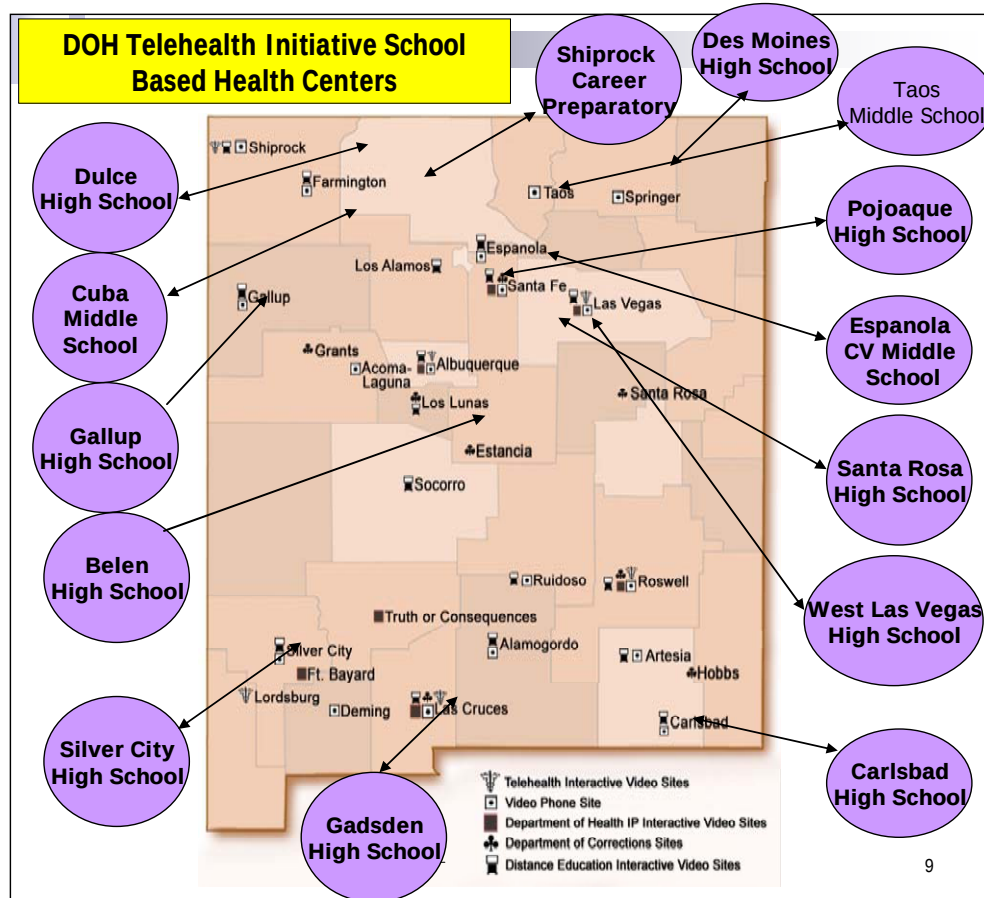


LCDF – La Clinica de Familia
 IHS – Indian Health Service
 DOH – Dept of Health
 HMS – Hidalgo Medical Services
 PMS – Presbyterian Medical Systems
 NMTHA – New Mexico TeleHealth
 Alliance



New Mexico Dept of Health

All sites will be connected through GSD



All sites have video teleconferencing capabilities

State of New Mexico Department of Corrections

Dept of Corrcetions

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Estancia</u>	NM								
		Torrence County Detention(TCDF)	P. O. Box 837	87016	(505) 384-2711	YES	T1		2
<u>Grants</u>	NM								
		Western NM Correctional(WNMCF)	PO Drawer 250	87020	(505) 384-2711	YES	T1		4
		NM Womens Correctional(NMWCF)	17000 East Old Highway 66	87020	505-827-8667	YES	T1		4
<u>Hagerman</u>	NM								
		Roswell Correctional Center (RCC)	578 W. Chickasaw Rd	88232	505-827-8667	YES	T1		10.5
<u>Hobbs</u>	NM								
		Lea County Correctional(LCCF)	6900 W. Millen	88244	505-827-8667	YES	T1		5
<u>Las Cruces</u>	NM								
		S. NM Correctional (SNMCF)	1983 Joe R. Silva Blvd.	88004	505-827-8667	YES	T1		1
<u>Los Lunas</u>	NM								
		Central NM Correctional(CNMF)	1525 Morris Rd	87031	505-827-8667	YES	T1		2
<u>Santa Fe</u>	NM								
		Pennitentry of NM	PO Box 1059	87504	505-827-8667	YES	T1		1
<u>Santa Rosa</u>	NM								
		Guadalupe County Correctional	PO Box 520	88435	505-827-8667	YES	T1		7

State of New Mexico Department of Health

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data	Proposed Data	RUCA Code
							Connection	Connection	
<u>Alamogordo</u>	NM	Alamogordo Health Office	1207 8th Street	88310	(505) 344-4673		T1		4
<u>Albuquerque</u>	NM	Scientific Laboratory	700 Camino de Salud NE	87196	(505) 841-2543	YES	T1		1
		ABQ NW Valley Health Office	7704 Second St NW	87017	505 841.8978	YES	T1		10.5
		Alamosa Center Public Health Office	6900 Gonzales SW	87121	505-831-2534		T1		1
		Sequoyah Adolecent Treatment Center	3405 W Pan American Fwy	87107	(505) 344-4673	YES	T1		1
		ABQ SW Valley Health Office	2001 Centro de Familiar SW	87105	(505) 894-4200	YES	T1		1
		Stanford Health Office	1111 Stanford NE	87106	(505) 894-4200	YES	T1		1
		ABQ SE Valley Health Office	7525 Zuni SE	87109	(505) 344-4673		T1		1
		BCCP HSB	625 Silver SW	87102	(505) 344-4673	YES	T1		1
		Turquoise Lodge - Drug and Alcohol	6000 Isleta Blvd SW	87105	505 841.8978	YES	T1		1
<u>Anthony</u>	NM	Anthony Health Office	865 North Main	88021	(505) 537-3302		T1		1
<u>Artesia</u>	NM	Artesia Health Office	111 N. 1st St	88210	(505) 344-4673		T1		4
<u>Belen</u>	NM	Belen Health Office	PO Box 686	87002	(505) 344-4673		T1		4.2
<u>Bernalillo</u>	NM	Bernalillo Health Office	County Courthouse	87004	(505) 344-4673		T1		1
<u>Bloomfield</u>	NM	Bloomfield Health Office	903 W. Broadway	87413	(505) 344-4673		T1		2
<u>Carlsbad</u>	NM	Carlsbad Health Office	1306 West Stevens	88220	(505) 537-3302		T1		4

State of New Mexico Department of Health

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Carrizozo</u>	NM	Carrizozo Health Office	PO Box 128	88301	(505) 344-4673		T1		10.6
<u>Chama</u>	NM	HCNNM-CHAMA	211 NORTH PINE	87520	(505) 756-2143	YES	T1		10
<u>Chaparral</u>	NM	Chaparral Health Office	112 Lisa Box 104	88021	(505) 537-3302		T1		1
<u>Clayton</u>	NM	Clayton Health Office	100 Court St.	88415	(505) 344-4673		T1		10
<u>Clovis</u>	NM	Clovis Health Office	1216 Cameo	88101	(505) 537-3302	YES	T1		4
<u>Cuba</u>	NM	Cuba Health Office	PO Box 880	87013	(505) 344-4673		T1		10.4
<u>Deming</u>	NM	Deming Health Office	215 S. Silver	88030	(505) 344-4673		T1		4
<u>Dexter</u>	NM	Dexter Health Office	206 S. Monroe	88230	505 841.8978		T1		10.2
<u>Espanola</u>	NM	Espanola Health Office	Rt 3 Box 348	87532	(505) 344-4673		T1		4
<u>Estancia</u>	NM	Estancia Health Office	County Court House	87016	(505) 344-4673		T1		2
<u>Farmington</u>	NM	Farmington Health Office	744 W. Animas	87401	(505) 344-4673	YES	T1		1

State of New Mexico Department of Health

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Fort Sumner</u>	NM	Ft. Sumner Health Office	514 Ave. C	88119	(505) 344-4673		T1		10
<u>Ft. Bayard</u>	NM	Ft Bayard Med Center	100 Calle de Centro	88036	(505) 537-3302	YES	T1		6
<u>Gallup</u>	NM	Gallup Health Office	1919 CollegeDr	87301	(505) 344-4673		T1		4
<u>Grants</u>	NM	Grants Health Office	515 W High Street	87020	(505) 894-4200		T1		4
<u>Hatch</u>	NM	Hatch Health Office	112 West Railroad	87937	(505) 537-3302		T1		10.4
<u>Hobbs</u>	NM	Hobbs Health Office	1923 N Del Paso, Suite B	88240	(505) 344-4673	YES	T1		4
<u>Las Cruces</u>	NM	Las Cruces Health Office	1170 N. Solano, Suite A	88001	(505) 894-4200	YES	T1		1
		East Mesa Health Office	5220 Holman Rd.	88012	(505) 537-3302		T1		1
<u>Las Vegas</u>	NM	Mora Health Office	PO Box 187	87732	(505) 344-4673		T1		10.5
		Las Vegas Health Office	18 Gallegos Rd	87701	(505) 344-4673	YES	T1		4
<u>Lordsburg</u>	NM	Lordsburg Health Office	500 East 13th St.	88045	(505) 537-3302		T1		7
<u>Los Alamos</u>	NM	Los Alamos Health Office	3917 W. Road	87544	(505) 344-4673		T1		4
<u>Los Lunas</u>	NM	Los Lunas Health Office	1000 Main St. NW, Bldg #3	87031	(505) 344-4673	YES	T1		2

State of New Mexico Dept of Health

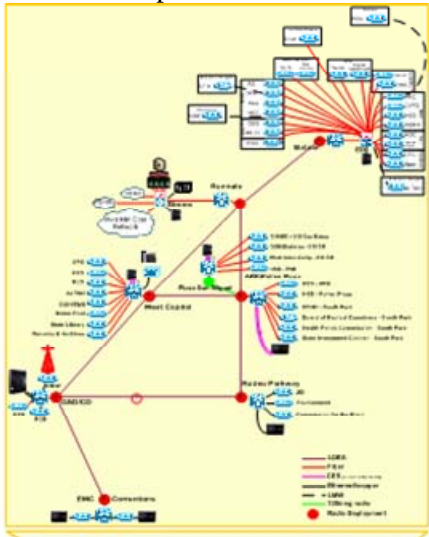
		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Lovington</u>	NM	Lovington Health Office	302 North 5th St.	88260	(505) 344-4673		T1		7.4
<u>Moriarty</u>	NM	Moriarty Health Office	P.O. Box 2460	87035	(505) 344-4673		T1		2
<u>Portales</u>	NM	Portales Health Office	1515 W. Fir	88130	(505) 344-4673		T1		4
<u>Raton</u>	NM	Raton Health Office	226 East 4th St.	87740	505 841.8978		T1		7
<u>Reserve</u>	NM	Reserve Health Office	PO Box 256	87830	(505) 344-4673		T1		10
<u>Rio Rancho</u>	NM	Rio Rancho Health Office	224-A Unser Blvd	87124	505 841.8978	YES	T1		1
<u>Roswell</u>	NM	Roswell Health Office	200 E, Chisum	88203	(505) 344-4673	YES	T1		4
<u>Roy</u>	NM	Harding County Health Office	County Courthouse	87743	(505) 344-4673		T1		10
<u>Ruidoso</u>	NM	Ruidoso Health Office	105 Kansas City Road	88345	(505) 537-3302		T1		7
<u>Santa Fe</u>	NM	Santa Fe Health Office	605 Letrado	87402	(505) 344-4673	YES	T1		1
<u>Santa Rosa</u>	NM	Santa Rosa Health Office	117 Third St	88435	(505) 894-4200		T1		7

State of New Mexico Department of Health

		Site Name	Address	Zip Code	Phone #	Current Video	Current Data Connection	Proposed Data Connection	RUCA Code
<u>Silver City</u>	NM	Silver City Health Office	2610 N Silver St.	88062	(505) 344-4673			T1	6
<u>Socorro</u>	NM	Socorro Health Office	214 Neel Ave.NW	87801	(505) 537-3302	YES		T1	7
<u>Sunland Park</u>	NM	Sunland Park Health Office	PO Box 390	88063	(505) 894-4200			T1	1
<u>T or C</u>	NM	T or C Health Office	201 East 4th	87901	(505) 344-4673			T1	7
<u>Taos</u>	NM	Taos Health Office	105 Albright St, Suite B	87571	(505) 344-4673	YES		T1	4
<u>Tierra</u>	NM	North Rio Arriba Health Office/WIC	P.O. Box 250	87575	(505) 344-4673			T1	10
<u>Truth or</u>	NM	NM Veterans Home	992 S. Broadway	87901	(505) 894-4200	YES		T1	7
<u>Tucumcari</u>	NM	Tucumcari Health Office	402 Miel de Luna	88401	(505) 344-4673			T1	7

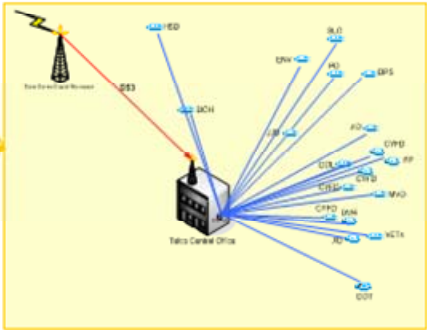
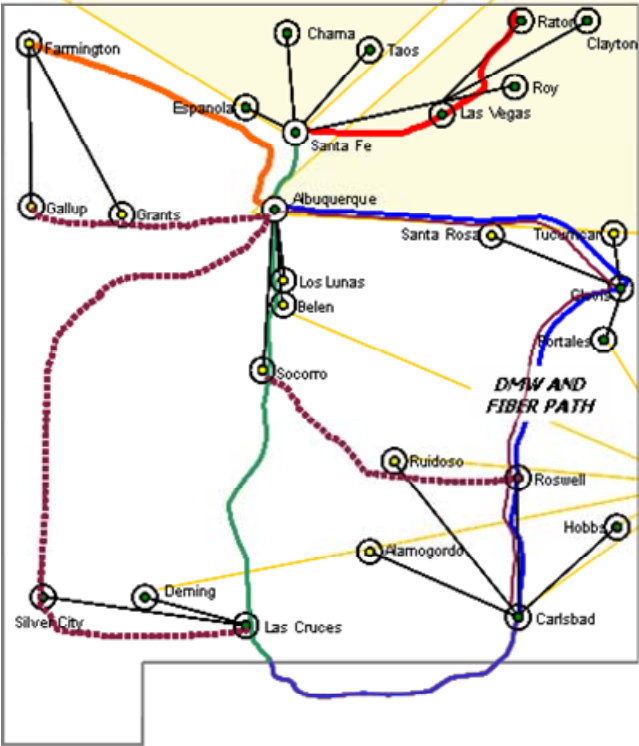
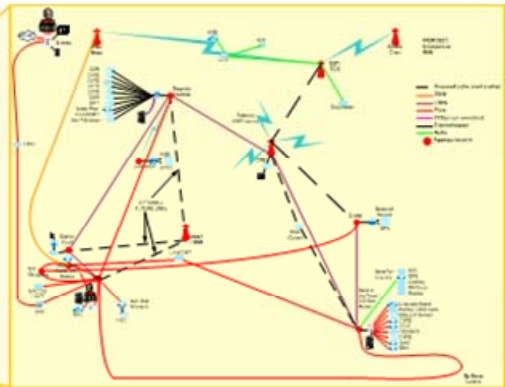
State Owned Network

Santa Fe Metropolitan Network



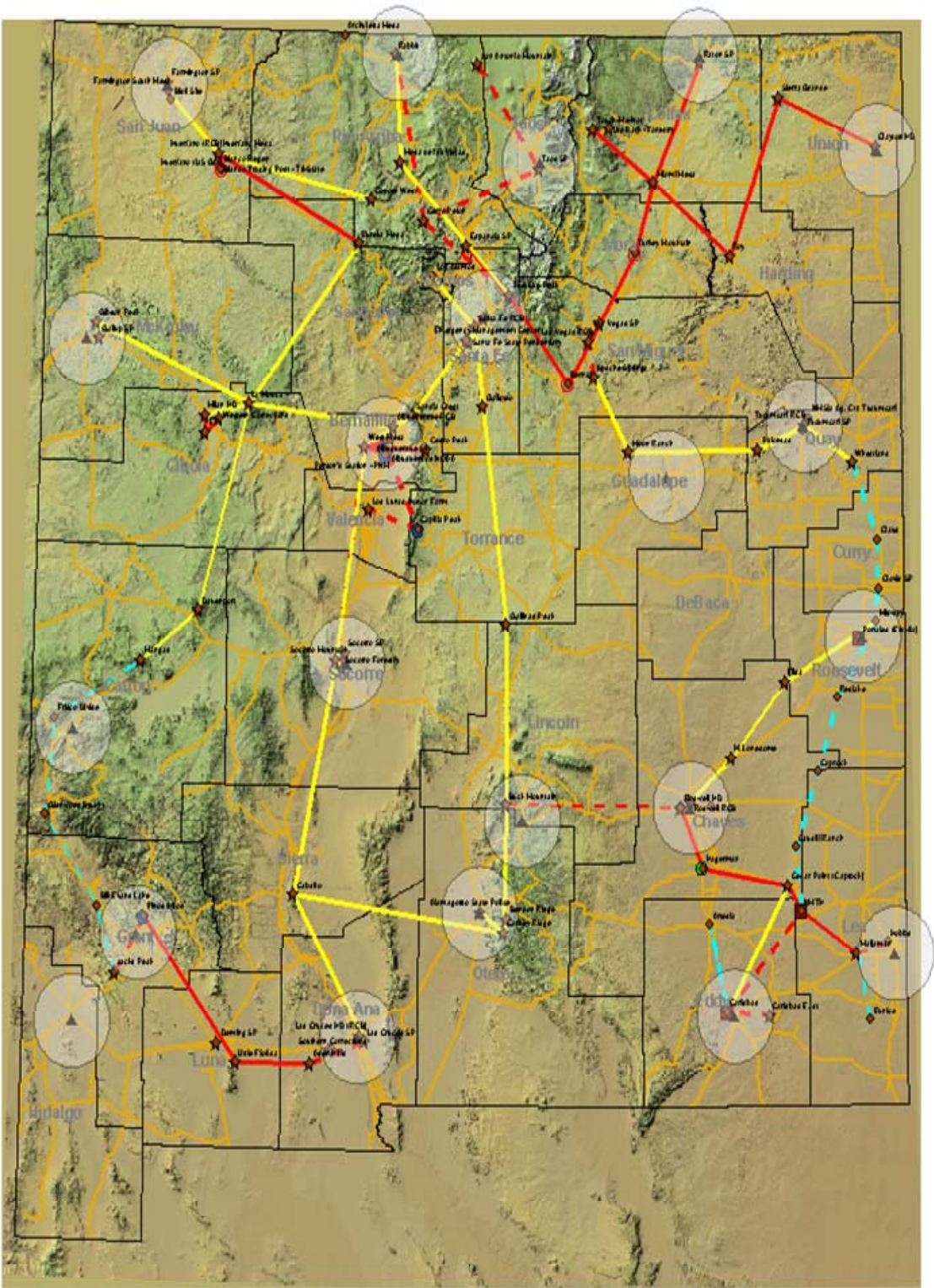
The fiber, digital microwave and MAN initiatives converge with the use of MPLS to provide a high capacity, reliable and consolidated State wide network infrastructure to meet the continually growing needs of State agencies and to foster economic development throughout the State.

Proposed Albuquerque MAN



New Mexico State Owned & Proposed Networks

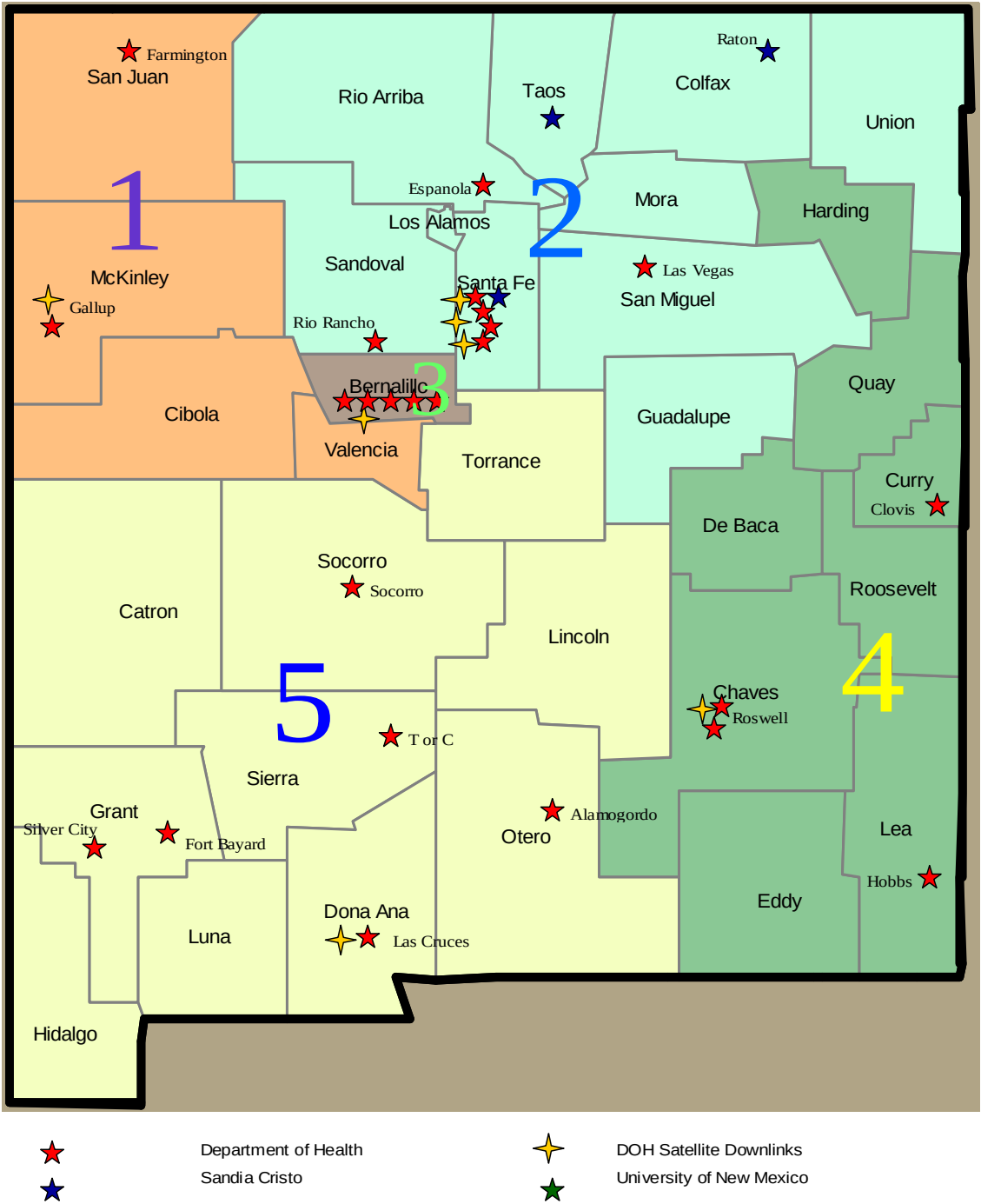
New Mexico State Owned Networks



0 100 Miles

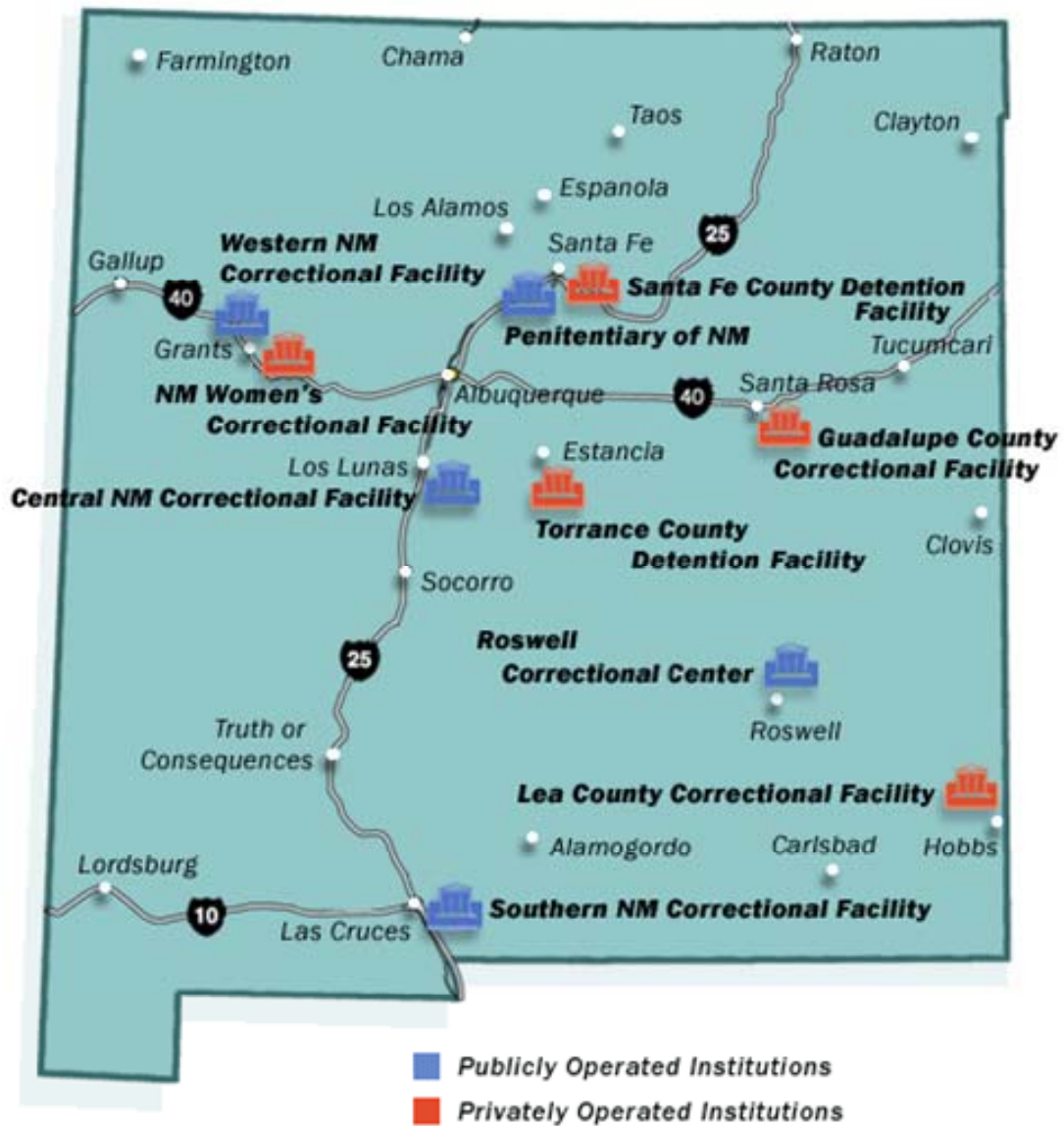


New Mexico Dept of Health Sites



New Mexico Dept of Corrections Facilities

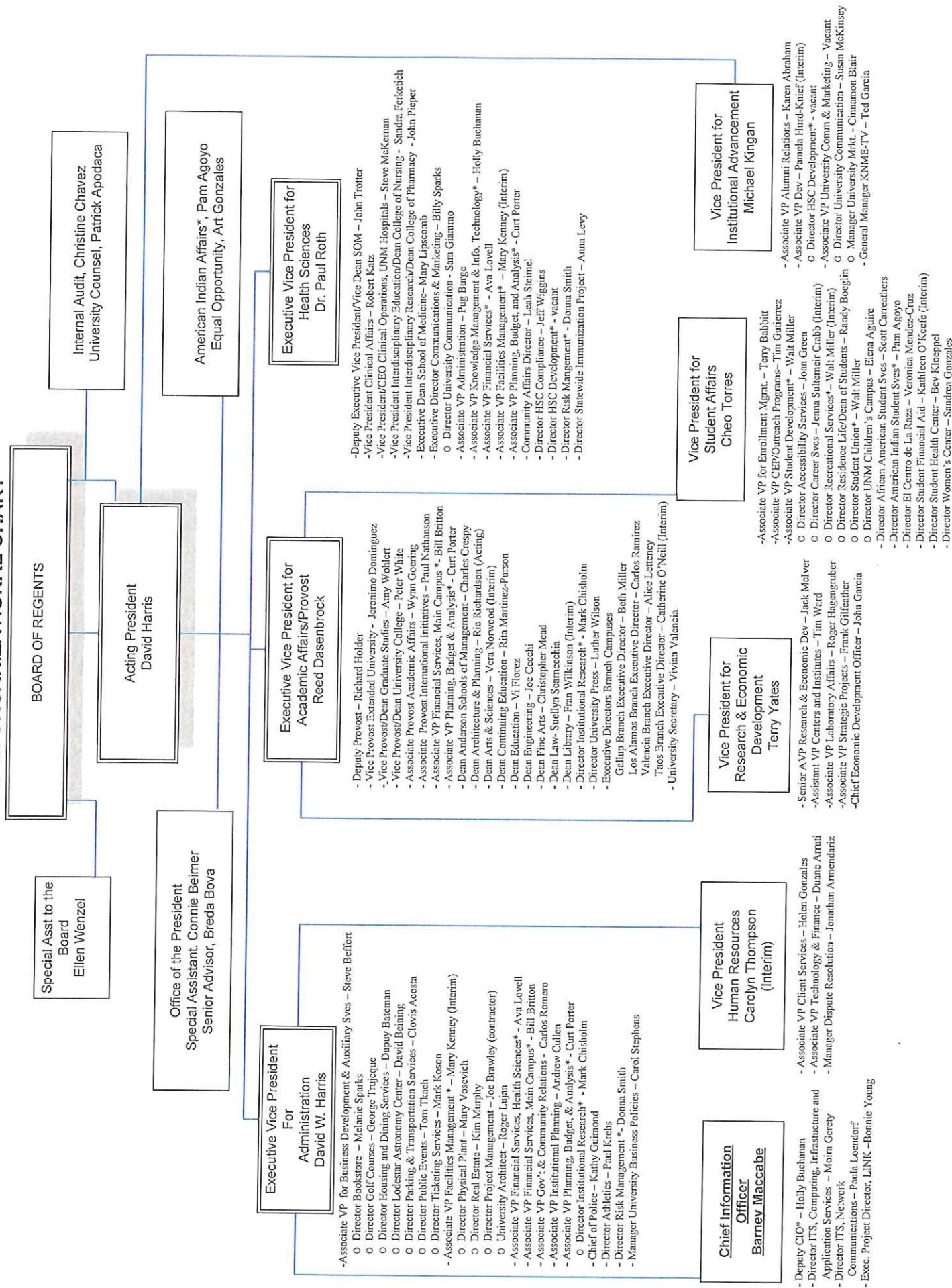
All sites will be connected through GSD



All sites have video teleconferencing capabilities

Appendix 2

UNM ORGANIZATIONAL CHART

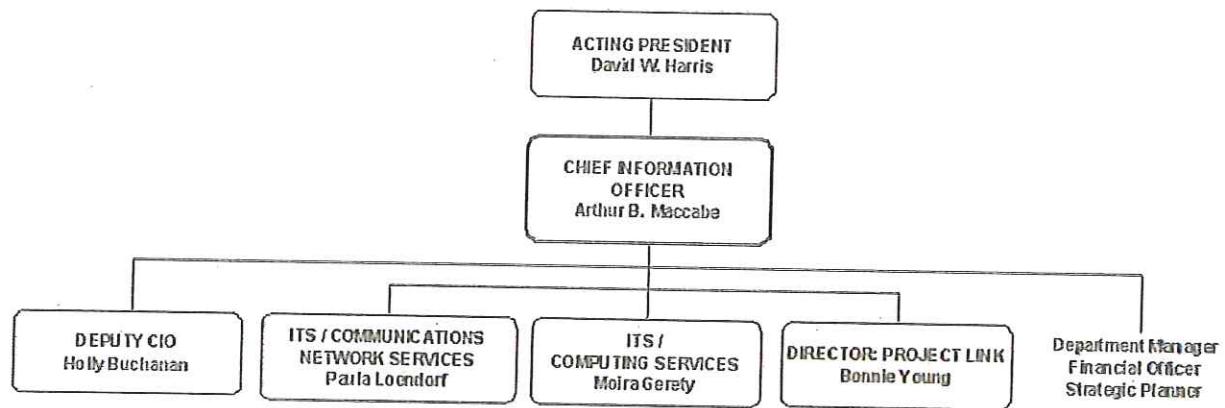


*Indicates dual reporting responsibilities

May 1, 2007

Chief Information Officer

2006-2007 Organizational Structure*



*As of February 2007

Source: UNM Office of the Chief Information Officer

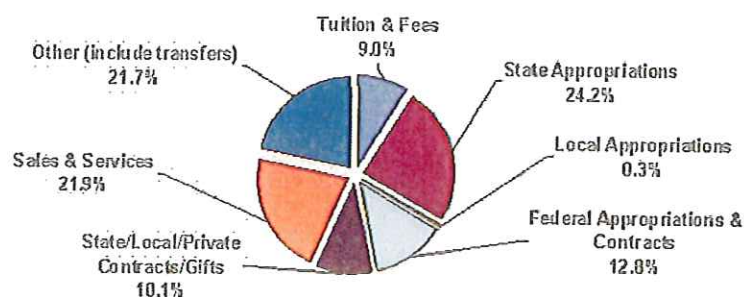
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Actual Current Fund Revenue

University of New Mexico, FY 2005-2006



Revenue - All UNM *

In Millions of Dollars (Unrestricted and Restricted Combined)

	FY 02-03	FY 03-04	FY 04-05	FY 05-06
Tuition & Fees	\$82.5	\$89.4	\$101.6	\$110.5
State Appropriations	\$258.2	\$274.6	\$286.2	\$296.5
Local Appropriations	\$3.0	\$3.0	\$3.1	\$4.1
Federal Appropriations & Contracts	\$142.5	\$145.0	\$163.0	\$157.3
State/Local/Private Contracts/Gifts	\$86.3	\$91.8	\$96.2	\$123.1
Sales & Services	\$176.2	\$215.2	\$249.8	\$267.6
Other (include transfers)	\$146.2	\$101.5	\$90.0	\$265.6
Total	\$894.9	\$920.5	\$989.9	\$1,224.7

* Excludes UNM Hospital and component units, such as the UNM Foundation, Science and Technology Corp., and University Physician Associates. The Annual Audit Report changed to GASB accounting standards in FY 02-03. This limits the trend data to only four years. Subsequent reports will continue to add years until there is a five year trend based on the new reporting standards.

Source: University of New Mexico Annual Audit Reports, and supporting worksheet from UNM Controllers Office

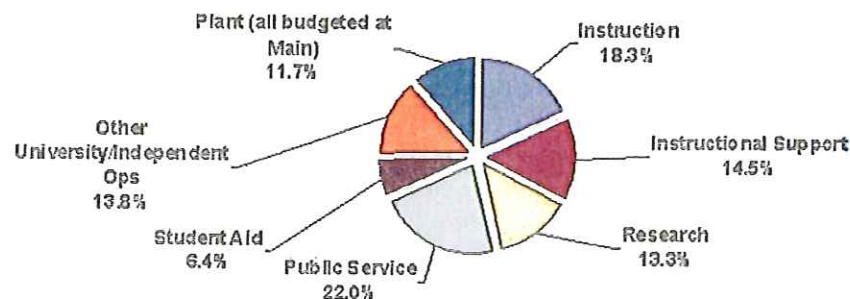
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Actual Current Fund Expenditures

University of New Mexico, FY 2005-2006



Expenditures - All UNM *

In Millions of Dollars (Unrestricted and Restricted Combined)

	FY 02-03	FY 03-04	FY 04-05	FY 05-06
Instruction	\$169.9	\$179.2	\$187.7	\$196.3
Instructional Support	\$120.0	\$125.3	\$149.7	\$155.3
Research	\$139.2	\$149.7	\$142.1	\$142.5
Public Service	\$196.7	\$202.2	\$227.3	\$235.6
Student Aid	\$60.1	\$65.7	\$68.4	\$68.5
Other University/Independent Ops	\$98.7	\$139.7	\$146.2	\$147.8
Plant (all budgeted at Main)	\$97.9	\$102.4	\$96.3	\$124.9
Total	\$882.5	\$964.2	\$1,017.7	\$1,070.9

* Excludes UNM Hospital and component units, such as the UNM Foundation, Science and Technology Corp., and University Physician Associates. The Annual Audit Report changed to GASB accounting standards in FY 02-03. This limits the trend data to only four years. Subsequent reports will continue to add years until there is a five year trend based on the new reporting standards.

Source: University of New Mexico Annual Audit Reports, and supporting worksheet from UNM Controllers Office

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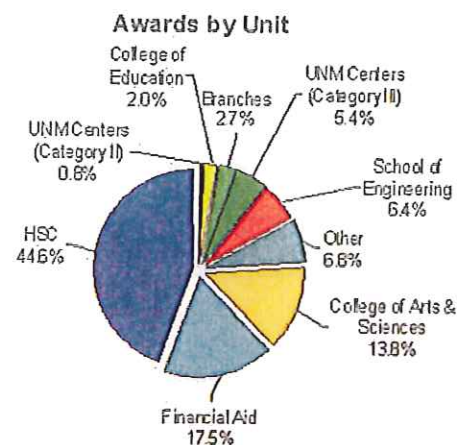
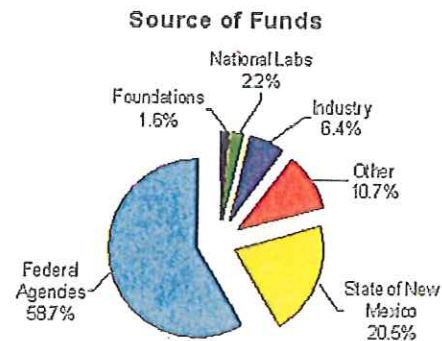
Contract & Grant Awards

UNM Total* (FY 2006)

Contract & Grant Awards

Source of Funds	Amt. (in mil.)
Foundations	\$4.7
National Labs	\$6.5
Industry	\$19.1
Other	\$31.9
State of New Mexico	\$61.1
Federal Agencies	\$175.3
Total	\$298.6

Units Awarded	Amt. (in mil.)
UNM Centers (Category II)	\$2.3
College of Education	\$6.1
Branches	\$8.0
UNM Centers (Category III)	\$16.1
School of Engineering	\$19.2
Other	\$20.3
College of Arts & Sciences	\$41.1
Financial Aid	\$52.3
HSC	\$133.2
Total	\$298.6



*Includes Main, HSC, Branches, Extended University, and Continuing Education.

Source: Office of the Vice President for Research and Economic Development

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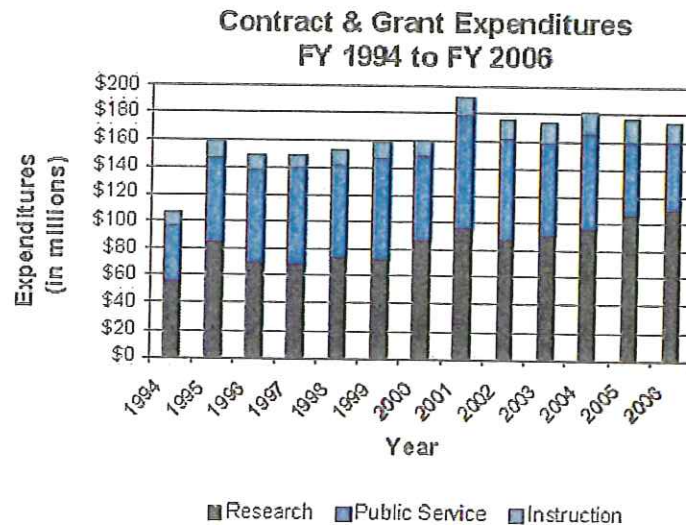
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Contract & Grant Expenditures*

UNM Total** (FY 1994 to FY 2006)

Contract & Grant Expenditures (In millions)

FY	Research	Public Service	Instruction
1994	\$54.9	\$41.3	\$10.3
1995	\$84.4	\$62.5	\$11.5
1996	\$69.2	\$68.7	\$10.7
1997	\$67.8	\$71.7	\$9.9
1998	\$74.3	\$68.1	\$10.0
1999	\$73.5	\$73.9	\$11.4
2000	\$86.8	\$61.8	\$11.5
2001	\$96.5	\$83.0	\$13.2
2002	\$88.1	\$73.5	\$14.5
2003	\$90.5	\$68.4	\$15.0
2004	\$97.1	\$68.0	\$16.4
2005	\$105.3	\$54.6	\$16.7
2006	\$110.4	\$49.7	\$13.8



* Direct costs only. Does not include state or federal student financial aid.

** Includes Main, HSC, Branches, Extended University, and Continuing Education.

Source: Office of the Vice President for Research and Economic Development

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The University of New Mexico



Financial Services

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Financial Services, Main: Controller Administration Home



About Us

Welcome to Financial Services -the Controller's Division Home Page. This site offers information about our organization and the services we provide. For questions regarding these services or special handling of specific

payment documents, document on the navigation buttons provided.

The Controller's Division is responsible for all central accounting functions for the University. The Division is composed of a number of interrelated departments who are responsible for the following specific accounting functions: payroll, purchasing and university services, contract and grant accounting, student and cashier operations, taxation, accounts receivable, accounts payable, property accounting and general accounting.

The Controller's Office is the core control center for the Division. The suite of offices in the UNM Business Center house the Associate Vice President and University Controller, the three Associate Controllers, the Financial Analyst, and three support staff members.

It is the responsibility of the Assoc VP and Controller to assure compliance with all policies, rules, and regulations adopted by the University or imposed by external agencies, including state and federal audit requirements, following generally accepted accounting practices. The Controller also oversees the maintenance of the official financial records of the University.

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Website Questions & Comments? Email: jgermack@unm.edu

UNM Centers & Institutes* 2006-2007

University Libraries

Center for Regional Studies	277-2857
Center for Southwest Research	277-6151

Anderson Schools of Management

Management Development Center	277-2525
Center for Support of Economic Development	277-8881

University College

UNM Water Resources Program	277-7759
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Office of the Vice President/Research & Economic Development

Center for High Performance Computing (HPC)	277-8249
Center for High Technology Materials (CHTM)	272-7800
Center for Micro-Engineered Materials (CMEM)	277-2833
Center on Alcohol Substance Abuse & Addictions (CASAA)	925-2300
Bero American Science & Tech Education Consortium	277-7974
Institute for Applied Research Services	277-2216
Bureau of Business and Economic Research (BBER)	277-2216
Division of Government Research (DGR)	277-3305

Office of the Provost

Latin American Iberian Institute (LAI)	277-2961
Southwest Hispanic Research Institute (SHRI)	277-2965
Spanish Colonial Research Center (SCRC)	346-2890

Health Sciences Center

School of Medicine

Cancer Research & Treatment Center	272-4443
Center for Brain & Behavioral Sciences	272-4411
Center for Community Partnership	272-4590
Center for Development and Disability	272-3000
Center for Disaster Medicine	272-6246
Center for Environmental Health Sciences	272-4289
Center for Health Promotion and Disease Prevention	272-2990
Center for Infectious Diseases and Immunity	272-5372
Center for Injury Prevention, Research, & Education	272-5062
Center for Native American Health	272-4100
Center for Telehealth	272-6633
Center for Vascular Disease & Diabetes	272-5556
Center of Excellence	272-6000
Clinical Trials Center	272-2836
Ethics Institute	272-4566
General Clinical Research Center	272-2386
Geriatric Education Center	272-4934
Institute for Public Health	272-3881
MIND Imaging Center	272-0760
New Mexico AIDS Education & Training Center	272-8443

College of Pharmacy

NM Center for Environmental Health Sciences	272-4289
NM Poison and Drug Information Center	272-4261
NM Center for Isotopes in Medicine	272-8101

College of Nursing

Rosenblum Weiss Center for Nursing Excellence	272-8166
Center for Outcomes Research	272-4221

* Identifies centers and institutes where research activities take place.

Source: Deans' Offices; Office of Vice President for Research & Economic Development; Health Sciences Controller's Office.

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UNITED STATES DEPARTMENT OF EDUCATION

WASHINGTON, D.C. 20202-_____

February 16, 2006

RECEIVED

FEB 21 2006

President's Office
UNM

OPEID: 00266300
University of New Mexico
Albuquerque, NM

Dear President:

We are pleased to inform you that your recent request for designation as an eligible institution under Title III, Part A and Title V of the Higher Education Act of 1965, as amended, (HEA) is approved.

Subject to the specific program requirements, your institution may apply for a new grant under any of the Title III, Part A Programs, and the Title V, Hispanic-Serving Institutions Program.

As a result of receiving this designation, your institution is also eligible for a waiver of the non-Federal share matching requirements under the Federal Work Study Program, the Federal Supplemental Educational Opportunity Grant Program, and the TRIO Student Support Services Program under Title IV of the HEA, as well as the Undergraduate International Studies and Foreign Language Program authorized by Title VI of the HEA. The eligibility for a waiver of the non-Federal share matching requirements applies for a five-year period beginning July 1, 2006. Accordingly, you do not need to reapply for designation as an eligible institution for five years, unless you wish to apply for a grant under the Title III, Part A or the Title V, Hispanic-Serving Institutions Program. You must apply for eligibility designation in each year you wish to participate in a program competition for funding.

The offices within the Department that administer those specific programs will handle the waiver of the cost sharing. Please retain this letter as evidence of your eligibility.

If you have questions concerning this designation, please contact Imogene Byers at imogene.byers@ed.gov or 202 502-7672, Kelley Harris at kelley.harris@ed.gov or 202 219-7083, or Carnisia Proctor at carnisia.proctor@ed.gov or 202 502-7606.

Sincerely,

Larry Oxendine
Interim Director
Institutional Development and
Undergraduate Education Service



University Business Policies and Procedures Manual

1000

UNM HISTORY, MISSION, AND ORGANIZATION

Effective Date: November 1, 1991

Revised: 04/01/94, 03/01/06

Subject to Change Without Notice

1. General

From time to time, University colleges and departments are called upon to provide general information about the University in the recruitment of faculty, staff, or students. Outlined below are some very general information about the University which may be helpful.

2. History of The University of New Mexico

2.1. Origins

The University of New Mexico was created by an act of the Territorial Legislature in 1889, opened as a summer school on June 15, 1892, and began full-term instruction on September 21 of the same year. The original campus in Albuquerque was comprised of twenty (20) acres, with a single structure.

In creating the University, the Legislature designated it as the state University whose object should be to "provide the inhabitants of the state of New Mexico with the means of acquiring a thorough knowledge of the various branches of literature, science, and arts."

2.2. Accreditation

The University of New Mexico has been fully accredited by the North Central Association of Colleges and Secondary Schools since 1922. It is currently recognized by an extensive list of accrediting organizations in many fields.

2.3. The University Today

In 1989, The University of New Mexico celebrated its centennial year. Today, the University is the largest of the state's publicly-supported institutions of post secondary education. In addition to the original Albuquerque campus, the University also operates branch colleges in Valencia County, Gallup, and Los Alamos, as well as graduate centers in Santa Fe and at the Los Alamos National Laboratory. Total enrollment in The University of New Mexico undergraduate, graduate, and professional programs exceeds 31,000 students.

3. Mission of The University of New Mexico

The mission of The University of New Mexico is to serve the educational needs of the citizens of the state, and those of the nation and world. This mission involves four (4) interrelated dimensions:

- (1) The University develops and offers comprehensive educational programs at the associate, baccalaureate, master, and doctoral levels in a wide range of academic, professional, and occupational fields.
- (2) The University, a designated Carnegie I research university, conducts research and engages in scholarly and other creative activities to support undergraduate, graduate, and professional educational programs, and to create, interpret, apply, and accumulate knowledge.
- (3) The University contributes to the quality of life in New Mexico by providing selected services to the public that are part of, contribute to, or originate from the University's teaching and scholarly activity programs.
- (4) The University Health Sciences Center is a valuable resource to New Mexico. Added value is provided to health care through leadership in providing innovative, collaborative education; advancing the frontiers of science through research critical to the future of health care; delivering health care services that are at the forefront of science; and facilitating partnerships with public and private biomedical and health enterprises.

4. Administrative Organization

The President of the University is appointed by The University of New Mexico Board of Regents and is directly responsible to them. As the chief executive officer of the institution, the President directs the administration in carrying out University policy, and has the authority to assign and reassign administrative duties.

5. Additional Information

The [**UNM Fact Book**](#) provides updated information concerning enrollment statistics, employment, budget, etc.

6. Related Links

[**UNM Fact Book**](#)

Comments may be sent to [**UBPPM@UNM.edu**](mailto:UBPPM@UNM.edu)
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University Business Policies and Procedures Manual

2000 RESPONSIBILITY AND ACCOUNTABILITY FOR UNIVERSITY INFORMATION AND TRANSACTIONS

Effective Date: July 1, 2004
Subject to Change Without Notice

1. General

University administrative processes, systems, and forms provide electronic and manual mechanisms for business and administrative functions such as finance, student, student financial aid, human resources, and development. Use of University information and systems is restricted to authorized University business and administrative users. Deans, directors, and department heads will define departmental approval processes and designate individuals in their organizations who are authorized to process business and administrative transactions. This policy defines the specific responsibilities of individuals who request, initiate, approve, and/or review business and administrative transactions and reports. These individuals are accountable for fulfilling the responsibilities defined in this policy.

2. Deans, Directors, and Department Heads

Deans, directors, and department heads are responsible for ensuring designated individuals have attended the necessary training required to effectively and efficiently complete authorized business and/or administrative processes and transactions. Deans, directors, and department heads are accountable for exercising good judgment, upholding ethical standards, and should have internal procedures in place to ensure periodic review of designations and related training.

2.1. Authorizing and Processing Transactions

Each of these two functions, authorizing transactions and processing transactions, carry distinct responsibilities listed below. If the functions are performed by the same person, that individual is accountable for both sets of responsibilities.

2.1.1. Requesters

The requester is the individual who identifies the need for the transaction and authorizes the request to be processed. The requester is responsible for:

- determining the validity and appropriateness of the transaction; and
- evaluating the transaction for compliance with contractual requirements.

This individual will be accountable for fulfilling the above responsibilities, exercising good judgment, and upholding ethical standards.

2.1.2. Initiators

Initiators are individuals who have been authorized by a dean, director, or department head to enter transactions into electronic business or administrative systems and/or prepare paper forms. If the initiator is not the requester of the transaction, the initiator should make sure he or she has a signed authorization to initiate a transaction. In such cases, departments should develop procedures for documenting requests. Initiators are also responsible for:

- ensuring the electronic transaction and/or form is complete and accurate;
- verifying all backup documentation; and
- notifying approvers and requester if a transaction will cause an account to go over budget.

Initiators are accountable for fulfilling the above responsibilities, exercising good judgment, and upholding ethical standards.

2.2. Departmental Approvers

Approvers are individuals designated by deans, directors, or department heads to review and approve electronic transactions and/or forms before they are released for processing. Depending on the type of transaction and the level of risk, there may be more than one individual required to approve a transaction. However, the first-level approver is responsible for:

- conformity with budget;
- verifying the appropriateness of the transaction; and
- compliance with University policies and procedures.

Subsequent approvers are primarily responsible for acceptance of the added risk associated with high dollar and/or risk transactions. Approvers will be accountable for fulfilling the above responsibilities, exercising good judgment, and upholding ethical standards.

3. Central Office Approvers

3.1. Finance

Central finance office approvers are responsible for:

- verifying proper accounting and transaction processing; and
- ensuring compliance with administrative, accounting, and/or purchasing policies and regulations.

Approvers are accountable for fulfilling the above responsibilities, exercising good judgment, and upholding ethical standards.

4. Post Transaction Review

4.1. Finance

It is critical for the financial integrity of the University that administrators and principal investigators responsible for University resources review the cumulative financial picture

for each of their respective funds. Reviewers include financial managers and principal investigators in departments and staff in central administration offices. These individuals are responsible for oversight of transactions.

4.1.2. Financial Managers and Principal Investigators

Each department designates organization financial managers which are recorded in the finance system. Financial managers or designees are responsible for a monthly review of the transactions affecting their funds to ensure allowability and appropriateness of transactions, conformity with approved budget, and financial integrity of the fund. If this responsibility is delegated, the delegation must be signed by the cognizant financial manager and kept on file in the department.

4.2. Controller's Office

The Controller's Office is responsible for a periodic review of transactions including trend analysis, internal controls, and review of departmental approval processes.

Reviewers will be accountable for fulfilling the above responsibilities, exercising good judgment, and upholding ethical standards.

5. University Information

All individuals authorized to process, approve, and/or review transactions and reports are responsible for the proper use of any information they view.

6. Sanctions

Individuals who do not demonstrate due care and good judgment in the administration of their duties may be subject to disciplinary action, up to and including, discharge.

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University Business Policies and Procedures Manual

2400

COST ACCOUNTING STANDARDS

Effective Date: July 15, 1998

Subject to Change Without Notice

1. General

The U.S. Government Office of Management and Budget (OMB) Circular A-21, "Principles for Determining Costs Applicable to Grants, Contracts, and Other Agreements with Educational Institutions" requires the University to comply with applicable cost accounting standards published by the Cost Accounting Standards Board (CASB) and to submit a Disclosure Statement (Form DS-2) to the University's cognizant audit agency. The DS-2 describes the University's cost accounting practices. These cost accounting practices must be followed by all University units, departments, and programs that use University funds.

2. Cost Accounting Standards

Circular A-21 identifies four (4) cost accounting standards that apply to educational institutions.

2.1. Cost Accounting Standard 501

This standard requires that costs be estimated, accumulated, and reported consistently. A cost that is included in a contract or grant proposal as a direct cost must be accumulated as a direct charge in the accounting records. The same rule applies to indirect charges.

2.2. Cost Accounting Standard 502

This standard requires that costs incurred for the same purpose be accounted for in the same manner. A department cannot account for such costs in one manner while another department accounts for them differently. Therefore, this standard requires that the University have established cost accounting practices that are applied consistently throughout the campus.

2.3. Cost Accounting Standard 505

This standard requires that unallowable costs be identified and excluded from any costs charged to federal contracts and grants. The University's policies and procedures for complying with this standard are described in **"Accounting for Federally-Defined Allowable and Unallowable Costs"** Policy 2410, UBP.

2.4. Cost Accounting Standard 506

This standard requires that the University's cost accounting period be the same as the University's fiscal year.

3. Disclosure Statement (DS-2)

The University Controller is responsible for submitting a Disclosure Statement (DS-2) to the cognizant agency. The DS-2 discloses the University's cost accounting practices, which must comply with Circular A-21 and applicable cost accounting standards. The Controller is also responsible for maintaining an accurate DS-2 and filing amendments to the DS-2 when disclosed practices are changed to comply with a new or modified standard, or are changed for other reasons. Costs will be disallowed if the University fails to comply with Circular A-21 or fails to consistently follow its established or disclosed cost accounting practices (DS-2) when estimating, accumulating or reporting the costs of sponsored agreements.

Comments may be sent to UBPPM@UNM.edu
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University Business Policies and Procedures Manual

2430

COST SHARING ON SPONSORED PROJECTS

Effective Date: July 15, 1998

Revised: 08/01/06

Subject to Change Without Notice

Authorized by Regents' **Policy 5.9 "Sponsored Research"**

1. General

Cost sharing refers to a portion of a sponsored project or program costs that is paid by the University. Cost sharing can be imposed by a sponsor as a condition of the sponsored award or it can be volunteered by the University. The University Vice President for Research and Economic Development or the University Executive Vice President for Health Sciences will agree to cost sharing only when required by the sponsor or in rare situations when justified by the competitive nature of the award. Cost sharing should be held to a minimum and must adhere to the sponsoring agency's guidelines and comply with this policy.

Cost sharing obligations must be funded from identifiable resources available to the principal investigator, department, school, or center involved. Any indication of cost sharing mentioned in the technical proposal must also be included in the proposal budget. Once a sponsor accepts a proposal containing a cost sharing commitment, it is binding on the University and the sponsoring agency must approve any subsequent changes.

2. Cost Sharing Responsibilities

The primary responsibility for cost sharing lies with the principal investigator, department, unit, college or school.

2.1. Principal Investigator

The principal investigator must notify the chairperson or director of any external requirements for cost sharing. After the chairperson or director identifies funds for the cost sharing requirements, the principal investigator prepares a proposal based on the funding agency's guidelines. The principal investigator is responsible for ensuring cost sharing funds are expended according to the funding agency's guidelines and this policy.

2.2. Department, College, School, Center, or Division

Before a proposal is submitted, the individual with budgetary authority over the funds used for cost sharing must approve the funding in writing. These funds will be transferred to an assigned cost share account at the start of the project.

2.3. Office of Research Services or Health Sciences Pre-award Office

Before the proposal is submitted, the Office of Research Services or Health Sciences Pre-award Office reviews the proposal, supporting documentation, and agency guidelines to:

- ensure all required approvals have been obtained; and
- verify that cost sharing has been correctly reflected in the proposal.

2.4. Contract and Grant Accounting

After the award is received the Contract and Grant Accounting Office:

- transfers assigned funds to the cost share account at the start of the program;
- approves expenditures for the award account and cost share account; and
- reports all project expenditures to the funding agency.

2.5. Financial Services' Office

The Financial Services' Office acts as a liaison with federal and non-federal auditors.

3. Cost Sharing

Cost sharing expenditures are part of the total project and program costs, which include all allowable costs incurred by the University, both direct and indirect, in meeting the objectives of the sponsored project or program. There are two types of cost sharing: mandatory and voluntary. Mandatory cost sharing is cost sharing that is required by the sponsoring agency. Voluntary cost sharing is agreed to by the University in excess of mandatory cost sharing requirements.

3.1. Costs Allowable for Cost Sharing

To qualify as cost sharing, expenditures must:

- be necessary and reasonable for proper and efficient completion of the project or program objectives;
- be verifiable with University records;
- be allowable under applicable cost principles;
- be included in the approved budget when required by the sponsoring agency;
- be incurred for the specific project or program;
- be incurred within the time period of the award;
- not be charged to any other sponsored project or program; and
- not be paid by the federal government under another award, except where authorized by federal statute to be used for cost sharing or matching.

3.2. Typical Types of Cost Sharing Costs

Mandatory and voluntary cost sharing expenditures which meet all of the above criteria can include the following types of costs.

3.2.1. Costs funded by the University from non-sponsored accounts, and certain nonfederal sponsored accounts and not included as cost sharing for any other sponsored project or program.

3.2.2. Cash and third party in-kind contributions (non personnel) not included as contributions for any other federally assisted project or program.

3.2.3. Volunteer or in-kind services provided by external sources such as professional and technical personnel, consultants, and other skilled and unskilled labor if the services are an integral and necessary part of an approved project or program and are required by the award.

3.2.4. Grant-related income included in the approved project/program budget and approved as additional costs by the sponsor.

3.2.5. Matching funds usually involving a University contribution of funds specifically appropriated for or allocated to the project.

3.2.6. Where full indirect costs are not charged to the sponsor, they may be shown on the budget as a cost sharing expense being borne by the University. The sponsoring agency must have allowed the use of unrecovered indirect costs as use for cost sharing purposes.

3.3. Unallowable Costs for Cost Sharing

The following type of expenditures can not be used as contributions to cost sharing.

3.3.1. Unallowable costs as defined in Office of Management and Budget, Circular A-21.

3.3.2. Indirect costs in excess of the University's approved indirect cost rates.

3.3.3. Salary dollars in excess of regulatory salary caps, e.g. NIH and NSF salary caps, when effort expended in contribution of the sponsored award exceeds the amount of effort associated with the salary cap.

3.3.4. Cost overruns (for indirect cost proposal classification, the University considers voluntary cost sharing as departmental research).

4. References

- Office of Management and Budget Circular A-110
- "Uniform Administrative Requirements for Grants and Agreements With Institutions of Higher Education, Hospitals, and Other Nonprofit Organizations"
- Office of Management and Budget Circular A-21
- "Principles for Determining Costs Applicable to Grants, Contracts, and Other Agreements With Educational Institutions"
- 45 Code of Federal Regulations Part 74, Subpart G

Comments may be sent to UBPPM@UNM.edu

<http://www.unm.edu/~ubppm>

Network Modeling by LANL

Our design philosophy stems from networks optimized in the process of adaptation in biological systems. The brain represents the most complex of biological system known to us, consisting of about 20 billion interconnected neurons. Sets of neurons form smaller functional networks, which in the language of Marvin Minsky (Minsky, 1986) form agents capable of performing specific tasks. There is an abundance of local, short-range connections, and they are the structural basis for the development of local functional networks. The agents form societies, and these communicate among themselves to create the marvelous capabilities of the brain. Communication in the brain is energetically expensive (Chklovskii et al., 2002), and the brain architecture reflects the optimization of the circuits to meet the energy limitations and at the same time to effectively perform the functions required by the environment for survival and prosperity.

A small percentage of long-range connections between distant agents greatly reduces the minimal path between any two neurons. This pattern of short-range and long-range connections is optimal for selectively biasing the communication of local and global networks (Chklovskii et al., 2002, Laughlin and Sejnowski, 2003). The basic architectural principles that the brain uses in the long-range connectivity vary little across humans. For example, the onset of the primary brain response to a visual stimulus is 60 ms after the stimulus onset and the variation in that number is related to the distance between the retina and the primary visual cortex, which is at the back of the brain. This is an example of a large-scale connection. The information travels very fast along such connections, and once the information travels to the visual part of the brain, it is processed locally. The local processing is performed by neurons in close proximity, and the connection speed between them is much slower reflecting the information processing speed of the neurons.

The connections need not be faster than the speed limit set by the processing time of the neurons. In the language of modern computers, the motherboard bus doesn't need to be faster than the information processing in the CPU and the RAM. Fortunately for us we possess the mathematical tools for analysis of such architectures (Strogatz, 2001), and we will use these mathematical tools in our network design and assessment of the network operation in different situations.

Agent-based models are mathematical abstractions of distributed systems consisting of many units forming an interconnected web. Each unit's physical properties are mapped onto the mathematical quantities characterizing the agent. In the case of a computer network, the agent can be the facility at a given location. The properties of this facility, like the time of operation, number of people at the facility, type and number of medical equipment, type and number of computers, etc., are mapped onto mathematical variables. The connections between different facilities and the connection throughputs are mapped on the network properties (links) formed by the agents.

A typical simulation involves an initial state of the system and a given scenario. The system is evolved based on an algorithm involving both deterministic and stochastic components. At predetermined intervals of time, the results of the operation of network are analyzed. The C++ programming language is particularly well designed for such applications. In C++ the abstract agent is programmed as a class, and the particular

agents representing the medical facilities are instances of this class. The operations on the agents are the methods defined in this class. C++ is also fast compiled language that allows large number of agents to be efficiently simulated. Using C++ will allow us to simulate networks the size of the United States as well as networks spanning the Earth.

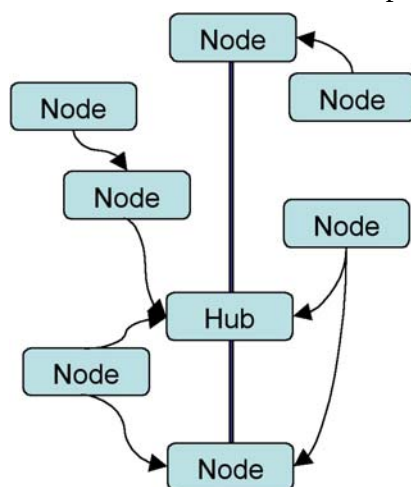
In this proposal we will focus on three “real life” scenarios of great importance to our Nation: Pandemics occurring in the U.S., large-scale forest fires, and severe earthquakes. Each of these scenarios have different disaster relief requirements and will load the network in a different way allowing us to better assess our network design. A major issue in computational studies like this is the validation of the model and the results. We plan to perform small-scale experiments to validate our approach.

Our data analysis will be based on irreducible frequent pattern analysis (IFPA), which has been used to analyze transaction databases. The exchange of information between network nodes can be viewed as information transactions at a given time. Each information exchange forms a bimodal transaction, sending information by the first node and accepting information by the receiving node or nodes. Each of these can be quantified by numbers between 0 and 1, with 0 corresponding to complete failure and 1 to a complete success. Frequent patterns are transfer patterns that occur often in the operation of the network and the irreducible frequent patterns correspond to patterns that cannot be decomposed into a sum of other simpler patterns.

Network Assessment

Any computer network can be represented by a set of nodes and the links between these nodes (Fig. 1). In mathematical terms, the nodes and , links form a graph. Data flows along the links with given speed determined by the physical properties of the transmission lines or communication equipment in the case of microwave or laser transmission. To evaluate the functioning of a complex network, which depends on the multiple human and equipment factors as well as the evolution of a particular real life scenario, we will separate the system into functional components.

First we will evaluate the network capabilities only taking into account the geographical location of the network nodes and the transmission speed between these nodes. We will run a set of communication test patterns to identify the bottlenecks in the network. These



bottlenecks are architectural features and we will resolve them by either increasing the band-width of the slow links or by including new links. At this stage we have evaluated the connections between the medical facilities alone.

The next network component is the operation of each node. In our application, each node has its own specific architecture that depends on the medical and computer equipment present at the given location, the number and hours of operation of the medical and computer experts, etc. For each location we will

generate a table reflecting the characteristics of a medical facility and the characteristics of its location (Table 1). Lookup in this table will be used during the simulation of the disaster events at each location. In a given scenario, it is possible that the communication bottlenecks are not in the network capabilities, but in the human acquisition and processing of data. For example if a given location has a large demand for X-ray scans, the transmission speed might be adequate between

that location and the target location, but the medical facility might not have the ability to obtain the necessary X-ray scans in a short time at the necessary volume. We therefore need to evaluate in each of the three chosen scenarios the data loading speed onto the network at each location. This evaluation will be performed using the data from the location specific table.

Location coordinates	13,187
Human resources	5
Equipment type 1	4
Equipment type 2	12
Time of operation	9-5
Connection nodes with speed	14,165:1Mb/s; 12,123:2kb/s
Number of people serviced by the node	23000

Simulations

Fig. 1 An example of a network in New Mexico.

To optimize the network design, we will implement a mathematical

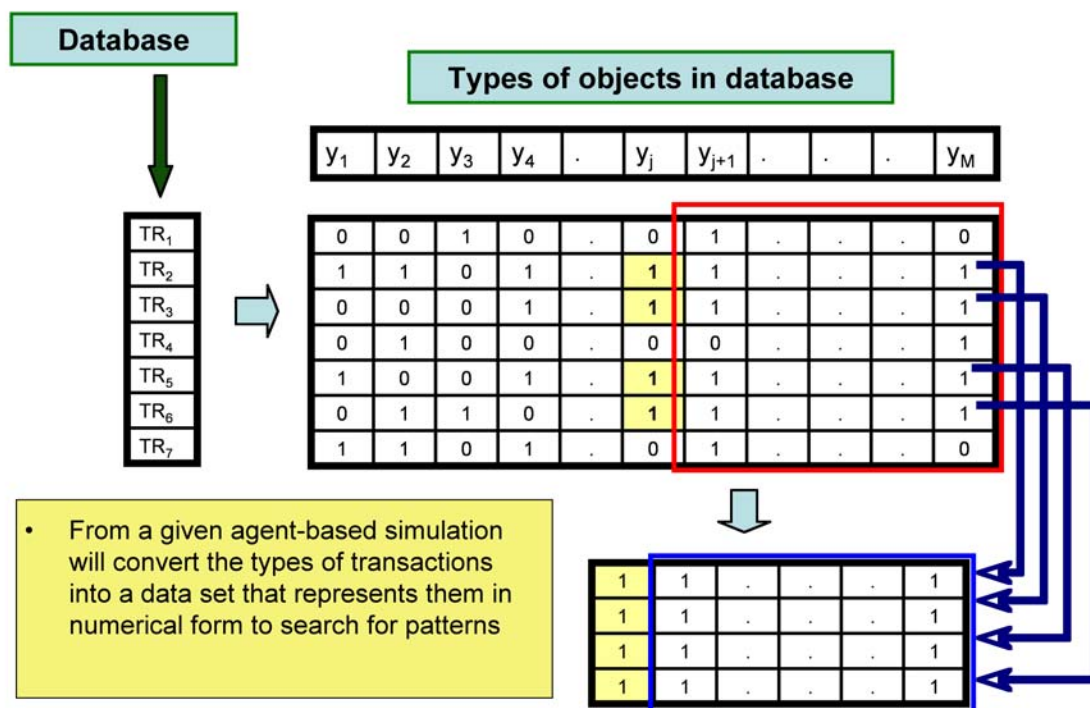
Table 1. Example of a lookup table

model of three different real life scenarios in an emergency response in the participating states and a distant state. Our results will be specific to the local network capabilities, but it can be applied to any other set of states as well as the whole country or countries. The simulation of every individual taking part in a given emergency situation with the subjective behavioral specifics of each individual is currently an impossible task. However in an emergency, people behave in a similar manner that can be categorized based on their age, role, location, medical state, etc. This is the strategy used in agent-based simulations of pandemics, and we will adapt that strategy here. The categories of people in the simulations interact with the environment and this interaction determines the dynamics at the medical facilities. Examples of these factors include the state of the roads, time of the day, state of the local communication network, and weather.

Data Analysis

To analyze the data from the simulations, we will use a powerful approach applied in fraud discovery in transaction databases. Each data transmission can be quantified by a real number between zero and one. One corresponds to complete transmission and zero to complete failure. Given patterns of transactions taking place during a small interval of time can be represented by a matrix or a table. A full operation of the network is a set of

Analysis of simulations



matrices representing successive time intervals of the network operation. Each of these matrices can be digitized and mapped onto a vector, which represents a given transaction (Fig. 2). To analyze the patterns of a large number of transactions is very hard, but within the set of all transactions, there is a relatively small subset called irreducible frequent patterns. These cannot be reduced to a sum of other simpler patterns—they are irreducible frequent patterns that characterize the network operation. This is a concept developed at LANL that has proven extremely effective in pattern analysis.

Network Optimization

The analysis of irreducible frequent patterns leads to the identification of bottlenecks, robustness of sub-paths, weaknesses and strengths in the network, etc. The analysis can also tell us how flexible a network needs to be to efficiently accommodate different emergency situations. We will use this information to modify the existing networks and iterate the modeling-analysis-modification procedure to obtain optimal networks, in terms of types of hardware but also connectivity, re-routing and other properties. The results of this iterative process will be quantified by the values of a cost-function. The extrema of this cost function correspond to optimal performance of the network. We will use appropriate optimization methods like simulated annealing, Monte Carlo simulations, and genetic algorithms to find optimal solutions to the network architecture. We expect to find different optimal network configurations for different scenarios. We will choose the network architecture that simultaneously serves all three different rescue efforts in the most optimal manner.

Appendix 4

Resources In Place To Support FCC Project

1. **Dale Clark Alverson, M.D.**
Medical Director - Center for Telehealth
University of New Mexico
2. **Arthur Bernard Maccabe, Ph.D**
Office of the CIO
University of New Mexico
3. **Chaouki Abdallah, Ph.D**
Professor & Chair, ECE Department
University of New Mexico
4. **Krastan B. Blagoev, Ph.D**
Research Associate Professor
Electrical & Computing Engineering
University of New Mexico
5. **Michael Hites, Ph.D**
Vice President, Planning & Information
Technology and CIO
University of New Mexico
6. **Antonio Redondo, Ph.D**
Acting Director of Theoretical Division
Los Alamos National Laboratories
7. **Mary Ann Scott, M.M.**
Associate Director – Center for Telehealth
University of New Mexico
8. **Moirra G. Gerety, MBA**
Director, IT Services; ITS CIAS
University of New Mexico
9. **Greg Blackwell, BSEE, CCNA, N+**
Manager, Telehealth Technology
Center for Telehealth
University of New Mexico
10. **Elizabeth A. Krupinski, Ph.D**
Research Professor
Radiology & Psychology
Associate Director Evaluation
Arizona Telemedicine Program

Resources In Place To Support FCC Project

TAG Participant BioSketches

11. **Laura Banks, DVM, MPH**
Associate Director – Center for Disaster Medicine
University of New Mexico
12. **Mark Carroll, M.D.**
Director, Telehealth Program
Indian Health Services
Arizona
13. **Michael Belgarde, LCDR**
NAIHS CIO
Navajo Area Office
IRM/MIS Department
14. **Wesley Old Coyote**
Chief Information Officer
Tucson Area IHS
TAIHS-DIST
15. **Mike Holcomb**
Associate Director, Network Architecture
Arizona Telemedicine Program

CURRICULUM VITAE

DALE CLARK ALVERSON, M.D.

University of New Mexico School of Medicine
Center for Telehealth and Cybermedicine Research
1005 Columbia, NE
Albuquerque, New Mexico 87131
(505) 272-8633/Fax: (505) 272-0800/dalverson@salud.unm.edu

Personal:

Date of Birth: June 29, 1945
Place of Birth: Detroit, Michigan
Home Address: 312 Laguna SW
Albuquerque, NM 87104
(505) 247-8789
Marital Status: Wife: Jennifer Bean-Alverson
Bean and Associates Inc, Professional Court Reporting
Children: Melissa (10/29/69),
Dale (11/20/70)
Heather (2/29/76)
Jessica (1/22/87)
Arianna (2/14/90)

EDUCATION AND POST GRADUATE TRAINING:

Undergraduate:	1963-1966; 1970
Major-Biology; Minor-Chemistry	
Wayne State University	
Detroit, Michigan	
Doctor of Medicine:	1970-1974
University of Michigan Medical School	
Ann Arbor, Michigan	
M.D. (cum laude) conferred June, 1974	
Internship in Pediatrics:	1974-1975
Butterworth Hospital	
Grand Rapids, Michigan	
Residency in Pediatrics:	1975-1977
University of Colorado Medical Center	
Denver, Colorado	
Fellowship Neonatal/Perinatal Medicine	1980-1981
University of Michigan Medical Center	
Holden Neonatal Intensive Care Unit	
Ann Arbor, Michigan	

EDUCATION AND POST GRADUATE TRAINING (continued):

Fellowship Neonatal/Perinatal Medicine University of New Mexico School of Medicine, Albuquerque, New Mexico	1981-1982
Medical Informatics MBL/NLM Course Fellow Marine Biological Laboratory, Woods Hole, MA. Sponsored by the National Library of Medicine. Certificate, Spring Course, 2002.	2002

PROFESSIONAL AND ADMINISTRATIVE POSITIONS:

Staff Physician: Department of Pediatrics Perinatology Marquette General Hospital Marquette, Michigan	1977-1981
Assistant Clinical Professor: Pediatrics and Human Development College of Human Medicine Michigan State University East Lansing, Michigan	1979-1981
Assistant Professor: Pediatrics and Ob/Gyn Division of Neonatology Department of Pediatrics University of New Mexico School of Medicine Albuquerque, New Mexico	1982-1986
Associate Director: General Clinical Research Center University of New Mexico School of Medicine Albuquerque, New Mexico	1986-1990
Associate Professor: Pediatrics and Ob/Gyn, Division of Neonatology Department of Pediatrics University of New Mexico School of Medicine Albuquerque, New Mexico	1986-1994
Director, Division of Neonatology University of New Mexico School of Medicine Albuquerque, New Mexico	1988-1997
Professor: Pediatrics and Ob/Gyn, Division of Neonatology Department of Pediatrics University of New Mexico School of Medicine Albuquerque, New Mexico	1994-Present
Regents Professor: University of New Mexico School of Medicine Albuquerque, New Mexico	1994-Present

PROFESSIONAL AND ADMINISTRATIVE POSITIONS(continued):

Medical Director, Center for Telehealth and Cybermedicine Research University of New Mexico School of Medicine Albuquerque, New Mexico	1995-Present
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PRIVATE PRACTICE:

Private Pediatrician Marquette, Michigan	1977-1980
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MILITARY SERVICE:

United States Air Force (Active Duty) Medical Corp - Medical Laboratory Technician Honorable Discharge	1966-1969 1972
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BOARD CERTIFICATION:

National Board of Medical Examiners - Diplomate	1975
Michigan Medical Practice Board	1977
American Board of Pediatrics Diplomate and Board Certified	1980
American Board of Pediatrics Sub-Board of Neonatal-Perinatal Medicine Board Certified	1983
American Board of Pediatrics Recertification (Voluntary) in Pediatrics and Neonatal-Perinatal Medicine,	1989

LICENSURE:

Colorado (National Boards) #19790 (Inactive)	1976
Michigan (Reciprocity) #038042 (Inactive)	1977
New Mexico (National Boards) #81-145	1981

PROFESSIONAL SOCIETIES:

A.O.A. Honorary Medical Society	1973
American Medical Association	1977
American Academy of Pediatrics - Fellow	1981
American Academy of Pediatrics - Section on Perinatal Pediatrics	1980
Western Society for Pediatric Research	1984
Society of Critical Care Medicine	1985
American Institute of Ultrasound in Medicine	1985
New Mexico Pediatric Society	1986
Society for Pediatric Research	1988
Greater Albuquerque Medical Association	1989
European Society for Pediatric Research	1990
Academy of Radio and Television Health Commentators	1992
American Telemedicine Association	1996
American Medical Informatics Association	1996
Association of Telemedicine Service Providers	1997
International Association of Medical Science Educators	2002
Center for Telemedicine and e-Health Law	2000

PROFESSIONAL SOCIETIES (continued):

Society for Simulation in Healthcare	2005
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HONORS

Alpha Omega Alpha University of Michigan Medical School Chapter	1973
Galens Honorary Medical Society University of Michigan Medical School	1972
The Lange Award	1974
Teacher of the Year Award The University of New Mexico Department of Pediatrics	1987
The Glenn T. Peake GCRC Clinical Investigator Award	1988
Awarded Tenure on Faculty, University of New Mexico	1988
Distinguished Achievement Award American Heart Association, New Mexico Affiliate	1992
Outstanding Media Person, New Mexico Hospital Association	1993
University of New Mexico Regents' Professorship Award	1994-97
UNM HSC Vice Presidents Partnership Award	1999
Honorary Professor, Universidad Tecnologica Equinoccial Quito, Ecuador	2004
UNM International Excellence Award	2005

Educational Activities:**1. Medical Students**

- a. MS-1:
 - i. Primary Care Curriculum Circuit Rider, Phase I-B (MS-1)
 - ii. Lecture to MS-1 class/Clinical Correlation- Biochemistry on Acid-Base Balance
- b. MS-2:

Primary Care Curriculum Tutor, Phase II (MS-2) Cardiovascular, Pulmonary, Renal Block
- c. MS-3:

Preceptor, Department of Pediatrics, MS-3 Pediatric Rotation
- d. MS-4:

Clinical teacher, Neonatology Rotation Elective, MS-4
- e. MS 2-4: Research Mentor, Claire Gogal (Class of 2003), *"A Pilot Study: Impact of Video-Phone Technology on the Emotional Well-Being of Pediatric Oncology Patients Who are Separated from Their Families"*
- f. MS 3-4: Research Mentor, Rex Baker (Class of 2004), *"Project TOUCH: Reification of Abstract Concepts as They Apply to Medical Education"*
- g. MS 2-4: Research Mentor, Matthew Starr
- h. MS 2-4: Research Mentor, Tropha Wright
- i. MS 2-4: Research Mentor, Erika Mendoza, Kevin Henry, Mai-Jing Liu

Educational Activities (cont.):**1. Medical Students (continued)**

- j. MS1-4: Research Mentor, Fatima Gutierrez and Jennifer Pierce
- k. MS1-4 Research Mentor: Summer Nguyen

2. Resident/Graduate Students-Fellows**a. Residents**

- i. Attending teaching/training Pediatric, OB/Gyn, Emergency Medicine, Anesthesia residents while on Neonatology Service, both on teaching rounds and via neonatology core curriculum lectures
- ii. Presenter at Pediatric Grand Rounds and other pediatric core didactic lecture
- iii. Lecturer and participant at weekly Perinatal Grand Rounds
- iv. Preceptor for several Pediatric Residents throughout their pediatric residency training

b. Fellows

- i. Attending teaching/training Neonatology Fellows:
 - 1. Kristi Watterberg, M.D. - 1983 - 1985
 - 2. Sydney Swetnam, M.D. - 1984 - 1987
 - 3. Cristina Carballo, M.D. - 1986-1988
 - 4. Lyn Peterson, M.D. - 1987-1989
 - 5. Mary Armon, M.D. - 1988-1990
 - 6. Randall Nederhoff, M.D. - 1990-1993
 - 7. Carol Kennon, M.D. - 1991-1994
 - 8. Pam Gewinner, M.D. - 1992 - 1995
 - 9. Ned McNamara, M.D. - 1993 - 1996
 - 10. Connie Anderson, M.D.- 1999- 2002
 - 11. Kate Stanley, M.D.- 2000-2003
 - 12. Rebecca Moran, M.D.- 2001-2004
 - 13. Erika Fernandez, M.D.- 2001-2004
 - 14. Scott Snyder, M.D.- 2002-2005
 - 15. Rossana Chang, M.D.- 2002-2005
 - 16. Christina Chamberlain, MD 2004-2006
 - 17. Robin Broz, DO, 2005-2006
- ii. Lecturer: Fetal Physiology Seminars
- iii. Presenter and participant at monthly Neonatology Journal Club

3. Postgraduate/Continuing Medical Education

- a. Guest Lecturer , University of Heidelberg and the Fraunhofer Institute, Germany, 1988
- b. Guest Lecturer, Riks Hospitalit, Oslo, Norway, 1988
- c. Voluntary recertification in Pediatrics and Neonatal-Perinatal Medicine, American Board of Pediatrics-May 19, 1989
- d. Guest Lecturer. Southwest Research institute, San Antonio, Tx, 1990
- e. Guest lecturer, Cardiovascular Institute, Chinese Academy of Medical Sciences, Beijing, China ,Oct 1990
- f. Guest Lecturer, Hospital University of Pennsylvania and Children's Hospital of Philadelphia, Philadelphia, PA 1990
- g. Outreach Education Presentations on behalf of the Division of Neonatology in Las Cruces, Roswell, Clovis, Gallup PHS, Albuquerque Lovelace Medical Center, Presbyterian Hospital, and Saint Joseph Hospital

Educational activities Allied Health/Public/Miscellaneous (continued):

4. Allied Health/Public/Miscellaneous

- a. Allied Health
 - i. Lecturer for Respiratory Therapist Course at TVI on Mechanical Ventilation and RDS in the Newborn
 - ii. Teacher and Trainer of Neonatal Nurse Practitioners at UNM via didactic lectures and teaching rounds on the Neonatology Clinical Service
 - iii. Lecturer for general nursing regarding newborn care at the "Amazing Newborn" annual conference
 - iv. Lecturer at the National Association of Neonatal Nurses Annual Conference, Orlando FLA., 1993
- b. Public
 - i. Health Commentator NBC affiliate, KOB-TV, nightly news-"For Your Health"
 - ii. Lay public presentations on Heart Disease and Cardiovascular Research on behalf of the American Heart Association
 - iii. Lay public presentations on Health Care Reform for Eastern New Mexico Medical Center Foundation, Roswell, NM and the League of Women Voters, Albuquerque, NM
 - iv. Lay public presentations on neonatal-perinatal care issues on behalf of the March of Dimes
 - v. Preceptor for lay internship program Greater Albuquerque Medical Association
 - vi. Presenter on Neonatology at the National Court Reporters Association National and local Meetings
 - vii. Preceptor for APS high school students; Career Enrichment Center Medical Internship Program

INVITED EDUCATIONAL LECTURES AND PRESENTATIONS:

Alverson DC, "Reyes Syndrome" Topics on Neurosurgery and Neuroanesthesia- A Broad Based Seminar. Marquette, Michigan.	1978
Alverson DC, Neonatal Asphyxia and Resuscitation" Third Annual Spring Perinatal Days. Co-sponsored by Northeastern Perinatal Center, Green Bay, Wisconsin and Continuing Medical Education Program, Escanaba, Michigan.	1979
Alverson DC, "Developing a Multi-Disciplinary Cystic Fibrosis Clinics" in the Upper Peninsula" Seminar on Cystic Fibrosis Marquette, Michigan.	1979
Alverson DC, "Cardiac Output Measurements" Fourth Annual Pediatric Cardio-Pulmonary Update Albuquerque, New Mexico.	1982
Alverson DC, "Noninvasive Measurement of Cardiac Output in the Newborn" Perinatology/Neonatology Ann Arbor, Michigan.	1982
Alverson DC, "Neonatal Resuscitation" and "Newer Ventilatory Modalities" Fifth Annual Pediatric Cardio-Pulmonary Update Albuquerque, New Mexico.	1983
Alverson DC, "Lasix and the Immature Neonate" Sixth Annual Pediatric Cardio-Pulmonary Update Albuquerque, New Mexico.	1984
Alverson DC, "Noninvasive Cardiac Output Monitoring" Panel on "Shock in the Infant and Young Child" 13th Annual Critical Care Medicine Symposium San Francisco, CA.	1984
Alverson DC, "Concepts and Controversies in Perinatal Care" Program Director Albuquerque, New Mexico.	1984
Boros S, and Alverson DC: "Mechanical Ventilation in Pediatrics Newer Techniques" 7th Annual Pediatric Cardio-Pulmonary Update Albuquerque, New Mexico.	1985
Alverson DC, "Concepts and Controversies in Perinatal Care" Program Co-director Albuquerque, New Mexico.	1985

INVITED EDUCATIONAL LECTURES AND PRESENTATIONS(continued):

Alverson DC, "Concepts and Controversies in Perinatal Care" Program Co-director Albuquerque, New Mexico.	1986
Alverson DC, "Surfactant Replacement Therapy in RDS" 10th Annual Pediatric Cardiopulmonary Update Albuquerque, New Mexico.	1988
Alverson DC, "High Frequency Ventilation" Birth, Babies & High Technology Stockton, California.	1988
Alverson DC, "Noninvasive Measurement of Oxygen Delivery" Birth, Babies & High Technology Stockton, California.	1988
Alverson DC, "Oxygen Utilization: review of unique aspects of oxygen delivery mechanisms in neonates" Neonatal Hematology: An In Depth Review and Update for Neonatologists Washington, DC.	1989
Alverson DC, "Effect of Transfusion on Oxygen Utilization." Neonatal Hematology: An In Depth Review and Update for Neonatologists. Washington, DC.	1989
Alverson DC, "Problems Associated with the Preterm Neonate: issues in the neonatal period." Concepts and Controversies in Perinatal Care Albuquerque, New Mexico.	1989
Alverson DC, "Jet Ventilation - a Worthwhile Technique?" Fifth Annual Balloon Fiesta Lung Disease Conference Pulmonary Emergencies from Infancy to Adulthood Albuquerque, NM.	1989
Alverson DC, "High Frequency (JET) Ventilation Panacea or Fancy 12th Annual Pediatric Cardiopulmonary Update, Albuquerque, NM.	1990
Alverson DC, "Update on High Frequency Ventilation and ECMO" Perinatal Care: The Present and the Future Albuquerque, New Mexico.	1990
Alverson DC, "Doppler Derivation of Cardiac Output in Neonates & Infants", Laser Doppler Derivation of Blood Flow" "Computer Applications to Doppler Derivation of Blood Flow and Hemodynamics" Guest lecturer at Cardiovascular Institute and Fu Wai Hospital, Chinese Academy of Medical Sciences Beijing, China.	1990

INVITED EDUCATIONAL LECTURES AND PRESENTATIONS(continued):

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| Harris TR, Alverson DC: "Pulmonary Causes for Neonatal Respiratory Distress Other than IRDS: Case Studies"
Fourteenth Annual Pediatric Cardio-Pulmonary Update,
Albuquerque, NM. | 1992 |
| Alverson DC, "Health Care in the United States – Are we in a crisis?"
League of Women Voters of Albuquerque/Bernalillo County
Albuquerque, NM. | 1992 |
| Alverson DC, "Transfusion in the Neonatal Intensive Care Unit: Efficacy of Blood Replacement Therapy",
Transfusion Medicine
Albuquerque, NM. | 1992 |
| Alverson DC, Armenta L, Gibson J, Harris J, Joralemon G:
"Ethics at the Beginning of Life"-Panel.
The Dorothy Turner Memorial Seminar
Albuquerque, NM. | 1992 |
| Alverson DC, "Status of Erythropoietin Treatment"
Current Concepts and Controversies in Perinatal Care
Albuquerque, NM. | 1992 |
| Alverson DC, "Neonatal (Oxygen) "Deliverance"/Determination of Neonatal Cardiac Output"
Ninth National Meeting, National Association of Neonatal Nurses
Orlando, FL. | 1993 |
| Alverson DC, "Trauma to the Trauma Center: How Do We Survive?"
Seventh Annual Trauma Conference
Las Cruces, NM. | 1993 |
| Alverson DC, "Cost Effective Approach to the Timing of Neonatal Brain Injury"
California Perinatal Association 1994 Annual Conference
Perinatology/Neonatology 2000: The Future is Now!
Monterey, CA | 1994 |
| Alverson DC, "Decision-making for Pediatric Transfusions"
Lovelace Child Health Lecture Series
Albuquerque, NM | 1994 |
| Alverson DC, "Evolving Roles and Preparation of Advanced Practice Nurses: Collaboration for Success-Panelist representing the Media's Perspective"
Albuquerque, NM | 1994 |

INVITED EDUCATIONAL LECTURES AND PRESENTATIONS(continued):

Alverson DC, "Media and Violence: A Reporter's View" Fourth Annual Symposium of the Biomedical Ethics Committee "Language, Gender and Violence- Their Influence on Health Care" Albuquerque, NM.	1994
Alverson DC, "Epidemiology of Pediatric Injury in New Mexico" Trauma Update 1994 Albuquerque, NM	1994
Alverson DC, "To Transfuse or Not to Transfuse, That is the Question!" Cardiopulmonary Update 1995, Albuquerque, NM. April 7, 1995	1995
Alverson DC, "Innovations in Neonatology" Concepts and Controversies in Perinatal Care-1995, UNM, Sept 29-30, 1995	1995
Alverson DC, "Men's Health Care", Women's Professional Organization, Public Service Company of New Mexico, Albuquerque, NM November 16, 1995	1995
Alverson DC, "Innovations in Neonatology" Regional IHS Pediatric and Obstetrics Annual Conference, Albuquerque, NM January, 1996	1996
Alverson DC, "New Mexico Health care Crisis? - Rural Health Issues" New Mexico Rural Development Council Conference, Las Vegas, NM, June 1996	1996
Alverson DC, "Respiratory Care Innovations in Neonatology", NMSRC Annual Conference, August, 1996	1996
Alverson DC, "Telemedicine:Virtual Hands Across the Firewalls" Federal Provider Credentialing Conference, Albuquerque, NM, September 1996	1996
Alverson DC, "Telemedicine in Rural New Mexico and Its Role in Perinatal Care", New Mexico Section ACOG Annual Ob/Gyn Update, Santa Fe, NM, February 15, 1997	1997
Alverson DC, Ramo, BW, Rubin Rich, Jadrnak J, Rogers E, "Role of the Media in Educating Patients-A Panel Discussion" AOA Student Symposium, Albuquerque, NM, April 8, 1997	1997
Alverson DC, "Developing a Telemedicine Business Plan", Panelist presenting program development In New Mexico, Tribal Healthcare 2000: Telecommunications and Telemedicine Conference and Trade Show, San Diego, CA, July 15-17, 1997	1997

INVITED EDUCATIONAL LECTURES AND PRESENTATIONS(continued):

Alverson DC, "Telemedicine in Primary Care", New Mexico Academy of Family Physicians 40th Annual Ruidoso-Family Practice Seminar, Ruidoso, NM, July 14-17, 1997	1997
Alverson DC, "Accessing Pediatric Health Care Information on the Net: Surfing with Dr. Dale." The Amazing Newborn Conference, Albuquerque, NM, November 7, 1997	1997
Alverson DC, "Telemedicine in Pediatrics and Primary Care"; Financing Telehealth at a Regional Level: Real Life Experiences-Panel". Paying for Telehealth Conference, Denver, CO, February 2, 1998	1998
Alverson DC, "Telemedicine and Legal Issues", International Academy of Trial Lawyers Conference, Vietnam, March 17, 1998	1998
Alverson DC, "New Mexico Telemedicine Network/ UNM Telemedicine Program", IHS Information Technology Conference, Albuquerque, NM July 29, 1998	1998
Alverson DC, Telemedicine: Clinical Applications. New Mexico Telemedicine Network Conference, Albuquerque, NM , Nov. 6, 1998	1998
Alverson DC, "UNM HSC Telemedicine Program". NMHR USF Conference Albuquerque, NM, Nov. 16, 1998	1998
Alverson DC, "Telepathology and Laboratory Medicine". New Mexico Society for Clinical Laboratory Science Annual Meeting, Albuquerque, NM, March 26, 1999	1999
Alverson DC, "Telemedicine from a Doctor's Point of View" NMHR USF Conference, Albuquerque, NM, April 12, 1999	1999
Alverson DC, "Telemedicine in Alamogordo" Alamogordo Rotary Club, Alamogordo, NM, April 14, 1999	1999
Alverson DC, "Telemedicine Business Planning Review" NMTN Annual Conference, Albuquerque, NM, Sept 13, 1999	1999
Alverson DC, "NMTN Overview and Tour" ATSP Annual Conference, Albuquerque, NM, Sept 14-17, 1999	1999
Alverson DC, "Telehealth, From Mars and Beyond" ATSP Annual Conference, Albuquerque, NM, Sept 14-17, 1999	1999

INVITED EDUCATIONAL LECTURES AND PRESENTATIONS(continued):

Alverson, DC, "US West Business Planning Tool Assessment" ATSP Annual Conference, Albuquerque, NM, Sept 14-17, 1999	1999
Alverson DC, "Telemedicine from a Directors Perspective" Panel Discussion Moderator on Barriers to Utilization ATSP Annual Conference, Albuquerque, NM, Sept 14-17, 1999	1999
Alverson DC, "Cybercare for the Fetus and Newborn" Current Concepts and Controversies in Perinatal Care Albuquerque, NM, Sept 17, 1999	1999
Alverson, DC, "Telemedicine: What is it and what does it mean to family physicians?" American Academy of Family Physicians, New Mexico Chapter, Annual Conference Albuquerque, NM, January 23, 2000	2000
Alverson, DC, "Regulatory Issues Which Impact Telehealth/eHealth; from a Physician's Perspective" Association of Telemedicine Service Providers 2000 Minneapolis, MN, September 2000	2000
Alverson, DC, "Telemedicine 101- The Industry and Different Approaches to Program Launching" Association of Telemedicine Service Providers 2000 Minneapolis, MN, September 2000	2000
Alverson, DC, "Telemedicine: Relevance to Healthcare Delivery in Rural America" St. Alexius Telecare Network Conference, Bismarck, ND, September 2000	2000
Alverson, DC, "Telemedicine: Relevance to Healthcare Delivery in New Mexico" New Mexico Medical Group Management Association, Albuquerque, NM, September 2000	2000
Alverson, DC, "Telemedicine: Relevance to Healthcare Delivery In the 21th Century" American Association of Medical Assistants 44 th Annual Convention, Albuquerque, NM, September 2000	2000
Alverson, DC, "TOUCH project", Distributed Medical Intelligence Conference, Breckenridge, CO, March 2001	2001
Alverson, DC, "Telemedicine 101" and Teleradiology Panel, I H S Information-Technology Conference, Albuquerque, NM, July 2001	2001
Alverson, DC, "Telemedicine/Telehealth and the CyberMedicine Revolution: Relevance to Healthcare Delivery and Neonatal/Perinatal Medicine? New Mexico Association of Neonatal Nurses Conference, October, 2001	2001
Alverson, DC, "Telemedicine in New Mexico: Where we're at and where we're headed" New Mexico Home Health Care Conference, Albuquerque, NM, November, 2001	2001

INVITED EDUCATIONAL LECTURES AND PRESENTATIONS(continued):

Alverson DC, Caudell TP, "Introduction to the Access Grid" Adventures in Super Computing Challenge Winter Workshop, UNM HPCERC, Albuquerque, NM, January 30, 2002	2002
Alverson, DC, "Telemedicine in New Mexico: Where we're at and where we're headed" TVI Health Professions Career Day, Albuquerque, NM, March 5, 2002	2002
Alverson, DC, "The CyberMedicine Revolution: Relevance to Healthcare Delivery of the Future. Where are We Going?", Inland Northwest Health Services Telehealth Conference, Spokane, WA, March 20, 2002	2002
Alverson, DC," Telehealth: The Next Generation of Healthcare Delivery", New Mexico Biotechnology and Biomedical Association Conference, Santa Fe, NM, April 9, 2002	2002
Alverson, DC," The Future of the Telehealth System: The Next Generation of Healthcare Delivery", New Mexico Hospital Association of Medical Auxiliaries District III, Roswell, NM, April 13, 2002	2002
Alverson, DC, "Project TOUCH: (Telehealth Outreach for Unified Community Health) Incorporating new technologies into medical education and training", NASA/MITAC Just-in-Time Education Workshop, Virginia Commonwealth University, Richmond, VA, May 13-14, 2002	2002
Alverson DC, "The Future of the Telehealth System: The Next Generation of Healthcare Delivery", New Mexico Telemedicine Conference sponsored by ABBA, Albuquerque, NM, May 17, 2002	2002
Alverson DC, Harrison J, "Hot Topics: New Mexico Health Care Issues", The 2002 Economic Vitality Summit, Tamaya Resort, New Mexico, August 20, 2002	2002
Shannon, S, Alverson, DC, "Roundtable: Partnering For Access Through Telehealth Technology", 28 th Annual Conference, National Association for Rural Mental Health, Santa Fe, NM, August 28, 2002	2002
Alverson DC, Caudell TC, "Telehealth" UNLV High Performance Computing Site Visit, UNM HPCERC, Albuquerque, NM, October 10, 2002	2002
Chilton L, Alverson DC, "The Media in Child Advocacy" New Mexico Pediatric Society Fall Meeting Socorro, NM, October 13, 2002	2002

INVITED EDUCATIONAL LECTURES AND PRESENTATIONS(continued):

Alverson DC, "Supercomputing in Your Future; From Here to the Cosmos! The CyberMedicine Revolution" 2002-2003 Adventures in Super Computing Challenge, Glorietta, NM, October 21, 2002	2002
Alverson DC, Saiki S, "Project TOUCH" (Telehealth Outreach for Unified Community Health) 2002 AAMC Annual Meeting San Francisco, CA, November 10-11, 2002	2002
Alverson DC, "Project TOUCH: Internet2 Based Integration Of Advanced Technologies for Distributed Medical Education" Internet2 Day, University of New Mexico, March 28, 2003	2003
Alverson DC, Joseph S, "Public health and the Media" 2003 RAMBO Sevilleta Conference Sevietta, NM, April 22, 2003	2003
Alverson DC, "A State Model for Telehealth" iNnovations: Exploring Internet-based Healthcare Communications Arkansas Foundation for Medical Care Taos, NM, May 15, 2003	2003
Alverson DC, "The Virtual Collaborative Clinic, Mission To Mars, Virtual reality in Outer Space" Symposium on Distributed Interactive Virtual Environments University of Western Australia Interactive Virtual Environments Centre Perth, Australia, May 27, 2003	2003
Alverson DC, Caudell TP, "Project TOUCH- A Virtual Tele-Environment for Integrated Telehealth Applications" Symposium on Distributed Interactive Virtual Environments University of Western Australia Interactive Virtual Environments Centre Perth, Australia, May 28, 2003	2003
Alverson DC, "Future of Telehealth: Next Generation of Healthcare Delivery-A Solution to Access?" Perinatal Grand Rounds, King Edwards Memorial Hospital Perth, Australia, June 6, 2003	2003
Alverson DC, Pullara F, "Telemedicine: Virtual Health Outreach And Education Using Information Technologies and Telehealth" Making it Happen Inside and Out: Corrections, Public Health and Community Conference, Albuquerque, NM June 11, 2003	2003
Alverson DC, "Flying High and Fast: High Frequency Jet Ventilation", New Mexico Association of Neonatal Nurses Annual Meeting 2003, Albuquerque, NM, October 2003	2003

INVITED EDUCATIONAL LECTURES AND PRESENTATIONS(continued):

Alverson DC, "The Application of Telemedicine in Rural Communities and the Challenges to Health Issues in New Mexico". Ibero-American Science & Technology Education Consortium, NM IT Challenge, Albuquerque, NM, November 6-7, 2003	2003
Alverson DC, "The Application of Telemedicine in Rural Communities and the Challenges to Health Issues in New Mexico and Latin America". Ibero-American Science & Technology Education Consortium, First ISTEC International Telemedicine Meeting, Santa Cruz, Bolivia, December 3-5, 2003	2003
Alverson DC, Speedie S, Effective Management Techniques In the Distance Learning Environment. In Telehealth: The Time Has Come, 9 th Annual OAT Grantee Meeting, Bethesda, MD, January 11-14, 2004	2004
Alverson, DC, "Distributed Interactive Virtual Environments for Collaborative Experiential Learning and Training Independent of Distance over Internet2 ", 4 th Annual International Meeting on Medical Simulation, Hyatt Tamaya Resort, NM, January 17, 2004	2004
Alverson DC, Shannon S, Prill A, Sullivan E, Effertz G, Preston A, Beffort S: Forming a State-Wide Telehealth Alliance in New Mexico: A Network of Networks Model. Alaska Telehealth Advisory Council, Anchorage, Alaska, March3, 2004	2004
Alverson DC, Shannon S, Prill A, Sullivan E, Effertz G, Preston A, Beffort S: Forming a State-Wide Telehealth Alliance in New Mexico: A Network of Networks Model. New Mexico Medical Directors Meeting, Albuquerque, March 11, NM 2004	2004
Alverson DC, Shannon S, Prill A, Sullivan E, Effertz G, Preston A, Beffort S: Forming a State-Wide Telehealth Alliance in New Mexico: A Network of Networks Model. Telehealth Leadership Conference, Arlington, VA, March 16, 2004	2004
Alverson DC. Healthcare and Health Education in Cyberspace: Using Information Technologies and Telehealth to Alleviate Healthcare Access and Knowledge Disparities. The Snyder Lecture, Info Fair 2004 Spencer S. Eccles Health Sciences Library, University of Utah, Salt Lake City, March 23, 2004	2004
Alverson DC, "The Application of Telemedicine in Rural Communities and the Challenges to Health Issues in New Mexico and Latin America". Universidad de Carabobo, Valencia, Venezuela, April 26, 2004	2004
Alverson DC. Project TOUCH. Reacciun2 Conference, Centro Nacional de Tecnologia de Information, Caracas, Venezuela, April 29-30, 2004	2004

INVITED EDUCATIONAL LECTURES AND PRESENTATIONS(continued):

Alverson DC (as part of panel) Advanced Initiatives in Medical Simulation; State of the Science: Researcher Panel. Advanced Initiatives in Medical Simulation Conference. Silver Spring, MD, May 10-11, 2004	2004
Alverson DC. Proyecto TOUCH: Simulacion Realidad Virtual Interactivo Distribuido Independiente a Distancia via Internet2 para el Educacion de Medicina. International Distributed Medical Intelligence Conference and American Telemedicina Association, Latin American Caribbean Chapter Conference. Mendoza, Argentina, August 1-4, 2004	2004
Alverson DC. Formacion de una Red Internacional de Redes en Telesalud y Colaboracion Virtual. International Distributed Medical Intelligence Conference and American Telemedicine Association, Latin American Caribbean Chapter Conference. Mendoza, Argentina, August 1-4, 2004	2004
Alverson DC. Sustentabilidad de Telesalud. International Distributed Medical Intelligence Conference and American Telemedicine Association, Latin American Caribbean Chapter Conference. Mendoza, Argentina, August 1-4, 2004	2004
Alverson DC. Proyecto TOUCH: Simulacion Realidad Virtual Interactivo Distribuido Independiente a Distancia via Internet2 para el Educacion de Medicina. Universidad Tecnologia Equinoccial, Quito, Ecuador, August 11, 2004	2004
Alverson DC. Formacion de una Red Internacional de Redes en Telesalud y Colaboracion Virtual. Universidad Tecnologia Equinoccial, Quito, Ecuador, August 11, 2004	2004
Alverson DC. Sustentabilidad de Telesalud. Universidad Tecnologia Equinoccial, Quito, Ecuador, August 11, 2004	2004
Alverson DC. Forming a State-Wide Telehealth Alliance in New Mexico: <i>A Network of Networks Model</i> . Nebraska Rural Health Association Conference, Kearney, Nebraska, September 10, 2004	2004
Alverson DC. The CyberMedicine Revolution Supercomputing in <u>Your</u> Future; From Here to the Cosmos!. Good Samaritan Health Systems Medical Staff Meeting, Kearney, Nebraska, September 10, 2004	2004
Alverson DC. Distributed Immersive Virtual Reality Simulation Development for Medical Education over Internet2, As part on a panel; <i>The Role and Value of Advanced Networking in Teaching and Learning</i> . Fall Internet2 Membership Conference Austin, TX, September 28, 2004	2004
Alverson DC. Cutting Edge of Telehealth. New Mexico Coalition For Health Information Leadership Initiatives. Albuquerque, NM, October 18, 2004	2004

INVITED EDUCATIONAL LECTURES AND PRESENTATIONS(continued):

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| Alverson DC. Distributed Immersive Virtual Reality Simulation Development for Medical Education over I2. West-Midwest APC/PDAS Regional meeting. Santa Fe, NM, October 28, 2004 | 2004 |
| Alverson DC. Formation of an International Network of Networks for Telehealth and Virtual Collaboration AIRDS, Albuquerque, NM, November 10, 2004 | 2004 |
| Alverson DC. Formación de una Red Internacional de Redes en Telesalud y Colaboración Virtual.and Proyecto TOUCH: Simulación Realidad Virtual Interactivo Distribuido Independiente a Distancia via Internet2 para el Educacion de Medicina. ISTECH XIV General Assembly/ISTECH Salud Reunion, University of South FloridaSF, Tampa, FLA, December 1-2, 2004 | 2004 |
| Alverson DC. Cutting Edge of Telehealth, Forming a State-Wide Telehealth Alliance in New Mexico: <i>A Network of Networks Model</i> NM Bar Conference, Technology, e-Commerce and the Practice of Law: A 2005 Update, April 8, 2005 | 2005 |
| Alverson DC. New Mexico Telehealth: Past, Present and Future The New Mexico Telehealth Alliance Spring Conference, Albuquerque, NM, May 5, 2005 | 2005 |
| Alverson DC: JCAHO and Telehealth. Telehealth Leadership Conference, Washington DC, June 6-8, 2005 | 2005 |
| Alverson DC: Formation of an International Network of Networks for Telehealth and Virtual Collaboration. Telehealth Leadership Conference, Washington DC, June 6-8, 2005 | 2005 |
| Alverson DC: New Mexico Telehealth: Forming a State-Wide Telehealth Alliance in New Mexico: <i>A Network of Networks Model</i> University of New Mexico Knowledge management Information Technology Advisory Committee, June 15, 2005 | 2005 |
| Alverson, DC. Advanced Technologies for Training: DISTRIBUTED IMMERSIVE VIRTUAL REALITY SIMULATION Defense Nuclear Weapons School Workshop, Kirtland AFB, Albuquerque, NM, June 28, 2005 | 2005 |
| Alverson DC. Proyecto TOUCH: Simulación Realidad Virtual Interactivo Distribuido Independiente a Distancia via Internet2 para el Educacion de Medicina. Universidad Tecnologica Equinoccial, School of Medicine, Quito, Ecuador, July 6, 2005 | 2005 |
| Alverson DC. Formation of an International Network of Networks for Telehealth and Virtual Collaboration. Pan American Health Organization, WHO Collaborating Center for Partnerships in Health. Albuquerque, NM, August 2005 | 2005 |
| Alverson DC. <i>Respiratory Therapy Training in Cyberspace: Serious Games</i> . New Mexico Society for Respiratory Care Annual meeting 2005, Albuquerque, NM, August 30, 2005 | 2005 |

INVITED EDUCATIONAL LECTURES AND PRESENTATIONS (continued):

Alverson DC (Panel Moderator), Heil W, Clyburn C. Alternative Perspectives: <i>Thinking Outside the Box</i> . ATA Technology Summit, Palm Springs, CA, September 13, 2005	2005
Alverson DC: Healthcare and Health Education in <i>Cyberspace</i> Society for the Technological Advancement of Reporting Albuquerque, NM, October, 2005	2005
Alverson DC. Telehealth: Healthcare and Health Education in Cyberspace-Using Information Technologies and Telehealth to Alleviate Healthcare Access and Knowledge Disparities. Association of Health Facility Survey Agencies 35th Annual Training Conference, Albuquerque, NM, October, 2005	2005
Alverson DC. New Mexico Telehealth; Forming a State-Wide Telehealth Alliance in New Mexico -A Network of Networks Model: The Potential for Children's Telehealth Services. UNM Pediatric Grand Rounds. October, 2005	2005
Alverson DC. New Mexico Telehealth: Forming a State-Wide Telehealth Alliance in New Mexico: A Network of Networks Model- What we must do now! Hispano/Latino Health Summit, Albuquerque, NM October 2005	2005
Alverson, DC. New Mexico Telehealth: Forming a State-Wide Telehealth Alliance in New Mexico: A Network of Networks Model- What we must do now! New Mexico Homecare and Hospice Association Annual conference, Albuquerque, NM, October, 2005	2005
Alverson DC. Four Corners Telehealth Consortium. Four Corners Public Health Consortium Annual Conference, Durango, CO, October 2005	2005
Alverson, DC. New Mexico Telehealth; Forming a State-Wide Telehealth Alliance in New Mexico - A Network of Networks Model Colorado Telehealth Symposium, Denver, CO, November, 2005	2005
Alverson, DC. Advanced Technologies for Training: DISTRIBUTED IMMERSIVE VIRTUAL REALITY SIMULATION UNM EEC lecture series, November, 2005	2005
Alverson DC. New Mexico Telehealth; Forming a State-Wide Telehealth Alliance in New Mexico - A Network of Networks Model UNM Medical Informatics Lecture series, November, 2005	2005
Alverson, DC. Advanced Technologies for Training: DISTRIBUTED IMMERSIVE VIRTUAL REALITY SIMULATION UC Davis Medical Informatics lecture series, November, 2005	2005
Alverson, DC, Un Paradigma Emergente: Telesalud e ISTECS Salud Formacion de un Red de Redes Internacional <i>para</i> Telesalud and Colaboración Virtual. ISTECS General Assembly XV Sao Paulo, Brasil November 30, 2005	2005

INVITED EDUCATIONAL LECTURES AND PRESENTATIONS (continued):

Alverson DC. Forming Telehealth Alliances National Telehealth Grand Rounds, Video conference from UNM December, 2005	2005
Alverson, DC. . New Mexico Telehealth; Forming a State-Wide Telehealth Alliance in New Mexico - A Network of Networks Model Potential for Pediatric Services, San Juan Regional Medical Center Medical Staff meeting, December, 2005	2005
Alverson, DC. Virtual Reality Simulation: Pediatric Simulation Technology. International Meeting on Medical Simulation, San Diego, CA, January, 2006	2006
Alverson, DC. Virtual Reality Simulation: Lessons Learned International Meeting on Medical Simulation, San Diego, CA, January, 2006	2006
Alverson DC. Mechanical Ventilation of the Newborn. TVI RT lecture series, Albuquerque, NM, February, 2006	2006
Alverson DC. Virtual Renal Physiology Model. Conference on Integrating Technology and Evidence-Based Education: A Hands-On Experience for Health Sciences Educators. Albuquerque, NM, February 2006	2006
Alverson DC. The Access Grid Demonstration. Conference on Integrating Technology and Evidence-Based Education: A Hands-On Experience for Health Sciences Educators. Albuquerque, NM, February 2006	2006
Alverson DC. New Mexico Telehealth: Forming a State-Wide Telehealth Alliance in New Mexico- A Network of Networks Model Relationship to Diffusion of Innovations Theory. UNM Communications and Journalism Class, March 2006	2006
Alverson DC. Distributed Virtual Reality Simulation: "Serious Games" in Cyberspace. Telehealth Leadership Conference, Washington DC, March 2006	2006
Alverson DC. Emerging Paradigms: Formation of an International Network of Networks for Telehealth and Virtual Collaboration. UNM School of Medicine International Forum, Albuquerque, NM, March 2006	2006
Alverson DC. Implications of New Technology in the Practice of Medicine: Forming Telehealth Alliances; A Network of Networks Model. Federation of State Medical Boards Annual Conference, Boston, MA, April 2006	2006

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March 2007

Education

- 1982 Ph.D., Georgia Institute of Technology; School of Information and Computer Sciences; Advisor, Richard LeBlanc; "Language Features for Fully Distributed Processing Systems"
- 1980 M.S., Georgia Institute of Technology; Information and Computer Sciences; Advisor, Shannon Brunjes/William Underwood.
- 1977 B.S. (with distinction), University of Arizona; Mathematics

Employment

- present–2007 Chief Information Officer (Interim), University of New Mexico, Albuquerque, New Mexico.
- present–2006 Professor of Computer Science, University of New Mexico, Albuquerque, New Mexico.
- 2007–2004 Director, UNM Center for High Performance Computing University of New Mexico, Albuquerque, New Mexico.
- 2006–1993 Associate Professor of Computer Science, University of New Mexico, Albuquerque, New Mexico.
- 1993 Faculty Sabbatical, Massively Parallel Computing Research Laboratory, Sandia National Laboratories, Albuquerque, New Mexico.
- 1993–1982 Assistant Professor of Computer Science, University of New Mexico, Albuquerque, New Mexico.
- 1981 Teaching Assistant, School of Information and Computer Science, Georgia Institute of Technology, Atlanta, Georgia.
- 1982–1980 Research Assistant, the Research Program in Fully Distributed Processing Systems, School of Information and Computer Science, Georgia Institute of Technology, Atlanta, Georgia.
- 1979–1978 Operations Supervisor, Computer Science Laboratory, School of Information and Computer Science, Georgia Institute of Technology, Atlanta, Georgia.
- 1997–1974 Tutor, Department of Mathematics, University of Arizona, Tucson, Arizona.

Honors

- 2006 School of Engineering Senior Research Award
- 1997 School of Engineering Senior Teaching Award.
- 1996 College of Engineering Student's Faculty Recognition Award.

- 1992–1989 Halliburton Lecturer, University of New Mexico, College of Engineering.
- 1991 College of Engineering Student's Faculty Recognition Award.
- 1977 NIH/NLM Biomedical Trainee, Georgia Institute of Technology.

Professional Activities

- present–2002 Chair, Technical committee for FAST-OS (Forum to Address Scalable Technology for runtime and Operating Systems), a DoE Office of Science initiative to establish a research program for highly scalable operating systems.
- 2006–2002 Member, External Review Committee for LANL's CCN (Computing, Communications, and Networking) Division.
- 2006, 2005, 2002 Member, External Review Committee for Sandia's CCIM (Computers, Computation, Information, and Mathematics) Center.
- 2006 Organizer, FAST-OS PI Meeting (May 20&30, Boston, MA).
- 2006 Technical Program Committee, Supercomputing.
- 2006, 2005, 2004 Organizer, FAST-OS Birds of a Feather meeting at Supercomputing.
- 2006 Workshop co-chair, HiperIO, IEEE International Conference on Cluster Computing.
- 2006, 2005 Program Committee, IEEE International Conference on Cluster Computing.
- 2006, 2005 Steering Committee Member, Linux Cluster Institute International Conference on Cluster Computing, the HPC Revolution.
- 2005–2001 Organizing Committee, LACSI Symposium.
- 2005, 2004 co-Organized (along with Jeanine Cook from NMSU, Lorie Liebrock from NMT, and Pat Teller from UTEP), High-end Computing Along the Rio Grande Booth at Supercomputing.
- 2005 Organizer, FAST-OS PI Meeting (June 9&10, Washington, D.C.).
- 2005–2003 Local arrangements chair, LACSI (Los Alamos Computer Science Institute) Symposium.
- 2004–2005 Member, UNM Research Cabinet.
- 2005 Member, UNM IT Cabinet.
- 2005 Member UNM Next Generation Media Initiative Steering Committee.
- 2004 Workshop chair for High Speed Local Networks Workshop at IEEE Local Computer Networks Conference.
- 2004 Tutorial co-Chair and Program Committee Member, Linux Cluster Institute International Conference on Cluster Computing, the HPC Revolution.
- 2003 Publicity Chair, IEEE International Conference on Cluster Computing.
- 2003 Organizer, FAST-OS (Forum to Address Scalable Technology for runtime and Operating Systems) Workshop (July 9&10, Washington, D.C.).
- 2003 Program Committee Member, Linux Cluster Institute International Conference on Cluster Computing, the HPC Revolution.

- 2002 Organizer, FAST-OS (Forum to Address Scalable Technology for runtime and Operating Systems) Workshop (July 9&10, Chicago, IL.).
- 2000 Organizer and presenter, Tutorial on Design and Analysis of High Performance Clusters for Supercomputing.
- 200–1996 Consulting with Micron Communications, Inc. to develop practical cryptographic protocols for RF based smart cards.
- 2000–1992 Develop, maintain, and enhance tkisem, a free software package that emulates the SPARC processor for instructional purposes.
- 1998 co-Editor (with Steve Chapin), special issue of *Software: Practice and Experience* on Parallel and Distributed Operating Systems.
- 1997 co-Editor (with Steve Chapin), special issue of *IEEE Concurrency: Parallel, Distributed and Mobile Computing* on Parallel and Distributed Operating Systems.
- 1997, 1996 University of New Mexico Athletic Council.
- 1996 co-Organizer (with Steve Chapin), Mini-track on Parallel and Distributed Operating Systems for HICSS (Hawaii International Conference on Systems Sciences).
- 1993 Member, MPI (Message Passing Interface) Forum.
- 1992, 1991 co-Chair for the State of New Mexico Commission on Articulation in Computer Science.
- 1992 co-Organizer (with Bill Huntelman), DOE Workshop on Future Directions in Computer Security (August 17-18, Albuquerque, NM).

Ph.D. Dissertations Supervised

- 2005 Patricia Gilfeather, "Splintering Commodity Network Protocols in High-Performance Computing."
- 2004 Jared Dreicer, "High Performance Computing Spare Replacement Hardware Fault Tolerance."
- 2002 Rolf Riesen, "Message-Based, Error-Correcting Protocols for Scalable High-Performance Networks."
- 2001 Chu Jong, "Scalability Issues in the Development of Tools for Massively Parallel Systems."
- 1997 Philip L. Campbell, "Using Execution Discipline to Accelerate Computer Programs."
- 1996 Francisco R. Reverbel, "Persistence in Distributed Object Systems: ORB/ODBMS Integration."
- 1994 Ksheerabdh Krishna, "Representing and Extracting Program Dependences."
- 1992 Stephen R. Wheat, "A Fine Grained Data Migration Approach to Application Load Balancing on MP MIMD Machines."

M.S. Theses Supervised

- 2005 Galen Shipman, "Infiniband Scalability in Open MPI."
- 2004 Satish Sambasivan, "Design and Implementation of a Trouble Ticketing System."

- 2003 Sean Brennan, "Distributed Sensor Network Software Development Testing Through Simulation."
- 2003 Edgar Leon, "An MPI Tool to Measure Application Sensitivity to Variation in Communication Parameters."
- 2002 Wenbin Zhu, "OS Bypass Investigation and Experimentation."
- 2002 William Lawry, "COMB: A Portable MPI Benchmark to Assess Overlap."
- 2002 Dennis Lucero, "Transient Cplant"
- 2001 Todd Underwood, "Improving IP Performance by Offloading Fragmentation and Reassembly."

Funded Research

- 2009–2006 "A Framework for Dynamic Retasking and Redeployment Sensor Networks," Principal Investigator, US Department of Energy National Nuclear Security Agency, Amount: \$750,000.
- 2008–2005 "A Framework for Adaptable Operating and Runtime Systems," Principal Investigator, US Department of Energy Office of Science, Amount: \$750,000.
- 2007–2002 "Scalable Systems Software Research," Principal Investigator, Sandia National Laboratories, Amount: \$950,000.
- 2007–2002 "Operating System and Networking for Distributed Sensor Networks," Principal Investigator, Los Alamos National Laboratory, Amount \$150,000.
- 2006–2003 "PERCS Productive, Easy-to-Use, Reliable Computing Systems," Co-Principal Investigator, DARPA/IBM, Amount: \$600,000 (no overhead).
- 2006–2002 "Los Alamos Computer Science Institute," co-Principal Investigator, Los Alamos National Laboratory, Amount \$600,000
- 2002–1996 "Continued Development of the Puma Operating System for Massively Parallel Systems," Principal Investigator, Sandia National Laboratories, Amount: \$947,000.
- 2002 "High Performance Computing Fault-Tolerance," Principal Investigator, Los Alamos National Laboratory, Amount: \$25,000.
- 2002–2001 "Benchmark for Measuring Operating System Bypass Performance," Principal Investigator, Computer Science Research Institute, Sandia National Laboratories, Amount: \$43,000.
- 1995–1993 "Library Support for SUNMOS/PUMA," Principal investigator, Sandia National Laboratories, Amount: \$215,197.
- 1993–1992 "Thread Annotations with Dataflow Semantics," Principal Investigator, Sandia National Laboratories, Amount: \$63,000.
- 1993–1991 "Library Support for SUNMOS," Principal investigator, Sandia National Laboratories, Amount: \$26,000.
- 1992–1991 "The Current Status of SUNMOS," Principal investigator, Sandia National Laboratories, Amount: \$13,000.

- 1992–1991 “Leveled Monitoring.” Principal Investigator, Los Alamos National Laboratory, Amount: \$50,000.
- 1992–1991 “Leveled Monitoring and Analysis in Local Area Networks.” Principal Investigator, National Security Agency, Amount: \$57,000.
- 1991–1990 “Leveled Monitoring.” Principal Investigator, Los Alamos National Laboratory, Amount: \$50,000.
- 1990–1989 “Leveled monitoring in Intrusion Detection Systems.” Principal Investigator, Los Alamos National Laboratory, Amount: \$20,000.
- 1989 “Imperative Languages for the eps ‘88 Architecture,” Co-Principal Investigator, Sandia National Laboratories, Amount: \$20,000.
- 1985 “A Distributed Implementation of P&NS,” Principal Investigator, Sandia University Research Program, Amount: \$30,000.
- 1985 “Identification of Parallelism in Existing Software,” Principal Investigator, Sandia National Laboratories, Amount: \$14,112.
- 1985 “Micro Electronic Process Development,” Co-Principal Investigator, Sandia National Laboratories, Amount: \$64,843.
- 1984 “Introducing Protocol Specifications into Pronet,” Principal Investigator, Sandia University Research Program, Amount: \$30,000.

Book

Computer Systems: Architecture, Organization, and Programming, Richard Irwin, Inc (now McGraw-Hill), 1993.

Referred Journal Publications

- R. Brightwell, W. Camp, B. Cole, E. DeBenedictis, R. Leland, J. Tomkins, and A. B. Maccabe, “Architectural specification for massively parallel computers: An experience and measurement-based approach,” **Concurrency and Computation: Practice and Experience**, Special Issue: Performance Issues in Computer Architecture and Design, 17(10):1271–1316, August 2005.
- Angela M. Mielke, Sean M. Brennan, Mark C. Smith, David C. Torney, Arthur B. Maccabe, and Josh F. Karlin. Independent sensor networks. **IEEE Instrumentation and Measurement**, June 2005.
- S. Brennan, A. M. Mielke, D. C. Torney and A. B. Maccabe, “Radiation Detection with Distributed Sensor Networks,” **IEEE Computer**, 37(8), August 2004, pages 57–59.
- R Brightwell, A. B. Maccabe, R. Riesen, “Design, Implementation, and Performance of MPI on Portals 3.0,” **International Journal of High Performance Computing Applications**, Volume 17, Number 1, Spring 2003.
- R. Brightwell, L. A. Fisk, D. S. Greenberg, T. Hudson, M. Levenhagen, R. Riesen and A. B. Maccabe, “Massively Parallel Computing Using Commodity Components,” **Parallel Computing**, vol 26, number 2–3, pages 243–266, February 2000.
- S. R. Wheat, A. B. Maccabe, R. E. Riesen, D. W. van Dresser, and T. M. Stallcup, “PUMA: An Operating System for Massively Parallel Systems,” **Journal of Scientific Programming**, vol.

3, no.4, Winter 1994, (special issue on operating system support for massively parallel systems) pp 275–288.

- J. E. Sturtevant, A. B. Maccabe and P. M. Campbell, "Performance of a particle-in-cell plasma simulation code on the BBN TC2000," *Concurrency: Practice and Experience*, Vol. 4, No. 1, 1992.

Referred Conference Publications

- G. Shipman, T. Woodall, R. Graham, A. Maccabe, P. Bridges, "Infiniband Scalability in Open MPI," to appear in *Proceedings of 2006 International Parallel and Distributed Processing Symposium (IPDPS)*, April 2006.
- P. Gilfeather and A.B. Maccabe, "Modeling Protocol Offload for Message-Oriented Communication," in *Proceedings of the IEEE International Conference on Cluster Computing (Cluster 2005)*, September 2005.
- W. Zhu, P. Bridges, and A.B. Maccabe, "Online Critical Path Profiling for Parallel Applications," in *Proceedings of the IEEE International Conference on Cluster Computing (Cluster 2005)*, September 2005.
- R. Brightwell, R. Riesen, K. Underwood, T. Hudson, P. Bridges, and A.B. Maccabe, "A Performance-Comparison of Linux and a Lightweight Kernel," *Proceedings of the IEEE International Conference on Cluster Computing (Cluster2003)*, December 2003.
- R. Brightwell, A.B. Maccabe, and R. Riesen, "On The Appropriateness of Commodity Operating Systems for Large-Scale, Balanced Computing Systems," *Proceedings of 2003 International Parallel and Distributed Processing Symposium (IPDPS)*, April 2003.
- R. Brightwell, M. Levenhagen, R. Riesen and A.B. Maccabe, "A Performance Comparison of Myrinet Protocol Stacks," *Proceedings of Third Linux Clusters Institute Conference on Linux Clusters*, October 2002.
- A.B. Maccabe, W. Zhu, J. Otto, and R. Riesen, "Experience in Offloading Protocol Processing to a Programmable NIC," *Proceedings of IEEE International Conference on Cluster Computing*, September 2002.
- W. Lawry, C. Wilson, A. Maccabe, and R. Brightwell, "COMB: A Portable Benchmark Suite for Assessing MPI Overlap," *Proceedings of IEEE International Conference on Cluster Computing*, September 2002.
- D.S. Greenberg, R. Brightwell, L.A. Fisk, and R. Riesen, and A.B. Maccabe, "A System Software Architecture for High-end Computing," in *Proceedings of Supercomputing '97*, November, 1997.
- F. R. Reverbel and A.B. Maccabe, "Making CORBA Objects Persistent: the Object Database Adapter Approach," in *Proceedings of the 3rd USENIX Conference on Object-Oriented Technologies and Systems (COOTS'97)*, June 1997.
- S.R. Wheat, A.B. Maccabe, R.E. Riesen, D.W. van Dresser, and T.M. Stallcup, "PUMA: An Operating System for Massively Parallel Systems," in *Proceedings of the 27th Hawaii International Conference on System Sciences*, January 1994.

- S.R. Wheat, K.D. Devine, and A.B. Maccabe, "Experience with Automatic, Dynamic Load Balancing and Adaptive Finite Element Computation," in *Proceedings of the 27th Hawaii International Conference on System Sciences*, January 1994.
- K.D. Devine, J.E. Flaherty, S.R. Wheat, and A.B. Maccabe, "A Massively Parallel Adaptive Finite Element Method with Dynamic Load Balancing," in *Proceedings of Supercomputing '93*, November 1993.
- R.A. Ballance, A.B. Maccabe, and K.J. Ottenstein, "The program dependence web: A Representation Supporting Control, Data, and Demand-driven Interpretation of Imperative Languages," in *Proceedings of the SIGPLAN '90 Conference on Programming Language Design and Implementation (PLDI)*, White Plains, NY, June 20-22, 1990, ACM, pp. 257-271.
- A.B. Maccabe and R.J. LeBlanc, "The Design of a Programming Language Based on Connectivity Specifications," in *Proceedings of The third International Conference on Distributed Processing Systems (IEEE)*, November, 1982.
- A.B. Maccabe and R.J. LeBlanc, "A Language Model for Fully Distributed Systems," in *IEEE COMPCON FALL 1980*, September, 1980.
- A.B. Maccabe, W.E. Underwood and S. Brunjes, "Author Support for the Design of Automated Medical Interviews," *Proceedings of The Third Annual Symposium on Computer Application in Medical Care (IEEE)*, October, 1979.

Referred Workshops

- P. Gilfeather and A.B. Maccabe, "An Extensible Message-Oriented Offload Model for High-Performance Applications," in *Proceedings of the Los Alamos Computer Science Institute Symposium, October 2005*.
- S. Sharma, P. Bridges, and A. Maccabe, "A Framework for Analyzing Linux System Overheads on HPC Applications," in *Proceedings of the Los Alamos Computer Science Institute Symposium, October 2005*.
- P. Gilfeather and A.B. Maccabe, "Connection-Less TCP," *CAC Workshop (at IPDPS)*, Denver, April 2005.
- P. Bridges and A.B. Maccabe, "IMPuLSE: Integrated monitoring and profiling for large-scale environments," In *Proceedings of the Seventh Workshop on Languages, Compilers, and Runtime Support for Scalable Systems*, October 2004.
- R. Riesen and A.B. Maccabe, "Simple, Scalable Protocols for High-Performance Local Networks," *Proceedings of IEEE Workshop on High Speed Local Networks*, November 2003.
- R. Riesen and A.B. Maccabe, "RMPP: The Reliable Message Passing Protocol," *Proceedings of IEEE Workshop on High Speed Local Networks*, November 2002.
- E.A. Leon, A.B. Maccabe, and R. Brightwell, "Instrumenting LogP Parameters in GM: Implementation and Validation," *Proceedings of IEEE Workshop on High Speed Local Networks*, November 2002.
- R. Brightwell, W. Lawry, A.B. Maccabe, and C. Wilson, "Optimizing an MPI Implementation to Increase CPU Availability," *Proceedings of IEEE Workshop on High Speed Local Networks*, November 2002.

- P. Gilfeather and A.B. Maccabe, "Making TCP Viable as a High Performance Computing Protocol," Proceedings of the *LACSI Symposium*, October 2002.
- P. Gilfeather and A.B. Maccabe, "Splintering TCP," Seventeenth International Symposium on Computer and Information Sciences, Special Session on Advanced Networking Hardware, October 2002.
- R. Brightwell, B. Lawry, and R. Reisen, and A.B. Maccabe "Portals 3.0: Protocol Building Blocks for Low Overhead Communication," *CAC Workshop (at IPDPS)*, April, 2002.
- R. Brightwell and A.B. Maccabe, "Scalability Limitations of VIA-Based Technologies in Supporting MPI," Proceedings of the *Fourth MPI Developer 's and User 's Conference*, March 2000.
- D.A. Bader, A.B. Maccabe, J.A. Mastler, J.K. McIver III, P.A. Kovatch, "Design and Analysis of the Alliance/University of New Mexico Roadrunner Linux SMP SuperCluster," Proceedings of the *IEEE 1st International Workshop on Cluster Computing (IWCC)*, December 1999.
- A.B. Maccabe, R. McDonald and V. Anand, "Learning how to characterize normal behavior in local area networks," *Fourth Workshop on Computer Security Incident Handling*, August 4–6, 1992, Denver, Colorado.

BIOGRAPHICAL SKETCH

NAME	POSITION TITLE
Chaouki Abdallah	Professor & Chair, ECE Department University of New Mexico

EMPLOYMENT:

- 7/05---Present: Professor & Chair Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM.
- 1/05---6/05: Professor, Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM.
- 8/01---12/04: Professor, Associate Chair, and Director of the Graduate Program, Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM.
- 8/00---7/01: Associate Professor, Electrical and Computer Engineering, University of Tennessee, Knoxville, TN.
- 8/94---7/00: Associate Professor, Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM.
- 9/88---7/94: Assistant Professor, Electrical and Computer Engineering, University of New Mexico, Albuquerque, NM.

EDUCATION

INSTITUTION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
Georgia Tech	Ph.D.	1988	EE
Georgia Tech	M.S.	1982	EE
Youngstown State Univ.	B.E.	1981	EE

MEMBERSHIP:

IEEE (Senior Member).

A. FIVE SELECTED RELEVANT PUBLICATIONS:

- 1) S. Tarbouriech, C.T. Abdallah, J.N. Chiasson, Editors, *Advances in Communication Control Networks*, Springer-Verlag, Heidelberg, Lecture Notes in Control and Information Sciences, Vol. 308, 2005.
- 2) S. Bengea, R. DeCarlo, P.F. Hokayem, and C.T. Abdallah, *Suboptimal Control Techniques for Hybrid Systems Operating via Networks*, pp. Lecture Notes in Control and Information Sciences, Springer-Verlag Edited volume 308, S. Tarbouriech, C.T. Abdallah, and J. Chiasson, Editors 2005, pp. 281--302.
- 3) J. Chiasson, Z. Tang, J. Ghanem, C. T. Abdallah, J.D. Birdwell, M.M. Hayat, and H. Jerez, "The Effect of Time Delays on the Stability of Load Balancing Algorithms for Parallel Computations," *IEEE Transactions on Control Systems Technology*, Vol. 13, No. 6, pp. 932--942, November 2005.
- 4) M.M. Hayat, S. Dhakal, J. Ghanem, H. Jerez, C. T. Abdallah, J.D. Birdwell and J. Chiasson, "On the Optimization of Load Balancing in Distributed Networks in the Presence of Delay," Springer-Verlag Edited volume, S. Tarbouriech, C.T. Abdallah, and J. Chiasson, Editors 2004.

- 5) R. Sandoval-Rodriguez, C.T. Abdallah, H. Jerez, and R.H. Byrne, "Experimental Results on the Effects of 802.11b WLAN on Networked Control System," Proceedings IEEE Mediterranean Control Conference, Cyprus, pp. 1113--1118, June, 2005.

B. OTHER RELEVANT PUBLICATIONS:

1. P. Dorato, C.T. Abdallah, and V. Cerone, **Linear Quadratic Control: An Introduction**, Second Printing with Corrections, Krieger Publishing Company, Malabar, FL, 2000.
 2. L. Menini, L. Zaccarian, and C.T. Abdallah, Editors, **Current trends in Nonlinear Systems and Control**, Birkhauser, Systems and Control: Foundations and Applications Series, 2006.
 3. Z. Tang, J. White, J. Chiasson, J.D. Birdwell, C.T. Abdallah and M.M. Hayat, "Closed-loop Load Balancing: Comparison of A Discrete Event Simulation with Experiments," Proceedings American Control Conference, pp. 2721--2726, Portland, Oregon, 2005.
 4. A. Regmi, R. Sandoval, R. Byrne, H. Tanner, and C.T. Abdallah, "Experimental Implementation of Flocking Algorithms for non-holonomic models," Proceedings American Control Conference, pp. 4917--4922, Portland, Oregon, 2005.
-

CURRENT STUDENTS:

1) **PhD. Students:** Jorge Piovesan, Joud Khoury, Ivan Lopez-Hurtado, Lai Xu, and David Kozlwoski.

2) **M.S. Students:** M. Majedi, A. Behshad, N. Antoun, S. Azar.

PREVIOUS PhD STUDENTS:

Rafael Sandoval-Rodriguez, Mohammed Hayajneh, Judd Rohwer.

DISSERTATION ADVISER:

Professor Frank L. Lewis, Georgia Institute of Technology, currently at the University of Texas, Arlington.

RECENT COLLABORATORS:

- Dr. V. Koltchinski, Georgia Institute of Technology
- Dr. Mark Spong, University of Illinois, Urbana-Champaign
- Dr. Don Hush, Los Alamos National Laboratory.
- Dr. Bert Tanner, University of New Mexico.
- Dr. J. Chiasson, University of Tennessee.
- Dr. J. Douglas Birdwell, University of Tennessee.
- Dr. Judd Rohwer, Sandia National Laboratories.

BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME Krastan B. Blagoev		Staff Member	
eRA COMMONS USER NAME blagoev			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Sofia University, Sofia, Bulgaria	M.A.	1984-1990	High Energy Physics
Florida Atlantic University, Boca Raton, FL	M.A.	1990-1992	Condensed Matter
Boston College, Chestnut Hill, MA	Ph.D.	1992-1998	Condensed Matter
Cavendish Laboratory, Cambridge University,	Research	1998-1999	Theoretical Physics
Harvard Medical School, Harvard University,	Research	1999-2000	Biomedical Imaging

A. Positions and Honors

09/1998-09/1999: Research Fellow, Cavendish Laboratory, Cambridge University, UK
 09/1999-08/2000: Research Fellow, Brigham and Women's Hospital and Harvard University
 08/2000-06/2002: Research Assistant Professor, Physics Department, Boston College
 07/2001-07/2003: Assistant in Physics, NMR Center, Massachusetts General Hospital
 06/2002-Present: Technical Staff Member, Los Alamos National Laboratory

*Marquis Who'sWho in America, 2007.

Distinguished career award, Boston College Graduate School of Arts and Sciences, 2004.
 Strategic Hire Award, Los Alamos National Laboratory, 2002.

B. Selected peer-reviewed publications (in chronological order).

1. Krastan B. Blagoev, Luc T. Wille, First-order phase transition between orthorhombic phases in $\text{YBa}_2\text{Cu}_3\text{O}_x$, Phys. Rev. B48, 6588 (1993).
2. K. Kempa, P. Bakshi, D. Broido, K.B. Blagoev, Polarization of Electrons in Quantum Dashes in External Magnetic Field, Solid State Comm. 91, 231 (1994).
3. Krastan B. Blagoev and Kevin S. Bedell, Luttinger Theorem in One Dimensional Metals, Phys. Rev. Lett. 79, 1106 (1997).
4. V.I. Valtchinov, G. Kalman and K.B. Blagoev, Phases in Strongly Coupled Electronic Bilayer Liquids, Phys. Rev. E56, (1997).
5. K.B. Blagoev, J.R. Engelbrecht and K.S. Bedell, S-wave Superconductivity in Weak Ferromagnetic Metals, Phil. Mag. Lett. 78, 169 (1998).
6. K.B. Blagoev, J.R. Engelbrecht, and K.S. Bedell, Phases in Weak Ferromagnetic Metals, J. Phys. Chem. Solids 59, 1801 (1998).
7. K.B. Blagoev, J.R. Engelbrecht and K.S. Bedell, Effect of Ferromagnetic Spin Correlations on Superconductivity in Ferromagnetic Metals, Phys. Rev. Lett. 82, 133 (1999).
8. G.J. Kalman, K.B. Blagoev, K.I. Golden, G. McMullan, V. Valtchinov, and H. Zhao, Charged particle bilayers: Equilibrium and dynamics, J. Phys. IV France 10 (2000).
9. Krastan B. Blagoev, Fred Cooper, John F. Dawson, Bogdan Mihaila, Schwinger-Dyson approach to non-equilibrium classical field theory, Phys. Rev. D64, 125003 (2001).
10. N.I. Karchev, K.B. Blagoev, K.S. Bedell, and P.B. Littlewood, Coexistence of superconductivity and ferromagnetism in ferromagnetic metals, Phys. Rev. Lett. 86, 846 (2001).
11. P. Farinas, K.B. Blagoev, K.S. Bedell, and N. Studart, Towards the detection of a new ferromagnetic spin-wave mode, J. Magn. Magn. Mater. 226, 490 (2001).

12. Kevin S. Bedell and Krastan B. Blagoev, Quantum spin hydrodynamics and a new spin current mode in ferromagnetic metals, *Phil. Mag. Lett.* 81, (2001).
13. Jason A. Jackiewicz, Krastan B. Blagoev, Kevin S. Bedell, A model for coexistent superconductivity and ferromagnetism, *Phil. Mag.* 83, 3247-3254 (2003).
14. Choi CH, Moser J, Sobourin N, Blagoev K, Naughton M, Usheva A., YY1-DNA interaction results in a significant change of electronic context as measured by capacitance, *Biophys Chem.* 103:109-15 (2003).
15. Krastan B. Blagoev, Kevin S. Bedell, and Peter B. Littlewood, Blagoev et al. Reply:, *Phys. Rev. Lett.* 92, 199706 (2004).
16. GT Kenyon, JS George, BJ Travis, KB Blagoev, Models of the retina with application to the design of a visual prosthesis, *Los Alamos Science* 29, (2004)
17. Krastan B. Blagoev, Luc T. Wille, Disorder induced dynamical phase transition in one dimensional cellular automata, *Phil. Mag.* B84, 835 (2004).
18. M. M. Parish, B. Mihaila, E. M. Timmermans, K. B. Blagoev, and P. B. Littlewood, BCS-BEC crossover with a finite-range interaction, *Phys. Rev.* B71, 064513 (2005).
19. B. Mihaila, S. Gaudio, K.B. Blagoev, A. Balatsky, PB Littlewood, and D. Smith, Density and spin response functions in ultracold fermionic atom gases, *Phys. Rev. Lett.* 95, 090402 (2005).
20. C.P. Opeil, R.K. Schulze, B. Mihaila, H. M. Volz, J.C. Lashley, K.B. Blagoev, M.E. Manley, W.L. Hults, R.J. Hanrahan Jr., R.C. Albers, P.B. Littlewood, and J.L. Smith, Angle-resolved photoemission study of a (001) α -uranium single crystal, *Phys. Rev.* B75, 045120 (2007).
21. K.B. Blagoev, B.S. Alexandrov, E.H. Goodwin, and A.R. Bishop, Ultra-violet light induced changes in DNA dynamics may enhance TT-dimer recognition, *DNA repair* 5, 863-867 (2006).
22. B.S. Alexandrov, L.T. Wille, K.O. Rasmussen, A.R. Bishop, and K.B. Blagoev, Bubble Statistics and Dynamics in Double-Stranded DNA, *Phys. Rev.* E74, 050901(R) (2006).
23. Bogdan Mihaila, Krastan B. Blagoev, and Fred Cooper, Phases of a fermionic model with chiral condensates and Cooper pairs in 1+1 dimensions, *Phys. Rev.* D73, 016005 (2006).
24. B. Mihaila, S. A. Crooker, K. B. Blagoev, D. G. Rickel, P. B. Littlewood, and D. L. Smith, Spin noise spectroscopy to probe quantum states of ultracold fermionic atom gases, *Phys. Rev.* A74, 063608 (2006).
25. C.P. Opeil, R.C. Albers, K.B. Blagoev, M. Gulacsi, J.C. Lashley, P.B. Littlewood, M.E. Manley, B. Mihaila, P.S. Riseborough, R.K. Schulze, D.J. Thoma, H.M. Volz, and J.L. Smith, Photoelectric Effect in Uranium, *J. Phys. Soc. Japan.* 75 (2006).
26. B. Mihaila, SA. Crooker, DG Rickel, KB Blagoev, PB Littlewood, and DL Smith, Quantitative study of spin noise spectroscopy in a classical gas of 41K atoms, *Phys. Rev.* A74, 043819 (2006).
27. C.P. Opeil, R.K. Schultze, M.E. Manley, J.C. Lashley, W.L. Hults, RJ. Hanrahan Jr., J.L. Smith, B. Mihaila, K.B. Blagoev, R.C. Albers, and P.B. Littlewood, Valence-band UPS 6p core-level XPS, and LEED of uranium (001) single crystal, *Phys. Rev.* B73, 165109 (2006).
28. B. Mihaila, Opeil, C. P. Drymiotis, F. R. Smith, J. L. Cooley, J. C. Manley, M. E. Migliori, A. Mielke, C. Lookman, T. Saxena, A. Bishop, A. R. Blagoev, K. B. Thoma, D. J. Lashley, J. C. Lang, B. E. Boerio-Goates, J. Woodfield, B. F. Schmiedeshoff, G. M., Pinning frequencies of the collective modes in alpha-uranium, *Phys. Rev. Lett.* 96, 076401 (2006).
29. O. Maillard, S. Solyom, U. Camenisch, K.B. Blagoev, and H. Naegeli, How the nucleotide excision repair reaction achieves DNA damage specificity and strong selectivity, accepted in *DNA repair* (2007).
30. K.B. Blagoev, B. Mihaila, B.J. Travis, L.B. Alexandrov, A.R. Bishop, D. Ranken, S. Posse, C. Gasparovic, A. Mayer, C.J. Aine, M. Morita, W. Müller, J. Connor, Ulbert, E. Halgren, Modelling the magnetic signature of neuronal tissue, *Neuroimage* (2007) in press.
31. T. Antal, K.B. Blagoev, S. A. Trugman, S. Redner, Aging and Immortality in a Cell Proliferation Model, accepted in *J. Theor. Biol.* (2007).
32. B. Mihaila, S. Gaudio, K.S. Bedell, K.B. Blagoev, E. Timmermans, Acoustic attenuation rate in the Fermi-Bose model with Finite-range fermion-fermion interaction, *Phys. Rev.* A75, 013603 (2007).

Edited Books:

“Strongly Coupled Coulomb Systems 97”, G. Kalman, M. Rommel, and K.B. Blagoev (eds.), (Plenum, 1998).

C. Research Support.**Ongoing Research Support**

Project Number/PI: Krastan B. Blagoev
 Funding Source: DOE/The MIND Institute
 Title of Project: "Neuronal Currents Detection in Humans Using MRS"
 Time Period: 1/1/2006-5/1/2008
 Role in Project: PI
 Major Goal: Evoked response currents detection in human primary visual cortex
 Using single voxel MR spectroscopy

Project Number/PI: U2006A168/ Krastan B. Blagoev
 Funding Source: Center for Integrative Nanotechnologies (CINT)
 Title of Project: "Investigating Teomere Structure and Function by Atomic Force Microscopy and Fluorescence Microscopy"
 Time Period: 1/1/2007-7/1/2008
 Role in Project: PI
 Major Goal: Investigate the chromosome protection structures that telomeres form on both ends of the chromosome in human cells.

Project Number/PI: LANL-LDRD-DR/Darryl Smith
 Funding Source: Los Alamos National Laboratory Directed Research Office
 Title of Project: "New Materials for Radiation Detection"
 Time Period: 10/1/2005 – 10/1/2008
 Role in Project: Co-PI
 Major Goal: Develop new materials for new radiation detectors.

Completed Research Support

Project Number/PI: LANL-NMSUKrastan B. Blagoev
 Funding Source: LANL-NMSU Memorandum of Understanding
 Title of Project: "Integrated EEG and Brain Mapping for Brain Machine Interface in Security Monitoring"
 Time Period: 10/1/2005-10/1/2006
 Role in Project: PI
 Major Goal: Develop a multimodal integration technique and study the feasibility of using it for training security personnel.

Project Number/PI: LANL-LDRD-DR/Darryl Smith
 Funding Source: LANL-NMSU Memorandum of Understanding
 Title of Project: "Spintronics"
 Time Period: 10/1/2005-10/1/2006
 Role in Project: Co-PI
 Major Goal: Model the electron magnetization transport in organic materials and the transport across metal-semiconductor interfaces.

Project Number/PI: Krastan B. Blagoev
Funding Source: Institute for Complex Adaptive Matter (ICAM)
Title of Project: "Application of Condensed Matter Physics Techniques to Biological Physics Problems",
Time Period: 8/1/2000-6/1/2002
Role in Project: PI
Major Goal: Apply techniques from condensed matter physics to study the conductivity of DNA.

Project Number/PI: LANL-LDRD-ER/Krastan B. Blagoev
Funding Source: Los Alamos National Laboratory Exploratory Research Office
Title of Project: "Revolutionary techniques for large data sets analysis"
Time Period: 6/1/2002-10/1/2003
Role in Project: PI
Major Goal: Develop model dependent as well as model independent techniques for data mining.

BIOGRAPHICAL SKETCH

NAME Michael Hites	POSITION TITLE Vice President, Planning and Information Technology and CIO		
EDUCATION/TRAINING			
INSTITUTION AND LOCATION			
Illinois Institute of Technology University of Illinois Urbana University of Arizona	DEGREE <i>(if applicable)</i> Ph.D. M.S. B.S.	YEAR(s) 1997 1992 1989	FIELD OF STUDY Aerospace Engineering Mechanical Engineering Mechanical Engineering

A. POSITIONS:

- Vice President for Planning and Information Technology and CIO, New Mexico State University
- Chief Technology Officer, Illinois Institute of Technology
- Director, Computing and Network Services, IIT
- Assistant Dean for Computing & Research Assistant Professor, IIT

B. HONORS:

- High Tech Consortium of Southern New Mexico Service Award
- New Mexico Internet Professionals Association Service Award
- New Mexico Business Weekly Innovator of the Year
- Arizona Regent's Scholar
- Tau Beta Pi
- Mortar Board

C. LECTURES:

- "IT Planning 101: Bringing Together Leaders to Produce Results", SunGard Summit, Las Vegas, NV, March 2007.
- "Building New Mexico's Public Fiber Network Under the Radar, Educause StateNets, Phoenix, AZ, January 2007.
- "Commissioning a Reformation of Higher Education", Chronicle Technology Forum, Las Vegas, NV, November 2006.
- "Just Don't Call it Banner. NMSU's Integrated ERP Project," Educause, Dallas, TX, October 2006.
- "Building New Mexico's Public Fiber Network Under the Radar, Educause (poster session), Dallas, TX, October 2006.
- "The New Mexico State University Unified Digital Campus", web seminar for SunGard Higher Education, May 2006.
- "Unbridling Kentucky: Internet2 as a Catalyst and New Mexico's Public Fiber Network", Internet2 Spring Member Meeting, Arlington, VA, April 2006.
- "Just Don't Call it Banner. NMSU's UDC." SunGard Higher Education Summit, Orlando, FL, April 2006.
- "Perspectives from a CIO: Question and Answer", University of Texas-El Paso, El Paso, TX, April 2006.

- "Building New Mexico's Public Fiber Network Under the Radar, Educause Southwest Regional, Austin, TX, February 2006.
- "Governor's Summit on Telecommunications Infrastructure", Panelist, Las Cruces, NM, January 2005.
- "Supporting Academics, Scholarship and Research through Information Technology", Asociación, Nacional de Instituciones de Educación en Informática, A.C., Ciudad Juárez, Chihuahua, June 2004.
- "Beyond the Bake Sale: Ideas for Controlling Costs and Increasing Revenues", February 2004.
- "What Can NMSU Offer the High Tech Community?", High Tech Consortium of Southern New Mexico, July 2003.
- "CIO Roundtable Discussion on Collaboration in Information Technology," Illinois Technology Showcase, Chicago, IL, November 2001.
- "Collaborating Across Professional Boundaries: Education to Practice" (moderator for session), Interprofessionalism Conference, Chicago, IL, November 2000.
- "Are We Ready for Cyberschool" (moderator for session), ICCA Annual Conference, Chicago, IL, March 1999.
- "Technology and Change in the Workplace," Chicago Chapter of Executive Women International Dinner and Meeting, Chicago, IL, February 1999.
- "Web-based Laboratories in Undergraduate Education," IIT Office of Institutional Advancement Department Seminar, Chicago, IL, June 1998.

D. CAREER SUMMARY:

Dr. Hites is Vice President for Planning and IT/CIO at New Mexico State University in Las Cruces, New Mexico and CEO of HitesTech LLC. He leads strategic planning for NMSU's five-campus, land-grant system of 27,000 students and is responsible for system IT policy, information services, telephone and data networks, application development, training, system administration, PC services, institutional research, university planning and advising to NMSU leadership. NMSU actively partners with the New Mexico government, and Hites helped design the shared, statewide course management system available to all of NM higher education, which is now a part of the governor's K-20 "cyber academy" initiative. An ERP veteran, Hites directed the implementation of NMSU's Banner/Luminis systems. Hites is active with both I2 and NLR and helped plan the El Paso/Las Cruces NLR POP and the I-25 fiber network. Hites is on the board of the High Tech Consortium of Southern New Mexico and a member of New Mexico Technology in Education, Educause, SCUP, AIR, CHECS, ASEE, Leadership New Mexico, and the Las Cruces Chamber. He is an avid RV'er and motorcyclist and is waiting for more games to come out for the PS3.

E. ADMINISTRATIVE SUMMARY:

The Vice President for Planning and Information Technology at New Mexico State University:

Is a member of the President's Cabinet and responsible for university-wide strategic planning as well as the offices of Information and Communication Technologies (<http://ict.nmsu.edu>) and Institutional Research, Planning and Outcomes Assessment (<http://irpoa.nmsu.edu>).

Directs the central information technology (IT) and institutional research (IR) staff and works closely with all academic and administrative units. The VPPIT is responsible for academic and administrative technology services, institutional research, and university planning serving NMSU's five-campus system throughout New Mexico.

Serves on the Higher Learning Commission accreditation steering committee, writes reports, strategic plans, financial plans, operating plans, technical reports, grant proposals, scholarly manuscripts and ad hoc reports for senior administration regarding information technology and information services.

:

Manages the five-campus technology infrastructure and manages the New Mexico higher education network for the New Mexico Council for Higher Education Computing/Communications Services, including Internet2 and National LambdaRail.

Oversees information services for the financial, human resources, student and alumni records at NMSU using SCT Banner and several third-party, integrated systems through a web-based portal. The VPPIT is responsible for cable and satellite television and Internet courses, faculty training, classroom technology and online technology infrastructure with Blackboard.

Works directly with faculty and research centers to write grants, participate in faculty research and teach project-based courses. Involvement in faculty research varies between research centers, but includes infrastructure support, programming, project management, grant writing, letters of support, cost sharing and system administration.

Collects and distributes statistical data and information for and about the university, serves as the primary informational interface between NMSU and external organizations, provides leadership for collaborative strategic and operational planning throughout NMSU.

Leads fundraising activities related to information technology.

F. NATIONAL/INTERNATIONAL ORGANIZATIONS:

- Educause (Primary Institutional Representative).
- Society for College and University Planning (Primary Institutional Representative).
- Association for Institutional Research.
- NM Council for Higher Education Computing/Communication Service (President 2004).
- North Suburban Higher Education Consortium (Steering Committee 2000-2003).
- American Society of Engineering Education.
- American Society of Mechanical Engineers.
- Aggie Athletic Foundation (Aggie Scholarship Association).

Antonio Redondo

Address: Theoretical Division
Los Alamos National Laboratory
Mail Stop B210
Los Alamos, New Mexico 87545

Telephones: (505) 667-4401 (office)
(505) 665-4055 (fax)

E-mail: redondo@lanl.gov

Education: Ph.D., California Institute of Technology, 1977.
Major: Applied Physics.
Minor: Theoretical Chemistry.
Thesis: Theoretical Studies of Silicon Surfaces Using Finite Clusters.
Supervisors: Thomas C. McGill (Applied Physics) and
William A. Goddard III (Chemistry).

M.Sc., California Institute of Technology, 1972.
Major: Applied Physics.

B.Sc. (*magna cum laude*), Utah State University, 1971.
Major: Physics.
Minor: Mathematics.

Current Research Interests:

Modeling of cell signaling processes
Modeling of soft matter and biomaterials properties
Modeling host-pathogen interactions
Theoretical methods for signal analysis.
Theoretical catalysis.

Professional Experience:

1977-79	Assistant Professor of Physics, Universidad de Los Andes, Mérida, Venezuela.
1979-80	Associate Professor of Physics, Universidad de Los Andes, Mérida, Venezuela.
1980-81	Visiting Associate in Chemistry, California Institute of Technology.
1981-83	Research Associate in Chemistry, California Institute of Technology.
1983-94	Technical Staff Member, Electronics and Electrochemical Materials and Devices Group, Los Alamos National Laboratory.
1994-2005	Group Leader, Theoretical Chemistry and Molecular Physics Group, Los

2002- Alamos National Laboratory.
Adjunct Professor, Computational Science Research Center, San Diego State University

2005-2006 Group Leader, Theoretical Biology and Biophysics, Los Alamos National Laboratory.

2006- Theoretical Division Leader (Acting), Los Alamos National Laboratory.

Honors and Awards:

Woodrow Wilson Foundation Graduate Fellow, California Institute of Technology, 1972.

IBM Graduate Fellow, California Institute of Technology, 1974-76.

Award for Technical Accomplishment, Partnership for a New Generation of Vehicles (presented by Vice-president Al Gore at the White House, 31 March 1997).

Los Alamos Achievement Award, Los Alamos National Laboratory 1997.

Medalla Bicentenario, Universidad de Los Andes, Mérida, Venezuela, 25 November 1998 (this is the highest medal that the University confers for technical achievement; awarded by the Rector of the University in a special ceremony)

Fellow, World Technology Network (www.wtn.net), 1999

Sandia National Laboratories Achievement Award, 2003

Los Alamos Achievement Award, Los Alamos National Laboratory, January 2005

Los Alamos Achievement Award, Los Alamos National Laboratory, December 2005

Fellow, American Association for the Advancement of Science, 2005

Publications and Patents:

Over 105 articles in refereed journals and book chapters, 2 patents.

Professional Societies:

American Physical Society
American Chemical Society
American Association for the Advancement of Science

MARY ANN SCOTT

CENTER FOR TELEHEALTH, HEALTH SCIENCES CENTER
UNIVERSITY OF NEW MEXICO
ALBUQUERQUE, NM 87131
OFFICE: 505-272-8055 - CELL: 469-879-5799

S U M M A R Y

Senior business development, project management and training professional with extensive expertise in delivering creative solutions for technically diverse and complex areas. Established reputation for building partnerships (alliances) among governmental agencies/officials, academia, industry, and Native American Nations to meet shared goals. High energy, team player able to communicate and foster collaboration with a wide variety of stakeholders.

P R O F E S S I O N A L E X P E R I E N C E

UNIVERSITY OF NEW MEXICO (UNM) HEALTH SCIENCES CENTER (HSC)

2006-PRESENT

Associate Director, Center for Telehealth and Cybermedicine Research

Responsible for the day-to-day business activities of the Center for Telehealth (CfTH)

- ♦ Provided strategic oversight to CfTH in the reorganization process, including hiring and training of a new services manager and new administrative assistant, and implementation of effective technical services.
- ♦ Supervised budget preparation and planning of funding presentations to UNM HSC management and legislative representatives at the State and Federal level, raising the public awareness of the services provided by the Center and thus increasing capacity for future funding of new programs.
- ♦ Secured partnerships for CfTH with Los Alamos National Laboratory (LANL), Sandia National Laboratories (SNL) and Indian Health Service (IHS) to collaborate on grant proposals such as Post Traumatic Stress Disorder (PTSD) and FCC Internet Two (I2) / National Lambda Rail (NLR).
- ♦ Directed the collaboration of a multi-billion dollar team to submit a \$25 M proposal to FCC; facilitated interaction between various State agencies of NM, AZ, CO, and Hawaii with two Federal laboratories and multiple divisions of UNM, putting in place teaming strategies and organizational methodologies.
- ♦ Developed the concept of a PTSD proposal of \$16 M for UNM HSC and the Governor of New Mexico.
- ♦ Supported the Medical Director in the expansion of clinical telemedicine services such as cancer, stroke, geriatrics, pediatric sub-specialty services, pediatric orthopedics, trauma triage/neurosurgery, disaster and emergency response network, translator services, programs for the Deaf, and expanded ECHO Model.
- ♦ Expanded services provided by UNM HSC to Navajo Area Indian Health Service, including trauma care, to support radiology and emergency services at Gallup, Shiprock, Chinle, Crownpoint, and Ft. Defiance.
- ♦ Collaborated with statewide consortiums to develop plans and procedures for coordinated delivery of telehealth services in New Mexico, particularly to underserved populations.
- ♦ Served as official Scribe for the Strategic Telehealth Advisory Council and Four Corners Consortium.
- ♦ Worked closely with senior faculty members, health care professionals, and administrators to define current and emerging trends in the delivery of healthcare and the required policy to support new programs across multiple schools of UNM, including Pharmacy, Nursing, and Continuing Education.
- ♦ Planned, developed, and implemented revenue-generating training programs for CfTH.
- ♦ Designed marketing and promotional telehealth materials, including pins, shirts, and web-based programs.
- ♦ Supervised \$125 K improvement of physical facilities such as roof, stucco, paint, fence and handicap ramp.

M SCOTT, INC. Dallas, TX

2003 – 2006

President and CEO

Small woman-owned business specializing in security, scientific engineering, and emerging technologies

- ♦ Provided business development, project management, proposal review, and security expertise relative to Architectural/Engineering projects for the Department of Energy for DMJM H&N / AE Com, ARES Corporation, Burns and Roe Federal Services Division.
- ♦ Directed Architectural and Engineering (AE) business development activities for Burns and Roe Federal Services Division (BREI) as Client Services Manager (CSM) at Los Alamos National Laboratory (LANL).
- ♦ Identified key resources to build a small-business team of technical security experts required to respond to the \$125 million Nuclear Materials Safeguards and Security Upgrades Proposal (NMSSUP) for DoE.
- ♦ Secured technical opportunities for M Scott, Inc. (MSI) at the Waste Isolation Pilot Plant (WIPP), BWXT Pantex, Sandia National Laboratories (SNL), LANL, Nevada Test Site and Yucca Mountain.

- ♦ Facilitated industrial-academic-governmental partnerships between The Center for Integrated NanoTechnology (CINT) at SNL and LANL with Texas Instruments, Exxon Mobil, University of Texas at Arlington, and UT Southwestern Medical School resulting in multi-million dollar grants and projects.
- ♦ Conducted US Homeland Security training classes (Biannual Strategy Implementation Reporting System) for state/local officials funded by the Office for Domestic Preparedness through Texas A&M University.
- ♦ Provided telemedicine and eCommerce consulting services for Kelly Anderson and Associates to obtain economic development opportunities in the field of telehealth for Native American Tribes.
- ♦ Integrated diverse teams for Carter and Burgess in response to The Bureau of Land Management to assist The Navajo Nation in determining the value of its land and subsequent revenue stream.

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION (SAIC), San Diego, CA 2000-2002

Project Manager (*Navajo Area Office (NAO), United States Indian Health Service (IHS), Window Rock, AZ*)

Responsible for the day-to-day operations of SAIC and its subcontractors who implemented information technology to three hospitals and twelve clinics across the Arizona and New Mexico Navajo Region. This infrastructure provided the latest e-health technology to remote areas.

- ♦ Staffed and managed projects ranging from \$50 thousand to over \$22 million in value for The Department of Health and Human Services, the world's largest public health organization.
- ♦ Guaranteed that money was appropriately allocated and tasks were proceeding in an efficient manner, holding vendors and contractors to a high standard of accountability.
- ♦ Ensured multiple stakeholder satisfaction of government, business, and public health providers, including hospital administrators, technical directors, physicians, nurses, and support staff.
- ♦ Interviewed, hired, and trained culturally diverse employees to become excellent staff members.

THE UNIVERSITY OF TEXAS AT DALLAS SCHOOL OF MANAGEMENT, Dallas, TX 2000

Independent Contractor

Supported the Dean and his staff in the development of an eCommerce Center.

- ♦ Assessed department-head needs, planned strategic goals/objectives and supported instructional priorities for implementation of the eCenter.
- ♦ Mentored teaching assistants with research guidance, evaluation of programs, and publication of materials.
- ♦ Identified viable industrial funding sources, such as 21st Century Group, Fujitsu, Haynes and Boone, Kerr McGee and Travelocity.

THE DELAWARE TRIBE OF WESTERN OKLAHOMA, Anadarka, OK 1999-2000

e-Health Consultant

Pursued telemedicine/telehealth opportunities with the Deans of educational institutions such as The University of Texas Southwestern Medical School at Dallas, The University of North Texas Health Science Center, Texas Tech University, and The University of New Mexico.

- ♦ Wrote grants to secure funding for educational projects to narrow the digital divide for diverse populations.
- ♦ Provided appropriate briefing to prepare legislation on The Government Computerized Patient Record - a federal form of electronic medical patient record used by The Department of Defense, Veteran's Affairs, and Indian Health Service.

LOS ALAMOS NATIONAL LABORATORY (LANL), Los Alamos, NM 1993-1999

Project Manager, Advanced Computing Laboratory

Created partnerships with industry in the field of healthcare.

- ♦ Secured funding from NITA Department of Commerce to transfer LANL telemedicine technology to neighboring Northern New Mexico. An award of \$1,539,400 was given to NNM Community College to transfer telemedicine technology from LANL to seventeen rural clinics in the primarily Hispanic and Native American Communities.
- ♦ Supported scientists in the development of cutting-edge public health technology.
- ♦ Made presentations to pharmaceutical conventions and healthcare forums for new industry standards.
- ♦ Worked on international Nonproliferation program with Russia to secure biological weapons.

Technical Marketing Consultant, Earth and Environmental Science Division

Facilitated high-level visits from potential corporate investors in the advanced computational programs.

- ♦ Promoted LANL information technology to Fortune 500 companies such as ExxonMobil, Phillips and Halliburton, allowing The Lab to transfer cutting-edge technology to unique business applications.
- ♦ Created partnerships at the Board of Director Level with SMU, CalTex Petroleum, and Monsanto.

U. S. DEPARTMENT OF DEFENSE HEALTH AFFAIRS, Washington, D. C.

1997

Northrop Grumman Sub Contractor

Developed partnerships between the Department of Defense Health Affairs (DoD HA) and companies such as Motorola, AT&T and Novartis Pharmaceutical to develop high-tech pilot projects.

- ♦ Invited to serve on The White House Subcommittee for Telemedicine to review the legal issues relative to the delivery of electronic health care across state lines and the compliance of state licensing issues.
- ♦ Supported DoD HA military staff in the selection of new products and the implementation phase of clinical trials in a government laboratory.
- ♦ Prepared briefings for Senators' staff regarding pending funding and legislation.

INDEPENDENT CONTRACTOR, Dallas, TX

1986-1993

Program Director - Southern Methodist University, Fujitsu Corporation, NEC, Hitachi, Sanwa Bank

Planned and implemented a program for American and Japanese business executives to share an educational opportunity that would enhance each other's understanding of the best way to implement business strategy and maintain long-lasting relationships.

- ♦ Invited by the Chairman of Fujitsu to be their private advisor for five years.
- ♦ Scrutinized study projects, resolved problems, and determined appropriate expectations, goals, and deadlines for projects which included the University of Texas at Austin, Texas A&M University, as well as kindergarten through twelfth grade classes in the State of Texas.
- ♦ Guided Japanese students in the advancement of educational skills required for success in the U.S.

JAPAN AMERICA SOCIETY OF DALLAS-FORT WORTH, Dallas, TX

1982-1992

Volunteer - Founded The International Youth Festival

- ♦ Created the mission of the Youth Festival, which made the statement that students do not have to speak the same language in order to communicate - communication can be done through the arts.
- ♦ Increased participation from the first performance, which was held in Caruth Auditorium at SMU with only thirteen children to events throughout the metropex with over eighty students of all backgrounds.

P R E V I O U S E X P E R I E N C E

M SCOTT FINE ARTS, Dallas, TX

Owner

Established an international art business.

- ♦ Launched a part-time business from the yellow pages that generated \$100,000 plus per year.
- ♦ Expanded to multi-million dollar sales in international business with global distribution.
- ♦ Served as a resource for some of Texas's largest and most prestigious companies including Neiman Marcus.
- ♦ Specialized in Japanese and Hispanic Art and placed major pieces in local museums and corporate collections, including the Meadows Museum at Southern Methodist University.

PROFESSIONAL MUSICIAN, New York, NY

Pianist, Composer, and Teacher

Studied piano with Kyriena Siloti, the only living relative of Rachmaninoff. Learned international business from observations of Ms. Siloti as agent for the United States Defense Department and liaison for defecting Russians.

- ♦ Performed in chamber music ensembles as well as solo concerts.
- ♦ Published piano-teaching compositions and coached piano students of all ages.

SOUTHERN METHODIST UNIVERSITY, Dallas, TX**Adjunct Professor**

Developed a new department into a financially profitable venture. Directed public communications.

DALLAS INDEPENDENT SCHOOL DISTRICT, Dallas, TX**Music Teacher**

Taught K-12 at-risk students and received the Letot Award for Community Service.

E D U C A T I O N

Post-graduate Study, Kyriena Siloti, *The Julliard School*, New York, NY

International Defense Program - Russia/United States Scientist Exchange Program

Master of Music, Piano, *Southern Methodist University*, Dallas, TX

Designated the Outstanding Female Student

Bachelor of Music, Piano, *Southern Methodist University*, Dallas, TX

Bachelor of Music, Education, *Southern Methodist University*, Dallas, TX

P U B L I C A T I O N S

- ♦ *Entrance of the Khan*, piano solo, Schmitt, Hall and McCreary Company
- ♦ *Checkin' the Line*, piano solo, Carl Fischer Publisher
- ♦ *Wagons West*, piano solo, Carl Fischer Publisher

L I C E N S E / C L E A R A N C E

- ♦ Texas Real Estate License, nine years
- ♦ Texas All-level teaching certificate for life
- ♦ Department of Energy "L" Security Clearance, three years
- ♦ New Mexico Teaching Certificate K-12

A S S O C I A T I O N S

- ♦ Dallas-Ft. Worth Health Industry Council
- ♦ Society of Petroleum Engineers
- ♦ Japan-America Society of Dallas-Ft. Worth, Vice President
- ♦ Saint Chad's Episcopal Church
- ♦ American Telemedicine Association

BIOGRAPHICAL SKETCH

NAME Moira G. Gerety		POSITION TITLE Director, Information Technology Services – Computing Services	
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training)</i>			
INSTITUTION AND LOCATION			
University of New Mexico, Albuquerque, NM	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
University of New Mexico, Albuquerque, NM	BUS	1979	University Studies
	MBA	1985	Information Systems

A. POSITIONS:

2004-Present: Director, University of New Mexico, Information Technology Services – Computing Services.

2003-2004: Chief Information Officer, State of New Mexico.

2000-2002: Director, Public Service Company of New Mexico, Corporate Information Services.

1997-2000: Manager, Sunsoft Corporation, Information Services.

1994-1997: Adjunct Professor, University of New Mexico, Anderson Schools of Management.

B. HONORS:

Tinker Foundation recipient for IT Research in Colombia, 1982.

C. LECTURES:

1999 Y2K, University of New Mexico, Anderson School of Management: PRESENTATION.

2006 *Information Technology Governance Address to Navajo Tech Administration*, University of New Mexico: PRESENTATION.

D. CAREER SUMMARY:

Teaching mathematics at a secondary school as a bi-lingual multi-cultural teacher was my first career path. From here my career eventually evolved into Information Technology Management. I started interning in this profession at Sandia National Labs, working on asset management and procurement systems for the Department of Energy. My next position was at Digital Equipment Corporation where I worked as a Network Engineer and early office automation, including email and word processing. Next, at Wolf & Associates consulting, I specialized in strategic planning and materials management, primarily for government utilities and manufacturing. Eventually, I returned to Digital Equipment Corporation to work on an early Enterprise Resource Planning (ERP) and Materials Resource Planning (MRP) environment; first, building a reporting

environment for business forecasting, then managing the master scheduling group that controlled the appropriate product schedules to best utilize staff, materials and machine capacity. As an Independent Consultant, I specialized in strategic planning, IT assessments, and ERP planning and implementations. At Sunsoft, I managed the Information Technology department and led the implementation of Oracle financials and distribution, as well as leading y2k readiness. At Public Service Company of New Mexico (PNM) I assumed the responsibilities for managing the company's IT unit of a shared services organization attempting to centralize or consolidate common IT services. At the State of New Mexico I became its Chief Information Officer and was responsible for the strategic plan for Information Technology in New Mexico, where a collaborative development process established a plan, which continues to guide the state to this date; implemented portfolio management to oversee more than \$100M in IT projects; launched Governor Richardson's Wire New Mexico program, which established a vision of "all purpose" communications infrastructure that can be leveraged for all state operational traffic, and support state programs such as Telehealth, Distance Education and Network Intensive Research. A present, I serve as the Director of Information Technology Computing Services for the University of New Mexico transitioning the IT department to a post mainframe, distributed computing environment, as part of an overall administrative consolidation; building partnerships between Higher Education networks and state, city, county, and tribal network investments. The university network expertise is being leveraged through our partnerships to continue to bring internet services to all of New Mexico.

E. ADMINISTRATIVE SUMMARY:

As Director of Information Technology Computing Services for the University of New Mexico, I manage a staff of 180, with an additional 30 students, with an operating budget of \$19M and project budgets of up to \$62M. As Chief Information Officer for the State of New Mexico, I managed a staff of 10 to oversee all executive branches of IT spending of over \$180M in the state; oversaw all telecommunication contracts. At Public Service Company of New Mexico, I managed a staff of 165 and a budget of \$15M recurring and up to 6M capital projects, including voice and data communications. My administrative summary totals 9 years in telecommunications management and over 10 years experience in large scale capital project management and oversight.

F. NATIONAL/INTERNATIONAL ORGANIZATIONS:

2003 to Present; EDUCAUSE Consortium.
2006 to Present; Information Systems Advisory Board; Albuquerque Public Schools.
2006 to Present; City of Albuquerque, Information Services Division.
1998 to Present; CIONET.
2003-2004; National Association of State CIO.
1987-1994; American Production & Inventory Control Society.
2006 to Present; Internet to the Hogan.
2007 to Present; Higher Education Task Force for Information Technology.
2003-2004; State of New Mexico Information Technology Commission.

Mr Gregory Lawrence Blackwell
Technology Manager
UNM/HSC Center for Telemedicine

1005 Columbia NE
Albuquerque, NM 87104
(505) 220-8442
(505) 272-4205
GBlackwell@salud.unm.edu

Education

BS Electronics and Electrical Engineering
Sep-1985 to Jun-1990 University of New Mexico Albuquerque, NM
Concentration on Communications Systems

Polycom CVE – Certified Video Teleconferencing Engineer

CCNA Certificate
May-2003 to Dec-2004 Cisco Networking Academy Albuquerque, NM

Work Experience

Technology Manager – UNM HSC Center for Telemedicine
July 2006 to present

Network Analyst

Nov-2004 to July 2006 UNM/HSC Center for Telemedicine Albuquerque

- Responsible for the design and implementation of a Polycom MCG-50 bridge.
- Involved coordination with HSLIC and CfTH to evaluate manufactures and define design parameters.
- Evaluated needs of project ECHO, CfTH and HSLIC including integration with Microsoft Live Communicator
- Coordinate software installation with main campus, DOH, NMCD, SBIRT and VA hospital to enable cross linking of bridges and gatekeepers.
- Responsible for the Design and Implementation of project ECHO's telemedicine clinic including a Polycom VSX 7000, Visual Concert, Plasma Display, Projector and sound system.
- Responsible for collaborating with rural clinics to obtain IP (H.323) conferencing capabilities typically in coordination with NMTHA routed through CHECsNet. .
- Coordinated w/ UNMHSC networking to utilize a VPN connection for each client install in compliance with HIPAA

Act as technical advisor to all project ECHO staff

Systems Engineer/Project Manager

Oct-2003 to Nov-2004 Integrated Controls Albuquerque, NM

Responsible for design, engineering and project management of a variety of Communication, Video, Media Distribution, Voice and Health Care Management Systems. I am also the Network Manager for a small office of 171 nodes.

Major Projects:

Los Alamos and Sandia National Labs Fire System Central Monitoring

- Designed and engineered each Central Monitoring facility such that each system was UL1981 certified.
- The design included redundant servers, RAID 5, receivers, communications and power with automatic failover using ABS Phoenix Software.
- Created acceptance testing procedures for UL 1981 certification.
- Created monthly, bi-annual, and annual maintenance and testing procedures necessary to maintain the UL 1981 certification.
- Created a wireless network using AES transceivers for secondary communications and as a primary in remote locations.
- Farmington Municipal School District Digital Video Servers and Media Distribution System
- Designed, engineered and project managed a district wide Digital Video Server network with DX7100 servers and 200 NTSC video cameras.
- 25 servers communicated with the Farmington School District central office via T1 lines.
- Communications with a monitoring company and Farmington Police Dispatch were also established.
- Alarms generated by Video Motion Detection could be viewed by dispatchers as well as officers in the field using their squad car laptops.
- Dukane media distribution servers utilized existing CATV and Cisco IPTV to create a library of instructional media available to teachers at the click of a mouse.
- Integrated Controls ISO 9001 Quality Assurance Program
- As part of an effort to obtain an ISO 9001 certification, I evaluated, reorganized and created standards for how all maintenance contracts are managed.
- Integrated new procedures with existing company procedures to reduce waste and create an easy integration.
- Created procedures for each testing and maintenance for 15 different types of control systems that Integrated Controls currently supports.
- William Field Services Remote Video Controls System
- Designed, engineered and project managed a remote video control system to control pan/tilt/zoom cameras, matrix switchers, digital video servers at 8 compressor stations scattered through out NW New Mexico.
- Utilized H.263 CODEC transceivers using T1 lines all communicating back to operation headquarters in Bloomfield, NM.

- Equipment at each was designed to meet explosion proof standards of a natural gas compressor station.
- Northern Navajo Medical Center Access Control and Patient Tracking System
- Designed an integrated access control, infant abduction, digital video storage, patient tracking ID credential system.
- Designed systems to comply with HIPPA regulations.

Systems Engineer

May-1995 to Feb-2003 SCI Inc. Albuquerque

- -Technical Design of all systems.
- -Evaluating new products and technology.
- -Proposal Writing.
- -Analyzing ways to reduce the customers TCO and increase ROI.
- -Creating drafting standards.
- -Producing detailed design schematics.
- -Training of technical staff on all new products.
- -Coordinate with customers IT managers to integrate electronic security into the IT infrastructure.
- -Create relations with and evaluate subcontractors for use in implementing systems.
- -Participated in the New Mexico Technology showcase, marketing electronic security to IT managers.
- -SCI's in house network manager.
- In November of 1999, I participated in the creation of standards for the Hewlett Packard company and Agilent Technologies, to be used through North America for field office transition into two separate companies. By the close of 2000, I designed, coordinated, and managed the successful installation of 28 of these sites from Honolulu to Manhattan at costs ranging from \$42K to \$88K, constituting a total of 1.8M in a 12 month period. Our integration team met every installation move deadline for the time-critical projects and was under budget.
- Each system integrated Lenel access control, DSC alarms, analog and digital video, and telephony. All controlled through a regional server running SQL, replicating with local databases. For each project I created a complete set of detailed point-to-point drawings and coordinated with local subcontractors for a successful installation. I personally traveled to each site for commissioning of each system.

Systems Engineer

Oct-2000 to Apr-2001 ISR Freemont, CA

I participated in the design and implementation of a very high end security system for a company called Relera. This system included redundant enterprise servers located in Denver and regional servers located around the country. I managed the configuration of each server and commissioned the implementation at each site.

Each site also had its own Digital Video Server which would record up to 200 cameras onto 2.0TB raid 5 hard drives. Both types of server were managed and replicated back to the enterprise server located in Denver.

Project Engineer

Aug-1990 to Mar-1995 Goodrich Aerospace Albuquerque

I started my engineering career on the Aerosist Flight Experiment for NASA. I designed, built and implemented test equipment for the onboard command and telemetry units. These systems involved discrete analog and digital design as well as systems integration.

As Project Engineer, I was responsible for the production, testing, and delivery of telemetry systems for the Trident II missile defense system. I was responsible for the delivery of 5 million dollars of equipment per year. I was also responsible for the redesign of systems hardware due to component end of life, which involved a detailed knowledge of PCM technology and discrete electronics design. I also had the opportunity to be part of a design team that created a new piece of flight hardware for the Trident II system. This unit went from design to delivery in 3 months and gave me the experience of seeing a product from concept phase all the way to production and delivery.

Certificates

CCNA
Network +
SoftwareHouse
Lenel Systems
Nice Systems

Technical Skills

Polycom MGC-50 design and programming. Polycom VSX, FX and PVX design and programming
H.323, H.320 and SIP protocols.
Microsoft Office, AutoCad, Visio, Internet Tools, CSI Master Spec, Network Administration and TCP/IP protocols.

BIOGRAPHICAL SKETCH

NAME Elizabeth A. Krupinski, Ph.D.		POSITION TITLE Research Professor Radiology & Psychology Associate Director Evaluation Arizona Telemedicine Prog.	
EDUCATION (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	FIELD OF STUDY
Cornell University, Ithaca, NY	B.A.	1984	Exptl. Psychology
Montclair State College, Upper Montclair, NJ	M.A.	1987	General Psychology
Temple University, Philadelphia, PA	Ph.D.	1992	Exptl. Psychology

Professional Positions

1987-1992	Research Specialist, Department of Radiology, Univ of Pennsylvania
1988-1992	Instructor, Department of Psychology, Temple University
1992-1997	Research Assistant Professor, Depts Radiology & Psychology, Univ of Arizona
1996-present	Associate Director of Evaluation & Assessment, Arizona Telemedicine Program
1997-2003	Research Associate Professor, Depts Radiology & Psychology, Univ of Arizona
2003 – present	Research Professor, Depts Radiology & Psychology, Univ of Arizona

Awards & Honors

1. Most Outstanding Graduate Student-Arts & Sciences-Montclair State College, 1988.
2. Most Outstanding Graduate Student-Psychology-Montclair State College, 1988.
3. RSNA Certificate of Merit Award - RSNA 1996, 1998
4. Executive Council Award of the American Roentgen Ray Society 1996 (co-author)
5. Herbert M. Stauffer Award (Association of University Radiologists) - Outstanding Paper in *Academic Radiology* 1997
6. SPIE Medical Imaging (Perception & Performance) Honorable Mention Award – 1999, 2003, 2005
7. RSNA Resident Research Award (co-author) - 1997, 1998
8. *Radiology* Editor's Recognition Award for reviewing with Distinction - 1998, 1999
9. President Medical Image Perception Society – 1997 - present
10. American Association for Women Radiologists 2005 Research & Education Foundation Professional Leadership Award to attend the Association of American Medical Colleges Mid-Career Women Faculty Professional Development Seminar
11. Successes & Failures in Telehealth 4th International Conference Best Paper Award (session 2) 2004
12. Vice President American Telemedicine Association – 2006 – 2007
13. President Elect American Telemedicine Association – 2007 - 2008

Relevant Telemedicine & Observer Evaluation Publications (selected)

- (1) Weinstein RS, Bloom KJ, Krupinski EA, Rozek LS. (1992). Human performance studies of the video microscopy component of a dynamic telepathology system. *Zentralblatt Fur Pathologie*, 138, 399-401.
- (2) Krupinski EA, Weinstein RS, Bloom, KJ, Rozek LS. (1993). Progress in telepathology: system implementation and testing. In RS Weinstein (Ed). *Advances in Pathology & Laboratory Medicine*, Vol 6; St. Louis : Mosby; pp. 63-87.
- (3) Krupinski EA, Alsafadi Y. (1994). Lossy network transmission: influence on the detection of microcalcification clusters in mammograms. *Academic Radiology*, 1, 333-338.
- (4) Yu YP, Martinez R, Krupinski E, Weinstein R. (1994). Analysis of JPEG compression on communications in a telepathology system. *SPIE Medical Imaging*, 2165, 283-294.
- (5) Krupinski EA, Weinstein RS, Rozek LS. (1996). Experience-related differences in diagnosing medical images displayed on monitors. *Telemedicine Journal*, 2, 101-108.
- (6) Dunn BE, Almagro UA, Choi H, Sheth NK, Arnold JS, Recla DL, Krupinski EA, Graham AR, Weinstein RS. (1997). Dynamic-robotic telepathology : Department of Veterans Affairs feasibility study. *Human Pathology*, 28, 8-12.
- (7) Halliday BE, Bhattacharyya AK, Graham AR, Davis JR, Leavitt SA, Nagle RB, McLaughlin WJ, Rivas RA, Martinez R, Krupinski EA, Weinstein RS. (1997). Diagnostic accuracy of an international telepathology consultation service. *Human Pathology*, 28, 17-21.
- (8) Krupinski EA, Hopper L. (1997). Teleradiology in rural Arizona: user's perspective. *SPIE Medical Imaging*, 3035, 350-354.

- (9) Krupinski EA, Maloney K, Hopper L, Weinstein RS. (1997). Evaluation of radiologist performance using telemedicine services. J of Digital Imaging, 10,83-85.
- (10) Krupinski EA. (1999). Teleradiology satisfaction. Advance for Administrators in Radiology & Radiation Oncology, 9, 50-52.
- (11) Krupinski EA, Roehrig H, Furukawa T. (1999). Influence of film and monitor display luminance on observer performance and visual search. Acad Radiol, 6, 411-418.
- (12) Johnson JP, Lubin J, Krupinski EA, et al. (1999). Visual discrimination model for digital mammography. Proc SPIE Med Imag, 3663, 253-263.
- (13) Roehrig H, Krupinski EA. (1999). Image quality of monochrome and color displays for PACS workstations. In: CARS '99 Lemke HU et al (eds). Elsevier Science, The Netherlands, pp. 335-340.
- (14) Krupinski EA, LeSueur B, Ellsworth L, Levine N, et al. (1999). Diagnostic accuracy and image quality using a digital camera for teledermatology. Telemedicine Journal, 5, 257-263.
- (15) Krupinski EA, McNeill K, Ovitt TW, Alden S, Holcomb M. (1999). Patterns of use and satisfaction with a university-based teleradiology system. J Digital Imaging, 12, 166-167.
- (16) Krupinski EA, Webster P, Dolliver M, Weinstein RS, Lopez AM. (1999). Efficiency analysis of a multi-specialty telemedicine service. Telemedicine Journal, 5, 265-271.
- (17) Dunn BE, Choi H, Almagro UA, Recla DL, Krupinski EA, Weinstein RS. (2000). Routine surgical telepathology in the Department of Veterans Affairs: experience-related improvements in pathologist performance in 2200 cases. Telemedicine Journal, 5, 323-338.
- (18) Krupinski EA. (2000). The importance of perception research in medical imaging. Radiation Medicine, 18, 329-334.
- (19) Krupinski EA, Roehrig H. (2000). The influence of a perceptually linearized display on observer performance and visual search. Academic Radiology, 7, 8-13.
- (20) Krupinski EA. (2000). Practical applications of perceptual research. In: J Beutel, HL Kundel, RL Van Metter (Eds). Handbook of Medical Imaging Vol 1. Physics & Psychophysics. Bellingham, WA; SPIE Press, 895-929.
- (21) Krupinski EA, Gonzales M, Gonzales C, Weinstein RS. (2000). Evaluation of a digital camera for acquiring radiographic images for telemedicine applications. Telemedicine Journal and e-Health, 6, 297-302.
- (22) Krupinski EA, Roehrig H. (2000). Recent developments in evaluating soft-copy displays for medical images. Recent Research Developments in Optical Engineering, 3, 35-49.
- (23) Barker G, Krupinski EA, Laursen T, Erps K, Weinstein RS. (2001). Pay per view: the Arizona Telemedicine Program's billing results. Telemedicine J & e-Health, 7, 287-291.
- (24) Krupinski EA, Barker GP, Beinar S, Lopez AM, Weinstein RS. (2001). Fluctuations in service loads in an established telemedicine program. Telemedicine Journal & E-Health, 7, 27-31.
- (25) Weinstein RS, Descour MR, Liang C, Bhattacharyya AK, Graham AR, Davis JR, Scott KM, Richter L, Krupinski EA, Szymus J, Kayser K, Dunn BE. (2001). Telepathology overview: from concept to implementation. Human Pathology, 32:1283-1299.
- (26) Krupinski EA, McNeill KM. (2001). Teleradiology. In DA Miles (Ed). Oral and Maxillofacial Surgery Clinics: Maxillofacial Imaging: Principles and Applications; Philadelphia, PA: WB Saunders; pp.791-806.
- (27) Roehrig H, Krupinski EA, Furukawa T. (2001). Evaluation of a flat CRT monitor for use in radiology. Journal of Digital Imaging, 14:142-148.
- (28) Krupinski EA, Radvany M, et al. (2001). Enhanced visualization processing: effect on workflow. Acad Radiol, 8, 1127-1133.
- (29) Krupinski EA, Roehrig H. (2001). Observer performance using monitors with different phosphors – an ROC study. Proc SPIE Med Imaging, 4324, 18-22.
- (30) Krupinski EA. (2001). The possibility of low-cost telemedicine. Business Briefing: Next Generation Healthcare, CD-ROM Edition, 1-4.
- (31) Krupinski EA. (2002). Medical image perception: influence of monitor quality on observer performance. In: Quality Assurance: Meeting the Challenge in the Digital Medical Enterprise. Reiner BI, Siegel EL, Carrino JA (Eds). Society for Computer Applications in Radiology, Great Falls, VA, pp. 141-153.
- (32) Krupinski EA, Barker G, Rodriguez G, Engstrom M, Levine N, Lopez AM, Weinstein RS. (2002). Telemedicine versus in-person dermatology referrals: an analysis of case complexity. Telemedicine J & e-Health, 8, 143-147.
- (33) Krupinski EA, Nypaver M, Poropatich R, Ellis D, Safwat R, Sapci H. (2002). Clinical applications in telemedicine/telehealth. Telemedicine J & e-Health, 8, 13-34.
- (34) Krupinski EA. (2002). Clinical applications: present and future. In: RN Strickland (ed) Image Processing Techniques for Tumor Detection. New York, NY: Marcel Dekker, Inc., 47-70.
- (35) Krupinski EA, Roehrig H. (2002). Pulmonary nodule detection and visual search: P45 and P104 monochrome versus color monitor displays. Acad Radiol, 9:638-645.
- (36) Johnson JP, Krupinski E, Nafzinger J, Lubin J, Wus J, Roehrig H. (2002). Perceptually optimized compression of mammograms. Proc SPIE Medical Imaging, 4686, 256-262.

- (37) **Krupinski EA**. (2003). The future of image perception in radiology: synergy between humans and computers (Guest Editorial). *Acad Radiol*, 10, 1-3.
- (38) Bluemke DA, **Krupinski EA**, Ovitt T, Gear K, Unger E, Axel L, Box LM, Casolo G, Ferrari VA, Funaki B, Globits S, Higgins CB, Julsrud P, Lipton M, Mawson J, Nygren A, Pennell DJ, Stillman A, White RD, Wichter T, Marcus F. (2003). MR imaging of arrhythmogenic right ventricular cardiomyopathy: morphologic findings and interobserver reliability. *Cardiology*, 99:153-162.
- (39) Baskaran V, Pereles FS, Georganos SA, Shaibani A, Spero KA, **Krupinski EA**, Zhang A, Finn JP. (2003). Myelographic MR imaging of the cervical spine with a 3D true fast imaging with steady-state precision technique: initial experience. *Radiology* 2003;227:585-592.
- (40) **Krupinski E**, Johnson J, Roehrig H, Lubin J. (2003). Using a human visual system model to optimize soft-copy mammography display: influence of display phosphor. *Acad Radiol*, 10:161-166
- (41) **Krupinski EA**, Berger WG, Dallas WJ, Roehrig H. (2003). Searching for nodules: what features attract attention and influence detection? *Academic Radiology*, 10, 861-868.
- (42) **Krupinski EA**, Johnson J, Roehrig H, Engstrom M, Fan J, Nafziger J, Lubin J, Dallas WJ. (2003). Using a human visual system model to optimize soft-copy mammography display: influence of MTF compensation. *Academic Radiology*, 10, 1030-1035.
- (42) **Krupinski EA**, Lopez AM, Lyman T, Barker G, Weinstein RS. (2004). Continuing education via telemedicine: analysis of reasons for attending or not attending. *Telemedicine Journal and e-Health*, 10, 403-409.
- (43) **Krupinski EA**, Johnson J, Roehrig H, Nafziger J, Fan J, Lubin J. (2004). Use of a human visual system model to predict observer performance with CRT vs LCD display of images. *J Digital Imaging*, 17, 258-263.
- (44) Lopez AM, Avery D, **Krupinski E**, Lazarus S, Weinstein RS. (2005). Increasing access to care via tele-health the Arizona experience. *J Ambulatory Care Management*, 28:16-23.
- (45) Weinstein RS, Descour MR, Liang C, Barker G, Scott KM, Richter L, **Krupinski EA**, Bhattacharyya AK, Davis JR, Graham AR, Rennels M, Russum WC, Goodall JF, Zhou P, Olszak AG, Williams BH, Wyant JC, Bartels PH. (2004). An array microscope for ultrarapid virtual slide processing and telepathology. Design, fabrication, and validation study. *Human Pathology*, 35, 1303-1314.
- (46) Barker GP, **Krupinski EA**, McNeely RA, Holcomb MJ, Lopez AM, Weinstein RS. (2005). The Arizona Telemedicine Program business model. *Journal of Telemedicine & Telecare*, 11, 397-402.
- (47) Cruz M, **Krupinski EA**, Lopez AM, Weinstein RS. (2005). A review of the first five years of the University of Arizona telepsychiatry programme. *Journal of Telemedicine & Telecare*, 11, 234-239.
- (48) **Krupinski EA**, Johnson J, Roehrig H, Nafziger J, Lubin J. (2005). On-axis and off-axis viewing of images on CRT displays and LCDs: observer performance and vision model predictions. *Academic Radiology*, 12:957-964.
- (49) **Krupinski EA**, Roehrig H, Dallas W, Fan J. (2005). Differential use of image enhancement techniques by experienced and inexperienced observers. *Journal of Digital Imaging*, 18, 311-315.
- (50) Fan J, Roehrig H, Sundareshan MK, **Krupinski E**, Dallas WJ, Gandhi K. (2005). Evaluation of and compensation for spatial noise of LCDs in medical applications. *Medical Physics*, 32, 578-587.
- (39) **Krupinski EA**. (2005). Visual search of mammographic lesions: influence of lesion subtlety. *Academic Radiology*, 12: 965-969.
- (51) Siegel E, **Krupinski E**, Samei E, Flynn M, Andriole K, Erickson B, Thomas J, Badano A, Seibert A, Pisano ED. (2006) Digital mammography image quality: image display. *Journal of the American College of Radiology*, 3:615-627.
- (52) **Krupinski EA**, Lubin J, Roehrig H, Johnson J, Nafziger J. (2006). Using a human visual system model to optimize soft-copy mammography display: influence of veiling glare. *Academic Radiology*, 13:289-295.
- (53) **Krupinski EA**, Tillack AA, Richter L, Henderson JT, Bhattacharyya AK, Scott KM, Graham AR, Descour MR, Davis JR, Weinstein RS. (2006). Eye-movement study and human performance using telepathology virtual slides. Implications for medical education and differences with experience. *Human Pathology*, 37:1543-1556.
- (54) Weinstein RS, Lopez AM, Barker GP, **Krupinski EA**, Descour MR, Scott KM, Richter LC, Beinar S, Holcomb MJ, Bartels PH, McNeely RA, Bhattacharyya AK. (2007). The innovative bundling of teleradiology, telepathology, and teleoncology services. *IBM Systems Journal*, In Press.

Total publications = 201 (17 invited). Total presentations = 294 (231 invited). Both since 1987.

C. Research Support

ACTIVE

1) Eyestrain in radiologists (Krupinski)

NIH/NIBIB

Role: PI

04-01-06 – 1-31-09

The goals of this grant are to objectively measure visual fatigue in radiologists as they read in the digital environment and to measure the effect fatigue has on diagnostic performance.

2) Arizona Telemedicine Program (Weinstein) 01-01-96 – present (ongoing)
State of Arizona Role: Associate Director of Research
The goals of this project are to enhance health care delivery to medically-underserved populations throughout the state using telemedicine technologies through education, research and clinical services.

Last 5 Years Grants & Projects

1) Soft copy display for digital mammography (Roehrig) 01/01/00 - 12/31/03

NIH/NCI Role: Psychophysicist.
The major goals of this project are to develop a user interface for displaying digital mammograms that is perceptually optimized in relation to the radiologist observer so that diagnostic performance is optimized. No overlap.

2) Improving CRT display of digital mammograms (Roehrig) 04/01/00 - 03/31/03

NIH/NCI Role: Psychophysicist.
3) Optimizing Softcopy Displays for Digital Mammography (Krupinski) 09/01/00 - 08/31/04

NIH/NCI Role: PI, psychophysicist
The major goals of this project are to enhance and validate a model of human visual system performance that will then be used to systematically explore and optimize design tradeoffs for current and future digital mammography display systems.

4) Arizona Telemedicine Program (Weinstein) 06/01/97 –
05/31/01
Office Rural Health Policy Role: Director Evaluation & Assessment
The major goals of this program are to provide telemedicine services to sites in AZ. In my role, I conduct feasibility studies, image perception studies, and other related studies pertaining to observer performance and program evaluation. Particularly relevant are studies dealing with teleradiology, telepathology and teledermatology – all of which have crucial image perception components.

5) 8-bit vs 11-bit softcopy display for radiology: diagnostic accuracy and visual search (Krupinski) 02-
01-05 – 06-30-06
USAMRMC/TATRC Role: PI
The goal of this project is to determine if diagnostic accuracy and visual search efficiency are affected by the bit-depth of the display device.

TAG Participant BioSketches

Laura Banks, DVM, MPH

Dr. Banks is Associate Director of the University of New Mexico Center for Disaster Medicine located in Albuquerque. She directs the Critical Response and Emergency Systems Training Program, which has been funded by the federal Bioterrorism Training and Curriculum Development Program since 2003. This program provides emergency preparedness and response training for healthcare and public health professionals in New Mexico and Arizona, using a variety of methods including didactic and skills training and distance learning methods. In addition to project direction, Dr. Banks is a lecturer in the fields of public health, infectious disease, and emergency response. She provides instruction through conference presentations, on-line learning, disaster operations trainings, undergraduate and graduate courses, and telehealth presentations. Dr. Banks is a member of the New Mexico Public Health Emergency Planning and Response Advisory Committee and the New Mexico Education and Training Advisory Committee.

Mark Carroll, MD

Mark Carroll, MD is the Indian Health Service (IHS) Telehealth Program director. Dr. Carroll has served Indian health care in multiple clinical, administrative, and program development capacities since 1992. He has been involved in telehealth projects and activities for many years. He has also supported various IHS initiatives and activities related to telehealth care, information technology, performance improvement/clinical quality, adolescent health, school-based health care, community epidemiology/public health, and health promotion/community wellness program development.

Dr. Carroll received his undergraduate degree from Dartmouth College and his medical school degree from Dartmouth Medical School. He completed general surgical internship training at the Presbyterian-University of Pennsylvania Medical Center, pediatric residency training at the Children's Hospital of Philadelphia, and fellowship training in the Robert Wood Johnson Clinical Scholars Program at Stanford University. He has been the recipient of numerous awards, and has worked in diverse university, private, and public health settings since his post-graduate training.

Michael Belgarde

Mr. Belgarde is the Chief Information Officer (CIO) with current Billet 99HG845 at the Navajo Area Office (NAO) in Window Rock, Arizona. As a CIO for Navajo Area Indian Health Service (NAIHS), he supervises staff at NAO and 6 hospitals, 7-health centers, and 15 health stations providing context and perspective with IHS National 2006-2011 Strategic Plan. The Navajo Nation is the largest Indian tribe in the United States and has the largest reservation, which encompasses more than 25,000 square miles. Mr. Belgarde has provided leadership and direction for NAIHS with initiatives from the Office of

Information Technology (OIT) and Headquarters (HQ). In addition, he has implemented large scale projects from the Annual Acquisition Plan for the IRM/MIS department, NAO and NAIHS some of which include: Electronic Health Record (EHR) Preparation and Implementation, Master Person Index, Vista Imaging Installation in coordination with Division of Biomedical Engineering (OEHE), Integrated Service Router (ISR) Preparation to facilitate encryption and anti virus at wire speed with bandwidth utilization.

Mr. Belgarde is "Basic Readiness" deployable with the OFRD to assist in a disaster situation. He was selected to serve as CIO of the Navajo Area Office (NAO), with a billet increase to O-6 and has successfully completed the Executive Leadership Development Program (ELDP), which is an IHS Nationwide Programs and Initiatives goal for young emerging leaders. Mr. Belgarde has formed Cross Functional Interdisciplinary Teams across Service Units as a Project Officer and the Contracting Officer Technical Representative to facilitate several million dollar projects across Navajo Area IHS for FY07. He has worked closely with the University of Arizona (UofA) at Tucson with the Arizona Telemedicine Program (ATP) to create and facilitate an avenue for IHS to transmit TeleRadiology images to be examined and interpreted for emergencies involving patient care. Along with his IRM/MIS staff, he has completed and complied with Security Risk (RA) Assessments area wide as mandated by HHS and have the Certification and Accreditation (C&A) and Plan of Action and Milestones (POA&M) scheduled for the first quarter of FY07.

Mr. Belgarde has successfully completed the Project Officer (PO), Performance Based Scope of Work (PBSOW), and Acquisitions for Supervisors Training courses to assist with (6) digit procurements for NAIHS. He oversees the constant heavy workload of the office with support and service requests from NAO and the 6 Federal and 2 638 Service Units.

Wesley Old Coyote

Wesley Old Coyote provides Health Care Delivery systems Strategic Planning and Telehealth Infrastructure development support as the Chief Information Officer of the Tucson Area IHS. He most recently served as the Deputy Chief Information Officer (Indian Health Service), supporting a broad range of Digital Information Systems, Administrative and Clinical systems, Electronic Health Record deployment, Telecommunications Infrastructure Development and Integration, Telehealth Infrastructure assessment, Policy Development and Implementation, and Strategic Planning.

Mr. Old Coyote began his IT career in the U.S. Navy operating and supporting the Tomahawk and Harpoon Cruise Missile systems, Tomahawk Afloat Planning systems, Mission Planning systems, Digital Imagery systems, Satellite Communications Systems Management and Cruise Missile Support activities. Mr. Old Coyote joined the Indian Health Service as the Chief Information Officer of the Navajo Area IHS. He has also

worked with the Phoenix Area IHS, where he was the Director of the Information Resource Management. In May 2002, he returned to the Navajo Area IHS, where he continued with the development of the NAIHS Telehealth and Telemedicine network infrastructure. In FY 2003-04, Mr. Old Coyote performed National IHS-wide systems infrastructure assessments in support of the Electronic Health Record (EHR) and Telemedicine systems implementation projects.

Mr. Old Coyote earned his B.S. in Business Administration (MIS major) and recently served on the HHS Enterprise Architecture Review Board, HHS Data Architecture Workgroup, HHS Telecommunications Council, HHS IPv6 Integration Committee and has served on the IHS Information Systems Advisory Council, IHS Information Systems Coordinator Committee, IHS Southwest Telehealth Consortium, Navajo Area Telehealth Committee, Navajo Area IHS 638 negotiations member and Phoenix Area IHS 638 IT advisor. He continues to provide support and technical assistance for Self-Determination contracting discussions in direct support of Tribal Self Governance nationwide.

Mr. Old Coyote is an enrolled member of the Crow Tribe located in south central Montana.

Mike Holcomb

Mike Holcomb is the Associate Director of Network Architecture for the Arizona Telemedicine Program (ATP). He has worked with the program since 1997 and was promoted from Network Manager to his current position as Associate Director in November of 2002.

Mr. Holcomb has played a key role in the development and support of the Arizona Telemedicine Program network, which has grown from a pilot project involving 8 initial rural Arizona locations to a sustainable membership supported program that is continuing to grow and has successfully partnered with and connected with over 60 healthcare organizations throughout the State of Arizona.

TAG Participant BioSketches

Laura Banks, DVM, MPH

Dr. Banks is Associate Director of the University of New Mexico Center for Disaster Medicine located in Albuquerque. She directs the Critical Response and Emergency Systems Training Program, which has been funded by the federal Bioterrorism Training and Curriculum Development Program since 2003. This program provides emergency preparedness and response training for healthcare and public health professionals in New Mexico and Arizona, using a variety of methods including didactic and skills training and distance learning methods. In addition to project direction, Dr. Banks is a lecturer in the fields of public health, infectious disease, and emergency response. She provides instruction through conference presentations, on-line learning, disaster operations trainings, undergraduate and graduate courses, and telehealth presentations. Dr. Banks is a member of the New Mexico Public Health Emergency Planning and Response Advisory Committee and the New Mexico Education and Training Advisory Committee.

Mark Carroll, MD

Mark Carroll, MD is the Indian Health Service (IHS) Telehealth Program director. Dr. Carroll has served Indian health care in multiple clinical, administrative, and program development capacities since 1992. He has been involved in telehealth projects and activities for many years. He has also supported various IHS initiatives and activities related to telehealth care, information technology, performance improvement/clinical quality, adolescent health, school-based health care, community epidemiology/public health, and health promotion/community wellness program development.

Dr. Carroll received his undergraduate degree from Dartmouth College and his medical school degree from Dartmouth Medical School. He completed general surgical internship training at the Presbyterian-University of Pennsylvania Medical Center, pediatric residency training at the Children's Hospital of Philadelphia, and fellowship training in the Robert Wood Johnson Clinical Scholars Program at Stanford University. He has been the recipient of numerous awards, and has worked in diverse university, private, and public health settings since his post-graduate training.

Michael Belgarde

Mr. Belgarde is the Chief Information Officer (CIO) with current Billet 99HG845 at the Navajo Area Office (NAO) in Window Rock, Arizona. As a CIO for Navajo Area Indian Health Service (NAIHS), he supervises staff at NAO and 6 hospitals, 7-health centers, and 15 health stations providing context and perspective with IHS National 2006-2011 Strategic Plan. The Navajo Nation is the largest Indian tribe in the United States and has the largest reservation, which encompasses more than 25,000 square miles. Mr. Belgarde has provided leadership and direction for NAIHS with initiatives from the Office of

Information Technology (OIT) and Headquarters (HQ). In addition, he has implemented large scale projects from the Annual Acquisition Plan for the IRM/MIS department, NAO and NAIHS some of which include: Electronic Health Record (EHR) Preparation and Implementation, Master Person Index, Vista Imaging Installation in coordination with Division of Biomedical Engineering (OEHE), Integrated Service Router (ISR) Preparation to facilitate encryption and anti virus at wire speed with bandwidth utilization.

Mr. Belgarde is "Basic Readiness" deployable with the OFRD to assist in a disaster situation. He was selected to serve as CIO of the Navajo Area Office (NAO), with a billet increase to O-6 and has successfully completed the Executive Leadership Development Program (ELDP), which is an IHS Nationwide Programs and Initiatives goal for young emerging leaders. Mr. Belgarde has formed Cross Functional Interdisciplinary Teams across Service Units as a Project Officer and the Contracting Officer Technical Representative to facilitate several million dollar projects across Navajo Area IHS for FY07. He has worked closely with the University of Arizona (UofA) at Tucson with the Arizona Telemedicine Program (ATP) to create and facilitate an avenue for IHS to transmit TeleRadiology images to be examined and interpreted for emergencies involving patient care. Along with his IRM/MIS staff, he has completed and complied with Security Risk (RA) Assessments area wide as mandated by HHS and have the Certification and Accreditation (C&A) and Plan of Action and Milestones (POA&M) scheduled for the first quarter of FY07.

Mr. Belgarde has successfully completed the Project Officer (PO), Performance Based Scope of Work (PBSOW), and Acquisitions for Supervisors Training courses to assist with (6) digit procurements for NAIHS. He oversees the constant heavy workload of the office with support and service requests from NAO and the 6 Federal and 2 638 Service Units.

Wesley Old Coyote

Wesley Old Coyote provides Health Care Delivery systems Strategic Planning and Telehealth Infrastructure development support as the Chief Information Officer of the Tucson Area IHS. He most recently served as the Deputy Chief Information Officer (Indian Health Service), supporting a broad range of Digital Information Systems, Administrative and Clinical systems, Electronic Health Record deployment, Telecommunications Infrastructure Development and Integration, Telehealth Infrastructure assessment, Policy Development and Implementation, and Strategic Planning.

Mr. Old Coyote began his IT career in the U.S. Navy operating and supporting the Tomahawk and Harpoon Cruise Missile systems, Tomahawk Afloat Planning systems, Mission Planning systems, Digital Imagery systems, Satellite Communications Systems Management and Cruise Missile Support activities. Mr. Old Coyote joined the Indian Health Service as the Chief Information Officer of the Navajo Area IHS. He has also

worked with the Phoenix Area IHS, where he was the Director of the Information Resource Management. In May 2002, he returned to the Navajo Area IHS, where he continued with the development of the NAIHS Telehealth and Telemedicine network infrastructure. In FY 2003-04, Mr. Old Coyote performed National IHS-wide systems infrastructure assessments in support of the Electronic Health Record (EHR) and Telemedicine systems implementation projects.

Mr. Old Coyote earned his B.S. in Business Administration (MIS major) and recently served on the HHS Enterprise Architecture Review Board, HHS Data Architecture Workgroup, HHS Telecommunications Council, HHS IPv6 Integration Committee and has served on the IHS Information Systems Advisory Council, IHS Information Systems Coordinator Committee, IHS Southwest Telehealth Consortium, Navajo Area Telehealth Committee, Navajo Area IHS 638 negotiations member and Phoenix Area IHS 638 IT advisor. He continues to provide support and technical assistance for Self-Determination contracting discussions in direct support of Tribal Self Governance nationwide.

Mr. Old Coyote is an enrolled member of the Crow Tribe located in south central Montana.

Mike Holcomb

Mike Holcomb is the Associate Director of Network Architecture for the Arizona Telemedicine Program (ATP). He has worked with the program since 1997 and was promoted from Network Manager to his current position as Associate Director in November of 2002.

Mr. Holcomb has played a key role in the development and support of the Arizona Telemedicine Program network, which has grown from a pilot project involving 8 initial rural Arizona locations to a sustainable membership supported program that is continuing to grow and has successfully partnered with and connected with over 60 healthcare organizations throughout the State of Arizona.

Appendix 5



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Albuquerque Area Indian Health Service
5300 Homestead Rd, NE
Albuquerque, New Mexico 87110

April 23, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This serves as the Albuquerque Area Indian Health Service letter of commitment to partner with the University of New Mexico in the proposed FCC Rural Healthcare Pilot program.

**IHS Albuquerque Area:
Regional Internet 2 Access for IHS Wide Area Network**

I. Contact Information

A. Fiscal Point-of-Contact
Rhonda Boal
Chief Financial Officer
Division of Financial Management
Albuquerque Area Office
5300 Homestead Rd. NE
Albuquerque, New Mexico 87110
(505) 248-4582
e-mail: Rhonda.Boal@ihs.gov

Program Point-of-Contact
Joseph F. Lucero
Director
Division of Information Management Service
Albuquerque Area Office
5300 Homestead Rd. NE
Albuquerque, New Mexico 87110
e-mail: Joseph.Lucero@ihs.gov

II. Scope of Work

A. Goals and objectives.

The goal for Albuquerque Area Office is to access to Internet2 along with the Indian Health Service Navajo, Phoenix, and Tucson Areas. This means **upgrading our current routers** in order to assure that a secure and reliable device can support the various types of protocols required for communication into Internet2.

This project will result in the following outcomes:

- Provide an avenue to expand our Tele-health services in a secure and efficient manner to our Business Partners. In addition other "Doors" will be able to be opened to allow for our remote locations to access health, technical and administrative support services.

B. Previous experience in developing and managing telemedicine programs.

Current ABQ Area IHS sites transmitting images:

- Albuquerque Indian Health Center
- ACL Hospital (Transmitting X-ray images)
- Jemez Health Center (all images sent to PACS)
- Dulce Health Center (all images sent to PACS)
- Zuni Indian Hospital (all images sent to PACS)
- Mescalero Indian Hospital* (X-ray images transmits)

Albuquerque Area currently utilizes and supports 7 (seven) Tele-video Systems for supporting Tele-Behavioral Health Consults.

C. Project oversight.

Albuquerque Area will also support its own regional telemedicine network and activities via the existing administrative and clinical infrastructure/leadership of those Areas.

D. Indicate to what extent your network can be self-sustaining once established.

Sustaining Internet2 access once established will be supported by IHS Technical staff up to the "edge" of the Indian Health Service Network.

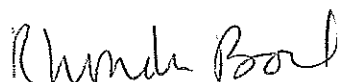
The total requested budget for proposed year 1 \$169,830 and include the following:

Hardware		
Fiber Connection Between AIH and UNM		21,250
<u>AIH Router</u>		
Cisco 3845	\$	14,000.00
DS3 module	\$	5,000.00
Fiber Module (need 2 modules)	\$	10,000.00
AIH Router Total		24,650
<u>AAO Router</u>		
Cisco 3845	\$	14,000.00
DS3 Module to AIH	\$	5,000.00
DS3 Module to Verizon	\$	5,000.00
WICs to T1 Need 14 WICS (14x700)	\$	9,800.00
AAO Router Total	\$	28,730.00
8 Service Units (Need 8 Cisco 3845's)		8 x \$14000 = \$95,200

For these items Albuquerque Area Indian Health Service has also committed to \$29,970 in matching funds for proposed year 1. Albuquerque Area Indian Health Service will supply the University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Thank you,

A handwritten signature in black ink, appearing to read "Rhonda Boal". The signature is fluid and cursive, with the first name "Rhonda" and last name "Boal" clearly distinguishable.

Rhonda Boal
Chief Financial Officer
Division of Financial Management
Albuquerque Area Office
5300 Homestead Rd. NE
Albuquerque, New Mexico 87110
(505) 248-4582
E-mail: Rhonda.Boal@ihs.gov



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

April 16, 2007

Navajo Area
Indian Health Service
P.O. Box 9020
Window Rock, Arizona 86515-9020

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This serves as the Navajo Area Indian Health Service letter of commitment to partner with the University of New Mexico in the proposed FCC Rural Healthcare Pilot program.

The Navajo Area IHS (NAIHS) Program's goals with respect to the FCC Rural Healthcare Pilot program are to upgrade its existing wide area network infrastructure to enable increased security and redundancy of telemedicine communications and to implement modern quality of service technologies that are critical to telemedicine communications. By implementing modern telecommunications carrier class network backbone technologies, NAIHS will be well positioned to interoperate with regional network partners via national high-speed backbone networks such as Internet2 or NLR.

The NAIHS Program's objectives with respect to the FCC Rural Healthcare Pilot program are:

- Create a high speed platform with Internet2 as the backbone for Telemedicine:
 - X-Ray Reads - The NAIHS has patients that are routine (back pain, etc...) and emergencies (Trauma, Blood Clots, Hemorrhage in liver or spleen, etc...),
 - CT Scan
 - Ultra Sounds
 - Chest
 - Spine
 - Abdomen
 - Arm and Leg
 - Mammograms
 - Etc...
 - X-Ray Consults - The NAIHS has patients who are in need of emergent neurosurgical consultations.
 - Head Trauma
- Reduce Contract Health Service (CHS) costs to minimize potential relocation of patients outside the NAIHS service area.
- Enable increased security and redundancy of telemedicine communications
 - Create a Mesh WAN topology capable of disaster recovery and resilience.
 - Install Carrier class Router at NAO w/ Security Bundle feature.
 - Install ISR Routers at Service Units, Health Centers, and Health Stations.
 - Install LAN switching fabric at Service Units, Health Centers, and Health Stations.
 - Install Active Directory Domain Controllers

The Navajo Area IHS (NAIHS) has experience with developing and managing telemedicine program partnerships and collaborations with:

- The Arizona Telemedicine Program (ATP)
- The Regents of the University of New Mexico, for its public operation known as the Health Sciences Center, specifically for the School of Medicine, Department of Neurosurgery and University Hospital ("UNMHSC")

These partnerships and collaborations involve the following legal document arrangements and agreements:

- Memorandum of Understanding (MOU) agreements.
- FISMA Clearance
- Interconnection Service Agreement (ISA)
- Section 508 Compliance
- Business Partner Agreement (BPA)

These partnerships and collaborations have involved the following WAN / LAN infrastructure considerations and infrastructure build outs:

- Dedicated Telemedicine WAN circuits accommodating the payload transmission of NAIHS X-Ray DIACOM image files for Reads and Consults.
- Dedicated Telemedicine Routers.

VLAN of LAN traffic at Service Units, Health Centers, and Health Stations.

Leadership Structure:

The Navajo Area IHS is under IHS which is under the parent organization Department of Health and Human Services (DHHS). The leadership component can be traced to the CIO of IHS Dr. Theresa Cullen and the Southwest Health Consortium (Phoenix, Albuquerque, Tucson, and Navajo Area Offices). These leadership vessels meet routinely throughout the Fiscal year.

- Charles Havekost as CIO of DHHS
- Dr. Theresa Cullen as CIO of IHS
- LCDR Michael J. Belgarde as CIO of Navajo Area HIS (NAIHS)

Management Structure:

The project management will be project management will be largely the responsibility of LCDR Michael J. Belgarde with the brain trust of:

- IHS Office of Information Technology (OIT)
- IHS Network Operations Security Center (NOSC)
- Arizona Telemedicine Program (ATP)
- Federal Contractor Awardees

Work Plan and Schedule:

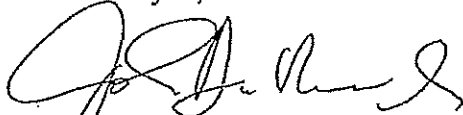
The Navajo Area IHS (NAIHS) work plan if awarded involves:

- Year 1
 - Comply with Federal Acquisition Requirements (FAR)
 - Author a Performance Based Scope of Work (PBSOW) for Mesh WAN topology Hardware (HW)
 - Complete the PBSOW for a Contractor
 - Coordinate with partnerships, collaborations and the brain trust
 - Order leased circuits
 - Enroll leased circuits with the Universal Service Administration Company (USAC)

The total requested budget for proposed year 1 (\$1,605,000) and potential year 2 (\$625,000) for a total amount of \$2,230,000 and include upgrade cored and edge routing and firewall equipment first year, second year, additional core network upgrades and network edge device upgrades, seeking to cover costs of backbone and spoke private line services that are not eligible under previous USF Rural Healthcare funding restrictions that limited eligibility to rural areas. For these items Navajo Area Indian Health Service has also committed to (\$240,000) in matching funds for proposed year 1 and potential year 2 in the amount of (\$170,000) for a total of \$410,000. Navajo Area Indian Health Service will supply the University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Thank you,

A handwritten signature in black ink, appearing to read "John Hubbard, Jr.", is written over the typed name.

John Hubbard, Jr., Area Director
Navajo Area Indian Health Service



Indian Health Service
Tucson Area Office
Office of the Director
7900 South "J" Stock Road
Tucson, AZ 85746-9352

April 16, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This serves as the Tucson Area Indian Health Service letter of commitment to partner with the University of New Mexico in the proposed FCC Rural Healthcare Pilot program. The project goal is to develop and implement a high availability Tucson regional Telehealth network within two years that will achieve the following outcomes:

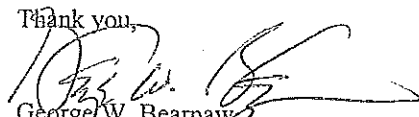
- Connection of 95% of the Tucson Area providers, who will be able to actively share electronic health information with Tucson Area IHS facilities;
- Improved access to health care resources, quality of care and quality transparency by providing timely health information to providers and beneficiaries;
- Improved coordination of care for chronic diseases and increase preventive interventions;
- Improved coordination between behavioral health and physical health services which will reduce medication errors/abuse and increase case management effectiveness;
- Reduction in medical costs associated with prescription errors, diagnostic lab/radiology test redundancy, unnecessary emergency room utilization and medical errors;
- Implement open source tools to meet technical standards common to web technologies and internet connectivity.

The TAIHS CIO's previous experience in developing and managing telemedicine programs include: served as the CIO of the Navajo Area IHS and Director of Information Resource Management at the Phoenix Area IHS, worked collaboratively with hospital and health care center staffs in developing Telehealth network infrastructure in support of connectivity to the Arizona Telemedicine Network. Provided technical and administrative support for infrastructure development for telemedicine clinical services, distance learning, videoconferencing and modalities to include; radiology, dermatology, retinal screening, cardiology, and mental health. Provide technical and administrative oversight of current telehealth infrastructure and future FCC Rural Health Care Pilot Program for the Tucson Area IHS. Previous experience in working with the USDA's Universal Service Administration in support of the Navajo, Phoenix, and Tucson Areas infrastructure expansion and development. Tucson area network will be 100% self-sustaining. I2 connectivity along with local circuit access will continue to be funded and supported beyond the two-year pilot period. Along with the existing Universal Service funded circuits, the Pilot Program establishes funding support for Internet2 access that would otherwise be extremely costly IHS Areas and facilities. The Tucson Area IHS will monitor the project and access improvement for enhanced access to health care resources to IHS and Tribal facilities.

The total requested budget for proposed year 1 (\$192,000) and potential year 2 (\$130,000) is in the amount of \$322,000 and include upgrade routing and WAN network equipment in first year, additional network upgrades second year, fiber and expanded bandwidth connectivity to San Simon and San Xavier facilities, San Simon, \$48,000 for fiber and connectivity in first year, \$32,000 for connectivity second year, San Xavier, \$94,000 for fiber and connectivity in first year, \$48,000 for connectivity in second year. For these items Tucson Area Indian Health Service has also committed to (\$28,800) in matching funds for proposed year 1 and (\$19,500 for potential year 2 for a total of \$48,300. Tucson Area Indian Health Service will supply the University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Thank you,



George W. Bearpaw
Area Director, TAIHS

Fiscal Agent contact information

Marilyn Lomakema
Senior Contracting Officer
7900 South J. Stock Road
Tucson, AZ 85746



Information Technology Services
Computing Services

April 16, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This letter serves as the Information Technology Services (ITS) letter of commitment to participate in the FCC Rural Healthcare Pilot Program Proposal. The Scope of Work is:

- 1) To provide access into the rural areas of New Mexico to the national high-speed communication backbones of Internet2 and National Lambda Rail for TeleHealth services.
- 2) To provide efficiency, better management capabilities and lower connection costs by using existing aggregation points (GigaPops) of Networks.
- 3) To provide a secure and reliable statewide network of networks that interconnects to the national networks.

The total requested budget for proposed year 1 is (\$3,650,000) and for potential year 2 is (\$1,600,000) bringing the total amount to \$5,250,000, which includes Computer Software, Equipment and Materials and Services. For these items ITS has also committed to \$933,333.34 in matching funds for proposed year 1 and potential year 2 the amount of (\$933,333.34) for a total of \$1,866,666.66. Accordingly, ITS will supply the University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Sincerely,

Moira Gerety, Director
Information Technology Services (ITS)

April 23, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This serves as the New Mexico Institute of Mining and Technology (NM Tech) letter of commitment to partner with the University of New Mexico in the proposed FCC Rural Healthcare Pilot program. Scope of work relative to the budget is as follows:

Access:

Provide access into the rural areas of New Mexico to the national high-speed communication backbones of Internet2 (I2) and National LambdaRail (NLR) for TeleHealth services.

Efficiency:

Provide efficient, professionally managed core network facilities that maximize network performance and lower connection costs by using existing aggregation points of Networks (e.g. GigaPops).

Reliability:

Provide a secure and reliable statewide network of networks that interconnects to the national and international resources.

Scalability:

Provide a network infrastructure that maximizes the number of connected areas and institutions in the southwest United States.

The University of New Mexico (UNM), New Mexico Institute of Mining and Technology (NMIMT) and New Mexico State University (NMSU) oversee the operation of expansive and reliable campus, statewide and national networks that interconnect higher education, public education, government and national laboratories to commodity and research networks. These include a state fiber network, the Internet (I1), I2 and NLR. The network includes rural higher education campuses, agricultural experiment stations, tribal networks, research parks and the Albuquerque and Las Cruces metro areas. Many TeleHealth services use these networks.

Existing statewide networking partnerships include CHECSNet, NMLR (New Mexico Lambda Rail), Sandoval Broadband, GSD (General Services Division of NM State Government), ITTH (Internet to the Hogan) and the Rio Grande Optical Network. These networks are interconnected at aggregation points, or "GigaPops", in the southern, central northern regions of New Mexico. Each POP managed and maintained by professional network engineers 24/7. The depth and breadth of this operational responsibility has built up knowledge and expertise to support any proposed networking initiatives. The facilities also utilize extensive electronic networking monitoring, including load balancing and intrusion detection, to oversee this "network of networks". A minimal investment would be required to monitor the new rural TeleHealth sites.

April 23, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This serves as the New Mexico State University (NMSU) letter of commitment to partner with the University of New Mexico in the proposed FCC Rural Healthcare Pilot program. Scope of work relative to the budget is as follows:

Access:

Provide access into the rural areas of New Mexico to the national high-speed communication backbones of Internet2 (I2) and National LambdaRail (NLR) for TeleHealth services.

Efficiency:

Provide efficient, professionally managed core network facilities that maximize network performance and lower connection costs by using existing aggregation points of Networks (e.g. GigaPops).

Reliability:

Provide a secure and reliable statewide network of networks that interconnects to the national and international resources.

Scalability:

Provide a network infrastructure that maximizes the number of connected areas and institutions in the southwest United States.

The University of New Mexico (UNM), New Mexico Institute of Mining and Technology (NMIMT) and New Mexico State University (NMSU) oversee the operation of expansive and reliable campus, statewide and national networks that interconnect higher education, public education, government and national laboratories to commodity and research networks. These include a state fiber network, the Internet (I1), I2 and NLR. The network includes rural higher education campuses, agricultural experiment stations, tribal networks, research parks and the Albuquerque and Las Cruces metro areas. Many TeleHealth services use these networks.

Existing statewide networking partnerships include CHECSNet, NMLR (New Mexico Lambda Rail), Sandoval Broadband, GSD (General Services Division of NM State Government), ITTH (Internet to the Hogan) and the Rio Grande Optical Network. These networks are interconnected at aggregation points, or "GigaPops", in the southern, central northern regions of New Mexico. Each POP managed and maintained by professional network engineers 24/7. The depth and breadth of this operational responsibility has built up knowledge and expertise to support any proposed networking initiatives. The facilities also utilize extensive electronic networking monitoring, including load balancing and intrusion detection, to oversee this "network of networks". A minimal investment would be required to monitor the new rural TeleHealth sites.

The Universities and the State of New Mexico General Services Department (GSD) will continue their existing partnership to provide project management and collaborative leadership to achieve the goals and objectives of the proposal. Our partnership has formal memoranda of understanding (MOU), and we work together to discuss, plan and implement statewide projects. Work plans are developed by members of the State and Universities, and are approved by a steering committee of the State and the Universities as well as the New Mexico LambdaRail not-for-profit corporation. The work plan will be to connect rural areas to the nearest GigaPop enabling statewide as well as national network connections. Areas will be prioritized based on cost, network capability available, and relevance to the goals of the project.

Our current, low speed network is already self-sustaining. We intend to purchase dark fiber and equipment with one-time, capital funding to eliminate the monthly fees for some of the existing circuits. The savings will be used to offset the increases in maintenance and long haul (e.g. I2) costs. All of the network backbone and a majority of the connected sites will use this approach. A draft business plan has been developed to recover costs of connectivity. This business plan will be completed and implemented based on available capital funding for the network expansion. The new network would only lease circuits where dark fiber was not available. This lower cost approach enables us to continue the self-sustaining model. Ultimately, the ongoing costs of the network are borne by customers using the new services. Our experience has shown that rural areas will readily pay for service that they would not normally obtain.

Scope of work relative to budget:

The total requested budget for proposed year 1 (\$1,000,000) and potential year 2 (\$1,000,000) for a total amount of \$2,000,000 and include upgrades to existing equipment, new optical routers, switches, cabling; enhance current Monitoring software, (Monitoring Centers at NMSU and UNM), first year enable backbone to remote sites, 2nd year more sites, installation, site travel and testing. For these items NMSU has also committed to (\$233,333.33) in matching funds for proposed year 1 and potential year 2 in the amount of (\$233,333.33) for a total of \$466,666.66. NMSU will supply the University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Thank you,



Michael Hites
Vice President for Planning and Information Technology
CIO New Mexico State University



The University of New Mexico

Department of Electrical and Computer Engineering MSC01 1100 1 University of New Mexico Albuquerque, NM 87131-0001
USA Phone: (505) 277-2630 Fax: (505) 277-1439 www.ece.unm.edu

April 27, 2007

Dale C. Alverson, M.D., Director Center for Telehealth University of New Mexico Health Sciences
Center MSC11 6090 Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This letter serves as the Electrical & Computer Engineering letter of commitment to participate in the FCC Rural Healthcare Pilot Program Proposal.

The Electrical and Computer Engineering (ECE) is conducting research to enable seamless communication between mobile (and stationary) devices across multiple networks and through heterogeneous communication environments. Our approach, which is funded by NSF under the FIND initiative, is based on a transient mobile network in which all communications occur between persistently identified entities. Such a network, which is mobile and ubiquitous in nature, allows entities to form and associate themselves with coordinated ad-hoc networks that are provided the means to integrate almost seamlessly with each other. ECE's approach leads to simplified network operations, management and provisioning, by placing all aspects of network administration into a common information management framework. This allows the overall architecture to maintain addressing and communications inter-connectivity while extensive implementation-level disruptions are carried out at the lower levels of the implementation and to adapt naturally, the incorporation of existing and future communication technologies. The total requested budget for proposed year 1 is \$581,435 and potential year 2 is \$0.

Initial Network Design Studies and Modeling

One of the goals of this proposal is to develop general approach for analysis and design of secure, reliable networks with a given functionality applicable to local as well as national size networks for disaster relief. This goal is very hard to achieve without detailed analysis of different network architectures as well as modeling and simulations of appropriate real life scenarios. In this section we will present our network design methodology, simulation strategies of three large-scale disasters, and data analysis of the simulations.

The Electrical and Computer Engineering Department at UNM in collaboration with the Los Alamos National Laboratory has extensive experience with large-scale simulations and in recent year this experience has been applied to national security problems. These include large-scale pandemics, analysis of the National energy grid, terrorist networks, etc. In these examples a large number of units are interconnected in a network, which evolves in time. Agent-based models have been indispensable for understanding the dynamics of these networks and in this proposal we will extensively use this methodology. Agent-based models are mathematical abstractions of distributed systems consisting of many units forming an interconnected web. Each unit's physical properties are mapped onto the mathematical quantities characterizing the agent. For example in the case of a computer network the agent can be the facility at a given location and the properties of this facility like the time of operation, number of people at the facility, type and number of medical equipment, type and number of computers, etc are mapped into mathematical quantities. The connections between different facilities and the connection throughputs are mapped on the network properties (links) formed by the agents. A typical simulation involves an initial state of the system and a given scenario. Then the system is evolved based on an algorithm involving both deterministic and stochastic components. At predetermined intervals of time the

result of the operation of network are analyzed. The C++ programming language is particularly well designed for such applications. In C++ the agents form a class of objects and the operations on the agents are the methods defined in this class. C++ is also fast compiled language that allows large number of agents to be efficiently simulated. Using C++ will allow us to simulate networks of the size of the United States as well as networks spanning the Earth.

In this proposal we will focus on three "real life" scenarios of great importance for our Nation. 1. Pandemic occurring in the US; 2. Large forest fire spreading in several neighboring states, and 3. Severe earthquake. Each of these three scenarios has different disaster relief requirements and will load the network in a different way allowing us better to probe our design. A major issue in computational studies like this is the validation of the model and the results. We plan to perform small-scale experiments to validate our approach.

Our data analysis will be based on irreducible frequent pattern analysis (IFPA), which has been used to analyze transaction data-bases. The exchange of information between network nodes can be viewed as information transactions at a given time. Each information exchange forms a bimodal transaction: sending of the information by the first node and acceptance of the information by the receiving node or nodes. Each of these can be quantified by numbers between 0 and 1, with 0 corresponding to complete failure and 1 to a complete success. Frequent patterns are transfer patterns that occur often in the operation of the network and the irreducible frequent patterns correspond to patterns that cannot be decomposed into a sum of other simpler patterns.

Network architectures: internet, brain networks, immunological networks, human population networks, national energy grid. Stability and security analysis based on different metrics;
Data dynamics on networks: traffic on different networks, stability, redundancy, security versus overload.
Simulation and iterations

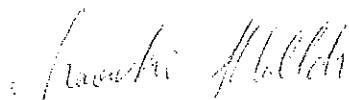
An example of a real emergency situation(s) in New Mexico. In these simulations different initial situations will be simulated and the network performance will be evaluated. In the simulations we will take into account external factors that can influence the network: human, electrical, weather etc.

Determination of Optimal TAG and plan the most appropriate implementation. Based on the network analysis methodology developed in IV. a. develop cost functions and set large-scale optimization simulations to find the optimal architecture. Here we will employ simulated annealing, genetic algorithms, conjugate gradient methods to find optimal solutions to the network architecture subject to the geographical and other existing constraints.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

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Sincerely,





Theoretical Division

Mail Stop B210
Los Alamos, New Mexico 87545
505-667-4401/Fax 505-665-4055

Date: 26 April 2007
Refer To: T-DO

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This serves as the Los Alamos National Laboratory letter of commitment to collaborate with the University of New Mexico in the proposed FCC Rural Healthcare Pilot program.

One of the goals of this proposal is to develop a general approach for analysis and design of secure, reliable networks with a given functionality applicable to local as well as national size networks for disaster relief. This goal is very hard to achieve without detailed analysis of different network architectures as well as modeling and simulation of appropriate real life scenarios. Los Alamos National Laboratory has extensive experience with large-scale simulations and in recent years this experience has been applied to national security problems. We are prepared to use this expertise to advise and collaborate with Dr. Krastan Blagoev in agent-based simulations of the networks considered in this proposal. Our experience includes large-scale pandemics, analysis of the National energy grid, terrorist networks, etc. In these examples a large number of units are interconnected in a network, which evolves in time. Agent-based models have been indispensable for understanding the dynamics of these networks and this proposal will extensively use this methodology.

We plan to collaborate with Dr. Blagoev when he undertakes simulations that consider examples of real emergency situations. In these simulations different initial situations will be simulated and the network performance can be evaluated with some of the techniques we have developed at Los Alamos.

I look forward to a rewarding collaboration in this very interesting project.

Sincerely,

Antonio Redondo, Ph.D.
Division Leader (Acting)
Theoretical Division

Vice President for Research
Sponsored Projects Services
J. Box 3308
888 N. Euclid, Room 510
Tucson, AZ 85722-3308

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FAX: (520) 626-4137

April 16, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

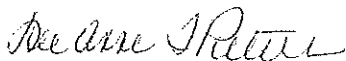
Dear Dr. Alverson,

This serves as the Arizona Telemedicine Program's letter of commitment to partner with the University of New Mexico in the proposed FCC Rural Healthcare Pilot program. The Arizona Telemedicine Program's goals with respect to the FCC Rural Healthcare Pilot program are to upgrade its existing wide area network infrastructure to enable increased security of telemedicine communications and to implement modern quality of service technologies that are critical to telemedicine communications. By implementing modern telecommunications carrier class network backbone technologies, ATP will be well positioned to interoperate with regional network partners via national high-speed backbone networks such as Internet2 or NLR. ATP plans to use its existing connectivity to Internet2 through the University of Arizona to link with regional or national peers to enable telemedicine services and research. As part of the Southwest Telehealth Access Grid (TAG), ATP plans to collaborate, via Internet2/NLR and potentially other networks, with other TAG participants in the modeling, testing and deployment of network communications architectures and services that are tailored for optimal use of telemedicine communications during times of disaster or emergency.

The total requested budget for proposed year 1 (\$449,699) and potential year 2 (\$429,167) is in the amount of \$878,866 which includes plans to upgrade core and edge routing and firewall equipment first year. Second year, additional core network upgrades and network edge device upgrades. Seeking to cover costs of backbone and spoke private line services that are not eligible under previous USF Rural Healthcare funding restrictions that limited eligibility to rural areas. For these items ATP has committed to first year (\$147,217) and second year (\$144,138) for a total of \$291,355 in matching funds for proposed year 1 and potential year 2. ATP will supply The University of New Mexico documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Thank You,



Lee Anne Peters
Contract Officer

April 16, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This letter serves as Holy Cross Hospital's letter of commitment to partner with The University of New Mexico in the proposed FCC Rural Healthcare Pilot program.

Holy Cross Hospital's goals with respect to the FCC Rural Healthcare Pilot program are to upgrade its existing network infrastructure to implement modern quality of service technologies that are critical to telemedicine communications and to enable increased security of telemedicine communications. By implementing modern telecommunications carrier class network backbone technologies, HCH will be well positioned to interoperate with regional network partners via national high-speed backbone networks

HCH objectives in participating in the grant proposal are to:

- Connect all HCH clinical sites to a backbone network with sufficient bandwidth to support telehealth, emergency response, educational and certification programs.
- Link HCH' network to external providers and networks such as the New Mexico Telehealth Alliance, New Mexico Health Information Collaborative, Collaborative Action for Taos County Health, Taos County Indigent Fund, First Born Program, Enchanted Health Outreach for Kids, University of New Mexico and Emergency Response teams.
- Upgrade bandwidth and network throughput; purchase bridges, routers, switches, servers; purchase encryption software; implement network monitoring and intrusion detection; implement highly secure network access points and protocols to ensure compliance with all relevant best practices, HIPAA and other applicable regulations.

The total requested budget for proposed year 1 (\$85,000) and potential year 2 (\$20,000) is in the amount of \$105,000 and includes hardware, software, connectivity, network design and network deployment costs. For these items HCH has also committed to matching funds in year one of \$(12,750) and year two of (\$3,000) for a total of \$15,750 in matching funds. HCH will supply The University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Thank you,



Kelley Shull Tredwin
Development Officer
Holy Cross Hospital
P.O. Box DD
Taos, NM 87571
kshull@taoshospital.org
505-751-5711



PRESBYTERIAN MEDICAL SERVICES

Building a Healthier State

April 16, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This letter serves as the Presbyterian Medical Services letter of commitment to partner with The University of New Mexico in the proposed FCC Rural Healthcare Pilot Project.

PMS Scope of Work:

A. Objectives

PMS' objectives in participating in the grant proposal are to:

- connect all PMS clinical and Head Start sites to a backbone network with sufficient bandwidth to support Telehealth, Emergency Response, Educational and Certification programs.
- Link PMS' network to external providers and networks such as the New Mexico Telehealth Alliance, Project Echo, Project Reach, and Emergency Response teams.
- Upgrade bandwidth and network throughput; purchase bridges, routers, switches, servers; purchase encryption software; implement network monitoring and intrusion detection; implement highly secure network access points and protocols to ensure compliance with all relevant best practices, HIPAA and other applicable regulations.

C. High-Level Project Management and Work Plan

Since the grant is heavily focused on technical infrastructure, PMS' overall project will be managed by the Information Services (IS) Department, headed by their Chief Information Officer (CIO), Noemi deBodisco.

Business and Clinical oversight will be provided by:

- Dr. Larry Lyons, MD, Vice President of Clinical Affairs,
- Dr. Ted Testa, PsyD., Director of Behavioral Health,
- Erica Stubbs, Director of Children's Services

Compliance oversight will be provided by:

- Don Daniel, Vice President of Legal Affairs & General Counsel
- Samantha Hults, Corporate Compliance Officer

PMS System Directors and Site Administrators will be involved at the detailed implementation phases of the project.



High-Level Work Plan

Our approach will be to align with our partners without hampering PMS-specific task progress. Clearly, many tasks can be achieved by individual entities working in parallel with other grant partners, but coordination will be critical. We will operate with the understanding that there will be an overarching Executive Committee comprised of all Grant Partners to be responsible for the administration of the overall grant, which will provide oversight, high level prioritization, conflict resolution and status reporting.

Upon being awarded the grant, PMS will:

- Align our overall objectives, project scope and activities with our partners in the Grant;
- Establish a PMS executive project team, including the individuals above;
- Conduct detailed site surveys, and develop a plan to connect our sites in order of priority, taking into account synergies and lead times;
- Participate in network modeling activities with other grant partners;
- Participate in the development of standards for interoperability between networks, including monitoring and security;
- Assist in the development, and issuance of an RFP, as required, for network and equipment;
- Identify key points of network connectivity with our grant partners;
- Develop a detailed project plan, including specific expenditures, personnel assignment, and key milestones;
- Track and report progress both internally and to the Executive Committee.

Estimated Schedule

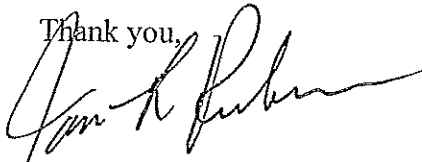
- Overall estimate is approximately 11 months from the time the grant is awarded.
- Month 1:
 - Establish Governance
 - Develop overall project plan, meeting schedules, communications plan
 - Develop individual entity work plans
 - Identify requirements for competitive bidding
 - Prioritize sites and interconnection points
 - Develop acceptance criteria and criteria for success
- Month 2:
 - Site Surveys
 - Equipment readiness
 - Competitive Bids for equipment, network services
 - Purchase equipment upgrades
 - Establish protocols for network interconnection
- Month 3:
 - Complete bidding process
 - Contracts
 - Develop vendor rollout schedules
 - Site work

- Month 4-10
 - PMS estimates that the overall project of upgrading our network sites and connecting all the locations will take approximately six months from the time competitive bidding is complete.
 - Test network interconnections
 - Progress reports, course correction
- Month 11
 - Review and assess
 - Report Progress
 - Plan for second year

The requested budget is for proposed year 1 (\$1,131,400) and potential year 2 (\$ 673,600) for a total of \$1,805,000. PMS has also committed to (\$202,500) in matching funds for proposed year 1 and (\$158,900) for potential year 2 for a total of \$361,400 in matching funds for proposed year 1 and potential year 2. PMS will supply the University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Thank you,



James L. Riebsomer
President and CEO
Presbyterian Medical Services
1422 Paseo de Peralta
P.O Box 2267
Santa Fe, New Mexico, 87504



April 16, 2007

Dale C. Alverson, M.D., Director
Center for Telehealth
University of New Mexico Health Sciences Center
MSC11 6090
Albuquerque, NM 87131-0001

Dear Dr. Alverson,

This letter serves as Sangre de Cristo Community Health Partnership letter of commitment to partner with The University of New Mexico in the proposed FCC Rural Healthcare Pilot Project.

I. Contact Information

- a. Sangre de Cristo Community Health Partnership, a 501(c) (3) non-profit.
Arturo Gonzales, PhD, Executive Director
Austin Buff, Information Resources Manager
1441 S. St. Francis Dr. suite A
Santa Fe, New Mexico 87505
(505) 983-8011

II. Scope of Work

- a. Goals and Objectives —. The goals of Sangre de Cristo Community Health Partnership (SDCCHP) in participation with this program are to increase access to and quality of delivery of substance abuse and mental health screening, brief intervention, treatment and referral services in rural areas of the state of New Mexico. In addition to having developed and implemented well-established network of behavioral health providers integrated within 35 health care facilities across the state to further this goal, **SDCCHP has currently implemented and maintains 20 Telehealth sites statewide** to support this initiative.
- b. **SDCCHP's objectives with FCC funding support** is to be able to continue maintaining the current Telehealth infrastructure and wherever feasible expand best clinical practice services to additional areas of the state by expanding SDCCHP's existing telemedicine infrastructure. Specifically the current Telehealth infrastructure and any future expansions will be used to
 - Eventually create a statewide system for substance abuse and mental health prevention, intervention and treatment.
 - Provide clinical supervision of the SBIRT Behavioral Health Counselors;
 - Conduct psychiatric patient clinical staffing and consultations

- Provide continuing professional clinical education to Behavioral Health Counselors, and partner site clinical providers and staff.

c. **Previous Experience** – SDCCHP currently manages and maintains two existing Telehealth networks. (1) One for use in the Substance Abuse and Mental Health Service Administration's Center for Substance Abuse Treatment (SAMHSA CSAT). Screening, Brief Intervention, Referral and Treatment (SBIRT) project; and (2) Implementation of the New Mexico Department of Health's Office of School and Adolescent Health (OSAH) for development, training and maintenance of 18 school based health centers across New Mexico. The SAMHSA CSAT SBIRT network consists of 20 sites each equipped with videoconferencing capability over an IP network involving T-1 lines into each facility.

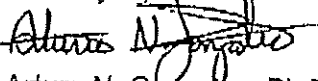
The OSAH network is in its initial phase of implementation of 18 sites and also involves T-1 lines into each facility. Further phases are expected, based on state funding considerations. SDCCHP has been overseeing and maintaining the SAMHSA CSAT SBIRT network for two years and has been developing the OSAH network for the past year. (Please see attached maps for a list of sites.)

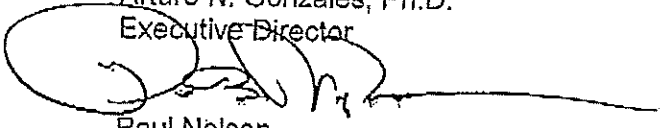
Project Management Plan – SDCCHP current has employed the professional staff and industry contacts in place to be able to continue management of the current Telehealth initiatives as well as any proposed

The total requested budget for proposed year 1 (\$221,850) and potential year 2 (\$228,660) is in the amount of \$486,663 and include connectivity fees for Pecos, and additional site to be TBA and 20 already existing SDCCHP Telehealth sites, routers, managed fast Ethernet switches, and single point of maintenance contact for all 22 telehealth sites. For these items Sangre de Cristo Community Health Partnership has also committed to (\$36,163) in matching funds for proposed year 1 and no matching funds for potential year 2. Sangre de Cristo Community Health Partnership will supply the University of New Mexico with appropriate documentation for backup of the matching funds as they are spent.

I certify that the statements herein are true, complete and accurate to the best of my knowledge, and accept the obligation to comply with FCC's terms and conditions if a grant is awarded as a result of this application. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties.

Thank you,


Arturo N. Gonzales, Ph.D.
Executive Director


Paul Nelson
Chief Financial Officer

Appendix 6

TAG Future Site List

Site Name	City	State	Address	ZIP	Phone #
ALBUQUERQUE HEALTH CARE FOR THE HOMELESS	Albuquerque	NM	1217 1st Street NW	87102	505-243-3373
BEN ARCHER HEALTH CARE CENTER	Alamogordo	NM	1501 East 10th Street	88310	505-443-8133
BEN ARCHER HEALTH CARE CENTER	Columbus	NM	626 Taft Street	88029	505-531-2165
BEN ARCHER HEALTH CARE CENTER	Hatch	NM	255 Highway 187	87937	505-267-3088
BEN ARCHER HEALTH CARE CENTER	Las Cruces	NM	1600 Thorpe	88005	505-382-9292
BEN ARCHER HEALTH CARE CENTER	Truth or Consequences	NM	1960 North Date	87901	505-894-7662
DE BACA FAMILY PRACTICE CLINIC	Fort Sumner	NM	500 North 10th Street	88119	505-355-2414
EL PUEBLO HEALTH SERVICES, INC.	Bernalillo	NM	121 Calle del Presidente	87004	505-867-2324
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	111 Coors Road NW, Suite E-2	87121	505-833-0024
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	1231 Candelaria NW	87107	505-345-3244
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	1316 Broadway, SE	87102	505-768-5450
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	2001 North Centro Familiar SW	87105	505-873-7400
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	2127 Los Padillas Road SW	87105	505-452-8633
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	2300 Arenal Rd SW	87105	505-873-0220
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	6900 Gonzales SW	87121	505-831-2534
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	7704 2nd Street NW	87107	505-890-1458
FIRST CHOICE COMMUNITY HEALTH CARE	Belen	NM	120 South 9th Street	87002	505-861-1013
FIRST CHOICE COMMUNITY HEALTH CARE	Edgewood	NM	8 Medical Center Road	87015	505-281-3406
FIRST CHOICE COMMUNITY HEALTH CARE	Los Lunas	NM	1258 Highway 314	87031	505-865-4618
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	5608 Zuni SE	87108	505-262-2481
FIRST CHOICE COMMUNITY HEALTH CARE	Albuquerque	NM	5608 Zuni SE	87108	505-262-6541
FIRST CHOICE COMMUNITY HEALTH CARE	Anton Chico	NM		87711	505-427-5036
FIRST CHOICE COMMUNITY HEALTH CARE	Chama	NM	211 North Pine	87250	505-756-2143
FIRST CHOICE COMMUNITY HEALTH CARE	Coyote	NM	Highway 96, East End of Town	87012	505-638-5487
FIRST CHOICE COMMUNITY HEALTH CARE	Embudo	NM	State Road 68, No. 2243	87531	505-579-4255
FIRST CHOICE COMMUNITY HEALTH CARE	Espanola	NM	111 North Railroad Avenue	87532	505-753-7218
FIRST CHOICE COMMUNITY HEALTH CARE	Espanola	NM	620 Coronado Street	87532	505-753-7395
FIRST CHOICE COMMUNITY HEALTH CARE	Espanola	NM	711 Bond Street	87532	505-753-9503
FIRST CHOICE COMMUNITY HEALTH CARE	Las Vegas	NM	1928 Hot Springs Blvd	87701	505-425-6788
FIRST CHOICE COMMUNITY HEALTH CARE	Las Vegas	NM	Mora & Baca 9th Street	87701	505-454-3219
FIRST CHOICE COMMUNITY HEALTH CARE	NM	NM	Wagon Mound	87752	505-666-2288
FIRST CHOICE COMMUNITY HEALTH CARE	Penasco	NM	15136 Highway 75	87553	505-587-2809
FIRST CHOICE COMMUNITY HEALTH CARE	Ribera	NM	San Miguel Clinic	87560	505-421-1113

TAG Future Site List

Site Name	City	State	Address	ZIP	Phone #
HEALTH CENTERS OF NORTHERN NEW MEXICO	Roy	NM		87743	505-485-2583
HEALTH CENTERS OF NORTHERN NEW MEXICO	Springer	NM	400 Prospect Street	87747	505-483-0282
HEALTH CENTERS OF NORTHERN NEW MEXICO	Truchas	NM		87578	505-689-2461
HEALTH CENTERS OF NORTHERN NEW MEXICO	Wagon Mound	NM		87752	505-666-2288
HIDALGO MEDICAL SERVICES	Animas	NM	No. 1 Panther Blvd	88020	505-548-2742
HIDALGO MEDICAL SERVICES	Bayard	NM	1107 Foy Hwy, P.O. Box 1389	88023	505-537-6125
HIDALGO MEDICAL SERVICES	Lordsburg	NM	530 DeMoss Street	88045	505-542-8384
HIDALGO MEDICAL SERVICES	Mimbres	NM	2743-B Hwy 35N, P.O. Box 358	88049	505-536-3990
HIDALGO MEDICAL SERVICES	Silver City	NM	114 W. 11th Street	88061	505-388-1511
JAL CLINIC	Jal	NM	101 East Panther Ave	88252	505-395-3400
LA CASA FAMILY HEALTH CENTER	Clovis	NM	1121 Maple Street	88101	505-769-0888
LA CASA FAMILY HEALTH CENTER	Clovis	NM	1521 West 13th	88130	505-769-0888
LA CASA FAMILY HEALTH CENTER	Roswell	NM	1511 Grand Street	88201	505-623-3255
LA CASA FAMILY HEALTH CENTER	Hondo	NM	Highway 70, Mile Marker 286	88336	505-653-4830
LA CASA FAMILY HEALTH CENTER	Portales	NM	1515 West Fir	88130	505-356-6695
LA CLINICA DE FAMILIA, INC.	Anthony	NM	855 North Main Street	88021	505-882-5706
LA CLINICA DE FAMILIA, INC.	Anthony	NM	855 North Main Street	88021	505-882-3607
LA CLINICA DE FAMILIA, INC.	Chaparral	NM	112 Lisa Box 21	88081	505-824-0820
LA CLINICA DE FAMILIA, INC.	Las Cruces	NM	1100 S. Main Street, Suite A	88005	505-526-1105
LA CLINICA DE FAMILIA, INC.	Las Cruces	NM	1160 Mall Drive	88001	505-521-7181
LA CLINICA DE FAMILIA, INC.	Las Cruces	NM	1160 Mall Drive, Suite B	88001	505-532-1933
LA CLINICA DE FAMILIA, INC.	Las Cruces	NM	1180 Mall Drive, Suite B	88001	505-532-2044
LA CLINICA DE FAMILIA, INC.	Las Cruces	NM	9400 Highway 70	88012	505-373-9202
LA CLINICA DE FAMILIA, INC.	Mesilla	NM	Ste. 7 Onate Plaza	88046	505-524-3571
LA CLINICA DE FAMILIA, INC.	San Miguel	NM	18424 South Hwy 28	88058	505-233-3830
LA CLINICA DE FAMILIA, INC.	Santa Teresa	NM	100 Strauss Road	88008	505-874-9338
LA CLINICA DE FAMILIA, INC.	Sunland Park	NM	2625 McNutt Road	88063	505-589-0887
LA CLINICA DE FAMILIA, INC.	Sunland Park	NM		88063	505-589-1500
LA CLINICA DEL PUEBLO DE RIO ARRIBA	Tierra Amarilla	NM	Escalante High School	87575	505-588-7201
LA CLINICA DEL PUEBLO DE RIO ARRIBA	Tierra Amarilla	NM	Highway US 84 CR324 House No. 14	87575	505-588-7252
LA FAMILIA MEDICAL CENTER	Santa Fe	NM	2145 Caja del Oro Grant Road	87501	505-438-3195
LA FAMILIA MEDICAL CENTER	Santa Fe	NM	312 B Montezuma	87502	505-982-6241
LA FAMILIA MEDICAL CENTER	Santa Fe	NM	818 Camino Sierra Vista	87505	505-988-1742

TAG Future Site List

Site Name	City	State	Address	ZIP	Phone #
LA FAMILIA MEDICAL CENTER Administration Office	Santa Fe	NM	1035 Alto Street	87501	505-982-4599
LAS CLINICAS DEL NORTE	Abiquiu	NM	Highway 84	87510	505-685-4479
LAS CLINICAS DEL NORTE	El Rito	NM	State Road 571, Building 28	87530	505-581-4728
LAS CLINICAS DEL NORTE	Ojo Caliente	NM	Highway 285, Junction 111	87549	505-583-2275
LAS CLINICAS DEL NORTE	Ojo Caliente	NM		87549	505-583-2191
MORA VALLEY COMMUNITY HEALTH SERVICE, INC.	Mora	NM	Highway 518-Mile Marker 26	87732	505-387-5069
PECOS VALLEY MEDICAL CENTER	Pecos	NM	Highway 50	87552	505-757-6366
PECOS VALLEY MEDICAL CENTER	Pecos	NM	Pecos High School Teen Clinic	87552	505-757-4720
PINE HILL HEALTH CENTER	Pine Hill	NM	Highway 53 BIA Route 125	87357	505-775-3271
PRESBYTERIAN MEDICAL SERVICE (PMS)	Reserve	NM	Lopez Ave	87830	505-773-4627
PRESBYTERIAN MEDICAL SERVICE (PMS)	Reserve	NM	One Foster Lane	87830	505-533-6456
PRESBYTERIAN MEDICAL SERVICE (PMS)	Artesia	NM	Memorial Drive	88210	505-746-9848
PRESBYTERIAN MEDICAL SERVICE (PMS)	Carlsbad	NM	105 N. Guadeloupe Street	88220	505-887-2610
PRESBYTERIAN MEDICAL SERVICE (PMS)	Cerrillos	NM	08A Main Street	87010	505-471-6266
PRESBYTERIAN MEDICAL SERVICE (PMS)	Cloudcroft	NM	72 James Canyon	88317	505-682-2542
PRESBYTERIAN MEDICAL SERVICE (PMS)	Counselor	NM	Cuba Clinic NM Hwy 44	87018	505-568-4328
PRESBYTERIAN MEDICAL SERVICE (PMS)	Estancia	NM	8th & Allen Street	87016	505-384-2777
PRESBYTERIAN MEDICAL SERVICE (PMS)	Farmington	NM	1001-D W. Broadway	87499	505-327-4796
PRESBYTERIAN MEDICAL SERVICE (PMS)	Fort Bayard	NM		88036	505-537-3622
PRESBYTERIAN MEDICAL SERVICE (PMS)	Gallup	NM	610 N. 5th Street	87301	505-863-3120
PRESBYTERIAN MEDICAL SERVICE (PMS)	Grants	NM	1217 Bonita Street	87020	505-287-2958
PRESBYTERIAN MEDICAL SERVICE (PMS)	Jemez Pueblo	NM	8372 NM Hwy 4	87013	505-834-0802
PRESBYTERIAN MEDICAL SERVICE (PMS)	Logan	NM	600 Gallegos	88426	505-487-5488
PRESBYTERIAN MEDICAL SERVICE (PMS)	Loving	NM	602 S. 4th Street	88256	505-745-3573
PRESBYTERIAN MEDICAL SERVICE (PMS)	Magdalena	NM	801 10th Street	87825	505-854-3161
PRESBYTERIAN MEDICAL SERVICE (PMS)	Mountainair	NM	105 E. Pinon St	87036	505-847-2271
PRESBYTERIAN MEDICAL SERVICE (PMS)	NM	NM	Fort Bayard	88036	505-537-3622
PRESBYTERIAN MEDICAL SERVICE (PMS)	Ojo Encino	NM	Cuba Clinic NM Hwy 197	87013	505-731-2268
PRESBYTERIAN MEDICAL SERVICE (PMS)	Questa	NM	2573 NM Hwy 522	87556	505-586-0331
PRESBYTERIAN MEDICAL SERVICE (PMS)	Rio Rancho	NM	1424 Deborah Road SE, Suite 101	87124	505-896-0928
PRESBYTERIAN MEDICAL SERVICE (PMS)	Santa Fe	NM	1422 Paseo de Peralta, Building 3	87504	505-954-2571
PRESBYTERIAN MEDICAL SERVICE (PMS)	Santa Fe	NM	2100 Yucca	87501	505-989-5577
PRESBYTERIAN MEDICAL SERVICE (PMS)	Santa Fe	NM	820 Paseo De Peralta, Suite 100	87501	505-986-9633

TAG Future Site List

Site Name	City	State	Address	ZIP	Phone #
PRESBYTERIAN MEDICAL SERVICE(PMS)	Santa Fe	NM		87501	505-954-1081
PRESBYTERIAN MEDICAL SERVICE(PMS)	Thoreau	NM	15 Navarre Blvd	87323	505-862-7417
PRESBYTERIAN MEDICAL SERVICE(PMS)	Torreon	NM	Torreon Clinic NM Hwy 197	87013	505-731-2284
PRESBYTERIAN MEDICAL SERVICE(PMS)	Tucumcari	NM	1302 E. Main	88401	505-461-2200
PRESBYTERIAN MEDICAL SERVICE(PMS)	Tularosa	NM	111 Central Ave.	88352	505-585-1250
COLFAX COUNTY SPECIAL HOSPITAL DISTRICT	Springer	NM		87747	505-461-2200
ABQ PHS Indian Hospital	Albuquerque	NM	801 Vassar Drive NE	87106	248-4000
Acoma-Canoncito-Laguna Hospital	San Fidel	NM	PO Box 130	87049	552-6634
Albuquerque Regional Medical Center	Albuquerque	NM	601 Dr. Martin Luther King Jr. Ave. NE	87102	727-8000
Alta Vista Regional Hospital	Las Vegas	NM	1235 8th St	87701	426-3500
Artesia General Hospital	Artesia	NM	702 N. 13th Street	88210	748-8354
Carlsbad Medical Center, LLC	Carlsbad	NM	2430 West Pierce	88220	887-4570
Cibola General Hospital	Grants	NM	1016 E Roosevelt Ave	87020	287-4446
Eastern New Mexico Medical Center	Roswell	NM	405 W. Country Club Road	88201	622-8710
Espanola Hospital	Espanola	NM	1010 Spruce Street	87532	753-1537
Gallup Indian Medical Center	Gallup	NM	516 Nizhoni Blvd	87301	722-1000
Gerald Champion Regional Medical Center	Alamogordo	NM	2669 North Scenic Drive	88310	439-6100
Gila Regional Medical Center	Silver City	NM	1313 E 32nd St	88061	538-4000
Guadalupe County Hospital	Santa Rosa	NM	535 Lake Dr	88435	472-3417
Heart Hospital of New Mexico	Albuquerque	NM	504 Elm Street NE	87102	724-2000
Holy Cross Hospital	Taos	NM	1397 Weimer Road	87571	758-8883
Indian Hospital-Crownpoint	Crownpoint	NM	P.O. Box 358	87313	786-6217
Indian Hospital-Zuni	Zuni	NM	PO Box 467	87327	782-5723
Lea Regional Medical Center	Hobbs	NM	5419 N. Lovington Highway	88240	492-5000
Lincoln County Medical center	Ruidoso	NM	211 Sudderth Dr	88345	257-8200
Los Alamos Medical Center	Los Alamos	NM	3917 West Road	87544	662-4201
Lovelace Medical Center Gibson	Albuquerque	NM	5400 Gibson Blvd SE	87108	262-7000
Memorial Medical Center	Las Cruces	NM	2450 S Telshor Blvd	88011	522-8641
Mescalero PHS Indian Hospital	Mescalero	NM	PO Box 210	88340	671-4441

TAG Future Site List

Site Name	City	State	Address	ZIP	Phone #
Mimbres Memorial Hospital & Nrsng Home	Deming	NM	P.O. Box 710	88030	546-5800
Miners' Colfax Medical Center	Raton	NM	200 Hospital Drive	87740	445-3661
Mountain View Regional Hospital	Las Cruces	NM	4311 E. Lohman Avenue	88001	556-7600
Nor-Lea General Hospital	Lovington	NM	1600 N. Main	88260	396-6611
Lovelace Women's Hospital	Albuquerque	NM	4701 Montgomery Blvd. NE	87109	727-8000
Northern Navajo Medical Center	Shiprock	NM	PO Box 160	87420	368-6001
Plains Regional Medical Center	Clovis	NM	2100 Dr. Martin Luther King Jr. Blvd	88101	769-2141
Presbyterian Hospital	Albuquerque	NM	1100 Central Ave SE	87106	821-1234
Presbyterian Kaseman Hospital	Albuquerque	NM	8300 Constitution Ave NE	87110	291-1000
Rehoboth McKinley Christian Hospital	Gallup	NM	800 A Hospital Dr	87301	863-7000
Roosevelt General Hospital	Portales	NM	42121 Highway US-70	88130	359-1800
San Juan Regional Medical Center 2	Farmington	NM	801 West Maple St	87401	325-5011
Santa Fe PHS Indian Hospital	Santa Fe	NM	1700 Cerrillos Rd	87505	988-9821
Sierra Vista Hospital	T or C	NM	800 East 9th Street	87901	894-2111
Socorro General Hospital	Socorro	NM	1202 Highway 60 West	87801	835-1140
St. Vincent Hospital 2	Santa Fe	NM	455 St Michaels Drive	87505	983-3361
Trigg (Dr. Dan C.) Memorial Hospital	Tucumcari	NM	301 E Miel De Luna Ave	88401	461-7000
Union County General Hospital	Clayton	NM	301 Harding Street	88415	374-2585
University of New Mexico Hospital 1	Albuquerque	NM	2211 Lomas Blvd., NE	87106	272-2325
Veterans Affairs Medical Center	Albuquerque	NM	1501 San Pedro Dr. SE	87108	265-1711
West Mesa Medical Center	Albuquerque	NM	10501 Golf Course Rd. NW	87114	727-2000
1 Level I Trauma Center					
2 Level III Trauma Center					

Appendix 7



April 17, 2007

Dale C. Alverson, MD
Medical Director, Center for Telehealth and Cybermedicine Research
Health Sciences Center
University of New Mexico
1005 Columbia, NE
Albuquerque, NM 87131

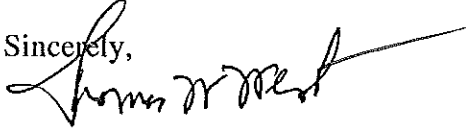
Dear Dr. Alverson;

On behalf of National LambdaRail, Inc. (NLR), I am pleased to provide our strong support for your Federal Communications Commission Rural Health Care Pilot Program proposal, "The Southwest Telehealth Access Grid (SW TAG)" as an integrated interstate network of networks built upon the considerable experience of key participants in rural telemedicine and rural healthcare in New Mexico, Arizona and the Southwest Indian Health Service (IHS) Telehealth Consortium and associated tribes. This proposal draws on the experience of those involved in delivery of healthcare, the New Mexico LambdaRail (NMLR) and Los Alamos National Laboratory (LANL) within the region. Those in the healthcare field will be responsible for developing and delivering the actual telehealth applications. NMLR will provide the state/regional networking capabilities and the connectivity to the national backbone being provided for this pilot program by NLR and Internet2. LANL will provide the modeling and simulation expertise in the development and deployment of this enhanced access grid.

This unique project creates a telehealth access grid for rural healthcare telemedicine across New Mexico and Arizona and links it into the high-speed Internet national backbones offered by NLR and Internet2 in Albuquerque, El Paso, Tucson and Phoenix. The grid will have the appropriate security and quality of service, which will significantly enhance your capacity to deliver critical rural health care services throughout the region. This grid will not only better support day-to-day telemedicine transactions among the participating agencies, but also provide a system that can be quickly switched to emergency mode to support telehealth interaction during a natural or man-made disaster, such as a terrorist attack or public health emergency, e.g., pandemic flu outbreak. By connecting hundreds of communities, healthcare facilities, and their providers, the SW TAG will support a broad spectrum of telehealth applications that serve rural communities and their citizens and address gaps in access to critical healthcare needs.

NLR, working through its member, NMLR, is pleased to be able a participant in this endeavor and will provide your project access to "free" capacity over NLR for the duration of the pilot program.

We wish you success in this project and look forward to working with you to accomplish these important goals to improve the health delivery to rural America.

Sincerely,


Thomas W. West
Chief Executive Officer

cc: Terry Yates, NMLR



Arizona State Senate

April 23, 2007

Dale C. Alverson, MD
Medical Director, Center for Telehealth and Cybermedicine Research
Health Sciences Center
University of New Mexico
1005 Columbia, NE
Albuquerque, NM 87131

Dear Dr. Alverson;

I am pleased to provide this letter in strong support for your FCC Rural Health Care Pilot Program proposal, "The Southwest Telehealth Access Grid (TAG). The proposed integrated interstate network of networks will be built upon the considerable experience of key participants in New Mexico, Arizona and the Southwest Indian Health Service (IHS) Telehealth Consortium and associated tribes. This proposal will incorporate experience with Internet2 (I2) and National Lambda Rail (NLR) within the region with Los Alamos National Laboratory providing the network modeling and simulation expertise in the development and deployment of this enhanced access grid.

The State of Arizona supported the creation of the Arizona Telemedicine Program 10 years ago and has provided funds towards its continuation since then. The Arizona Telemedicine Program has become a nationally and internationally prominent telemedicine program. With steady state funding from the state it has expanded the original 8-site pilot program to a network of more than 170 sites.

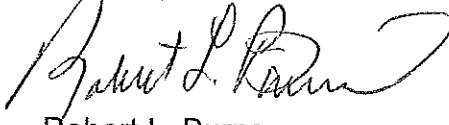
It appears that this proposal will create a telehealth access grid for rural healthcare telemedicine that will integrate the high-speed Internet backbones offered by I2 and NLR with appropriate security and quality of service to significantly enhance the states' capacity to deliver critical rural health care services throughout their regions. This grid will not only support day-to-day telemedicine transactions among the participating agencies, but also provide a system that can be quickly switched to emergency mode to support telehealth interaction during a natural or man-made disaster, such as a terrorist attack or public health emergency, e.g., pandemic flu outbreak. By connecting hundreds of communities, healthcare facilities, and their providers, the SW TAG will support a broad spectrum of telehealth applications that serve rural communities and their citizens and address gaps in access to critical healthcare needs.

Page 2

April 23, 2007

The State of Arizona lends its support to this project and acknowledges the expertise that the Arizona Telemedicine Program will bring forth in fulfilling the goals and objectives of this important proposal.

Sincerely,



Robert L. Burns

RLB:sfj



Arizona State Senate

April 23, 2007

Dale C. Alverson, MD
Medical Director, Center for Telehealth and Cybermedicine Research
Health Sciences Center
University of New Mexico
1005 Columbia, NE
Albuquerque, NM 87131

Dear Dr. Alverson;

I am pleased to provide this letter in strong support for your FCC Rural Health Care Pilot Program proposal, "The Southwest Telehealth Access Grid (TAG). The proposed integrated interstate network of networks will be built upon the considerable experience of key participants in New Mexico, Arizona and the Southwest Indian Health Service (IHS) Telehealth Consortium and associated tribes. This proposal will incorporate experience with Internet2 (I2) and National Lambda Rail (NLR) within the region with Los Alamos National Laboratory providing the network modeling and simulation expertise in the development and deployment of this enhanced access grid.

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It appears that this proposal will create a telehealth access grid for rural healthcare telemedicine that will integrate the high-speed Internet backbones offered by I2 and NLR with appropriate security and quality of service to significantly enhance the states' capacity to deliver critical rural health care services throughout their regions. This grid will not only support day-to-day telemedicine transactions among the participating agencies, but also provide a system that can be quickly switched to emergency mode to support telehealth interaction during a natural or man-made disaster, such as a terrorist attack or public health emergency, e.g., pandemic flu outbreak. By connecting hundreds of communities, healthcare facilities, and their providers, the SW TAG will support a broad spectrum of telehealth applications that serve rural communities and their citizens and address gaps in access to critical healthcare needs.

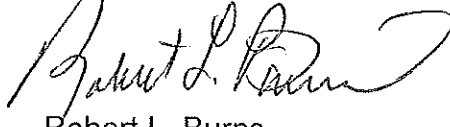
APPROVED BY THE SENATE, APRIL 23, 2007, BY A VOTE OF 14 YEAS TO 0 NAYS AND 0 ABSENTS.
SENATOR ROBERT L. BURNS, DISTRICT 9, FOR THE SENATE.
SENATOR JAMES B. HANSEN, DISTRICT 1, FOR THE SENATE.

Page 2

April 23, 2007

The State of Arizona lends its support to this project and acknowledges the expertise that the Arizona Telemedicine Program will bring forth in fulfilling the goals and objectives of this important proposal.

Sincerely,



Robert L. Burns

RLB:sfj



April 20, 2007

Dale C. Alverson, MD
Medical Director, Center for Telehealth and Cybermedicine Research
Health Sciences Center
University of New Mexico
1005 Columbia, NE
Albuquerque, NM 87131

Dear Dr. Alverson;

As the chairman of the New Mexico Telehealth and Health Information Technology Commission, I am sending this letter in strong support for your Federal Communications Commission Rural Health Care Pilot Program proposal, "The Southwest Telehealth Access Grid (TAG)" as an integrated interstate network of networks built upon the considerable experience of key participants in rural telemedicine and rural healthcare in New Mexico, Arizona, including the Arizona Telehealth Program, and the Southwest Indian Health Service (IHS) Telehealth Consortium and associated tribes. This proposal incorporates experience with Internet2 (I2) and National Lambda Rail (NLR) within the region with Los Alamos National Laboratory providing the network modeling and simulation expertise in the development and deployment of this enhanced access grid.

We understand that this creates a telehealth access grid for rural healthcare telemedicine and integrates the high-speed Internet backbones offered by I2 and NLR with appropriate security and quality of service, which will significantly enhance our capacity to deliver critical rural health care services throughout the region. This grid will not only better support day-to-day telemedicine transactions among the participating agencies, but also provide a system that can be quickly switched to emergency mode to support telehealth interaction during a natural or man-made disaster, such as a terrorist attack or public health emergency, e.g., pandemic flu outbreak. By connecting hundreds of communities, healthcare facilities, and their providers, the SW TAG will support a broad spectrum of telehealth applications that serve rural communities and their citizens and address gaps in access to critical healthcare needs.

The goals of this project directly support the mission of the Commission to encourage the development of telehealth capabilities throughout the rural areas of the state. We wish you success in this project and look forward to working with you to accomplish these important goals to improve the health of our rural communities.

Sincerely,



Robert Mayer
Chairman

New Mexico Telehealth and Health Information Technology Commission

Commissioners

Steven Adelsheim, M.D.	University of New Mexico
Lynne Anker-Unnever	Aging and Long Term Services Department
Leo Baca	Qwest Corporation
Tony Davis	Navajo Area Indian Health Service
Mark Duran	New Mexico Manufactured Housing Association
Stephen Easley, Ph.D.	Office of Workforce Training and Development
Paul Ehrlich, MA	Total Behavioral Health
Lowell Gordon, M.D.	Medicaid
Maggie Gunter	Lovelace Clinic Foundation
Jim Holloway	Public Education Department
Dwayne Jordan	Jordan Enterprises
Patricio Larragoite	Health Policy Commission
Richard Lueker, M.D.	New Heart Center
Ben Ray Lujan	Public Regulation Commission
John Martinez	General Services Division
Danice Picraux	State Representative
Jane Breen Pierce, Ph.D.	New Mexico State University
Danny Sandoval	Children, Youth, and Families Department
Erma Sedillo	Corrections Department
John C. Tiernan	El Centro Family Health
Tomas M. Torres	Rio Arriba Family Care Network
Jeannette Velarde, M.D.	Lovelace Health Plan
Craig Wingate	New Mexico Biotech



DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service

TELEHEALTH PROGRAM

Indian Health Service
1215 N. Beaver Street, Suite 201
Flagstaff, AZ 86001
928.214.3927

April 18, 2006

Dale C. Alverson, MD
Medical Director, Center for Telehealth and Cybermedicine Research
Health Sciences Center
University of New Mexico
1005 Columbia, NE
Albuquerque, NM 87131

Dear Dr. Alverson;

This is a letter of strong support for your Federal Communications Commission Rural health Care Pilot Program proposal, "The Southwest Telehealth Access Grid (TAG)". TAG represents an innovative approach to improved regional telehealth service delivery. The considerable experience of project participants makes this proposal noteworthy beyond its obvious "network of networks" concept. It is a unique opportunity to overlay diverse expertise and experience in telehealth so that an integrated service delivery model can be established. This new model will enable enhanced clinical service delivery, improved access to specialist care and distance learning, and new opportunities for network modeling and simulation expertise.

The Albuquerque, Navajo, Phoenix, and Tucson Areas of the Indian Health Service (IHS) are enthusiastic participants in the Southwest Telehealth Access Grid proposal. The 4 Southwest IHS Areas are committed to telehealth service delivery for the many Indian communities served by the Areas in the 5 state region. This commitment is demonstrated by years of regional partnership for telemedicine and the 2006 establishment of a Memorandum of Understanding among all 4 IHS Areas specific to telehealth service delivery. Dozens of rural Indian health facilities in the region presently receive services via telehealth. The proposed Telehealth Access Grid will enable these and other Indian health facilities in the southwest to expand access to specialist services and distance learning. The integration of high-speed Internet backbones offered by I2 and NLR will also help standardize network-to-network connectivity in the region, a vital network development that will enhance day-to-day and emergency response capacity as well as maintain appropriate security and quality of service.

Thank you for leading this important project. We look forward to development of the Telehealth Access Grid and continued regional leadership in innovative telehealth service .

Sincerely,

Mark Carroll, MD
Telehealth Program Director



PRESBYTERIAN MEDICAL SERVICES

Building a Healthier State

April 16, 2007

Dale C. Alverson, MD, Medical Director
Center for Telehealth and Cybermedicine Research
Health Sciences Center
University of New Mexico
1005 Columbia, NE
Albuquerque, New Mexico 87131

Dear Dr. Alverson:

As the representative of Presbyterian Medical Services (PMS), I am sending this letter in strong support for your Federal Communications Commission Rural health Care Pilot Program proposal, "The Southwest Telehealth Access Grid (TAG)" as an integrated interstate network of networks built upon the considerable experience of key participants in rural telemedicine and rural healthcare in New Mexico, Arizona and the Southwest Indian Health Service (IHS) Telehealth Consortium and associated tribes. This proposal incorporates experience with Internet2 (I2) and National Lambda Rail (NLR) within the region with Los Alamos National Laboratory providing the network modeling and simulation expertise in the development and deployment of this enhanced access grid.

We understand that this creates a telehealth access grid for rural healthcare telemedicine and integrates the high-speed Internet backbones offered by I2 and NLR with appropriate security and quality of service, which will significantly enhance our capacity to deliver critical rural health care services throughout the region. This grid will not only better support day-to-day telemedicine transactions among the participating agencies, but also provide a system that can be quickly switched to emergency mode to support telehealth interaction during a natural or man-made disaster, such as a terrorist attack or public health emergency, e.g., pandemic flu outbreak. By connecting hundreds of communities, healthcare facilities, and their providers, the SW TAG will support a broad spectrum of telehealth applications that serve rural communities and their citizens and address gaps in access to critical healthcare needs.

PMS is the largest non-profit health care organization in New Mexico. We have a long history of serving the underserved population in some of the most remote areas of the state. Whereas PMS already has an extensive data network in the State of New Mexico, we lack sufficient bandwidth to support TeleHealth applications, and many of our sites are not connected to the network at all. We believe that project TAG will prove to be of immense value to our organization in assisting us in connecting our sites, ramping up bandwidth, giving us access to

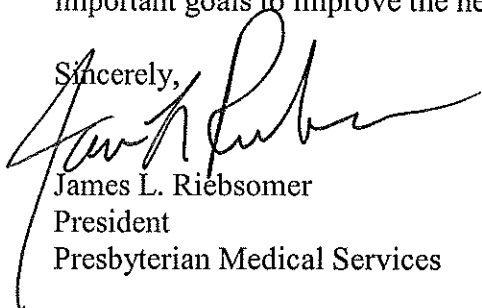


April 17, 2007
Alverson, Page 2

scarce provider resources and allowing our current providers to extend the reach of their services to the populations we serve. Another benefit will be the ability of PMS to leverage the 'on-ramps' to the national networks and to emergency services as they are supported by other members of this initiative.

We wish you success in this project and look forward to working with you to accomplish these important goals to improve the health of our rural communities.

Sincerely,

A handwritten signature in black ink, appearing to read "James L. Riebsomer", written over the typed name and title.

James L. Riebsomer
President
Presbyterian Medical Services

Internal Revenue Service

Date: April 17, 2007

PRESBYTERIAN MEDICAL SERVICES
ROBERTA LEE
PO BOX 2267
SANTA FE NM 87504

Department of the Treasury
P. O. Box 2508
Cincinnati, OH 45201

Person to Contact:
Ms. Lankford 17-18878
Customer Service Representative
Toll Free Telephone Number:
877-829-5500
Federal Identification Number:
85-0206810

Dear Sir or Madam:

This is in response to your request of April 17, 2007, regarding your organization's tax-exempt status.

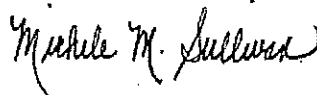
In July 1970 we issued a determination letter that recognized your organization as exempt from federal income tax. Our records indicate that your organization is currently exempt under section 501(c)(3) of the Internal Revenue Code.

Our records indicate that your organization is also classified as a public charity under sections 509(a)(1) and 170(b)(1)(A)(vi) of the Internal Revenue Code.

Our records indicate that contributions to your organization are deductible under section 170 of the Code, and that you are qualified to receive tax deductible bequests, devises, transfers or gifts under section 2055, 2106 or 2522 of the Internal Revenue Code.

If you have any questions, please call us at the telephone number shown in the heading of this letter.

Sincerely,



Michele M. Sullivan, Oper. Mgr.
Accounts Management Operations 1



OFFICE OF THE
PUBLIC REGULATION COMMISSION

CERTIFICATE OF INCORPORATION

OF

SANGRE DE CRISTO COMMUNITY HEALTH PARTNERSHIP

2089506

The Public Regulation Commission certifies that duplicate originals of the Articles of Incorporation attached hereto, duly signed and verified pursuant to the provisions of the NONPROFIT CORPORATION ACT (53-8-1 to 53-8-99 NMSA 1978) have been received by it and are found to conform to law.

Accordingly, by virtue of the authority vested in it by law the Public Regulation Commission issues this Certificate of Incorporation and attaches hereto a duplicate original of the Articles of Incorporation.

Dated: MAY 31, 2000

In testimony whereof, the State Public Regulation Commission of the State of New Mexico has caused this certificate to be signed by its Chairman and the seal of said Commission to be affixed at the City of Santa Fe

Bill Pope
Chairman
[Signature]
Bureau Chief

501-C 3



Holy Cross Hospital
118 Este Es Road, Suite F
Taos, NM 87571
505-751-3652
firstborn@taoshospital.org

16 April 2007

Dale C. Alverson, MD
Medical Director, Center for Telehealth and Cybermedicine Research
Health Sciences Center
University of New Mexico
1005 Columbia, NE
Albuquerque, NM 87131

Dear Dr. Alverson;

As the representative of Holy Cross Hospital's Firstborn Program, I am sending this letter in strong support for your Federal Communications Commission Rural health Care Pilot Program proposal, "The Southwest Telehealth Access Grid (TAG)" as an integrated interstate network of networks built upon the considerable experience of key participants in rural telemedicine and rural healthcare in New Mexico, Arizona and the Southwest Indian Health Service (IHS) Telehealth Consortium and associated tribes. This proposal incorporates experience with Internet2 (I2) and National Lambda Rail (NLR) within the region with Los Alamos National Laboratory providing the network modeling and simulation expertise in the development and deployment of this enhanced access grid.

We understand that this creates a telehealth access grid for rural healthcare telemedicine and integrates the high-speed Internet backbones offered by I2 and NLR with appropriate security and quality of service, which will significantly enhance our capacity to deliver critical rural health care services throughout the region. This grid will not only better support day-to-day telemedicine transactions among the participating agencies, but also provide a system that can be quickly switched to emergency mode to support telehealth interaction during a natural or man-made disaster, such as a terrorist attack or public health emergency, e.g., pandemic flu outbreak. By connecting hundreds of communities, healthcare facilities, and their providers, the SW TAG will support a broad spectrum of telehealth applications that serve rural communities and their citizens and address gaps in access to critical healthcare needs.

We wish you success in this project and look forward to working with you to accomplish these important goals to improve the health of our rural communities.

Sincerely,

Joella Ann Montoya, Program Coordinator

Enchanted Circle Health Outreach for Kids, Inc.

April 19, 2007

Dale C. Alverson, MD
Medical Director, Center for Telehealth and Cybermedicine Research
Health Sciences Center
University of New Mexico
1005 Columbia, NE
Albuquerque, NM 87131

Dear Dr. Alverson;

ECHO for Kids is a program focusing on "whole child health care" and finding a medical home for all the kids in Taos and Colfax counties. Our area of Northern New Mexico has a poverty rate of over 24%, and employer ability to offer insurance at less than 20%. We therefore have a large portion of our community going uninsured. While up to 70% of our kids qualify for the state Medicaid program, many still don't, or don't know that they qualify. We have created an Access to Care Voucher System that ensures all of our children can receive well child health care visits and non-hospitalization sick care visits. This is available from prenatal care up to 18 years of age. We are also collaborating with the state's Income Support Division to qualify and enroll those children in programs where families may not be aware of eligibility. Additionally, we are networking with other medical service programs and participating pediatricians and family practice physicians in our region to coordinate referrals for the children and their families into existing community programs. The technical infrastructure needed for our successful collaborations and networking is an fundamental part of our program development.

Therefore, as the Executive Director of the Enchanted Circle Health Outreach for Kids, Inc. (ECHO FOR Kids), I am sending this letter in strong support for your Federal Communications Commission Rural health Care Pilot Program proposal, "The Southwest Telehealth Access Grid (TAG)" as an integrated interstate network of networks built upon the considerable experience of key participants in rural telemedicine and rural healthcare in New Mexico, Arizona and the Southwest Indian Health Service (IHS) Telehealth Consortium and associated tribes. This proposal incorporates experience with Internet2 (I2) and National Lambda Rail (NLR) within the region with Los Alamos National Laboratory providing the network modeling and simulation expertise in the development and deployment of this enhanced access grid.

We understand that this creates a telehealth access grid for rural healthcare telemedicine and integrates the high-speed Internet backbones offered by I2 and NLR with appropriate security and quality of service, which will significantly enhance our capacity to deliver critical rural health care services throughout the region. This grid will not only better support day-to-day telemedicine transactions among the participating agencies, but also provide a system that can be quickly switched to emergency mode to support telehealth interaction during a natural or man-made disaster, such as a terrorist attack or public health emergency, e.g., pandemic flu outbreak. By connecting hundreds of communities, healthcare facilities, and their providers, the SW TAG will support a broad spectrum of telehealth applications that serve rural communities and their citizens and address gaps in access to critical healthcare needs.

We wish you success in this project and look forward to working with you to accomplish these important goals to improve the health of the our rural communities.

Sincerely,



Jill Cline
Executive Director
Enchanted Circle Health Outreach for Kids, Inc.



COLLABORATIVE ACTION for TAOS COUNTY HEALTH

April 18, 2007

Dale C. Alverson, MD
Medical Director, Center for Telehealth and Cybermedicine Research
Health Sciences Center
University of New Mexico
1005 Columbia, NE
Albuquerque, NM 87131

Dear Dr. Alverson;

As the representative of Collaborative Action for Taos County Health, I am sending this letter in strong support for your Federal Communications Commission Rural health Care Pilot Program proposal, "The Southwest Telehealth Access Grid (TAG)" as an integrated interstate network of networks built upon the considerable experience of key participants in rural telemedicine and rural healthcare in New Mexico, Arizona and the Southwest Indian Health Service (IHS) Telehealth Consortium and associated tribes. This proposal incorporates experience with Internet2 (I2) and National Lambda Rail (NLR) within the region with Los Alamos National Laboratory providing the network modeling and simulation expertise in the development and deployment of this enhanced access grid.

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We wish you success in this project and look forward to working with you to accomplish these important goals to improve the health of the our rural communities..

Sincerely,

Kim Covington
CATCH Coordinator

District Director

Department of the Treasury

Date:

22 JUL 1981

Taos Health Systems, Inc.
P.O. Box 2706
Taos, NM 87571

Employer Identification Number:

85-0289839

Accounting Period Ending:

May 31

Form 990 Required: ☒ Yes ☐ No

Person to Contact:

Contact Telephone Number:

(214) 767-2728

EE:EO:7215:WHJ

DAL:EO:81_2856

Dear Applicant:

Based on information supplied, and assuming your operations will be as stated in your application for recognition of exemption, we have determined you are exempt from Federal income tax under section 501(c)(3) of the Internal Revenue Code.

We have further determined that you are not a private foundation within the meaning of section 509(a) of the Code, because you are an organization described in section 170(b)(1)(A)(iii) and 509(a)(1).

If your sources of support, or your purposes, character, or method of operation change, please let us know so we can consider the effect of the change on your exempt status and foundation status. Also, you should inform us of all changes in your name or address.

Generally, you are not liable for social security (FICA) taxes unless you file a waiver of exemption certificate as provided in the Federal Insurance Contributions Act. If you have paid FICA taxes without filing the waiver, you should contact us. You are not liable for the tax imposed under the Federal Unemployment Tax Act (FUTA).

Since you are not a private foundation, you are not subject to the excise taxes under Chapter 42 of the Code. However, you are not automatically exempt from other Federal excise taxes. If you have any questions about excise, employment, or other Federal taxes, please let us know.

Donors may deduct contributions to you as provided in section 170 of the Code. Bequests, legacies, devises, transfers, or gifts to you or for your use are deductible for Federal estate and gift tax purposes if they meet the applicable provisions of sections 2055, 2106, and 2522 of the Code.

The box checked in the heading of this letter shows whether you must file Form 990, Return of Organization Exempt from Income tax. If Yes is checked, you are required to file Form 990 only if your gross receipts each year are normally more than \$10,000. If a return is required, it must be filed by the 15th day of the fifth month after the end of your annual accounting period. The law imposes a penalty of \$10 a day, up to a maximum of \$5,000, when a return is filed late, unless there is reasonable cause for the delay.

1100 Commerce St., Dallas, Texas 75242

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