

CASE STUDY

Kazakhstan: Telemedicine Network Solutions

ND SatCom SkyWAN® VSAT Technology used for regional telemedicine networks

The Customer

Kazakhstan is a very large country (2.717.300 km²) with comparable low population density (5.57 inhabitants per km²). To improve the medical care of the population the government has started to install a telemedicine network. Telemedicine is most beneficial for populations living in isolated communities and remote regions and therefore fits perfectly to the structure of Kazakhstan.



Kazakhstan administration regions overview

The concept of this initiative is to install dedicated telemedicine networks in the various regions. Regional medical centers will be established which have remote access to experts at central sites for medical consultancy and collaboration e.g. for online operations. As terrestrial infrastructure is often not reliable or simply not available, satellite communication is used to set up a telemedicine network for this purpose.

Customer Requirements

Telemedicine is currently being applied in virtually all medical domains and is practiced on the basis of two concepts: real-time (synchronous) and store-and-forward (asynchronous).

- Real time telemedicine could be as simple as making a telephone call or as complex as robotic surgery. Video-conferencing equipment is one of the most common forms of technologies used in synchronous telemedicine. There are also peripheral devices which can be attached to computers or the video-conferencing equipment which can aid in an interactive examination. For instance, a tele-otoscope allows a remote physician to 'see' inside a patient's ear; a tele-stethoscope allows the consulting remote physician to hear the patient's heartbeat. Medical specialties conducive to this kind of consultation include psychiatry, internal medicine,



rehabilitation, cardiology, pediatrics, obstetrics, gynecology and neurology.

▪ Store-and-forward telemedicine involves acquiring medical data (such as medical images, biosignals etc) and then transmitting this data to a doctor or medical specialist at a convenient time for assessment offline. It does not require the presence of both parties at the same time. Dermatology, radiology, and pathology are common specialties that are conducive to asynchronous telemedicine. A properly structured medical record, preferably in electronic form, should be a component of this transfer.



A new and emerging way of practicing telemedicine is better known as Primary Remote Diagnostic Visits. Here, devices examine a patient while a connected doctor in another location performs a virtual examination of the patient and treats him. This new technology and principle of practicing medicine has major potential to solve major health care delivery problems in Kazakhstan: Primary Remote Diagnostic Consultations can not only monitor pre-diagnosed chronic diseases but also hold out the promise of diagnosing and managing the diseases a patient will typically visit a general practitioner for.

Thus the communications infrastructure needs to allow for medical consultations, remote attendance to live operations, access to central databases and video conferencing. To enable these applications a unified infrastructure is required which can support VoIP, IP video conferencing and database access in high quality.

Thus in Kazakhstan, the intention is to hook up medical centers, hospitals and medical universities throughout the country. Due to Kazakhstan's lack of terrestrial infrastructure in remote areas, satellite communication is the only solution for fast and reliable connections between rural areas and urban medical institutions.

ND SatCom's SkyWAN[®] based solution

To solve these complex communication requirements the Kazakhstan government has opted for ND SatCom SkyWAN[®] technology. SkyWAN[®] is the leading MF-TDMA VSAT system to support voice, data and video simultaneously in the most cost-efficient manner. Due to its bandwidth-on-demand capabilities, ND SatCom SkyWAN[®] reduces bandwidth consumption to a minimum. It builds a flexible and at the same time homogeneous corporate network of the highest quality and availability for an entire communications system covering all locations.

Due to its versatility ND SatCom SkyWAN[®] is able to support all kind of communication applications. The sophisticated inbuilt IP QoS feature

ensures that time critical applications such as video transmissions for video conferences are handled according to requirements and priority. Time outs and interrupts of these applications do not occur. TCP applications are transferred at highest speeds using the inbuilt TCP-Accelerator.

The Telemedicine Network

The intention is to set up SkyWAN® networks for dedicated regions in Kazakhstan, with each network consisting of a hub at the central site and a number of terminals at the remote sites. Two telemedicine networks have already set up successfully in five regions:

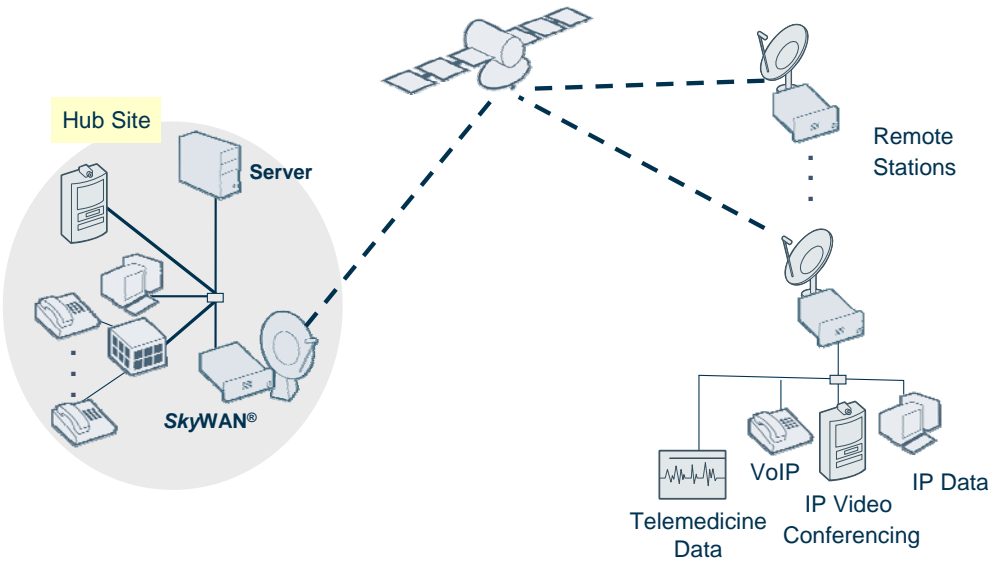
- a star based network with 18 terminals has been implemented for the regions of Qaraghandy and Atyrau
- a star based network with 26 terminals has been implemented for the regions of Aqmola, Qysyloarda and North Kazakhstan

Installation of these networks in the above regions has led to a significant reduction in the times taken to diagnose certain illnesses and diseases. Thus both overall medical care response time has been shortened in addition to the time and effort required to transport patients to medical centers. Furthermore, the results of the diagnoses have proved much better in the districts served by telemedicine networks.

Due to the success of the existing networks installations, extensions are planned for additional regions in Kazakhstan in 2007 and 2008.

ND SatCom GmbH
 P.O. Box
 88039 Friedrichshafen
 Germany
 Phone +49 7545 939 0
 Fax +49 7545 939 8701
 www.ndsatcom.com
 info@ndsatcom.com

Case Study Issued: July 2007



Network Configuration