All photos courtesy of ND SatCom.

Sichuan – satellite & the recovery effort

When a devastating earthquake hit the Sichuan Province of China on May 12th 2008, the infrastructure of the entire region was destroyed and therefore lines of communication went down. Satellite Evolution finds out the role that satellite has been playing in the aftermath of the disaster.

The quake was felt as far away as Beijing and Shanghai. The death toll has reached over 69,000 with many still missing and has left up to 11 million people homeless. The Sichuan earthquake has literally razed a region to the ground toppling everything above it and burying countless people in the rubble. As the region tried to come to terms with what had happened, the disaster recovery effort got into full swing but there were many problems that rescue groups encountered – villages were cut off by enormous landslides and falls of rock, roads were blocked – there was simply no way of entering some of the stricken villages and towns. When such a severe natural event occurs, the terrestrial communications infrastructure that is so heavily relied on in normal, everyday circumstances, is no longer available. Communication towers are destroyed, as are base stations and there are no means of communication. This is the point in time when satellite can literally save lives.

Satellites have played an absolutely key role in the disaster recovery effort in Sichuan province. Mobile satellite services in particular have been invaluable as have VSAT networks. The handheld satellite terminals are indispensable to first responders. They must remain mobile whilst gaining uninterrupted access to communications. The handheld satellite terminals allow both. Wang Bin, the Communist Party Secretary of Wenchuan County appealed to the

authorities by satellite phone from the disaster zone: “We are in urgent need of tents, food, medicine and satellite communications equipment through air drops”. Satellite equipment was at the top of the list of vital supplies along with food and shelter. With no infrastructure left in the region, satellite is the only way to re-establish contact with the outside world. Networks had to be repaired in 45 remote towns and communications restored to a further 64. The China Transportation Telecommunications Centre provided 400 satellite terminals to rescue headquarters, troops, police, fire fighters, medical teams, electricity workers and the media. The amount of satellite terminals used in the recovery effort numbered 2,000 and China imported a further 1,000.

Satellite industry pulls together

The response to the earthquake from the satellite industry has been impressive. Several leading companies have contributed equipment, services and bandwidth free of charge to the emergency services and this has enabled first responders to communicate with each other and headquarters, for information to be relayed back and forth, for decisions to be made on what the next actions should be. Let’s take a look at some of the companies that have been involved in the activities.

ND SatCom

Staff from ND SatCom’s Beijing office have been playing a crucial role in the recovery effort using their SkyWAN technology.

In May 2007, the China Earthquake Administration Bureau signed an order with ND SatCom for the supply of a SkyWAN-based emergency VSAT network consisting of 20 fixed stations, five flexible stations and 16 Fly-Away stations covering Beijing and a further 19 Chinese provinces. Intensive tests and trials were performed after their delivery. On May 7th 2008, the final Acceptance Test was completed – just five days before the earthquake struck. On May 13th, one day after the quake, an ND SatCom employee, Zhu Yizhong, visited the earthquake stricken region with some first responders from the Earthquake Administration Bureau and contributed to the set-up of the Front Command Centre in Dijiangyan, not far from the epicentre of the earthquake. Several aftershocks complicated the work.

On May 19th, ND SatCom employees operated a compact SNG vehicle in Sichuan for Sichuan TV.

The fact that the China Seismological Bureau (CSB) had the foresight to set up a nationwide emergency VSAT network on the SkyWAN platform meant that they were better equipped to deal with the aftermath of the quake. Once the earthquake had occurred the network was split into two sub-networks – a daily network and an emergency network with the Beijing hub station, Sichuan provincial centre fixed station and all earthquake-related stations operating in the emergency mode.

A vehicle station was immediately deployed from Kunmung, the capital city of an adjacent province to set up satellite communications with the Beijing hub station and the Sichuan provincial fixed station. Through the SkyWAN network, video conferences have been held and a large amount of video and photographs have been relayed to the CSB giving the Bureau leaders a much greater understanding of the disaster situation. Additional ND SatCom Fly-Away terminals and vehicle stations have been deployed to support disaster recovery services.

At this point in time, 11 stations including four vehicle stations and 1 Fly-Away station have formed an emergency network supporting one-way high quality video transmission, 2-way video conferencing, VoIP, data communications, file transmission and Internet access.

HNS

Hughes Network Systems shipped Hughes standard broadband satellite terminals to China for deployment in the earthquake damaged Sichuan province. The terminals are well suited for quickly implementing broadband connectivity for VoIP telephony, as well as Internet access services. The equipment was sent to SVA Communications, a Hughes customer and telecommunications service provider in Shanghai, who operates a hub earth station in Shanghai provided by Hughes. SVA deployed a number of Hughes terminals in Sichuan province to provide voice, video and data communications services in the disaster region. The additional terminals, supplied to Sichuan Telecom in Chengdu, helped augment much needed communications services.

Bahram Pourmand, Executive Vice President of Hughes commented, “This is a tragic occurrence and we hope that this small contribution will help support the emergency communications in Sichuan Province at this critical time.”

C-COM

A number of C-COM’s Chinese Value Added Resellers have assisted with the earthquake relief and the provision of Emergency Response services using iNetVu Mobile antenna systems.

Several iNetVu mobile antenna systems developed by C-COM Satellite Systems, a global provider of mobile auto-deploying satellite antenna systems, were deployed as part of the relief effort. C-COM has a significant number of iNetVu Mobile antenna systems deployed in China; most of these are with emergency response teams. Many of these units were dispatched to the earthquake area to assist with communications.

China Central TV (CCTV), which has 1.3 billion viewers, has also deployed one of its iNetVu units in the earthquake zone for Satellite News Gathering (SNG). This unit delivered high quality standard definition television directly from the disaster area to CCTV customers as well as to Internet users in China and has the flexibility to deliver live broadcasts from hard to reach earthquake locations.

“We are glad to be able to indirectly assist the people of Sichuan, who have been affected by this serious natural disaster. Our Chinese resellers and their customers are playing an instrumental role in getting the iNetVu technology to the hands of those who need it most and we are doing everything possible to provide them with support in this time of need” said Leslie Klein, President and CEO of C-COM Satellite Systems Inc.

Tracstar

TracStar Systems provided its mobile satellite communications antenna systems for use by emergency response organisations in the relief and communications efforts in Sichuan region. TracStar’s antennas, mounted on the top of response vehicles, enabled rescue workers to communicate using voice, video and data while moving within the region where normal communication infrastructure has been severely damaged.

TracStar also dispatched a technical team to the region to help deploy critical communications to the damaged areas, and loaned additional emergency communications packages to support humanitarian efforts in remote areas that cannot be reached by vehicle-mounted systems. The emergency systems are centred on TracStar’s Portable Quick Deploy Satellite Earth Station with the capability to restore communication in minutes, providing voice, data and video capabilities.

Chen Rong, a spokesperson for the companies involved said, “TracStar’s mobile satellite products are critical for communications to emergency search and rescue teams and relief efforts in earthquake areas. We have broadband communications from vehicles moving through the region and can restore communications to emergency operations facilities. The equipment is simple to deploy and operate and performs in the most adverse of conditions. TracStar’s equipment was also used extensively in the aftermath of the February snowstorm in China.”

“Rescue and relief responders require immediate and reliable communication solutions to save lives and affect the recovery. We

will continue to do all that we can to support our existing customers and provide humanitarian relief in the aftermath of this terrible disaster," said David Provencher, Co-Founder and General Manager of TracStar.

Important role for Earth observation

COSMO-SkyMed, the Italian satellite system for Earth observation, is being used to help the Chinese areas hit by the earthquake. At the request of the Chinese Government, the ASI (Italian Space Agency) satellites captured two images of the area surrounding the city of Guan Xian, close to the epicentre, thus proving to be able to operate on critical areas with very short response time. Moreover, due to the difficult weather conditions, only the Italian radar satellites could operate over Sichuan. An at-risk dam was clearly visible in the pictures that was constantly monitored in the days after the quake for damage. The images were processed at ASI's Data Acquisition Centre in Matera, southern Italy, managed for ASI by Telespazio.

COSMO-SkyMed continues to provide useful data to the Chinese Government, to the Italian Civilian Protection Department (which is planning a mission in Sichuan) and to various NGOs. COSMO images will be used to detect damage to buildings and metal structures, including bridges and dams.

COSMO-SKyMed is a satellite system for Earth observation used by the Italian Space Agency and the Italian Defence Ministry. The first interferogram of Earthquake area in China was received from the satellite. Based on COSMO-SkyMed data, it allows the study of geological effects. The interferogram is based on data captured by COSMO satellites on April 13 (one month before the earthquake) and on May 15 (three days after the event). Dedicated algorithms have allowed the comparison of the two images, revealing deformations of the Earth's surface. The image is in false colours, which are used to express different distances between the same point on Earth and the satellites.

A more frequent problem

Once again, unfortunately, we have seen displayed the awesome power of the earth. The frequency of these natural disasters is becoming much too familiar. Satellite has an enormous role to play in the aftermath of these events. The restoration of communications must be, along with food and shelter and medical supplies, one of the most vital parts of the emergency management jigsaw. Without satellite to reach the areas where there are no communications, there would be no way of transporting information on the scale of the disaster, the damage done and, more importantly, to assess what must be done to help those affected and get that help to them as soon as possible. On the other side of the coin, satellite technology can be used to help prevent these disasters from becoming catastrophic in terms of early warning systems and also earth observation that can monitor even tiny, but significant changes in the earth's surface, to the seas and even the atmosphere. It is crucial that governments and administrations all over the world recognise the importance of satellite communications when putting in place contingency plans to deal with these events. With quick deployment of satellite services, the impact of a disaster can be significantly mitigated. ■