Photo courtesy of SWE-DISH satellite systems.

Good things come in small packages

The VSAT has seen increased use over the past ten years and different sectors of industry and government are realising its potential. But is it really a 'killer' application? Satellite Evolution Asia looks for an answer.

Even in the telecom industry's darkest hour, the demand for TDMA VSAT enterprise terminals did see some growth while everything else crashed around them. They proved themselves to be an essential bedrock of the communications sector. By 2004, this growth had exploded into huge demand. As a result, prices of the terminals were driven down making them more accessible to all types of different users. The lower pricing of these terminals means that there is increased use by small and medium enterprises and also by consumers. Now, with the hardware being given away and only the services paid for, VSAT's popularity has soared. Advancements in technology, including the fact that VSAT antennas are now smaller, more lightweight and therefore deployable anywhere in the world means that they are becoming the application of choice for many market sectors. Although the regional market for VSAT systems is dominated by North America, this is changing as more and more countries realise the virtues of VSAT and wish to take advantage of the falling prices. Aside from price, however, there can

be no doubt that the most significant advantage that VSAT can offer is the fact that it provides 'last mile' communications and has the ability to reach those where cable and fibre cannot.

Nowadays, VSAT is a key element in enabling the integration of ICTs in under-developed countries due to a lack of terrestrial telecommunications infrastructure. In many emerging countries, VSAT is the most cost effective solution to provide connectivity in rural areas. It is flexible and adaptable to a range of applications. Considered a niche technology at one point, VSAT has proved itself to be something that is much more than that – a cost effective, flexible and extremely adaptable application.

Let's look at some key examples of these applications in closer detail.

Disaster recovery

The Asian tsunami, Hurricanes Rita and Katrina, the Sudanese floods – over past years these natural disasters appear to be on the rise and are fast becoming a part of our everyday life. Victims of these awful events are often those who are located in remote areas with a lack of communication or any existing communication is wiped out by the event itself and therefore they call for a multi-agency response. In cases such as these, the need for reliable communication overrides all else. Situations where a catastrophe has taken place are often busy, even chaotic as first responders try to come to terms with what has happened and to assess the situation, what is needed and when and how it will be secured.

There are some key requirements that must be fulfilled whilst restoring communications in a disaster situation:

- Quick deployment and restoration/ establishment of service;
- Cost effectiveness;
- Flexibility; and
- Simple integration into any existing network.

VSAT technology fits the bill perfectly. The VSAT may be deployed in a timely and efficient manner. The nature of the technology means that it is able to integrate into an existing system but also has the ability, using a mesh topology, to communicate with any site without the use of a central hub. A star topology will enable two-way communications between any site and a central hub and can provide access to voice, data, Internet and video. Above all, VSATs are cost effective and are now easy to use. A small antenna of only 1m in diameter can provide all the communication required in a disaster situation and may be transported easily to the site due to the fact that the dish will, in many instances, break down into smaller, more manageable and more transportable, pieces.

AAE's rapid deploy terminal. Photo courtesy of AAE Systems.

The US state of Florida used VSAT technology to set up a primary back-up communications system in case of hurricanes. The system provides fail-safe, point-to –point communications between their State Emergency Operations Centre and State Warning Point and also connects all other emergency agencies throughout the State. There are 114 fixed sites in operation located in each of Florida's 67 counties, at 7 National Weather Service forecast offices and at 28 Emergency Alert System programming radio stations plus the National Guard Headquarters and at flood control centres. Using HNS' Germantown uplink facility, each remote site is able to communicate via voice with other sites and the State Warning Point may communicate with multiple sites simultaneously. This is an ex-

ample of how VSATs may be used to prevent disaster as well as being able to respond to it.

E-Government

The 'e' in e-government signifies that an administration is in the process of transforming its internal and external relationships through the use of ICTs. This tool can aid governments in their delivery of resources that eventually improve human development. Using ICTs within a government does not change the work they do but makes it much more efficient and transparent and it may be used within every sector – education, health, agriculture etc. The importance of e-government in the developing world is becoming acknowledged more and more. Its ability to promote equality and to make the government and its services more accessible is essential. In turn, economic development is encouraged leading to a more competitive environment in which a society can compete in the global marketplace. VSAT technology can allow small businesses to tap into the global village and to help them develop. Governments are seeking ways to help these entrepreneurs to sample the benefits of e-business. For example, the Chinese government is looking for ways in which their farmers can begin to sell their goods online.

Africa is an ideal example that illustrates how e-government can change the lives of people in remote communities where they experience incredible isolation from the outside world that can prove to be very detrimental on several different levels. Isolated communities often find themselves unable to obtain basic human necessities such as medical help, education and training and access to aid when it is required. However, this is changing and in many regions, voice, fax and data are no longer alien where they were before. For example, the Internet Café has become hugely popular across the continent and the majority use VSAT technology.

By far the most significant applications are those that allow two-way communication via satellite, especially in areas that are too remote to provide 'traditional' ICTs. These days, we can see communications in even the remotest of places from deep Africa to Antarctica. VSATs make communications possible in even the most hostile environments. They provide voice, fax and data connectivity, Internet access, Wide Area Networks and extensions to Local Area Networks to remote locations.

VSAT communications are a one-stop-shop for all their customer's ICT needs. The advent of Internet Protocol VSATs (IPVSATs) has taken this one step further.

The use of distance learning has created a knowledgeable and efficient workforce. A project in Free State, South Africa has seen the development of the ICAM project (Interactive Learning, Communications and Management). This is a satellite-based project initiated by the Free State Department of Health who had previously been training their staff through a face-to-face workshop-based system. The training given was often not well attended, was costly and meant that a loss of work hours resulted as the staff had to be taken off duty to attend. So, following the lead of a major bank that provided training through a satellite-based system, ICAM was developed. The project now boasts 40 interactive, video-based classrooms that allow two-way communication.

An outstanding e-government success has been evident in Mexico where a project, the largest of its kind in the world, was born to attack the digital divide.

VIASAT announced in February this year that they will be providing an additional LinkStar hub and 1,200 VSATs to Mexican company INTERDirec in the phase 4 expansion of the e-Mexico network. The network provides broadband access to the general population of Mexico via Digital Community Centres (DCCs) and schools. The LinkStar system was the original winning network for 3,200 VSATs in Phase 1 of the project as well. This new phase of the project will bring the total of connected VSAT sites in the e-Mexico network to over 9,000.

The e-Mexico network is one of the primary components of the e-Mexico National System, a national IT project for Mexico. The project is coordinated by the Secretaría de Comunicaciones y Transportes (SCT) with three main areas of focus: connectivity, systems, and content. The connectivity phase is now reaching the most remote towns all over the country to give Internet access to schools, public libraries, centres for adult education, rural centres of heath services, and community centres open to service for the general population.

This network is a prime example of the changing relationship of government with society brought about by the use of VSATs to connect the two and bring them closer together. Instead of digital divide, there is digital development and between the year 2000 and the end of 2006, there was a five-fold increase in users. Another great result of the e-Mexico project is that they are now developing an e-government project with Korea that will include a government services search engine, an IT projects database and a citizen mobile services platform.

Retail and finance

The largest users of VSAT for retail and finance are based in the US and Europe. Corporate networks are maintained by companies in a wide range of industries for internal communications needs, either by themselves or outsourced to service providers, and they use VSATs to connect branch offices, factories, warehouses or points of sale with each other or to corporate headquarters. Everything business may be conducted over a VSAT network – credit card transactions, transmission and reception of sales figures, video conferencing, even training employees on new systems or operating procedures.

The first Ku-band VSATs developed were used to provide a portable means of connectivity for oil field drilling and exploration. Now, the most prestigious 'blue chips' of the global economy have recognised the benefits of broadband communications via satellite. You know the names: Abbey National Bank, American Express, BASF, BP, General Motors, Goodyear, Peugeot, Visa and many more.

One of the main users of VSAT systems within the retail sector is Wal-Mart. Russian integrator, IPNET is a certified provider of Hughes Network Systems and has recognised the huge growth of the consumer retail market and the trend of expansion to different regions and even different countries.

The need to encourage growth and to strengthen competitive positions is key. IPNET uses VSAT technology to set up multi-service communications systems for companies with a multi-branch structure.

In using VSAT technology, Wal-Mart has become a global brand and has secured many advantages including:

- Centralized management of the global net work;
- Targeted advertising;
- Centralised logistics;
- High level of information security; and
- Greater number of transactions.

In the banking and finance sector VSATs also hold many benefits. This single platform has multiple applications that provide teller services, branch automation, file and software updates, electronic benefit transfer and also employee training. Training using a VSAT network means that the training may be conducted from a central location and students participate from wherever they are. There is no requirement for them to leave their place of work. They also have two-way communication with their tutors and the ability to ask and answer questions. They also can take tests online. This method is so much cheaper than sending employees away to face-to-face courses where they must pay for travel and accommodation and lose productivity at the same time.

VSAT technology can provide financial institutions with everything they require and there is also the crucial point that this type of technology supports growth and acquisitions, allowing further development.

Oil and gas

The search for oil and gas is becoming more and more important throughout the world as we search for new supplies to satisfy our ever-growing energy needs. This calls for efficient and reliable communications in order to cover vast expanses of land. Due to the extreme nature of this type of exploration, satellite is normally the only solution that can connect the people in the field with their headquarters.

Once again, VSAT can provide a solution. Drilling rigs require telephone, fax, Internet, email, video streaming and conferencing and sometimes distance learning applications - demands all supported by VSAT terminals. As VSAT allows real-time transmission, informed decisions may be taken and any safety issues addressed and discussed as they arise. Productivity is therefore increased as VSAT connectivity will save time and money on the entire drilling operation. SCADA or Supervisory Control

and Data Acquisition – the monitoring of the pipelines, is absolutely essential to prevent any accidents. The remoteness of the pipelines can be a headache for oil and gas companies as they must be able to connect to a network to have data sent back to them on a regular basis. A hybrid network of VSAT and terrestrial radio is often used in these situations. It is not always cost effective to install a VSAT at every well so oil and gas wells are fitted with radio communications equipment to communicate with a base station that is interfaced with a VSAT that transfers the data to company headquarters. This is cost effective and more secure than using a network that 'hops' from site to site.

Whether offshore or onshore, no matter what distance, VSAT provides the ideal platform for the oil and gas industry.

Satellite news gathering

The Asian tsunami, hurricanes Rita and Katrina, the Iranian earthquake, the ongoing Iraq war – all have been covered through the use of satellite technology where mobile communications equipment is used for news broadcasting on a global scale. SNG is usually made possible through the use of vans that are equipped with two-way audio and video transmitters and receivers in the form of dish antennas. These dishes are aimed at a geostationary satellite and the signals are beamed between the satellite and a control room that is run by the broadcast station or network. The result is that pictures and reports may be broadcast from almost anywhere in the civilised world.

Guy Pelham, Live Editor for BBC News, oversees satellite newsgathering. Interviewed for this article, he acknowledges the huge transformation that newsgathering has undergone since the advent of the first satellite dishes to the type of kit that is used today. "A few years ago satellite dishes literally weighed a tonne. Now equipment is smaller, lighter and more transportable. Teams can take the technology into the field and report more effectively from around the world". The advance in antenna technology is quite remarkable. For example, Gigasat now manufacture two antennas that weigh in at 24.8kgs and 29.4kgs meaning that they can now comply with airline baggage restrictions. These flyaway antennas further break down so that they may fit into flight cases for transportation, each weighing under 10kgs each. Gigasat's largest antenna may be broken down into just five flight cases and can be re-assembled at its destination by two people in less than 30 minutes.

There has also been a reduction in the use of personnel required to operate the news gathering equipment. In the past, highly skilled technicians would have been a prerequisite for operation of the relevant equipment. Now, the equipment may be operated at the push of a button and dishes are automatically programmed to seek out a satellite, eliminating the need for manual operation. However, things can and do go wrong so it is important to keep a troubleshooter nearby to deal with any problems that may arise. For a broadcast quality production a high degree of training is necessary to produce top quality results and the specialist knowledge required means that journalists do not operate this type of equipment. However, the rise in popularity of smaller terminals such as the BGAN has meant that, with minimal training, they are journalist-operable.

Guy Pelham cites examples of the areas of the world where BGAN has come into its own providing coverage in Afghanistan, Darfur and the recent kidnap of British Embassy officials in Ethiopia. The ability to report in this way has "transformed news gathering over the last year". It is now possible with BGANs and the right streaming software to achieve good quality results and has prompted a move away from the videophone. Obviously, there is a time and place for this equipment and the BBC use outside broadcast vehicles frequently in cases where multiple cameras are required at state occasions, for example.

What happens next?

So what are the predictions for the future? The BBC are currently looking towards VSAT technology to complement their range of news gathering techniques and are currently running trials. Guy Pelham remarks that a combination of kit with low weight and low power and with the compression that is available today can produce reasonable quality 'lives'. He is also mindful that new technology such as HDTV will require a quality drive.

However, technological developments in the

future will see competing methods of newsgathering vying for attention. Emerging technologies such as Wi-Max, FTP over broadband and 3G networks are becoming increasingly popular. For example, 3G networks are becoming faster and have the ability to uplink pictures and audio and using fibre is exceptionally fast and considerably cheaper than its more expensive satellite counterpart. That said, Mr. Pelham is quick to point out that satellite is sometimes the only suitable form of news gathering "The unique selling point of satellite technology is that, used in the news gathering context, it goes anywhere. If you are covering a story in the middle of nowhere there is no infrastructure and satellite is the only way to do it. There's no Wi-Max, no fibre, no 3G. But with satellite you take the infrastructure with you and this is the unique selling point of satellite and why the BBC will be sticking with it for the foreseeable future."

Indeed, the scope for development is huge and the possibility of remotely controlled systems where journalism may be carried out without putting those who use the equipment at risk in war and disaster zones for example, is already being looked at.

The newsgathering industry has also begun to use IP, which gives broadcasters the ability to use editing equipment in the field and to transport the data back to the studio without changing formats. It also allows 2-way talkback so that the studio and the field can seamlessly communicate.

There is no 'one size fits all' when it comes to newsgathering and the key word appears to be 'flexibility'. If we look at today's news climate we can see how technology has had to move with the times. News can break from all continents at any time and the need for journalists to be on the spot ready to cover the news is very competitive. There are also a number of considerations that must be taken into account when selecting a method or a combination of methods of newsgathering. For example, budget restraints often determine the type of method used. However, there can be no doubt that SNG remains the most versatile newsgathering technique. Its ability to 'get anywhere' is its forte and the technological advancements that are made year on year will see satellite continuing to be easier to use, more and more cost effective and able to deliver news gathering of the very highest quality.

Killer application?

Here, we have explored just a few of the many, many reasons why VSAT is a killer application. It is also used in military and defence, for aeronautical applications, database systems, stock market broadcasting, satellite newsgathering, maritime services - the list goes on. Both public and private sectors benefit from VSAT technology.

The myriad of uses proves its flexibility and, more importantly, its reliability, not to mention cost effectiveness. In the developed and developing worlds VSATs play an increasingly important role….sometimes that role can save lives. So, is VSAT a killer application? Yes, it most definitely is.