

Fast, flexible and cost-effective, BGAN is rapidly establishing itself as a must-have tool for broadcasters such as CNN. **Richard Cheeseman** has the story

BYTE SIZE

REQUIREMENT: Fast, reliable IP connections for professional broadcasters

SOLUTION: BGAN streaming IP

BENEFITS

- Guaranteed bandwidth of up to 256kbps
- Professional video transport solutions tailored to BGAN
- Ability to fine tune the service
- IP or ISDN options
- Simultaneous voice and data
- Multi-user functionality
- Highly portable equipment



Be first on the scene and be first to file. Anyone learning their trade in journalism will have had this axiom, or something like it, drummed into them from their first day as a junior reporter. News becomes less newsworthy as time passes, so filing copy fast and getting your version into print before the competition is crucial.

This rule applies equally to television news, where broadcasters compete to be first to air with live footage from the latest war zone or disaster. But here the process is not as simple as for the print reporter, who can always file copy as

long as he has access to a telephone. The television news reporter requires heavy-duty technology, such as a microwave or satellite connection, to broadcast outside the studio.

Until the mid-1990s, the only option for a television news team rushing to cover a story in distant lands was to travel with bulky VSAT equipment, which was cumbersome to transport and took a long time to set up and dismantle. But for many reporters, with the need to travel fast and light, it simply wasn't an option, not least because of the extra time required to source and transport the unit. So reports of breaking stories would often feature only a reporter's voice, lamely accompanied by a head and shoulders photograph, until a back-up unit arrived with VSAT.

The advent of more portable satellite solutions, such as GAN from Inmarsat, began to change this. For the first time a reporter and a cameraman could carry their own equipment direct to the scene of a breaking story, set up quickly and broadcast live. While the video quality via a 64kbps ISDN link was rarely better than a standard videoconference service, it represented a leap forward for television news – live pictures from the scene just hours, or in some cases minutes, after a story broke.

Video over IP

"GAN is widely used by the world's largest television broadcasters, but its limited bandwidth has restricted its role," says Nadeem Khan, technology solutions manager for Inmarsat. "By combining two terminals, users can achieve 128kbps via ISDN, but even this is not enough for high-quality images. At that bandwidth, the image will degrade rapidly when anything in the frame moves, so reporters are trained to keep their movements to a minimum."

However, the arrival of BGAN, utilising internet protocol (IP) and boasting up to seven times the bandwidth of GAN, has the potential to kick start a revolution in television coverage of breaking news. BGAN certainly presents a compelling proposition to the professional broadcaster, because the terminals are small and as easily portable as a laptop computer, while the service itself offers greatly improved video quality over GAN. >>

Photography: Jonathan Fidler

PICTURE THIS

CNN, one of the world's leading broadcasters, has been an early and enthusiastic adopter of live video over IP and the BGAN service. "We have successfully and consistently filed more live video over IP than any other news organisation and have established CNN as the leader in live reporting with BGAN technology," said Tony Maddox, senior vice-president of news operations for CNN International.

CNN used BGAN to file hundreds of live video reports during the recent conflict in the Middle East. "The use of BGAN gave CNN the added flexibility to move across and report from all over the region, giving the network a distinct reporting advantage," said Maddox. "At the height of the hostilities, CNN had more than 100 journalists in the combat area – and BGAN was key for getting the news out to the rest of the world."

CNN reporters were located in all the main hotspots, as well as in places more removed from the conflict, such as the Bekaa Valley, Damascus and Tehran. News anchors operated from fixed satellite dishes in more secure locations, such as Haifa and Tyre, but journalists and war correspondents used BGAN to report live right in the combat zones or from the Lebanon-Syria border.

Mastery of BGAN

"While CNN carried live shots over BGAN from wherever their reporters were located, other networks were reduced to doing phoners, losing the key element of live images as the conflict was unfolding," said Maddox. "Due to the combination of our impressive newsgathering operation and our mastery of BGAN technology, no other network could match CNN's manpower."

The broadcaster cites international correspondent Aneesh Raman as an example of its ability to cover every important angle of the story. "Aneesh was the only Western television reporter in Iran for much of the time he was in Tehran," said Maddox. "We were able to cover the Iran angle because Aneesh wasn't tethered to a satellite dish, or the studios and crews of a host broadcaster." Raman often operated alone in Iran, setting up his own camera, dialling in by BGAN and producing his own live reports. "That kind of flexibility for a global news organisation, particularly in a conflict, is a game changer," said Maddox.

The BGAN service has two core video options for broadcasters: live video, via streaming IP or ISDN, and store-and-forward video via streaming IP, ISDN or standard IP. "Streaming IP offers

"The use of BGAN gave CNN a reporting advantage...it was key for getting news to the world"

guaranteed bandwidth for live video of a significantly higher quality than was possible with GAN," said Khan. "When deadlines allow, broadcasters have the option of using standard IP or ISDN to transmit, via store and forward, much higher-quality pre-recorded footage back to the studio for later transmission."

Video over IP is still relatively new but, as the example of CNN's rapid adoption proves, it is already becoming accepted as a viable alternative to analogue and other digital techniques in the world of broadcast news. This is mostly due to the flexibility and relative cheapness of sending data over the public internet.

The increasing quality and reliability of video over IP has much to do with the work of companies that produce dedicated encoding and video transport systems tailored to the requirements

If necessary, reporters and camera operators can set up BGAN and use it to transmit video while working alone



of IP. One is Streambox, which lists broadcasters British Sky Broadcasting, CNN, DirecTV and PCCW among its customers.

Seattle-based Streambox has worked closely with Inmarsat to ensure that its patented ACT-L3 video transport solution works efficiently over BGAN. "Inmarsat and some of our key customers and distributors have performed extensive testing of Streambox's portable video transport system's performance over satellite and IP networks," said Bob Hildeman, Streambox's chairman and CEO. "The equipment has also been tested for its ability to deliver reliable and error-free broadcast video and data over low-data rate networks. ACT-L3 is optimised for delivering broadcast video, transmitting it over long distances using cost-effective broadband, and serving it up over a variety of networks."

At point of capture, a news team will use a Streambox ACT-L3 portable encoder, available in Mac and Windows versions, or a Streambox SBT3-7500 encoder to encode live video and audio for transmission over BGAN streaming IP. When these signals are received by the broadcaster, they are decoded in real time by a Streambox unit such as the SBT3-5100 decoder and are then ready for live broadcast.

Ironing out the glitches

"Professional broadcasters use systems such as Streambox because they are effective at 'ironing out' the glitches that can occur when streaming data over IP networks," said Khan. "Firstly, they offer secure and excellent audio/video compression with

BGAN VIDEO HINTS AND TIPS

- Ensure you point your antenna accurately each time you register on the BGAN network. Otherwise, although you may have a connection, your streaming rate could be compromised, causing greater drain on the battery
- Consult your service provider about how to configure your dedicated line and other systems for receiving streamed data from the BGAN network. Factors such as firewall settings and the positioning of servers can affect the rate at which packets are received
- The BGAN LaunchPad allows users to configure error correction for streaming IP. Inmarsat recommends that it is disabled for UDP applications (ie Streambox and Quicklink)
- Inmarsat strongly recommends streaming IP for audio/video solutions
- Choosing a streaming IP connection that matches the data requirements or settings of your application is vital. 32, 64, 128 or 256kbps are available on high-end BGAN terminals. It is important to keep extra room for IP overhead.
- Do not leave the application (or the streaming connection) active when not in use

minimum loss of picture quality. Secondly, they have in-built error-correction systems to recover lost packets and correct the irregularities inherent in delivering video over IP networks."

All Streambox systems include advanced forward error correction (FEC), which detects, cancels and recovers lost video packets. They also have built-in reliability and advanced networking features, such as buffered variable bit rate and packet shaping, to take advantage of streaming BGAN channels.

Another video transport system tailored to BGAN is provided by UK-based Quicklink, which is supplying its laptop video transmission system to Al Jazeera International, the 24-hour news and current affairs channel headquartered in Doha, Qatar. The system will allow the company's journalists to broadcast live video over BGAN. Quicklink's MD, Richard Bolton, said it was important to be ready to meet the challenges of new technology:

"The BGAN terminals are small and as easily portable as a laptop computer, offering great quality"

"Television newsgathering is undergoing fundamental changes insofar as journalists can transmit their reports back to the studio using an increasing variety of networks and software tools."

Both Streambox and Quicklink utilize user datagram protocol (UDP) for video and audio transport, a protocol well suited to streaming IP over the BGAN network. With UDP, lost packets don't need to be retransmitted, so transfer speed takes precedence. Unlike TCP/IP, which slows or even stops transmission when data is lost, any dropped or lost packets are ignored and compensated for or replaced by the transport application. This application intelligence optimises transmission speeds, and is particularly effective on a non-contended line, such as BGAN streaming IP.



BGAN enables broadcasters to send live or store-and-forward video from almost any location in the world

Another important factor in successfully transmitting live video over BGAN is proper back-end integration of the terrestrial link with the BGAN network. John Stoltz is business development manager, media, for GCS, a New-York based solutions provider that works with CNN, and other broadcasters such as Fox and NBC: "As we have learned through BGAN testing with CNN, tweaking the IP configurations, both on the satellite and terrestrial links, is equally important for good-quality live video over BGAN as is selecting the right IP-based video encoders."

Recent advances in the encoding and compression of digital video are contributing to BGAN's rapid acceptance by professional broadcasters. One of the most significant is the H.264 AVC (advanced video coding) codec, the product of a collaboration between the ITU-T Video Coding Experts Group (VCEG) and the ISO/IEC Moving Picture Experts Group (MPEG).

Recognised as a powerful tool for compressing digital video (reputedly twice as efficient as MPEG-2), H.264 AVC has been adopted by companies such as Apple, Sony and Intel, as well as by video transport specialists. A leading example of the latter is Livewire Digital – familiar to readers of *Via Inmarsat* as the provider of communications solutions to vessels competing in the 2005-06 Volvo Ocean Race – which has integrated the standard into its latest mobile video product, the M-Link H.264 range.

Film and file from the field

The Livewire M-Link Voyager H.264 is the high-end member of the M-Link family. It caters for both professional live broadcast and store and forward operations and is fully compatible with either BGAN streaming IP or standard IP. Tristan Wood, managing director of Livewire Digital, said: "H.264 AVC brings with it even greater benefits for broadcasters in terms of both data compression and providing more flexibility for applications to a wide variety of network environments. We have designed our solutions to make it easy for journalists in the field to film and file

news stories whatever the conditions. M-Link H.264 AVC-based products offer a major increase in video quality, higher compression rates and faster delivery."

The flexibility of the BGAN service compared to GAN is another highly attractive feature for broadcasters. On high-end terminals such as the HNS 9201 and Thrane & Thrane Explorer 700, users can perform more than one task at once. For instance, the news team can speak to the studio on a separate voice channel while sending live video, with no loss of bandwidth over streaming IP.

Latest compression techniques

It is also possible to send pre-recorded and compressed video via a standard IP channel while using streaming IP for a live broadcast, so important footage can be received by the studio and edited ready for broadcast at the earliest opportunity.

The level of compression determines the quality of picture received at the other end and the time taken to transmit. The latest compression techniques, H.264, MPEG-4 or a derivative, typically allow one minute of broadcast-quality store and forward video to be transmitted in as little as five minutes over a 256kbps streaming IP channel.

"Streambox enables users to send store and forward files, and it facilitates video playout before the files have been transmitted in their entirety," says Hildeman. "The Streambox store-and-forward tool self-selects the best speed for connection and resumes broken transmission without restarting."

While basic news priorities never change, the race to be first with a story is becoming hotter than ever. Because of BGAN, the excuse 'we couldn't get a satellite link' no longer applies. Broadcast-quality live digital video, at a few minutes' notice, is now part of the picture for professional newsgatherers. ■

Inmarsat BGAN www.inmarsat.com/BGAN

Streambox www.streambox.com

Quicklink www.quicklink.tv

GCS www.globalcoms.com

Livewire www.livewire.co.uk

OTHER BGAN VIDEO APPLICATIONS

Videoconferencing BGAN is compatible with many widely available videoconference hardware and software solutions. These will provide video and audio of acceptable quality over a 64kbps ISDN or a BGAN streaming IP connection. Some broadcasters use them for live 'videophone' reports. BGAN-compatible hardware solutions are provided by Motion Media, Scotty Group, Tandberg and others, with software offered by such as Livewire, Emblaze and Polycom.

Video surveillance This provides a remote one-way video feed, often at a low frame rate but at high resolution, for situation monitoring. Connections to the remote site can be either automatically triggered via motion sensor or alarm trip, or simply 'dialed in'. With an expanded network of remotely steered cameras, it is possible for security-conscious organisations to maintain a high level of surveillance with a minimal on-the-ground presence.