Real-time surveillance streaming over limited bandwidth networks

Surveillance transmission/re-distribution infrastructure for operational flexibility

Usable video and efficient representation of detail – even over limited bandwidths

Exploits existing comms networks for rapid deployment and cost-effective operation
Accessing usable surveillance from remote locations, mobile units and incidents requires an innovative approach to transmission...

Digital Barriers developed the TVI surveillance transmission infrastructure specifically to address the challenges associated with transmission over limited or variable bandwidth networks.

Its ability to maintain a stream of low latency, high-quality video and audio, even where communications infrastructure is limited, makes TVI ideally suited to covert, remote and mobile operations.

TVI has quickly become established as the platform of choice for leading organisations that rely on resilient wireless surveillance...
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Tactical visual intelligence

the definitive surveillance distribution platform: real-time video and audio wherever it is required...

Obtaining usable, low latency surveillance content from remote, hostile and mobile locations is problematic. Communications networks are often limited in terms of their bandwidth and coverage and dedicated infrastructure is complex and costly to deploy.

In addition, conventional standards based video encoders, such as H.264 and MPEG4, are not designed for streaming over constrained or variable bandwidths. Digital Barriers developed the TVI surveillance encoding and transmission technology to specifically address the issues associated with low bandwidth networks and standards based video encoders. It provides a complete real-time surveillance distribution infrastructure.

TVI is capable of streaming alarms and other data, as well as video and audio. As such, it serves as a multi-function wireless integration hub at the centre of a range of security and surveillance systems. For example, it can be deployed with unattended ground sensors to monitor wide-areas, or embedded into re-deployable tactical cameras.
LAW ENFORCEMENT & BORDER SECURITY
Modern police forces rely on intelligence-led operations, with covert and tactical surveillance capabilities that can be deployed quickly – wherever the operation demands. In remote border regions, obtaining surveillance is further complicated by limited comms and power infrastructure...

MOBILE DEFENCE OPERATIONS
Agile, resilient real-time surveillance is a critical capability for modern defence forces that are increasingly engaged in countering the tactics of asymmetric adversaries. The availability of real-time situational awareness across land and airborne assets requires innovative, robust solutions...

CITYWIDE & TRANSIT SURVEILLANCE
Citywide and transit based surveillance schemes typically rely on fixed networking infrastructure, yet the addition of wireless transmission – as an alternative or addition – can extend surveillance coverage, avoid costly laying of cable and make surveillance information accessible anywhere...
TVI was designed specifically to address the challenge of streaming video over low or variable bandwidth networks, providing usable video over bandwidths as low as 9Kbps...
TVI | tactical visual intelligence

product profile and key features

TVI Architecture and Server
Bandwidths Supported: 9Kbps to 1Mbps
Security: Supports AES 256 encryption
TVI Server: Windows Server 2003+ or Linux, 2 GHz Processor, 1GB RAM

TVI Encoders
Video Sizes Supported: 128 x 96 to 704 x 576 (4CIF), frame rates to 25fps (PAL)
Video Input: PAL/NTSC
Networks Supported: Cellular (CDMA/EV-DO/GRPS/EDGE/UMTS/HSPA+), Wi-Fi, internet, satellite (via RJ45 Ethernet)*
High Res Image Retrieval: Enhanced definition (up to 704 x 576) over user-definable areas via high quality JPEG*

TVI Encoding Applications (software)
Devices Supported: Android 2.1 (and above), iOS 4.3 (and above)
Cameras: Front and rear (remote or locally switchable)

TVI Viewing Applications (software)
TVI Control Centre : Windows XP/Vista/7, 1GHz Processor, 512Mb RAM, DirectX 9
TVI Viewer: Supports Windows XP/Vista/7, Android 2.x, iOS 4, Windows Mobile 5/6/6.1/6.5

* Dependent on device or software application

Full specifications of TVI software and hardware product can be found on pages 26 - 33
Complete real-time surveillance solution

usable, low latency video and audio, even where network bandwidth is constrained or variable...

TVI is designed to provide a complete end-to-end surveillance distribution platform, from transmission at source – to access by multiple users simultaneously. Video, audio and other data can be transmitted from remote, mobile or rapidly deployed camera inputs via TVI hardware encoding units – or using the in-built cameras of standard mobile devices. This can then be viewed by in fixed locations or on the move.

The system optimises the transmission of video, audio and other data according to the network bandwidth available to it at any time – thereby maintaining a continuous, low latency stream of surveillance. TVI can utilise various comms bearers, such as cellular, satellite, tactical IP radios, Wi-Fi and broadband. It is effective at 9Kbps to 1Mbps.

TVI is an extremely flexible platform, with a single server capable of accessing and managing multiple encoding devices – including TVI hardware units and TVI encoding applications running on mobile devices. It can also act as a multi-function surveillance integration hub, interfacing with devices such as sensors, alarm triggers and DVRs.
TVI system architecture incorporating hardware and software encoders: the TVI encoders are able to transmit over a range of communications bearers to the TVI Server where the video and audio is decoded. The server also rebroadcasts the content to a range of viewers and devices that may be on a wired or wireless connection. TVI supports AES 256 encryption to secure the transmission stream.
TVI outperforms standards based 3G cellular streaming solutions...and unlike high power COFDM radio, it is not limited by range or the need for dedicated infrastructure...
TVI is the ultimate surveillance and video transmission platform. It provides resilient, usable imagery over a variety of comms bearers – including cellular, satellite, Wi-Fi, tactical IP radios and broadband Internet – with seamless failover across these networks according to availability. It is equally adept at mitigating constraints and variability in bandwidth.
Optimised and efficient video encoding

an innovative approach to video encoding that was developed for low bandwidth transmission...

TVI has transformed video transmission over constrained or highly variable bandwidth networks with its highly efficient, proprietary video codec. Regardless of the available bandwidth, TVI maintains a fixed frame that delivers the optimal representation of detail and ultra low latency video. This ensures that imagery continues to be usable as bandwidth fluctuates, without buffering or break-up off the video. The codec is equally as effective in broadcasting video out, as it is at transmitting from the source.

In contrast to TVI, conventional standards based codecs (such as H.264 and MPEG4) are based on a video encoding approach that relies on higher and less variable bandwidth. Because they operate by sending intermittent snapshots of a scene – and thereafter changes in the scene – the resulting data transmission profile is highly variable. This becomes more pronounced as movement increases in the scene, leading to buffering, latency and corruption in the video. Ultimately, the video becomes unusable.
The above is taken from video shot from a moving vehicle. Both TVI and H.264 codecs are streaming at 128kbps.

Top: as the H.264 video buffers, it starts to lag behind the TVI stream on the left – resulting in latency of 2+ seconds

Bottom: the H.264 video is dropping frames and reassembling them out of order – resulting in complete video break-up
Continually responding to bandwidth

active monitoring of the communications bearer to optimise transmission as bandwidth changes...

Dedicated high-power radio links, such as COFDM, are able to deliver high-quality point-to-point real-time video – but they are complex and costly to set-up and limited to around a 3km range. In contrast, cellular, satellite and broadband networks offer a near ubiquitous comms infrastructure that can be utilised as a bearer of opportunity for surveillance distribution. However, the inherent bandwidth constraints, variability and data costs associated with these networks pose challenges for video transmission.

TVI features an active comms channel manager to continually monitor the available bandwidth. This enables it to throttle up or down the amount of data that an encoder attempts to stream back to the server. The same approach is employed in streaming video from the server out to TVI Viewers. In this way, TVI can constantly optimise the amount of image detail to fit the available bandwidth. TVI also wraps audio and other data into one efficient transmission stream – with secure and efficient encryption.
**TVI versus H.264**: because H.264 and MPGE4 video codecs work by creating full frame images followed by a series of changes in the image, the resultant data profile can be highly variable – with ‘spikes’ beyond the capacity of the network. In contrast, TVI maintains a fixed frame rate and a transmission profile that responds to changes in network capacity.
Simplicity and cost-effectiveness

A reliable and secure ‘surveillance anywhere’ in a rapidly deployable and simple to use platform...

TVI is simple to deploy – with encoding, viewing and server software able to run on commercial IT and mobile platforms. Encoding and viewing applications are available on Android and iOS mobile devices, with a more fully featured viewing application and administration tool running on the Microsoft Windows platform. This includes simple access to local video archives – and TVI units are available with integral DVR recording. User accounts and individual encoders are equally simple to set-up and administer.

Since TVI is able to exploit commercial cellular infrastructure, the cost and complexity of deploying dedicated radio infrastructure is avoided – with data costs the only real operating cost. Because TVI can be put into sleep mode until required to stream, these costs can be minimised – with additional user controls over maximum streaming rates. Users of satellite networks, broadband, or corporate networks can also employ TVI to manage bandwidth-intensive video streaming and reduce associated data costs.
TVI Manager is a simple administration utility that provides complete control over all TVI encoders (hardware as well as software) and users on an organisation’s TVI Server instance. Individual encoders can be added to specific users/groups (for example for the duration of a surveillance operation) with granting of permission for individual controls or features.
TVI provides a platform that is not just capable of streaming video and audio from source, it also provides rebroadcast of content to wherever it is required – even on the move...
The TVI architecture provides a series of unicast connections to individual viewing clients. This could be in the form of the dedicated TVI Control Centre software or as an input to an existing command/control system – but it could equally be on Android, iOS or Windows Mobile viewing software, which incorporates key features – such as PTZ camera control.
Example deployment scenarios

multiple device and configuration options ensure that TVI is suitable for a multitude of diverse applications...

TVI provides a resilient ‘go anywhere’ tactical surveillance platform for mission-critical operations. End-to-end security (TVI supports AES 256 encryption) and strict control of access rights has led TVI to become established as the solution of choice for leading law enforcement and defence organisations around the world. Low power, compact and ruggedised TVI hardware units provide a means to transmit, access, record and retrieve surveillance in the harshest, most remote and challenging operational environments.

Its inherent flexibility and cost-effectiveness also makes TVI ideal for public safety and security applications, including critical infrastructure protection and event security. For example, this could include TVI enabled urban camera systems to monitor traffic black spots or TVI applications running on the mobile devices of front-line security operatives or lone workers. Furthermore, embedding TVI ‘in the network’ can ensure efficient, low latency distribution of high-volume surveillance and video data across an organisation.
**Mission-Critical Surveillance | TVI at the edge**
for egress of real-time-recorded video and audio from remote, harsh and mobile operating environments

- **Requirement:** reliable, secure, low latency surveillance transmission in areas lacking comms/power
- **TVI Solution:** ruggedised low-power encoders, integral recording and integration hub connectivity
- **Key Features:** enhanced area of interest, AES 256 encryption, silent operation, seamless network failover

**Mobile Surveillance | TVI on the move**
for ‘go anywhere’ surveillance transmission and access across transit networks, front-line operatives and more

- **Requirement:** low latency on-demand video utilising a comms ‘bearer of opportunity’ depending on location
- **TVI Solution:** compact vibration-resistant encoders, rapidly deployable TVI/camera kits, mobile applications
- **Key Features:** seamless transition across networks, remote archive retrieval, power-efficient operation

**Rapid Deployment Surveillance | TVI in the camera**
for temporary deployment of tactical camera systems or simple wire-free installation of fixed CCTV cameras

- **Requirement:** video transmission from sites where installation of fixed infrastructure is impractical or too costly
- **TVI Solution:** TVI encoder module for cameras (e.g. Stryker WMV+) or ‘plug and play’ encoder/recorder units
- **Key Features:** multiple network options, switchable live cameras and remote archive retrieval, highly cost-effective

**Bandwidth-Efficient Networking | TVI in the network**
for controlling and managing the distribution of low latency, high-volume video data across enterprises

- **Requirement:** distribution of high-volume video across (and outside) crowded fixed/temporary networks
- **TVI Solution:** TVI multi-channel encoder modules
- **Key Features:** simple configuration of encoders/users, low latency transmission of live content
Example operational deployment

applying the TVI platform, encoders and viewing applications to an agile covert policing operation...

Mission-critical surveillance operations are an excellent example of how TVI can reliably support both front-line operatives and control room commanders. Hardware encoders bring video and audio from covert camera installations, while mobile operatives are able to stream real-time video of surveillance targets from standard camera phones. Real-time and archive information is available to control room teams via TVI Control Centre tool or via a feed into existing video management systems – and mobile teams also have simultaneous access to real-time video on the move. Both groups are able to enhance areas of interest (e.g. face, vehicle registration details) during the operation.

The illustrative surveillance operation includes fixed camera coverage (1) of a target location with mobile surveillance (2) coming from foot based teams. Real-time information is being viewed and responded to by the control room (3) as well as tactical observation teams on the ground (4) and in the air. Comms infrastructure is being provided solely by cellular coverage (5) with TVI Server managing content distribution.
TVI is available in low power, compact hardware variants, as well as software encoder and viewing apps for Android and iOS mobile device platforms...
TVI technology can be deployed as encoding and viewing apps on standard mobile handsets – making use of the inbuilt camera, processing power and networking modules on modern devices. It can also be deployed in dedicated hardware units, optimised around operational imperatives such as size, environmental resilience or integral cameras/recording.
TVI Products and Specifications

equipment, applications and licensing to suit a range of requirements and organisations...

TVI is available in a number of form factors and a range of system set-ups. TVI Server sits at the heart of any TVI platform, providing the administration of user and encoder accounts and managing the connections to multiple encoders and viewers. Hardware and software encoders can be added to the system and determine the level of TVI Server licence required – from the TVI SV Base Server (up to 2 encoders), through the TVI SV 20/50/100 Servers (up to 20/50/100 encoders) and up to the TVI SV Enterprise Server (100+ encoders). TVI Viewers are available on various platforms and mobile viewers can be downloaded and installed from apps stores at no charge. TVI decoder units (TVI D200 and D400) are available to convert TVI inputs to analogue monitors.

Detailed product datasheets are available for all TVI devices and applications.
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<thead>
<tr>
<th>Model</th>
<th>Video Inputs</th>
<th>Audio Capability</th>
<th>On-board Archiving</th>
<th>Enclosure Design</th>
<th>Network Connectivity</th>
<th>Additional Connectivity</th>
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<tr>
<td>C200 / C300 / C310 compact streaming unit</td>
<td>1 BNC PAL/NTSC</td>
<td>stereo (2 way¹)</td>
<td>1000 frames (area enhance²)</td>
<td>compact non-vibration, silent operation</td>
<td>cellular (CDMA/EV-DO^3, GPRS, EDGE, UMTS, HSPA+), satellite, IP radio, ADSL, network (via RJ45)</td>
<td>serial (RS422, RS232), USB, RJ45</td>
</tr>
<tr>
<td>S400 ultra compact streaming unit</td>
<td>2 MCX PAL/NTSC</td>
<td>stereo (2 way¹)</td>
<td>1000 frames (area enhance²)</td>
<td>small non-vibration, silent operation</td>
<td>cellular (GPRS, EDGE, UMTS, HSDPA), satellite, IP radio, ADSL, network (via RJ45)</td>
<td>serial (RS232, RS485, RS422, RS232s), mini USB, RJ45</td>
</tr>
<tr>
<td>M350 ruggedised streaming unit</td>
<td>2 Amphenol PAL/NTSC</td>
<td>stereo (2 way¹)</td>
<td>1000 frames (area enhance²)</td>
<td>IP67 rated non-vibration, silent operation</td>
<td>cellular (GPRS, EDGE, UMTS, HSDPA), satellite, IP radio, ADSL, network (via RJ45)</td>
<td>serial (RS232, RS485, RS422/RS485s), IP67 USB, IP67 RJ45</td>
</tr>
<tr>
<td>R500 ‘Tri-Star’ surveillance integration hub</td>
<td>2 Amphenol PAL/NTSC</td>
<td>stereo (2 way¹)</td>
<td>2 x SD media cards</td>
<td>IP67 rated non-vibration, silent operation</td>
<td>cellular (GPRS, EDGE, UMTS, HSDPA), satellite, IP radio, ADSL, network (via RJ45), built-in Wi-Fi</td>
<td>serial (RS232, RS485, RS422/RS485s), IP67 USB, IP67 RJ45</td>
</tr>
<tr>
<td>H300 for mobile devices apps for Android and iOS</td>
<td>2 handset front/rear camera</td>
<td>stereo (2 way¹)</td>
<td>N/A</td>
<td>third-party Android and iOS mobile devices</td>
<td>cellular (GPRS, EDGE, UMTS, HSPA+, LTE^4), Wi-Fi (device)</td>
<td>N/A – handset dependent</td>
</tr>
</tbody>
</table>

1 One way supported with current software release
2 On-board frame buffer for high resolution enhancement of a frame or area of interest
3 C310 only (features built-in CDMA modem)
4 Dependent on mobile handset
**TVI C200/C300/C310** | compact surveillance transmission unit

### Hardware
**Physical Size:** L195mm x W148mm x D37mm (including connectors)
**Operating Temperature:** -32° to +60°, non-condensing
**Input Voltage:** 9V-36V DC
**Power Consumption:** -7W max (8.5W with fully operational modem), 5.5W nominal, <1.5W standby, <0.1W sleep

### Connectors
**USB:** For configuration and GPS dongle
**RJ45:** Ethernet connector for ADSL and network lines
**SIM:** SIM carriers (network agnostic)\(^1\)
**Video Input:** Standard BNC connector (PAL/NTSC sources)
**Audio:** 2 way audio (one way supported with current release software)
**RS422/Trigger:** Camera/device control, trigger input for wake/alarm reporting
**RS232:** Serial port for camera/device control
**RF Antenna:** SMA antenna for cellular modem connector

### Communications
**Internet Connectivity:** 10/100 RJ45 Ethernet
**Connectivity:** Built-in CDMA/EV-DO\(^2\) and GPRS/EDGE/UMTS/HSPA+ modules
**Satellite Connectivity:** 10/100 RJ45 Ethernet for connection to Inmarsat GAN/BGAN Fleet Routers
**PTZ Connectivity:** Supports Pelco P&D, Canon VC-C4/5, Sony Visca, etc. (others on request)
**Bandwidths Supported:** 9Kbps to 1Mbps

### Software
**Viewers Supported:** Software available for Windows PC and Windows Mobile 6.5, iPhone and Android
**Video Frame Sizes:** 128 x 96 up to 704 x 576 (4CIF), frame rates up to 25fps (PAL)
**High Res Image Retrieval:** Enhanced definition (up to 704 x 576) over user-definable areas via high quality JPEG

### Security
**Encryption:** Supports AES 256 encryption in addition to support for IP Sec VPN connections

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\(^1\) C300 and C310 only

\(^2\) C310 only
**TVI S400 | small form factor surveillance transmission unit**

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**Hardware**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Size</td>
<td>L120mm x W72mm x D33mm (including connectors)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-32° to +60°, non-condensing</td>
</tr>
<tr>
<td>Input Voltage</td>
<td>9V-36V DC</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>7W max with 1 x modem fully operational, 10W max with 2 x modems fully operational, 6W nominal, &lt;1.5W standby, &lt;0.1W sleep</td>
</tr>
</tbody>
</table>

**Connectors**

<table>
<thead>
<tr>
<th>Connector</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB</td>
<td>For configuration and GPS dongle</td>
</tr>
<tr>
<td>RJ45</td>
<td>Ethernet connector for ADSL and network lines</td>
</tr>
<tr>
<td>SIM</td>
<td>2 x SIM carriers (network agnostic)</td>
</tr>
<tr>
<td>Video Input</td>
<td>2 x MCX connectors (PAL/NTSC sources)</td>
</tr>
<tr>
<td>Audio/Power</td>
<td>2 way audio (one way supported with current release software), power out provides 2 x independent 12V supplies for external cameras</td>
</tr>
<tr>
<td>RF Antenna</td>
<td>2 x MCX antennas for cellular modem connector</td>
</tr>
<tr>
<td>Serial Ports/Alarms</td>
<td>Provides RS232/RS422/RS422/RS323 serial ports for control of cameras or other devices</td>
</tr>
<tr>
<td></td>
<td>3 x trigger inputs provide wake-up from sleep or alarm reporting</td>
</tr>
</tbody>
</table>

**Communications**

<table>
<thead>
<tr>
<th>Connectivity Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet Connectivity</td>
<td>10/100 RJ45 Ethernet</td>
</tr>
<tr>
<td>GPRS/3G/HSDPA Connectivity</td>
<td>2 x built-in GPRS/3G/HSDPA modules</td>
</tr>
<tr>
<td>Satellite Connectivity</td>
<td>10/100 RJ45 Ethernet for connection to Inmarsat GAN/BGAN Fleet Routers</td>
</tr>
<tr>
<td>PTZ Connectivity</td>
<td>Supports Pelco P&amp;D, Canon VC-C4/S, Sony Visca, etc. (others on request)</td>
</tr>
<tr>
<td>Bandwidths Supported</td>
<td>9Kbps to 1Mbps</td>
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</table>

**Security**

<table>
<thead>
<tr>
<th>Encryption</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Security</td>
<td>Supports AES 256 encryption in addition to support for IP Sec VPN connections</td>
</tr>
</tbody>
</table>

**Software**

<table>
<thead>
<tr>
<th>Viewers Supported</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Software available for Windows PC and Windows Mobile 6.5, iPhone and Android</td>
</tr>
<tr>
<td></td>
<td>128 x 96 up to 704 x 576 (4CIF), frame rates up to 25fps (PAL)</td>
</tr>
<tr>
<td></td>
<td>Enhanced definition (up to 704 x 576) over user-definable areas via high quality JPEG</td>
</tr>
<tr>
<td></td>
<td>128 x 96 up to 704 x 576 (4CIF), frame rates up to 25fps (PAL)</td>
</tr>
<tr>
<td></td>
<td>Enhanced definition (up to 704 x 576) over user-definable areas via high quality JPEG</td>
</tr>
</tbody>
</table>

**Video Frame Sizes**

<table>
<thead>
<tr>
<th>Frame Sizes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>128 x 96 up to 704 x 576</td>
<td>4CIF</td>
</tr>
<tr>
<td>frame rates up to 25fps (PAL)</td>
<td>Enhanced definition (up to 704 x 576) over user-definable areas via high quality JPEG</td>
</tr>
</tbody>
</table>

**High Res Image Retrieval**

<table>
<thead>
<tr>
<th>Definition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhanced</td>
<td>Enhanced definition (up to 704 x 576) over user-definable areas via high quality JPEG</td>
</tr>
</tbody>
</table>

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## TVI M350 | ruggedised surveillance transmission unit

### Hardware
- **Physical Size:** L210mm x W190mm x D75mm (including connectors) | Weight: 1.2kg
- **Operating Temperature:** -32° to +70°
- **Input Voltage:** 9V-36V DC
- **Power Consumption:** 7W max (8.5W with fully operational modem), 5.5W nominal, <1.5W standby, <0.1W sleep

### Connectors
- **Video Input:** Amphenol 62GB connector, 4 pin (2 for video, 2 for power)
- **Audio:** 2 way audio (one way supported with current release software)
- **25 Pin Connector:** RS232 serial plus RS422/RS485 camera/device control, trigger input for wake/alarm reporting
- **Power:** 3 pin Amphenol 62GB connector to support vehicle or battery operation
- **RF Antenna:** TNC antenna for cellular modem connector
- **USB:** IP67 USB connector for configuration and GPS dongle
- **RJ45:** Ethernet connector for ADSL and network lines
- **SIM:** Lockable, concealed SIM carrier (network agnostic)

### Communications
- **Internet Connectivity:** 10/100 RJ45 Ethernet
- **GPRS/3G/HSDPA Connectivity:** Built-in module
- **Satellite Connectivity:** 10/100 RJ45 Ethernet for connection to Inmarsat GAN/BGAN Fleet Routers
- **PTZ Connectivity:** Supports Pelco P&D, Canon VC-C4/5, Sony Visca, etc. (others on request)
- **Bandwidths Supported:** 9Kbps to 1Mbps

### Software
- **Viewers Supported:** Software available for Windows PC and Windows Mobile 6.5, iPhone and Android
- **Video Frame Sizes:** 128 x 96 up to 704 x 576 (QCIF), frame rates up to 25fps (PAL)
- **High Res Image Retrieval:** Enhanced definition (up to 704 x 576) over user-definable areas via high quality JPEG

### Security
- **Encryption:** Supports AES 256 encryption in addition to support for IP Sec VPN connections
TVI R500 ‘Tri-Star’ | ruggedised surveillance integration hub (with on-board recording)

### Hardware

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Size</td>
<td>L205mm x W234mm x D95mm (including connectors)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-15°C to +60°C</td>
</tr>
<tr>
<td>Input Voltage</td>
<td>9V-36V DC</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>22.5W streaming, 11W sleep (archiving), 4.5W sleep (RS232 trigger active), 0.5W deep sleep</td>
</tr>
<tr>
<td>On-board Recording</td>
<td>2 x SD media cards (to current max size available)</td>
</tr>
</tbody>
</table>

### Connectors

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video Input</td>
<td>2 x video input (PTZ)</td>
</tr>
<tr>
<td>Audio</td>
<td>Stereo audio (bi-directional)</td>
</tr>
<tr>
<td>Ethernet</td>
<td>1 x Ethernet (network comms), 1 x Ethernet (local comms e.g. local viewing / IP pass through)</td>
</tr>
<tr>
<td>Data</td>
<td>Asynchronous/synchronous RS232, RS422 and RS485 data interfaces available</td>
</tr>
<tr>
<td>Trigger</td>
<td>3 x trigger inputs (supports unattended ground sensor triggers)</td>
</tr>
<tr>
<td>Relay</td>
<td>1 x relay output</td>
</tr>
<tr>
<td>Antennas</td>
<td>1 x 3G antenna, 2 x Wi-Fi antennas (network and local)</td>
</tr>
</tbody>
</table>

### Communications

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet Connectivity</td>
<td>10/100 RJ45 Ethernet</td>
</tr>
<tr>
<td>GPRS/3G/HSDPA Connectivity</td>
<td>Built-in module</td>
</tr>
<tr>
<td>Wi-Fi</td>
<td>Built-in 802.11b, 802.11g, 802.11n (only 2.4GHz coverage at 802.11n)</td>
</tr>
<tr>
<td>Satellite Connectivity</td>
<td>Inmarsat BGAN and Thuraya</td>
</tr>
<tr>
<td>Other Comms Connectivity</td>
<td>IP and legacy microwave systems</td>
</tr>
<tr>
<td>PTZ Connectivity</td>
<td>Supports Pelco P&amp;D, Canon VC-C4/5, Sony Visca, etc. (others on request)</td>
</tr>
<tr>
<td>Bandwidths Supported</td>
<td>9Kbps to 1Mbps</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Software</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewers Supported</td>
<td>Software available for Windows PC and Windows Mobile 6.5, iPhone and Android</td>
</tr>
<tr>
<td>Video Frame Sizes</td>
<td>128 x 96 up to 704 x 576 (4CIF), frame rates up to 25fps (PAL)</td>
</tr>
<tr>
<td>High Res Image Retrieval</td>
<td>Enhanced definition (up to 704 x 576) over user-definable areas via high quality JPEG</td>
</tr>
<tr>
<td>On-board Recording</td>
<td>128 x 96 up to 704 x 576 (4CIF), frame rates up to 25fps (PAL)</td>
</tr>
</tbody>
</table>

### Security

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encryption</td>
<td>Supports AES 256 encryption in addition to support for IP Sec VPN connections</td>
</tr>
</tbody>
</table>
**TVI Apps for Android/iOS | mobile encoder applications for handheld devices**

**H300 Encoder for Android**

The codec is optimised to support dual core ARMv7 CPUs. Automatic network profile detection for HSPA+, CDMA, LTE.

- **Android OS:** Android 2.1 and above
  (Android 2.3 for accessing multiple cameras)
- **Cameras:** Front, rear (remote/local switching)
- **Security:** Supports AES 256 encryption
- **Configuration:** Bandwidth, frame rate, frame size, audio (remote/local configuration)

**H300 Encoder App for iOS**

Automatic network profile detection for HSPA+, CDMA, LTE.

- **iOS Version:** 4.3 and above
- **Devices:** iPhone 3GS/4/4S/5, iPad 2, iPad 3
- **Cameras:** Front, rear (remote/local switching)
- **Security:** Supports AES 256 encryption
- **Configuration:** Bandwidth, frame rate, frame size, audio (remote/local configuration)

**TVI Control Centre/Viewer | command/control and viewing applications**

**TVI Control Centre**

- **System Requirements:** 1GHz Processor, Windows XP/Vista/7, 512Mb RAM, DirectX 9
- **Viewing:** Real-time viewing of multiple encoders with full PTZ control
- **Retrieval:** Access to local DVR footage, enhanced area of interest
- **Configuration:** Encoder frame rate

**TVI Viewer**

- **Requirements:** Windows XP/Vista/7, Android 2.1 or later, iOS 4, Windows Mobile 5/6/6.1/6.5
- **Connectivity:** Wired Internet, cellular, Wi-Fi
- **Viewing:** Real-time viewing of encoder with full remote PTZ control
TVI Server | surveillance distribution engine

TVI Server
The TVI Server maintains ‘light touch’ comms with encoders to enable each one to monitor available bandwidth in real-time, manage codec settings ‘over the air’, manage encryption and stream video to viewers.

System Requirements:
- 2GHz Processor, Windows Server 2003+ or Linux, 1Gb RAM, Oracle Java JRE 1.6.0 or later

Connectivity:
- Internet with sufficient bandwidth

TVI Server can be licenced on the following basis:
- TVI SV Base: up to 2 TVI encoders
- TVI SV20: up to 20 TVI encoders
- TVI SV50: up to 50 TVI encoders
- TVI SV100: up to 100 TVI encoders
- TVI SV Enterprise: 100+ TVI encoders

TVI D200 and D400 | dedicated TVI decoder units

D200 Decoder
- Physical Size: L260mm x W186mm x D59mm
- Operating Temperature: 0° to +50°
- Input Voltage: 12V DC (AC to DC power unit supplied)
- Power Consumption: 25W nominal, 30W maximum
- Video Output: Composite output
- Transparent Data Channel: Via serial RS232 port
- Internet Connectivity: 10/100 RJ45 Ethernet connector for ADSL and network lines
- Control: Keyboard input via USB port

D400 Decoder
- Physical Size: L482mm x W381mm x D44mm
- Operating Temperature: 0° to +50°
- Input Voltage: 240V AC
- Power Consumption: 25W nominal, 30W maximum (x2)
- Video Output: Composite output (x2)
- Transparent Data Channel: Via serial RS232 port (x2)
- Internet Connectivity: 10/100 RJ45 Ethernet connector (x2) for ADSL and network lines
- Control: Keyboard input via USB port
Digital Barriers provides advanced surveillance technologies to the international homeland security and defence markets. Specialising in ‘edge-intelligent’ solutions that can be deployed across remote, hostile or complex operating environments, we work with governments, multinational corporations and system integrators in the defence, law enforcement, critical infrastructure, transportation and natural resources sectors.
Surveillance products and solutions that can be deployed across remote, hostile or complex operating environments
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