

DSNV4 – the BBC’s first bi-media newsgathering vehicle

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1. Introduction

In April 1997, BBC Resources introduced its first Digital Satellite Newsgathering Vehicle (DSNV4), designed for bi-media (radio and television) newsgathering. It reflects the latest brief for BBC News (as from April 1997) which is to provide newsgathering facilities – both editorial and technical – for *all* BBC news outlets across domestic television and radio as well as for BBC World Service radio and television.

2. Project brief

Although it is the fourth digital newsgathering vehicle that BBC Resources has put into service for BBC News, it is radically different in several ways. For the first time a vehicle was specified

Following on from the success of the Eurovan, BBC Resources has now built a bi-media DSNV which not only serves the simultaneous needs of the BBC’s radio and television news services but also is equipped for widescreen/stereo operations.

An outline description of the new vehicle is given here.

that took fully into account the need for bi-media operation, and which also had to be capable of working in the widescreen format and with stereo sound. This is in order that it will be compatible with the launch of widescreen services by the BBC in 1998.

The vehicle is designed to operate primarily in the UK, but also on the European continent. A fundamental requirement was that it had to be capable of *simultaneously* feeding radio and TV news reports. So, for example, it could be transmitting a live report for transmission on a domestic television news bulletin, and also a correspondent could be filing a piece for World Service radio.



3. Outline specification

To meet the operational requirements, the vehicle has been built with the following features, some of which are common to other BBC DSNG facilities:

- a Ku-band digital satellite uplink, compliant with Eutelsat and Intelsat regulations as well as with ETS 300-327 [1];
- a bit-rate of 8 Mbit/s for the digital uplink, using the Thomson (France) “ETSI variant” coder;
- a 2.5 GHz FM analogue terrestrial microwave link, mounted on an extendible 12m mast;
- a 270 Mbit/s serial digital video system (ITU Rec. 601 [2]) to provide widescreen capability within the vehicle;
- a stereo audio system;
- a separate reporter’s position, with editing and “live” insert facilities for radio news programmes;
- a bi-directional studio/OB communications system via satellite;
- a two-machine Betacam SP editing facility;
- an on-board single camera with lighting for live television inserts to news programmes;



Figure 1
BBC bi-media vehicle
on location at the
Newbury racecourse.

- a capability to handle a second camera, with synchronous switching;
- an on-board power generator.

The vehicle was built by Advent Communications (UK) in close co-operation with BBC Resources in order to achieve the high degree of integration of facilities required for the project. It is based on a Mercedes Sprinter 412D panel van, a compact vehicle which is only 5.8m long and 2.2m wide, with a GVW of 4600 kg.

The digital SNG and satellite communications system are identical to that described in a previous article on the BBC European DSNG vehicle – the *Eurovan* [3]. Both the 8 Mbit/s digital uplink and the 2.5 GHz terrestrial microwave link can be operated simultaneously to provide multiple paths out for the video and the audio.

It may seem unusual that we built a vehicle that has a 2.5 GHz terrestrial microwave link as well as a satellite uplink, when it is usually considered that having a satellite uplink gives full and free access from any location. Unfortunately, that is not always the case in metropolitan areas. This vehicle is intended to be used frequently around London, and it is in fact a replacement for a now-redundant terrestrial microwave links vehicle that worked predominantly around central London. Within this area there are many locations from which news stories are frequently covered and from where it is impossible to establish a satellite link due to obstruction of the skyline by adjacent buildings.

From these locations the only way to get a signal out is via the 2.5 GHz microwave terrestrial link. The BBC has four permanently-equipped remotely-

Abbreviations

DSNV	Digital satellite news-gathering vehicle
ENG	Electronic news gathering
ENPS	Electronic news-production system
ETS	European Telecommunication Standard
ETSI	European Telecommunication Standards Institute
FM	Frequency modulation
GSM	Global system for mobile communications
GVW	Gross vehicle weight
ITU-R	International Telecommunication Union, Radiocommunication Sector
OB	Outside broadcast
PAL	Phase alternation line
SDI	Serial digital interface
SNG	Satellite news gathering
YUV	The luminance (Y) and colour difference (U and V) signals of the PAL colour television system



controlled ENG microwave receiver sites around London, and this vehicle is able to work into any one of these sites.

4. Television programme path

The video signal from the live camera is converted to a 270 Mbit/s serial digital signal within an "add-on" unit that fits on the back of the camera, converting the analogue YUV output to SDI. This signal is then fed down the multi-mode Telecast Viper (USA) fibre-optic cable system that is used to connect the camera to the vehicle; the fibre-optic cable can also handle a second camera if required. Programme communications are also passed back and forth via the fibre-optic system.

The serial digital signal is fed into the SDI input of the Thomson 8 Mbit/s coder, via a synchronous

video matrix. This signal is also converted back within the vehicle to a broadcast-quality analogue PAL signal for feeding over the FM analogue 2.5 GHz microwave link.

There is a two-machine Betacam SP editing facility integrated into the vehicle, allowing the pictures to be edited quickly into a "package" that is suitable for transmission back to the studio, or can be played in "live" from the vehicle via the synchronous vision matrix. This matrix can also handle synchronous switching of other sources, such as the second camera, or an external source via a synchronizer.

The stereo audio system also uses the fibre-optic system to connect the microphones to the vehicle, where there is a 10-channel audio mixer to handle all the audio sources, either within the vehicle or from an exterior source.

Figure 2 (upper)
The TV area inside the new BBC bi-media vehicle.

Figure 3 (lower)
The Author sitting inside the radio area of the new BBC bi-media vehicle.



5. Radio programme path

There is a separate area for a correspondent to edit or file material for radio, either replayed off-tape or "live". The radio area, which is in the cab, can be isolated acoustically from the main operational area by sliding across a folding partition.

Within this area, the radio correspondent has use of a Sony Mini-Disc recorder, a Sony Walkman, a lip microphone for "live" reports, as well as a Shortcut 360 non-linear digital audio editor for more complex pieces.

Each of these can be routed directly by the correspondent to an audio channel on either the 8 Mbit/s Thomson coder, a separate 64 kbit/s G.722-coded satellite link, or via the 2.5 GHz microwave link. Reverse "cue" for the correspondent for "live" reports is derived from either one of the GSM cellphones on the vehicle, or via the 64 kbit/s satellite communications system which is integrated into the vehicle. This satellite link also provides access to the BBC's new newsroom computer system – the Electronic News Production System (ENPS) – which is vital for the correspondent. Within this radio area there is also a vision monitoring facility so that it can be used as an "off-tube" commentary area for television coverage if required.

Hence the correspondent can operate on behalf of radio in complete independence from the television operation, enabling the vehicle to be on-air simultaneously on both radio and television networks.



6. Conclusions

The ground-breaking approach in the concept, design and construction of this vehicle has resulted in a truly bi-media facility. It is probably one of the most “densely packed” SNG vehicles in terms of facilities currently in existence, and has attracted widespread interest and approbation from both within the BBC and outside in the industry. Since its introduction into service, it has covered a wide range of stories in the UK (including the General Election) and has ventured occasionally onto mainland Europe.

It is hoped that the BBC will be able to build further vehicles of this type in the future, taking advantage of future technological innovations in miniaturization of broadcast equipment in order to re-

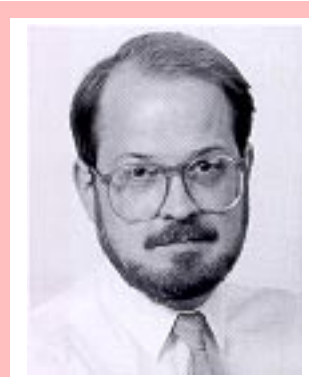
duce the size of the vehicle, while still producing the same (or an even greater) range of facilities.

Bibliography

- [1] ETS 300 327: **Satellite Earth Stations and Systems; Satellite Newsgathering (SNG) Transportable Earth Stations (TESs).**
- [2] ITU-R BT.601-5 (10/95): **Studio encoding parameters of digital television for standard 4:3 and wide-screen 16:9 aspect ratios.**
- [3] Higgins, J.M.M.: **The BBC European DSNG vehicle – the Eurovan**
EBU Technical Review, No. 269, Autumn 1996.

Mr Jonathan Higgins qualified from Wolverhampton Polytechnic with a Higher National Certificate in Electrical & Electronic Engineering in 1979. He joined the BBC that year and became a Supervisory Engineer in 1983, working in telecine, VT and the studios, but later going out “on the road” as a microwave links/OB engineer. When the BBC News & Current Affairs Directorate was created in 1989, Mr Higgins became a Duty Manager in the Location Facilities Unit. He later became the unit’s Operations Manager and then, in 1992, was promoted to Manager Location Facilities.

Today Mr Higgins is in charge of a busy newsgathering engineering unit which operates fast-response terrestrial microwave links and SNG uplinks in the UK, as well as both Ku- and C-band SNG uplinks around the world. He has been very involved in the development of both truck-based and “flyaway” SNG links and, in particular, DSNG uplinks. He oversaw the construction and introduction into service of the first (analogue) SNG truck for BBC News in 1992, followed by four digital SNG trucks. He has just started on the construction of the fifth (digital) truck for the BBC’s new 24-hour News service to be launched later this year, and is also involved in the specifying & maintenance of ENG equipment.



Montreux highlights the leadership of Prof. Krivocheev

It was standing room only, and lucky if you could find it. The Montreux International Television Symposium’s hottest topic for 1997 was digital high-definition television. The headliner was the side-by-side demonstrations of the DVB-T system and the US ATSC system – both now fully specified. Live broadcasts in 6 MHz and 8 MHz television channels provided picture quality which rose to excellent.

Who would have thought at the beginning of the decade that such levels of high-quality compression in terrestrial channel bandwidths would be possible? One individual thought so, and inspired the broadcasting community to work on and develop the systems seen in Montreux. This was Prof. Mark Krivocheev, Chairman of ITU Study Group 11. The demos were a fitting tribute to Prof. Krivocheev who celebrates his 75 birthday at the end of July 1997. His dream of compatible HDTV for 6, 7 and 8 MHz has been fulfilled. Prof. Krivocheev’s biography appeared in **EBU Technical Review** No. 255 (Spring 1993).

1997 saw the agreement by Study Group 11 of two major new ITU-R Recommendations. The first was for the digital terrestrial broadcasting systems (demonstrated in Montreux), and the other was for a world-wide HDTV production standard, based on a common image format (HD-CIF). These are the latest examples of twenty-five years of impressive recommendations in the ITU-R, under Prof. Krivocheev’s leadership.

At the recent meeting of Study Group 11, delegates proposed to make Prof. Krivocheev a Professor Emeritus for Study Group 11. One delegate closed the session with the remark: *Over the last three decades, television has changed society. Prof. Krivocheev has changed television.*

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