

# ENG INF

The Quarterly For BBC Engineering Staff

## Major BBC Showing at IBC

The BBC will take an important place at the International Broadcasting Convention in Brighton this year.

No less than seventeen conference papers will be read by BBC engineers and there is to be a major exhibition stand to show off more than a dozen novel engineering developments from Research and Designs Department.

All the products on show can be licensed for manufacturing by private industry or have already been licensed and need to be shown off to potential overseas customers. At the moment product licences draw in some £65,000 a year but we aim to increase that as much as possible.

The equipment on the stand will include novel equipment from Research Department for electronic preparation of Television Graphics and ACE (Advanced Conversion Equipment), the first four-field digital standards converter and the first to be virtually transparent in operation.

Other developments on show will include NICAM, the digital sound distribution system, high-quality Band II

FM transmitter equipment and compact, microprocessor-controlled equipment that will generate television logos and captions.

There will also be a demonstration of processing audio signals using a COPAS (Computer Processing of Audio Signals) system in which spectrum shaping, compression, limiting and other audio processes are all controlled by a bit-slice microprocessor working on digital signals.

Outside the exhibition hall will be CMCCR 2, the BBC's new Colour Mobile Central Control Room. It has sides that expand to 4th metres width, opening to give a spacious production unit that will handle 25 vision sources and includes a stack of 34 monitors.

## 405 Ends, Self-Help Begins

On May 20th, the Home Secretary announced the phased closure of the 405-line television service, authorisation for a further stage of relay station building and also signalled the start of a scheme for 'self-help transmitters'.

The closure of the 405-line transmitting stations will be spread over a period of five years between the beginning of 1982 and the end of 1986. The 39 BBC stations to be closed in 1982 are in areas where there is almost complete UHF coverage. The closure programme will be co-ordinated with the IBA so that transmitters in the same area will be closed at the same time. These are the key points from the announcement:

- Phase III, the next phase of UHF relay station building, will follow on after the present Phase II programme has been completed. With 200 Phase II stations still to be built at the rate of 70 stations a year, Phase III should begin during

1984. Service Planning Section at Research Department cannot yet anticipate the number of Phase III stations that will be required but feel it may be as many as 500. These will be built at the same rate of 70 a year.

- In the 'self-help' scheme, approval will be given to small remote communities to set up and run their own stations. Broadcasters will do the basic planning and will ensure that the transmitters are integrated into the network. Then when a station comes into operation the broadcasters will check that it is not causing interference to existing viewers in the area. When this has been done the Home Office will issue a licence for five years operation at a cost of around £100.

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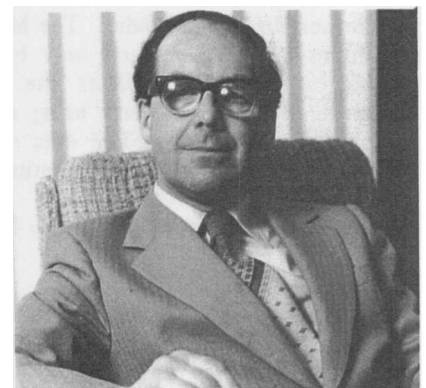
## 'Our Standards Are Highest'

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" You may think it is strange that at a time when many things are being cut that we should initiate this engineering bulletin but for a very small cost every year it should be able to contribute considerably to keeping us all in touch with what is going on in BBC Engineering. Some of you may well be pleasantly surprised at the range of development that is going on in BBC Engineering now, today.

With technology developing as rapidly as it does today I am very proud to be able to boast that engineers in the BBC are not just following close behind the technological bandwagon but are amongst those who are in the front pulling it along.

But the cuts in our expenditure have been on all our minds over the last few months and the repercussions will continue to affect us for a long time. We have to give up 130 posts in the Engineering Division from a total staff of some 7,000. As well as the reduction in staff we are going to suffer much tighter budgetary control, but as engineers we are thoroughly used to the practice of tailoring our system to the budget that is available.



Bryce McCrerrick  
Director of Engineering

Despite these cuts in effort and money our technical standards will not fall. As broadcasting engineers we will continue to lead the field in Research and Development and our operational standards will likewise continue to set and example to broadcasters the world over.

Some of the equipment that has recently gone in service shows just how BBC engineers are setting even higher standards. The new digital standards converter at Television Centre has proved so efficient that some people ask whether programmes have in fact Continued on back page

(contd. from page 1)

### Simple Self Help

Most of these stations are expected to use commercial yagi receiving and transmitting aerials and commercial amplifiers. The amplifiers will be similar to those being used at present for wired distribution systems. The power of each station will obviously depend on the area it has to serve but will have to be carefully planned to avoid interaction with other stations on the same or adjacent channels. Split receive/transmit sites may be necessary in some cases. Most of the stations should be active deflectors which receive and transmit on the same channel but some stations may need to use transposers in order to avoid possible interference.

So far there have been about 40 requests to operate 'self-help' stations mainly from remote communities in Scotland. So, it is difficult to assess how many 'self-help' stations will be put in service but estimates vary from 200 to 500 stations.

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A self-help system could be just as simple as this

#### 405-line Stations closing during 1982

Abergavenny	Cambridge	Hungerford	Okehampton
Aldeburgh	Campbeltown	Kendal	Oxford
Ayr	Canterbury	Kilkeel	Perth
Ballachulish	Cardigan	Kinlochleven	Port Ellen
Ballycastle	Cannarthen	Llanelli	Scarborough
Bedford	Church down Hill	Maddybenny More	Scilly Isles
Belmont	Dundee Law	Marlborough	Sheffield
Bexhill	Ffestiniog	Newhaven	Swindon
Bodmin	Girvan	Northampton	Ventnor
Bude	Hereford		

## Radio With Data As Well

Research Department is developing ways of sending extra, inaudible signals with radio broadcasts. Using these signals tuning could become automatic and the radio set of the future could have an electronic display indicating the name of the network, telling the time or giving the latest news headlines. There are two systems, one for VHF/FM and another for MF/LF radio. The MF/LF system is being pursued only by the BBC. It phase-modulates the radio carrier wave at 50 hertz using digital biphase modulation. The data rate is 25 bits per second and experimental transmissions have already been broadcast from Droitwich, Radio 4.

#### JOIN IN THE EXPERIMENT

Subcarrier tests are already underway at Wrotham and Research Department want volunteers who will listen critically to VHF at home or in their cars and report their comments.

The VHF/FM system is capable of supporting a data rate of 1200 bits per second using a biphase signalling rate of 2400 baud. The BBC has shown that these signals could be very effectively placed on a subcarrier of 57kHz. Test transmissions have been broadcast on Radio 4 and Radio London from Wrotham.

The VHF system can carry very much more data than the medium/long wave system and as well as international discussion on standards there will have to be considerable discussion with the receiver industry before the system could go into use.

Volunteers will have to complete a special form so if you can listen to Radio 4 from Wrotham and would like to join in the trials, telephone EID on BH 2921 for a form.

#### ABOUT 'ENG. INF'.

You can call it what you like but if you want to use our name you should pronounce it 'Enj. Inff'. We are aiming at the technical people in the BBC and we hope it will give a wider view of what is going on in BBC Engineering.

We would welcome your views on this first edition and we will welcome contributions from you for future editions. If you are too busy to put pen to paper, then just ring BH (London) 5432/5433 and let us know what you have been doing.

We will sort out the protocol of ensuring that any stories we print have been checked with the right people so you can feel free to pick up the telephone anytime you like. It may be that some of your achievements deserve much wider coverage in magazines outside the BBC. We can see to that too if the story and the time are right.

This edition was edited and prepared by David Allonby, Gwyn Morgan, Lynne Prop and Amanda Tucker.

## 'Digital TK Within Five Years' -Says Sanders

'We can expect to see all-digital telecine machines on the market within the next five years but all-digital cameras will have to wait for the nineties', says Richard Sanders of Research Department in an SMPTE Conference paper.

His team have already developed an all-digital telecine which produces 'an exceptionally clear and uniform picture'. The sensor is a 1024 element linear array which scans the film image sequentially at 24 or 25 frames per

second to produce a single 625-line or 525-line sequential output which then is digitally stored. The information in the field store is reordered and read out to provide conventional 625/50 or 525/60 interlaced video.

Dark areas of the picture must be coded to 11-bit sample accuracy. The team have devised a practical alternative to a full-bit ADC by providing a second 8-bit ADC with its signal pre-amplified by a factor of 8. The second ADC contributes three additional bits when-

ever the signal falls below 12.5% of peak white.

But broadcast quality digital cameras will have to wait. Richard Sanders says, 'lightweight camera heads using economical analogue LSI signal processing cannot be matched by digital circuits which need more space and consume a great deal more power. For example, to correct for element-to-element sensitivity variation in a sensor array would need a complete field-store for each sensor',

# Faster News Through Bush EDS

External Services now distribute scripts of news stories, talks and features (about 30 million a year), electronically to more than 200 outlets in Bush House. Staff in the 38 different language sections no longer have to wait for the scripts to be copied and delivered by hand. Now, they can get their stories in seconds from a VDU or a printer in their office.

At the heart of the *Electronic Distribution System* are two General Automation 16/440 mini-processors, operating in parallel. If there is a fault a complete standby system takes over immediately.

Each processor is associated with a 2-megabyte fixed disc and 24-megabyte disc-pack drive. New material entered each day is dumped onto a magnetic tape and later transferred to microfiche for archival storage.

Each of the 137 VDU's distributed around the building can undertake full text editing, but only those in the news, talks and features areas are free to amend the stories in the central store. Hard copies can be demanded from 85 medium speed (120 c.p.s.) 'Lear Siegler 200' printers and 36 low speed (10c.p.s.) Transtel printers strategically placed amongst the offices of the different sections.

As well as the short news stories, the system can accommodate individual talks of up to 5,000 words (a half-hour broadcast). A single story can take up



EDS VDU's in Bush House newsroom

to 15 'pages' on a VDU with each page holding up to 2,048 characters.

Ken Clayson, Manager Eng. (EDS), said, 'The system is saving an enormous amount of time and paper, and it lets us make far wider use of the material we prepare. For the first time, everyone of the broadcasting sections at Bush has access to all the scripts of the talks and features that are prepared here. In the days when we relied entirely on paper, that was just not possible'.

The system was built by ITT Business Systems to a specification set by S.C.P.D. after considerable discussion with potential users.



Ken Clayson, Kevin Synott at E.D.S.

## BBC Rays, in Mirror, Stop Cars

On June 5 the Daily Mirror accused the BBC of causing traffic chaos on the A45. In a page 3 story headed 'Blank Blink Every Trip' the Mirror alleged that the BBC's Daventry shortwave transmissions were putting electronic ignition systems out of action. As you might expect the Mirror was exaggerating more than a little.

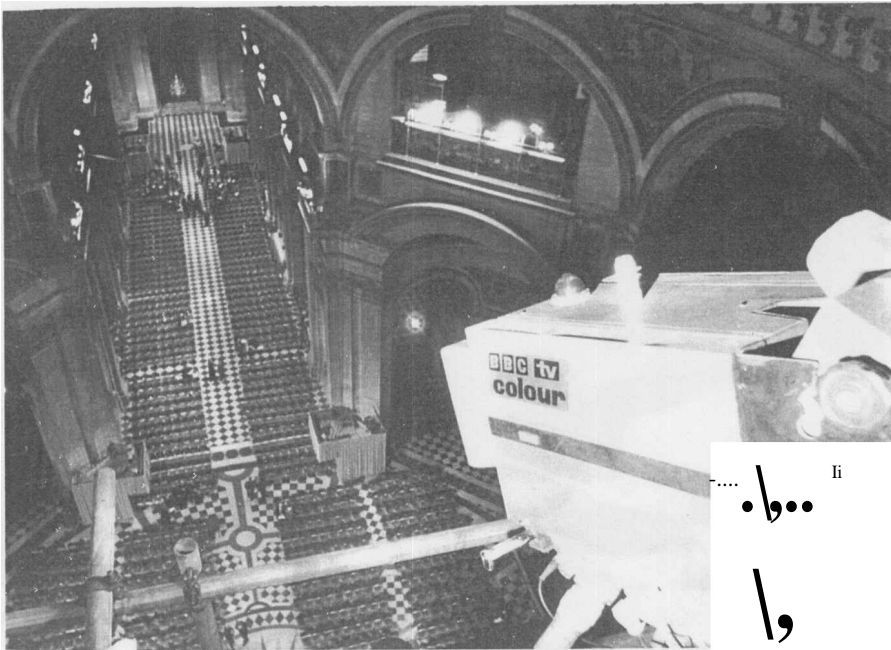
Apparently, over a three month period two cars, one an ancient Cortina and the other a Scimitar, had broken down on the A45 near our Daventry transmitting station. Both cars used the same type of ignition system.

The AA found that the first car started and ran normally after it had been towed some distance away from the station. The second car responded to the same treatment. Both cars used an ignition system in which light from a LED is interrupted to operate a photoconductive transistor which triggers the ignition and both the AA and the manufacturers themselves feel confident that our transmission did not cause the breakdown.

So far there has been no indication that the units were either faulty or had been poorly installed but the AA and the manufacturers are still investigating the problem. And we have said that they can carry out any tests they want to on site at Daventry.

The Daily Mirror were not the only paper to take up the story, as the result of their article an alarming report followed in the Birmingham Post. This said, 'the electronic equipment on the cars was affected by the BBC's high frequency low MHz transmission' - what-ever that means.





Camera in Whispering Gallery



Dave Hunter on Camera 5 outside Buckin!;Jam P;

## Major OB For Queen ~



CMCR at Admiralty Arch

On Tuesday 15th July there was a Service of Thanksgiving at St. Pauls as part of the celebrations for the Queen Mother's 80th birthday. A major BBC TV outside broadcast using 24 television cameras followed the Royal procession from Buckingham Palace and covered the ceremony in the Cathedral.

Producer, Mike Lumley said, 'The Jubilee broadcasts in 1977 were our starting point in planning the OB. The requirements were very similar and once again we were able to give viewers a spectacular view of the nave from a camera at the apex of the dome'.

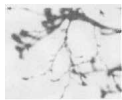
Overall direction for the broadcast centred on the BBC's Colour Mobile Central Control Room (CMCCR 1), a unit designed for use at major occasions

like this.

Frank Hughes, Assistant Head of Engineering Television OB's who co-ordinated the engineering planning said, 'The experience of the Jubilee broadcast in 1977 helped considerably in planning the coverage of this ceremonial programme. Apart from CMCCR 1 at St. Pauls from which the entire OB was directed, five other mobile control rooms at St. Pauls were used for operational cameras, radio-links and video-tape inserts. In the Cathedral additional lighting for television was set under the direction of Engineering Manager, John Wilson.'

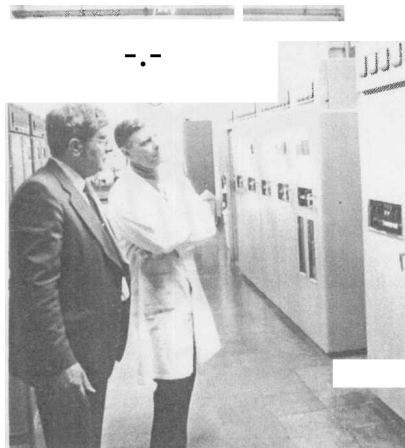
There were two mobile control rooms along the processional route as well as a single camera installed high up

## 25 year old Wrotham gets Major Re-build



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On 2 May 1980, the Wrotham VHF/FM transmitting station celebrated its 25th Anniversary. In 1966 it was the first station to go stereo and in 1972 the first to have a pcm link. Now it will be the first to be modernised.

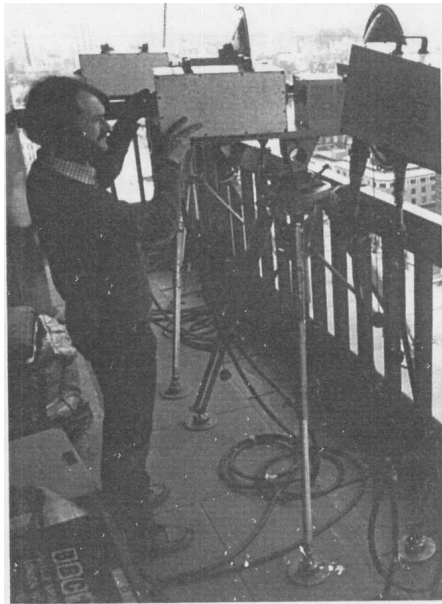
Wrotham will get a new aerial and new transmitting equipment. The new aerial will introduce a vertical component into the transmission to improve reception on portable and car radios, which normally use vertical aerials.

The work should be finished by 1981.

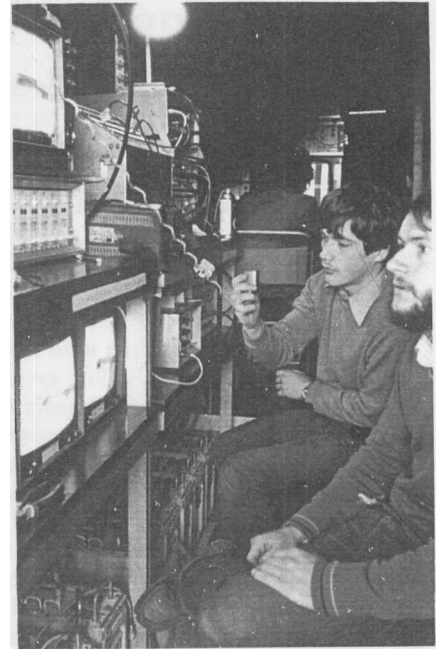
Far left: Wrotham mast as now.  
Near left: Ian Blanthorn, AEIC CP, and STM Derek Mann in Tx hall,



Palace



Links at New Zealand House



'Compact' links hut at NZ house

## Both er's Thanksgiving

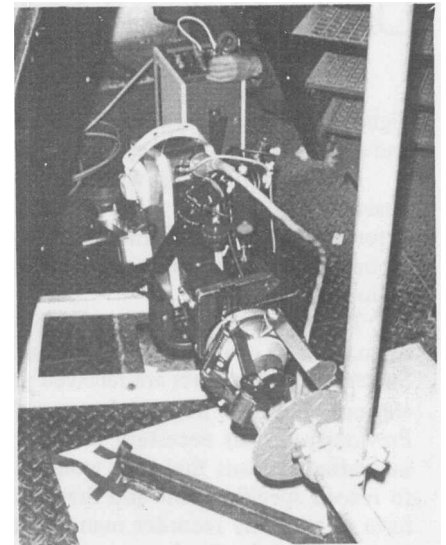
on top of New Zealand House. The first of these was one of the BBC's new Type 5 CMCR's equipped on this occasion with seven cameras. Three of these cameras covered the Royal Party as they prepared to leave Buckingham Palace, while the remaining four followed the start of the procession as it left the Palace and travelled along the Mall.

One advantage of the Type 5 units is that the cameras use tri-ax cables which are much smaller in diameter than the multi-core cables previously necessary. Tri-ax cables can more easily be pulled through the ducts under the road. Along the Mall and on Admiralty Arch four more cameras covered the procession on its way to the Cathedral.

The signals from the CMCR's at the Palace and Admiralty Arch were radio-linked to New Zealand House and from there they were fed on to St. Pauls.

At St. Pauls thirteen cameras covered the scene outside and inside the Cathedral. One of these on a building overlooking the West Door was linked by radio to its control van.

Six cameras were installed in the Nave and Chancel of the Cathedral, but the most spectacular shot of the Nave was provided by a camera mounted above a peep hole in the very top of the dome. This camera looked straight down onto the congregation 275 feet below. The same camera was also used outside on the Golden Gallery to give a bird's eye view along Ludgate Hill.



Peephole in the dome

## New Continuity Suite in BH Basement

Radio has a new stereo continuity studio in the basement of Broadcasting House and Radio 3 are now in occupation. Continuity 'B8' has been installed in double quick time by S.C.P.D. They wanted the new suite in a hurry because they needed to release one of the six suites on the first floor for staff training.

Amongst the novel equipment that has gone into the studio are some modern voltage controlled amplifiers from the new Designs Department 'Maxicon' system and an all solid-state monitoring system that does away with the need for relays.

T.O., John Morgan, and Jeff Bottom, S.C.P.D. with installation team in B8.

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