

# XIII COMMONWEALTH GAMES SCOTLAND 1986



JULY 1986

 **ENG INF**

SUPPLEMENT

## BBC-HOST BROADCASTER

The XIII Commonwealth Games are going to be the BBC's most complex and exciting Outside Broadcast reaching an audience all round the world and involving one thousand BBC staff on duty in Edinburgh. This supplementary issue of "Eng Inf", the BBC's engineering quarterly presents the background of the Host Broadcaster operation, some details of the various OBs and the preparation of the purpose-built Broadcast Centre.

We cannot expect our vast audience to appreciate the enormous efforts of planning, engineering and production that are going into the Games. Broadcasting is at its most effective when its techniques are least conspicuous — if the audience is made conscious of technology it usually means that there's an error in production or a failure of equipment. If this is true of broadcasting in general, it is even more true of broadcast engineering in particular. As engineers we provide the framework which sustains the skills of our production colleagues. The engineering for the Host Broadcaster operation at the XIII Games is on a massive scale and, for the broadcasts to be successful, it has to be right — first time!

The Host Broadcast team has been able to call on resources from all parts of the BBC. Brendan Slamin, Project Director, acknowledges that the size of the Corporation has been a tremendous



*Meadowbank Stadium*

asset in planning the Games coverage. As early as 1982 he was able to sketch out the pattern of the OBs and relate them to the vehicles and crews that are available. Without the strength of centralised planning within a single organisation the operation would have been virtually impossible. As it is other calls on BBC resources have been reduced to a minimum for the period of the Games although all the other regular sports events are being covered — as is the Royal Wedding.

The Host Broadcaster operation is no showcase of new and untried technology but the scale of the operation needs a Broadcast Centre designed to suit the Games. The BBC has never built a temporary operations centre on this scale

before and so to design, build and test all the studios, working areas and circuits has been a major challenge to the ingenuity of the PID Television team working under the guidance of Geoff Key of OB Section. The entire process has taken three years.

The largest number of broadcast engineers in Edinburgh for the Games consists of the BBC operational staff who work in the scanners, man the studios, operate VT machines and staff the Central Technical Area of the Broadcast Centre. Last, but by no means least, are the Communications staff who are mounting a huge operation in co-operation with BT to link together the venues, the Broadcast Centre and the home countries. Edward Trickett.

### *The Friendly Games*

Remember 1970? Remember the Closing Ceremony of the IX Commonwealth Games when the athletes danced round the Queen's carriage as it travelled slowly round the track? That was the last occasion that the Games were held in Edinburgh and that was when they earned the name of "*The Friendly Games*".

The Commonwealth Games have always been a smaller and more intimate affair than the Olympics. With only 10 sports and lasting only 10 days (compare the Olympics' 23 sports and 15 days) the Commonwealth Games have managed to avoid some of the worst excesses of the larger event. The Games take place every four years and are open to competitors from the countries of the Commonwealth. For this purpose that includes the dependent territories as well as the independent nations and so, for example, Gibraltar and Hong Kong are both represented. The home countries all have separate teams – and by home countries we mean not just Scotland, England, Wales and Northern Ireland but also the Isle of Man, Guernsey and Jersey. More than 50 countries are sending competitors to Edinburgh this year.

The ten sports are selected by the host country from a list of 16 – just two, athletics and swimming, must be included. The other 8 sports chosen by the Scots are: badminton, bowls, boxing, cycling, rowing, shooting, weightlifting and wrestling. None of these is a sport conducted on a purely team basis – those are specifically banned because the Games are "contests between individuals and not contests between countries" (Article 8 of the Commonwealth Games Constitution). So sports like hockey and football do not appear but team events do have their place in the 10 sports chosen, for example, the relay races in athletics, the fours and eights in the rowing.

In practice most of the sports chosen are the same as those selected four years ago – the odd one out this year is rowing which was last included back in 1962 in Perth, Australia. The Scots are taking advantage of their national



*The Broadcast Centre dining room with a mural by Glasgow designer, Peter Duelling.*

water sports course at Strathclyde Park which is set in more attractive surroundings than its English equivalent in Nottingham. The rowing programme includes women's rowing for the first time and over the same distance, 2000m, as for men.

Another newcomer to the Games is synchronised swimming, coming in as part of the swimming programme in addition to the swimming and diving. The Royal Commonwealth Pool, which was built specially for the IX Games in 1970, is again the venue for these events. The other venue built for the 1970 Games, Meadowbank Stadium, is once again home for the athletics and for the Opening and Closing Ceremonies.

The Host Broadcaster has a special part to play in the Opening Ceremony. Much of the ceremony follows a strict order laid down in the Games Constitution but it includes a display which, for the XIII Games, is being produced by the Host Broadcaster. Stewart Morris of Television's Light Entertainment Department is responsible for the production on behalf of the BBC.

#### **Televising the Sports**

It's simpler to think of the Games as ten separate live OBs rather than one big OB. Most of the sports are covered in a straightforward manner producing a single output from the scanner. This consists of international vision and international sound which is fed

back to the Broadcast Centre by SHF link or, in the case of Bowls, by underground cable. To guard against possible failure of the link we are using one VT machine at each venue to produce a continuous archive or guard recording while another machine is used for slow motion action replays. Three events need out-of-the-ordinary OB production – athletics (track and field), the marathons and the rowing.

Track and field athletics are naturally seen as the centrepiece of the Games. They involve the largest numbers of competitors and they require the most complex broadcast coverage. At any one time as many as three events can be taking place – a race on the track, a jumping event and a throwing event. Producers at the Broadcast Centre want to be free to choose any of these events so that means we need three live vision circuits back to the Broadcast Centre, one for track events and two for field. A fourth circuit provides pictures continuously from a wideangle camera which the producers can use for shots linking between coverage of different events. With so much going on there's a heavy demand for interviews with athletes – usually "flash" interviews at the trackside. One camera has been designated as the interview camera and its output is also continuously fed by a fifth circuit back to the Broadcast Centre. As if that wasn't enough, a sixth circuit is

allocated unilaterally to BBC Television to allow the home audiences to follow the fortunes of the British competitors without affecting the Host Broadcaster coverage.

Marathons are part of the athletics programmes but their 26 mile 385 yard course means a special operation for live television. The course starts and finishes in Meadowbank stadium and extends east along the south shore of the Firth of Forth to a turning point at Longniddry. The usual coverage for a marathon is to have a number of cameras at fixed positions along the course plus mobile cameras on the road and in the air to follow the leaders. The complication this time is caused by the need to cover both men's and women's marathons separately – and the starts of the races are only 30 minutes apart. Anyone who saw the London Marathon will remember that we used two ground mobile cameras, one on a motorcycle and one on the four-wheeled buggy, plus a helicopter-mounted camera. The same arrangement is planned for the Games marathons except that the ground mobiles will follow the men's race from the point where the athletes leave Meadowbank until the leaders re-enter the stadium. Then they will return to cover the crucial closing stages of the women's race, the last 30 to 40 minutes. We are providing separate continuous coverage of the women's marathon by using the

fixed cameras only until the mobiles can join in. While both races are taking place there are three circuits through to the Broadcast Centre: one carrying the men's marathon coverage, one the women's marathon and one showing the continuous output from the lead vehicle.

Rowing has not featured in the Commonwealth Games since 1964. This year's competition is at the new Scottish international standard course at Strathclyde Loch alongside the M74 between Motherwell and Hamilton. The Scottish course is very attractive, being set in the landscaped surroundings of the Strathclyde Country Park, but the pleasant surroundings have given us a new problem to solve. The course is 2000 metres long and the crews race six abreast. To cover the races effectively we need cameras which can move alongside the boats and look across the course – the following camera technique used in the Boat Race won't do for six-lane racing. Although the edges of some six-lane rowing courses are straight allowing the use of lorry-mounted cameras the edge of Strathclyde Loch is curved. As a result we need to mount the cameras on a boat which can travel as fast as the crews but which produces only a minimum wash so as not to disturb the crews. The boat used is being borrowed from Swiss television who use it every year to cover the major international regatta at

Lucerne. Altogether eight cameras are in use – two on the boat, two at the start, one at the 1000m mark, one at 1500m, one at the finish and one at the boating area where the crews embark and disembark. On finals days there's a ninth camera viewing the events from a helicopter.

#### The BBC as Host Broadcaster

With more than 50 countries sending teams to the Games and nearly 30 of them wanting to see the events on television it needs a Host Broadcaster to provide the complex operation.

As Host Broadcaster the BBC is ultimately responsible for the facilities that will allow listeners and viewers all round the Commonwealth to keep in touch with the events. The duties of the Host Broadcaster fall into four categories:

1. producing international television pictures and effects sound from all the sports,
2. providing fully-equipped commentary positions and other facilities at those sporting venues with live television coverage,
3. providing radio and television studios plus audio and video edit suites in a purpose-built Broadcast Centre,
4. producing a daily 60-minute television programme package of highlights from the Games for transmission in Commonwealth countries in Africa, Asia, the Caribbean and Europe.

The BBC is producing the live television coverage of most of the sports. Three events are not being covered live – the shooting, the team road race in the cycling and the 30 km walk in the athletics. We are recording these events at their venues by using single camera units with on-board recorders. The recordings are brought back to the Broadcast Centre by road and there they are edited and packaged for distribution to the clients.

Live coverage is being linked back to the seven television studios and eleven radio studios inside the Broadcast Centre. Here, production teams from the BBC domestic and overseas services,



*The diving pool at the RCP is being used for diving and synchronised swimming.*

ABC (Australia), CBC/SRC (Canada), BCNZ (New Zealand) and the Host Broadcaster (producing the 60 minute TV package) will turn the pictures and sound into the complete programmes.

The BBC along with ABC, CBC/SRC and BCNZ are sending commentary teams to the venues with live OBs. Back at the Broadcast Centre each television production team combines their commentary from each venue with the international pictures and sound and so produce the coverage with their own national flavour. Radio production teams use their radio commentaries combined with the international sound.

In the Host Broadcaster television studio a special BBC production team will be putting together the daily 60-minute package, tailoring their presentation to suit the receiving countries.

#### Building the Broadcast Centre

After the Games are over, Geoff Key of PID Tel will be entering a period of heartbreak. Geoff is the Installation and Systems co-ordinator for the Host Broadcaster and has been responsible for building the Broadcast Centre and installing the BBC area at Meadowbank. When the Games are over the Broadcast Centre, which took three years to plan and build, will have its equipment removed in a matter of days, and within weeks the internal walls will be demolished. However the objectives will have been met and 500 million customers satisfied.



Geoff Key

Geoff has co-ordinated the effort of three PID Tel (formerly part of SCPD) teams each responsible for different parts of the work. Charlie McCaw of Central Systems Section is the project leader for the Central Technical Area, Gaeron Davies (O.B. Section) has overseen the installation of the radio and television studios, the radio editing suites and the off-tube commentary booths and John Harris of Recording Section has been responsible for the video tape installation at the Broadcast Centre and the BBC areas at Meadowbank including kitchens, studio and operations centre.

The Broadcast Centre is the home-from-home for the 500 overseas broadcasters visiting Edinburgh and is the base for many BBC staff during the Games. When designing the installation the teams had to take into account the needs of the client broadcasters based on their requests and on the experience of previous Commonwealth Games. The final design contains six television suites with space for last minute expansion, and ten radio suites. Additionally there are seven self-contained BVU (¾" video tape) edit suites, three audio edit suites and four off-tube commentary booths. One important factor influenced the design team – the use of equipment already available. As far as possible they have avoided the cost of hiring equipment, preferring to use plant already committed to future projects or to borrow items from existing facilities. For example Television OBs in London are lending their Wimbledon routing matrix and Television Centre is sending VT machines. Many of the new items in the Centre have been bought for Type 6 OB scanners now in course of construction at Ampex, for Radio OB vehicles and to replace old equipment in the CMCCR.

It's not just technical facilities at the Broadcast Centre – there are offices, a dining room, kitchen, toilets and a conference room. Geoff has planned and supervised the construction all the way through, starting with vast open areas of a British Telecom

telephone exchange and an adjacent warehouse building. Partitioning was put in to segregate BBC and BT, then to create the rooms that have since become the working areas. By the summer of 1985 the partitioning had been finished and the power and technical cables were being laid in. The Central Technical Area installation has progressed steadily since then with most of the work having to be done on site by PID Tel engineers.

Major components for the television studios (BBC domestic, ABC, BCNZ and Host Broadcaster) were prefabricated by Link Electronics at their plant in Andover before being shipped to Edinburgh at the end of 1985. Similarly components for the radio studios were put together at the Audix factory in Saffron Walden before being moved to Scotland. The Canadian areas, two television suites and two radio studios remained empty shells until June, because the Canadians chose to ship over 16 tonnes of their Special Events kit which they would assemble themselves in Edinburgh. The BBC has supplied their studio accommodation with lighting, power, air conditioning and programme circuits to and from the CTA. The BBC also supplied the 625/50 monitors for the incoming HB vision circuits but those are the only 625-line pictures the Canadians will see. The Canadians will operate entirely on their own 525/60 standard and are using five standards converters on the HB feeds as they select them.

All the partitioning is constructed of plasterboard on a metal framing. For studios and other areas needing sound insulation a double thickness of plasterboard is fitted each side of the framing, with overlapping joints, and the void filled with rock-wool. Sound insulating ceilings are again constructed of double plasterboard, with an acoustic tile below. Fibreglass slabs pinned to the walls and covered with a light curtain give acoustic absorbency, which when supplemented by carpeting on the floor gives a very reasonable approach to professional studio standards, at a fraction of normal customer costs.



*BVU edit suite for BBC English regions.*

Ventilation, with chilling for television areas, is provided by air handling units, some of which may be used afterwards in local radio studios. While it has been necessary to provide dust silencer units to maintain the acoustic isolation, ductwork is of lightweight flexible material which economises in both direct and installation costs.

Although the Broadcast Centre is a substantial construction, Geoff has worked hard at keeping the costs down. As he says the studios are designed deliberately to suit the Games – there's no point in building in excess luxury. For example the ventilation in the

television studios is designed to provide sufficient cooling as long as the lights are not used for long periods but it is quite adequate for presentation studios. The sound-proofing in all the studios is very good for a sports presentation studio but would obviously not be good enough for music or drama. Ventilation and sound-proofing are very expensive – we cannot afford over-engineered studios.

Our landlords, British Telecom, have been the installation controllers for power distribution to main boards, and for much of the ventilation, working in close conjunction with the BBC.



*Canadian technician installer Graham Campbell alongside the Betacam half-inch VT machines arranged for editing. Note the equipment built inside the flight package.*



### System Diagram

Over the page is an overall system diagram for the broadcasting of the XIII Commonwealth Games. It starts on the left with the sporting venues and finishes on the right with the television and radio broadcasts to the countries of the Commonwealth. In the centre of the diagram is the Broadcast Centre containing its studios, edit suites, commentary booths and, of course, the Central Technical Area – heart of the broadcast operation.

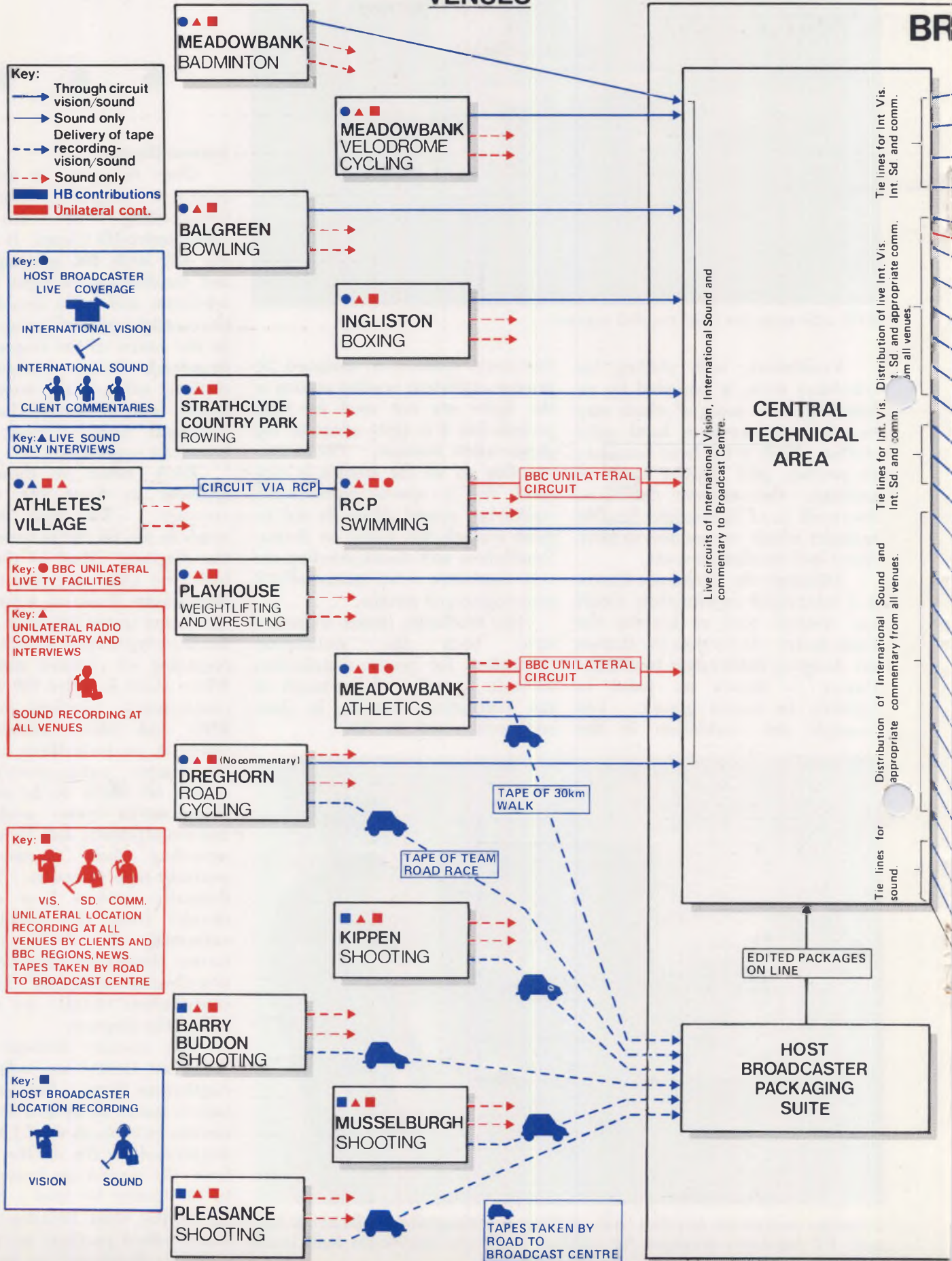
Each venue is shown with symbols to show the type of coverage. The keys to these symbols are on the extreme left of the diagram. Most of the venues have live OBs providing the Host Broadcaster feeds of international vision and sound but some, notably the shooting venues, only have local recording of pictures and sound. Where there is a live OB there are commentary positions for both BBC and client commentators (there is no such thing as a Host Broadcaster commentary). All venues are likely to be visited by single-camera crews working for individual clients and by reporters recording their comments on portable tape recorders. The BBC domestic services have exclusive circuits from the athletics and swimming. Any facility restricted to one client (including the BBC) is described as "unilateral". Unilateral contribution circuits are coloured red on the diagram.

Live circuits through to the Broadcast Centre are indicated by continuous lines – the carriage of tape is shown by pecked lines. Live circuits go through the CTA and are distributed to the studios. Tapes from the venues are brought back to the Centre by road – HB tapes go to the Host Broadcaster suite where edited packages are made up and then distributed on line via the



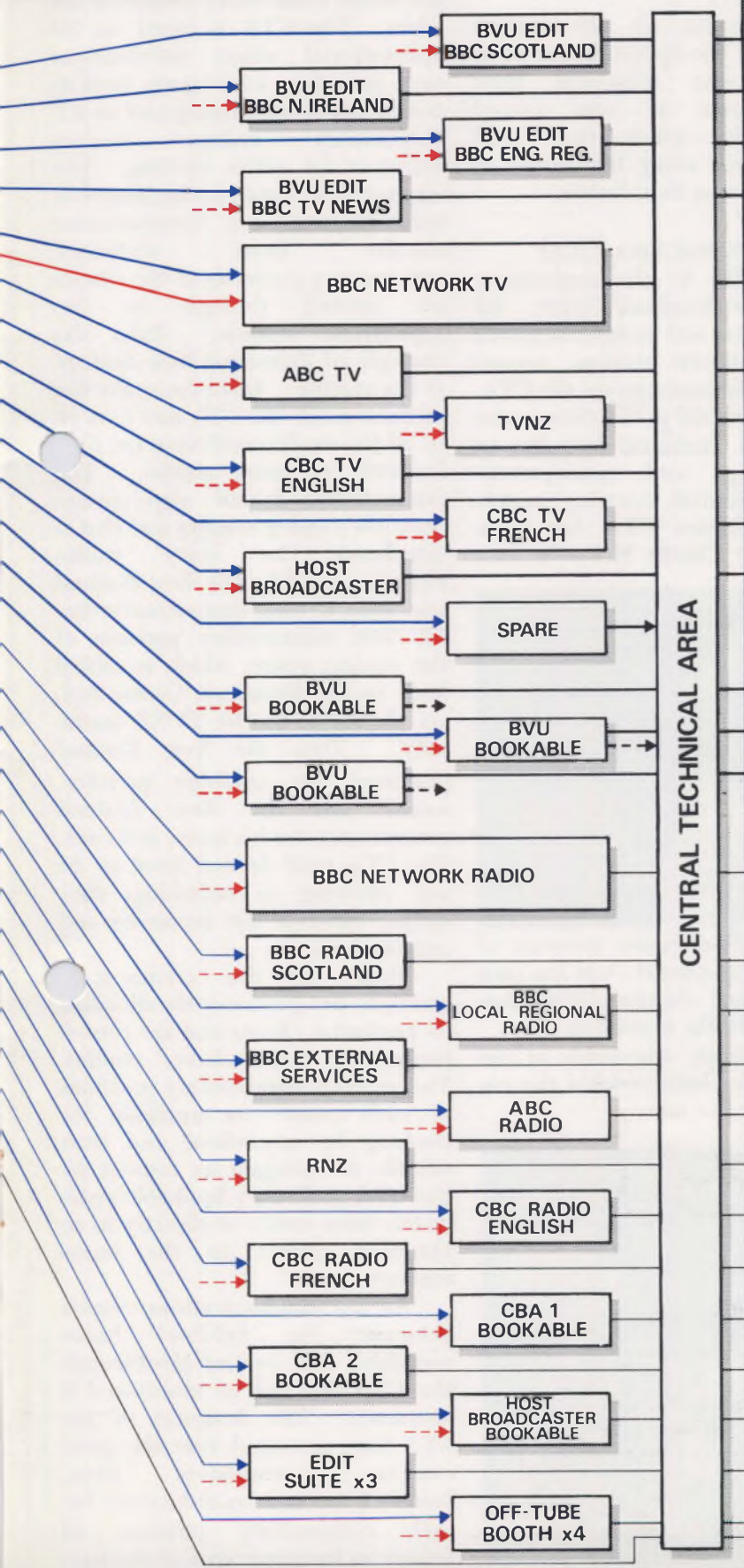
# XIII COMMONWEALTH

## VENUES



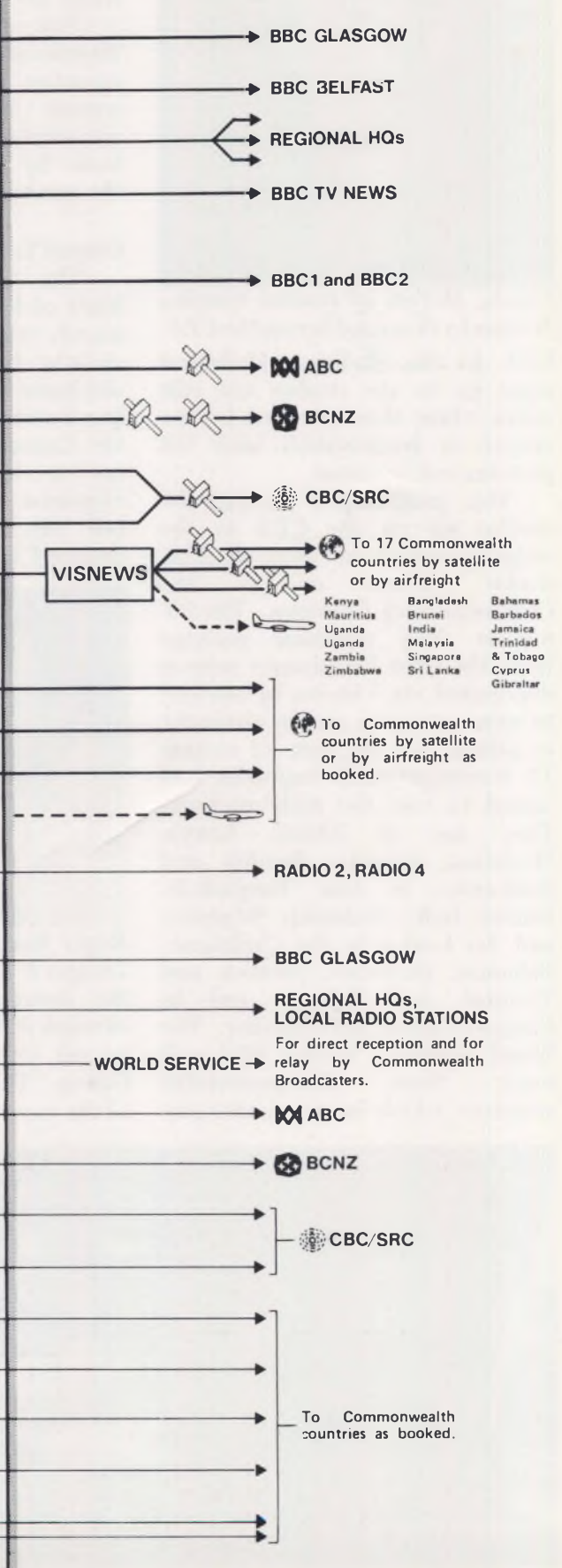
# GAMES SCOTLAND 1986

## BROADCAST CENTRE



## CENTRAL TECHNICAL AREA

## DESTINATIONS





*Charlie McCaw of Central Systems Section by the sound bays in the CTA.* CTA to the studios. Unilateral tapes go to the studios and edit suites where they are used by the clients in combination with HB pictures and/or sound.

The programmes leaving the studios go via the CTA to the outgoing circuits and on to the BBC studio centres or to the Commonwealth countries. The 60-minute daily television package from the Host Broadcaster suite is distributed via Visnews by satellite to some countries and by airfreight to others. At the time of writing 17 Commonwealth countries had agreed to take the daily package. They are in Africa: Kenya, Mauritius, Uganda, Zambia and Zimbabwe; in Asia: Bangladesh, Brunei, India, Malaysia, Singapore and Sri Lanka; in the Caribbean: Bahamas, Barbados, Jamaica and Trinidad and Tobago; and in Europe: Cyprus and Gibraltar. The World Service of the BBC will reach those Commonwealth countries which have not sent any

broadcasting staff to Edinburgh. Apart from direct reception by listeners in those countries some of the local broadcasters will rebroadcast the results from the World Service.

Not shown on the system diagram are the operations of radio reporters who telephone their reports home or who record commentaries which they send home by line using telephones at the venues or at their hotels.

#### Central Technical Area (CTA)

The CTA is the engineering heart of the Broadcast Centre. All sound, vision and communications circuits between studios, venues and home countries go via the CTA. In a conventional production centre the Central Technical Area has to use a large and consequently expensive central routing matrix but the Games CTA has been designed by Charlie McCaw's team



*Roger Rainbird, senior wireman of Designs & Equipment Dept has seen the Broadcast Centre installation through from the beginning.*

to suit precisely the needs of the Games. They have avoided the use of the expensive matrix.

The design philosophy is quite simple – you have a number of venues where sports OBs are going on and you have a number of studio suites all of which want to get feeds from every venue at all times. The CTA is based on 20 international vision distributions each providing 17 outputs feeding studio suites, monitoring and an RF distribution system feeding monitors for office viewing. The international sound is distributed in much the same way. Commentator circuits from dedicated commentary positions at the venues are routed through to the appropriate studios. Take the example of Television New Zealand at the rowing from the venue the pictures reach the CTA and then go to all the studios including the New Zealand television studio. The international sound also comes from the rowing scanner and that is distributed to every studio including TVNZ. The New Zealand television rowing commentator has his own commentary position at the rowing venue, which is cabled back to the Broadcast Centre and, via the CTA, to the TVNZ studio only. Thus the New Zealand producer can combine pictures, sound and the New Zealand commentary for his home audience. The CTA staff do not need to do any routing or switching; they simply monitor the incoming and outgoing circuits.

Most of the commentary positions are permanently allocated to particular clients and are routed through to those clients' studios. Two or more commentary positions at each venue are available for booking by any client and their circuits are plugged on request by the CTA staff to a bookable radio or television studio or directly to an outgoing circuit to the home country.

All the communications circuits between the studios, home countries and venues go through the CTA and can be monitored if necessary. The designers of the CTA have arranged that the jacks carrying commentary from, feedback to and co-ordination for each commentary position all appear in the same area of the bay. Each of the bays carrying these



*CTA control desk during the working-up period.*





*VT director's position in the BBC television complex.*

circuits is dedicated to one major client. It all means that fault-finding is made as easy as possible.

The CTA monitors the incoming circuits from the venues and the outgoing circuits to the home countries and to London. The control desk has three operating positions — two for television and one for radio. There are forty 9-inch monochrome monitors on the incoming and outgoing circuits visible from both television positions. Each vision monitoring engineer can select any circuit to view on a colour monitor, vectorscope and waveform monitor. To check on the Canadians' outgoing signals there are two 525-line colour monitors and there are two RF teletext sets for checking the Ceefax unit's output. Radio and television monitoring positions all have loudspeakers and headphones for checking sound.

The CTA is the source of the RF distribution system at the Broadcast Centre. Up to 18 incoming venue circuits plus the four received broadcast channels (BBC1, BBC2, ITV, C4) are modulated on the RF system which has monitors in all offices, studios, control rooms and, most importantly, off-tube commentary booths. It means that any broadcaster in any working area at the Broadcast Centre can see the action from any venue where there is a live OB.

#### The HB Television Suite

One floor of the Broadcast Centre contains the five television

suites which produce programmes for the overseas viewers. Four of these suites are for Australia, New Zealand and Canada but the fifth, the Host Broadcaster suite, makes the daily 60-minute package for viewers in 19 Commonwealth countries.

Client broadcasters can book the HB suite to produce their own programme packages using the HB pictures plus recordings from their own single camera crews. If they only need to edit their own recordings from the single cameras they can book one of the three BVU edit suites on the same floor.

The HB suite contains a small studio with a single camera and presentation desk. The gallery area shares a room with six one-inch VT machines. Three more one-inch machines have been squeezed into an outer office to cope with the expected demand. The gallery is equipped with a 16-channel Grass Valley vision mixer and a 24-channel Soundcraft sound mixer

plus a slide file, DVE (digital video effects), caption generator and a bank of monitors. The system is centred on a 32 x 16 Probel vision matrix with a sound matrix slaved to it.

The gallery receives all the international vision and sound feeds from the venues and commentary circuits from bookable commentary positions at the venues are routed through on request to the CTA. The suite includes an off-tube commentary booth containing a commentator unit and a monitor on the RF distribution system.

#### The BBC Television Complex

Not surprisingly the BBC "Grandstand" studio suite is the largest and most complicated in the Broadcast Centre. Between 10 and 12 hours per day of broadcasting on BBC1 and BBC2 will come from this studio which is capable of feeding the two networks independently.

The studio itself is only part of the complex which includes the studio gallery and racks area, a separate VT area, a graphics room and the VT library (which serves the overseas clients as well as the BBC).

The large presentation studio (area 45 square metres) has two Link 130 cameras and has suspended luminaires controlled by twelve 2 kW dimmers. The vision system in the gallery is centred on a Central Dynamics 32-channel mixing desk which, at some time after the Games, is to go into the CMCCR. Only 24 channels of the desk are being used with sources from the two cameras, twelve venue circuits, four circuits from the VT



*HB television suite gallery.*



*OB Section of PID Tel, in the BBC gallery – left to right Martin Jakeman, Gaeron Davies, Laurie Green, Nigel Fry, Graham Canning.*

area, two slide files, two digital video effects generators (DVE) with a combiner, one caption generator and two circuits from Television Centre for complex graphics. The vision mixer has two mix effects either of which can feed to line. A total of 40 monochrome monitors and 18 colour monitors are deployed in this BBC area.

The sound system is based on a 24-channel Soundcraft mixing desk; a stereo desk which is being used in mono but which is capable of providing two independent outputs. The inputs are from studio microphones, the VT area and mixed sound from the scanners at the venues. In this sense the BBC operation differs from the overseas client studios which are fed separately with international sound and their own commentary for mixing in the studio. The BBC commentary is mixed with international sound at the venues by the OB sound staff but a clean feed of international sound is also available in the BBC complex. The Host Broadcaster suite also has the choice of clean feeds of international sound and the BBC mixed programme sound.

The BBC communications system differs from the other clients – the BBC gallery has talkback and reverse talkback to/from the venue scanners. By comparison the client studios can only communicate with their

commentary positions. Each venue scanner has three control lines to the CTA, two are extended to the BBC gallery (for production and engineering) and one is for the CTA to assist in line-up.

The VT area in the BBC complex has 12 one-inch machines working from the 32 x 24 (3 level) Wimbledon matrix which came to Edinburgh immediately after the tennis championships. All the venue sources are brought through to the matrix (which handles venue vision, international sound and the BBC mixed programme sound) so that any VT operator can select any source to his machine. The VT director selects up to four machines as sources to the mixing desk in the gallery. The VT area also contains two off-tube booths for dubbing new commentary over edited sequences.

#### The Radio Studios

We have built four radio studios for the BBC and seven for the clients. One of the BBC studios is for network radio, reporting into Radio 2 and Radio 4. The studio itself is unique in being a prefabricated unit which was placed inside the Broadcast Centre before the partitioning was built. The second BBC studio is for Radio Scotland and the third is to be shared by the other regions and local radio. The outer office for these studios contains a News and

Current Affairs studio for Radio News. The fourth BBC studio is for the World Service – directly and indirectly it will send reports of the Games to listeners all round the Commonwealth.

Just as in television there are four radio studios dedicated to particular clients, one each for Australia and New Zealand and two for Canada, one each for the French and English language services. The Commonwealth Broadcasting Association has two studios which it is booking out to the other clients. As the Games drew nearer it became obvious that the two CBA studios would not be sufficient and an extra Host Broadcaster bookable studio has been equipped with Outside Broadcast equipment.

The CBA studio suites are typical, each consisting of a small studio with a control room next door. The two CBA studios have a common outer office although most of the others have individual offices. We have equipped each CBA control room with a 24-way mixing desk and four quarter-inch audio tape machines. International sound circuits are routed through to the studios, and bookable commentary positions at the venues can be routed through on request by the CTA. There is a special talkback system, also used in the television studios, to allow the radio producer to talk to his commentator at the venue.

In the radio area of the Broadcast Centre we have provided three quarter-inch audio edit suites and four off-tube commentary booths.

#### Ceefax at the Games

In two small rooms near the



*Control room of one of the CBA radio studios.*

Australian, Canadian and HB television suites, a small team will spend the Games producing a special results magazine for Ceefax. The magazine is 30 pages long and the sub-edit area contains four preparation terminals used to insert via data links into the Ceefax computer at Television Centre. The Ceefax staff will be kept up-to-date by the Games results service and by using monitors on the RF distribution system.

Viewers in Britain, Australia and New Zealand with hearing problems will be able to see live teletext subtitles for the Opening Ceremony and for selected sports. The Ceefax area contains one of the latest subtitle preparation desks producing data which will be inserted into the field-blanking intervals of the vision circuits leaving the CTA. In fact two different standards are being generated within the CTA to suit the three broadcasters and to let ABC, TVNZ and the BBC transmit the subtitles live.

#### New Commentator Unit

The XIII Games see the first use of an entirely new commentator unit built to a BBC specification by GlenSound Electronics. The unit has gone through a number of proving tests in the regions during the first six months of the year.

We always use purpose-built commentator units at big OBs where there are several overseas radio and television commentators. The units permit the commentators to switch their microphones between line and telephone, to call home or the base station and to set the mix of the information channels in each earpiece of their headphones.

Each unit can accommodate two commentators with full headsets or with separate microphone and headphones plus a third commentator with microphone only or, alternatively, a tape recorder can replay through the unit. Up to five units are controlled from one base station where the levels of the three outgoing sound channels per unit are mixed. One BBC engineer can control a number of base stations.

The new unit is only a quarter

the size of its predecessor and is connected to its base station not by a multicore cable but by a single coaxial feeder which carries all the sound and communication channels in multiplex form. It makes it much easier and neater to install at the OB venues.

At most venues the commentators (whether radio or television) are provided with a picture monitor showing the international vision output of the scanner at the venue. But at Meadowbank stadium they have two monitors with a wide choice of sources – five from athletics, one each from the badminton and the velodrome cycling plus the off-air broadcast channels. The commentators at athletics, boxing and swimming also have a monochrome monitor which displays an information service provided by Wige-data, the firm responsible for the results service at the Games.

The commentator unit also features in the Broadcast Centre where we have installed them in the bookable off-tube commentary booths (OTBs). OTBs are a boon to commentators who have to cover several events in the course of a day – they can select the pictures on the RF distribution system or from routed video feeds and make commentary from the screen.

#### Transport

The 1000 BBC staff and 500 client staff are in numerous hotels and halls of residence scattered round Edinburgh. So are the various sporting venues and the Broadcast Centre where all 1500 will be on duty. Providing the transport for all these people calls for a fleet of vehicles – especially since the spare parking at most venues is, in effect, non-existent.

The transport organiser, Eddie Gold from Kendal Avenue, has gathered together a fleet for the BBC staff consisting of 50 cars, two minibuses and six 53-seater coaches. The cars are for VIPs, senior producers and commentators; the coaches for the operational staff. The coaches are providing a regular service between the halls of residence and the venues according to a timetable: the cars will be

available on demand. Although the BBC is hiring the coaches the cars have been made available at no cost (other than the cost of fuel) because the lenders are happy to see their vehicles carrying the Host Broadcaster livery. On behalf of the clients Eddie Gold has negotiated the hire of cars.

#### The Men at the Top

A three-man team has headed this operation since the BBC was appointed Host Broadcaster in 1983. They are the Project Director, Brendam Slamin, who was previously Chief Engineer, Regions; Charles Munro, who is General Manager, Services and John Sterling, General Manager, Operations and Engineering.

The management team has developed close relationships with the many sporting and executive bodies associated with the Games. Between them they sit on virtually all of the 40-odd committees responsible for the Games.

Additionally, close contact has been established with the overseas client broadcasters who, between them, are originating 450 hours of television to about one thousand million people.

In the opinion of the management team, the BBC departments who are supplying the staff and facilities for the Host Broadcaster operation have been most helpful in the best traditions of the BBC.



*Brendan Slamin, Project Director, XIII Commonwealth Games.*