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A VERSATILE TELEVISION O.B UNIT

A NUMBER OF ARTICLES have appeared in this journal describing television outside broadcast units and the events they have covered. The range demonstrates the variety of requirements; Dr Wehrlin's article *'New O.B Units for Switzerland'*[1] stressed the requirements and operational conditions of Tessin; special operational conditions also resulted in the vehicles needed by Intertel A.G.[2] Each requirement demands different facilities, but this is not necessarily economic and the standard product has to be designed to meet the greatest number of user specifications. A typical vehicle in this category was the two-camera television O.B vehicle[3] but The Marconi Company has always kept available a standard design of vehicle incorporating three or four image-orthicon camera channels and associated equipment.

A new requirement has recently arisen in the Company's Operational Services Group for a vehicle to be used for demonstrations and hire purposes to employ up to six Mark VII colour camera channels, or alternatively up to eight Mark V black-and-white cameras. This is the vehicle described here.

DESIGN REQUIREMENTS

There are two main categories of outside broadcast to be covered. The actuality programme, a political event, ceremony, sport or news items, and on the other hand rehearsed programmes, music, variety and plays. The first type by its very nature requires extremely close teamwork in the vehicle and usually operates on a relatively small number of microphones. This follows from the fact that it is unrehearsed. The second category operates with sound equipment on the scale that is now becoming common in television studios. Some operators achieve the additional sound facilities by using a separate sound vehicle for the more elaborate shows but in this instance we provide all the facilities in one vehicle.

The vehicle is to be used for demonstration and hire purposes. Since hiring very often takes place in exceptional circumstances, i.e. when the normal facilities of a particular organization are stretched, it follows that a van with considerable accommodation for people is necessary. A careful analysis was made of the overall requirements and allowances made for a crew with a maximum of twelve and a minimum of six people seated inside the vehicle during use. Additional space is also provided for visitors, either attending a demonstration or extra crew members. With these large numbers, and with the demonstration role particularly in mind, access was obviously very important so separate entry and exit doors are provided in all areas.

The vehicle has been designed for colour operation and due to the size of picture monitors it was essential that the arrangements be such that all crew members used the same monitors. In this context weight loadings on the vehicle chassis were also very important as it might have to travel long distances between operations.

DESIGN FEATURES

It was regarded as a minimum requirement that the vehicle should consist of a standard chassis, on which would be constructed specially designed coachwork, styled in keeping with modern trends yet fully able to withstand at all times its practical application to all types of outside broadcast work. It should incorporate all the experience gained during many years in the design, construction and operation of such vehicles.

Bearing these stringent conditions in mind and

knowing that there was a target date of ten months for completion, the design team set to work to produce the most versatile and adaptable vehicle so far built.

A large variety of arrangements were sketched, including some where the operators faced sideways across the vehicle; or divided in the middle with racks of monitors with sound control on one side and the vision control on the other. All were rejected on grounds of inefficient use of space, equipment inaccessibility, complex coachwork or duplication of monitors. Each arrangement had its own specific advantages, but after weighing all the advantages and disadvantages, the arrangement shown in Fig. 1 was finally agreed as providing complete technical facilities, consistent with good access, reasonably straightforward coachwork and satisfactory weight loading.

CHASSIS

Past experience had shown a definite preference for a self-propelled truck chassis to be used for O.B vans. Articulated versions were considered in view of their many advantages, such as ease of parking but they were not finally chosen due to the higher capital cost. It was essential that the chassis be a proven, high performance rugged design capable of providing an economical service coupled with long life. The low slung coach chassis appeared to be a possible solution; although the completed vehicle would, on occasions, be required to cover long distances it was not considered these journeys would be at high speed. The vehicle would also be expected to carry all of its ancillary equipment and cables necessitating the provision of a large number of low level storage cupboards accessible from outside the vehicle. The coach chassis, by its design, restricts the amount of space available for this purpose. A third, and probably the most important factor, is that the coach chassis is not expected to be permanently near fully loaded. The chosen chassis would have to withstand these severe conditions and still be within the chassis manufacturer's recommended loadings. The Bedford TK range 8-ton diesel engined chassis was finally chosen fitted with a 400-in³ (6540 cc), 131 hp 6-cylinder unit.

CONSTRUCTION

It was necessary for the bodywork to be as strong and light as possible. Wood framing was dispensed with many years ago due to its tendency to expand and contract in severe climatic conditions so light alloy was used throughout. Fig. 2 shows the front end of the vehicle in an early stage of construction and illustrates the extensive use of light alloy extruded sections, the external skin being light alloy sheeting.

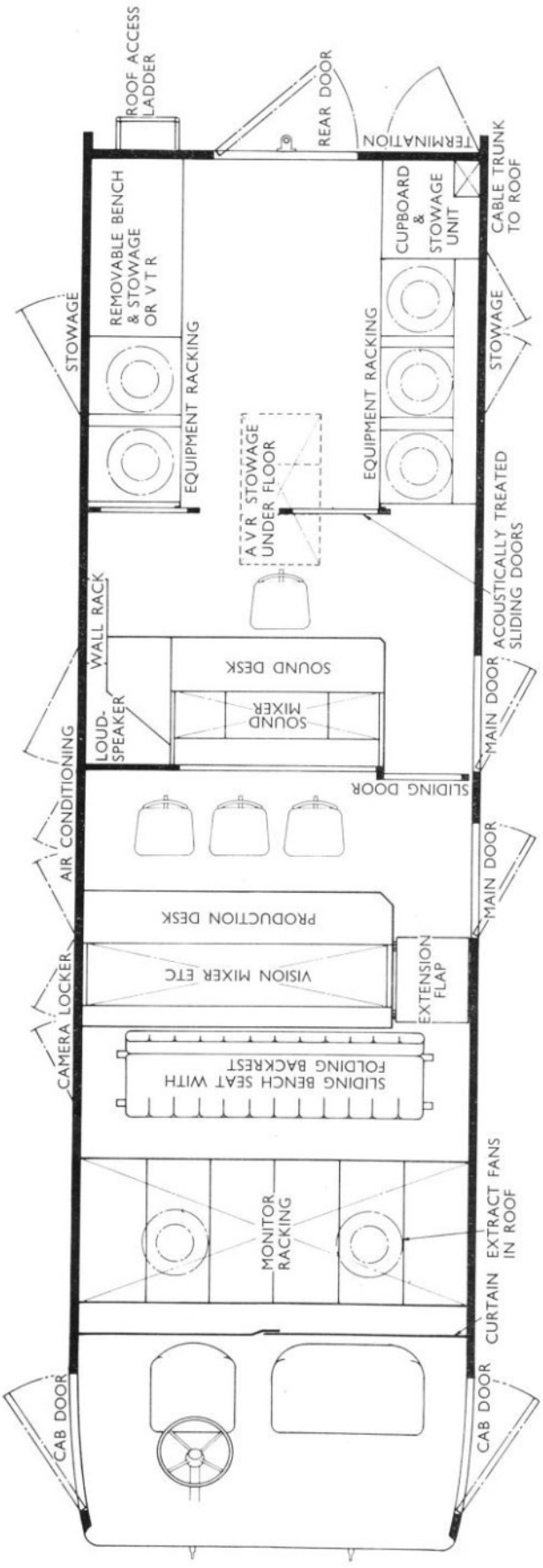

Fig. 1. The arrangement finally chosen.

VEHICLE STYLING

The motor car industry is probably more conscious of styling than any other comparable industry. Admittedly everyday products, both for domestic and commercial use, have some degree of styling applied to them but even today the motor car industry is a prime example of the large amount of effort involved in presenting the general public with up-to-the-minute designs.

The Marconi Company embarked upon a programme which integrated the ideas of professional equipment designers and stylists into detailed equipment design. The general appearance of the Mark VII[4] and Mark V[5] camera channels and the semi-automatic Master Switcher[6] are some of the direct results of this work.

It was apparent at an early stage in the design work that the vehicle would have to be large, with the design consultant's aim to ensure that the overall external image of the vehicle would be correctly proportioned. This was achieved by incorporating a large amount of fluted aluminium side panelling to reduce the 'slab' effect on both sides of the vehicle.

It was imperative that some form of roof rack be fitted in order to accommodate two camera (or link) positions. The complete roof rack was styled to blend into the overall vehicle design by boxing in the edges

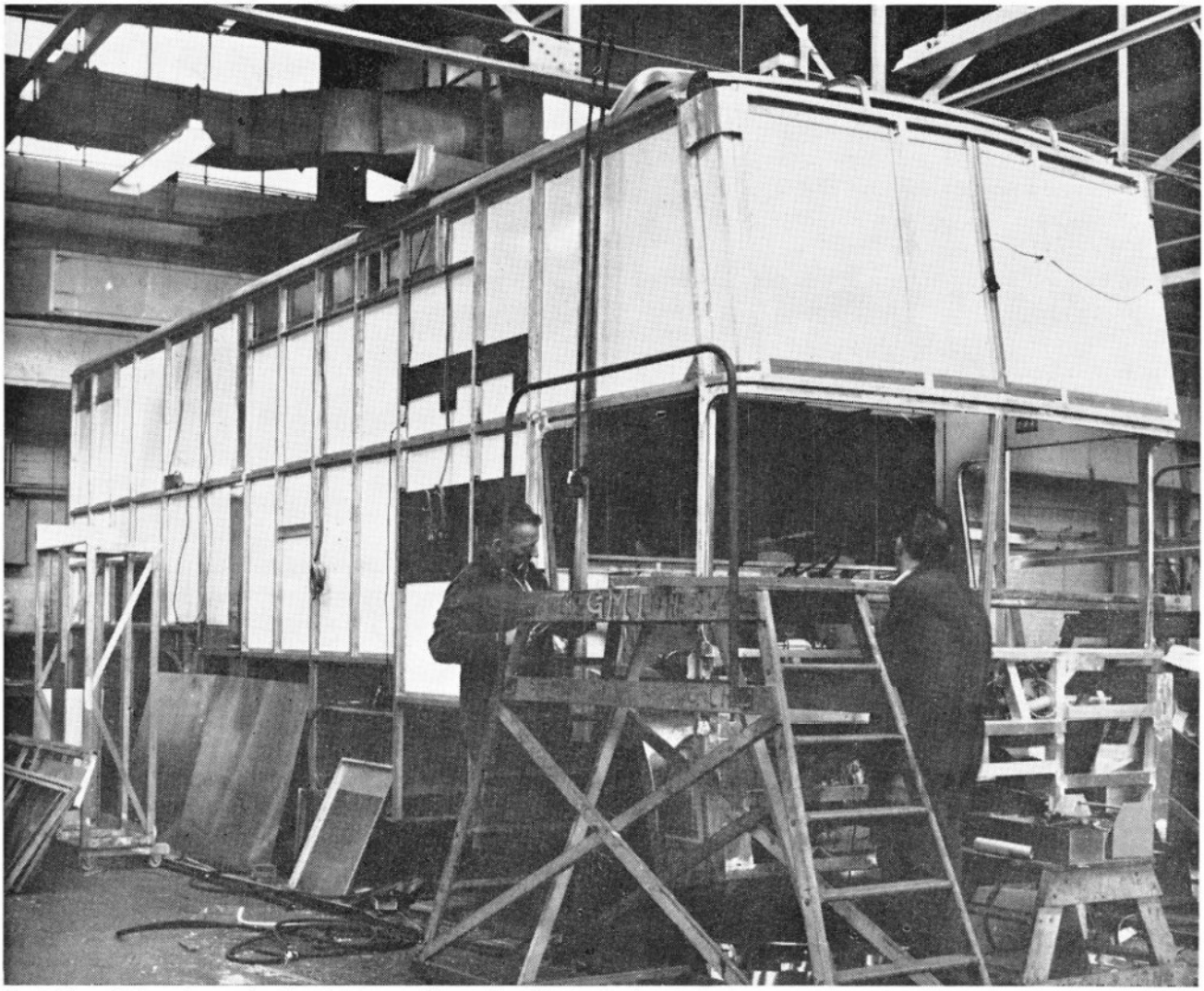

Fig. 2. The vehicle under construction. Interior panelling and vehicle electrical wiring in place.

Fig. 3. Interior view showing production area.

of the rack. Cable clamps were then fitted on the inner surface of this frame.

VEHICLE INTERIOR STYLING

Three fundamental requirements were agreed as minimum design targets for the interior layout. Firstly operator comfort was high on the list particularly as long periods of operation would be probable. Secondly as much space as possible was to be allocated to the production staff, and thirdly all equipment was to be readily accessible. Furnishings, colour schemes and general décor were then finalised after the basic layout requirements had been met. All surfaces, including walls and desks, were to be semi-matt finish, easily cleaned, and of a colour blending suitably with the equipment finish.

INTERNAL LAYOUT

The vehicle is divided into three separate, fully air-conditioned areas (Fig. 1). All the electronic equipment, with the exception of production monitors, is installed at the rear. The sound control area is situated in the centre of the vehicle and production at the front. The three areas are divided from each other by glass partitions, enabling the engineers at the rear of the vehicle to see the monitors at the front. This feature is desirable when colour equipment is being used.

EQUIPMENT

The vehicle has been designed to the limit of flexibility. Fig. 3 illustrates the production desk with the twelve monitors in the background with a bench seat provided in between for vision control engineers and visitors. Provision for twelve picture and waveform monitors is

made as multi-camera O.B.'s tend to require them when the vehicle is used as a master control room covering very complex subjects such as the Olympic Games or state occasions. The bench seat, fitted in front of the monitors, is really a multipurpose position, Mark V operational control panels can be fitted beneath any monitor at choice. Furthermore there is always the 'interested visitor' to contend with.

The 12-channel transistorized sound mixer[7] is shown in Fig. 3 fitted to the left-hand side of the production desk, with the vision mixer and communications panels to the right. This could be regarded as a typical arrangement for certain actuality programmes. The vertical section of the desk is designed to accept talkback panels, clocks, telephone panels and other ancillary items. The interesting feature of the production desk is its ability to accommodate at choice control panels in virtually any position. Fig. 4 shows eight operational control panels for the Mark V camera channel installed in the desk area occupied by the sound mixer in Fig. 3.

Access to sound control is by means of a sliding door from production, directly from outside by a separate exterior door or directly from the equipment area. In Fig. 4 a 24-channel sound mixer installation is shown, together with one echo and foldback panel immediately above one part of the mixer. Picture and sound monitoring facilities are available to the right of the desk, with tape recorder/reproducer, jackfield and storage facilities also in this area.

From the plan view of this vehicle, as illustrated in Fig. 1, it will be seen that the equipment area comprises mainly two sets of centre facing equipment racks. The novel feature of these racks is that they can both be winched toward the vehicle centre line for equipment and cable access. When normally positioned the racks are beneath large air extraction fans. Rack winching is carried out from outside the vehicle.

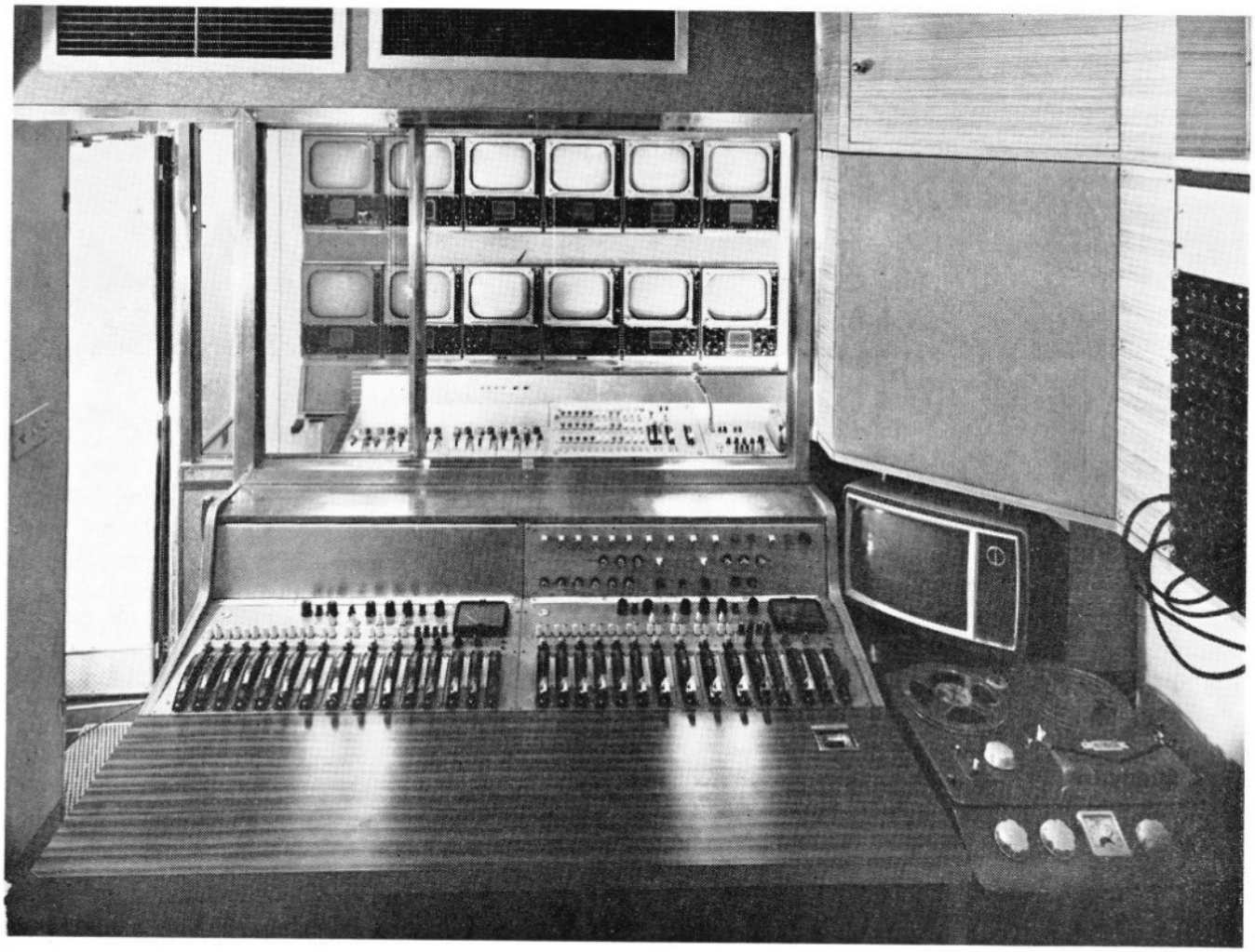

Fig. 4. Interior view showing sound desk in foreground and production area in background.

Fig. 5. The completed vehicle with roof-mounted Mark V camera.

ANCILLARY FEATURES

In this article, many items—some important and some not so important—have remained unsaid. Much thought and effort has been expended in ensuring that the most efficient air conditioning system was installed. The plant consists of three separate air conditioning installations (each with a capacity of 14,000 BThU's per hour). The compressors and condensers are mounted beneath the floor and the evaporator (cooling) coils and air circulation fans are installed in the false ceiling above the production area. Comprehensive heating (including floorpad heaters) is also available in the vehicle.

There are camera mounting platforms on the roof and at the front of the vehicle (Fig. 5). The complete system is so designed that subjects can be televised while the vehicle is travelling at speeds up to 30 m.p.h (48 k.p.h). Power is provided by a 25 kVA diesel electric trailer generator of which the power frequency is controlled by the field frequency of the television system in use. Due to extensive acoustic treatment of the trailer generator, it can be operated close to the vehicle or to sound pick-up points.

CONCLUSION

The experience and knowledge gained during the design, construction and commissioning of this vehicle for The Marconi Operational Services Group was immediately applied to the design of a 'standard' 4-camera unit. There has always been a steady demand for O.B units but in recent times this demand has concentrated on the extremely flexible designs.

The chassis is a 7-ton Bedford heavy duty, forward control diesel-engined unit with the body construction similar to the unit described here. Although the interior is again split into three main areas (production, sound and technical), there are certain fundamental changes. Production staff are now permanently allocated the full width of the vehicle while sound control remains in the centre. The second major change is in the technical area; three equipment racks house all the control equipment for the camera channels plus synchronizing generator, communications unit, mixer electronics and voltage regulators. Picture and waveform monitoring facilities are provided for setting up the cameras.

Two air conditioning units are sufficient for cooling both personnel and equipment. This is now a reasonable approach in view of the high degree of transistorization and the consequent reduction in heat dissipation.

The Operational Services Group Outside Broadcast Unit has already completed its first major assignment—two outside broadcasts within a few hours of each other at the 1966 British General Election.

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