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## NEW O.B. UNITS FOR SWITZERLAND

*For some time now studio and outside broadcast vehicles have been available for the German and French speaking parts of Switzerland. On 2nd May this year the Italian speaking part (Tessin or Ticino) had its own programme source when new outside broadcast units were put into service. These units were supplied by Hasler A.G to the specification of the Swiss P.T.T based on the experience of the Swiss Radio and Television Company (S.R.F.G). The main television equipment and the coachwork were supplied by Marconi's Wireless Telegraph Co, while Standard Radio A.G of Zurich supplied the audio side and altogether some twenty firms were responsible for other equipment.<sup>1</sup>*

**B**ECAUSE of the special requirements in Tessin, the usual single-vehicle layout was abandoned in favour of two smaller vehicles. Experience at Zurich and Lausanne and the need for frequent use in the demounted condition in a studio, all suggested that this solution would guarantee a more practical and rational operation. The tri-lingual nature of Switzerland also poses special problems on the sound channels.

Also new developments in television techniques had to be taken into account. On the one side, there is the improvement of quality of reproduction due to purely technical progress, such as better tubes, more reliable components and stable circuits. Equally important, however, are the changes in the philosophy of the system and the organization and distribution of responsibility.

The innovations in the Tessin outside broadcast unit are the separation of the purely technical and the programme sections. The essential aim has been to allow the sound and vision mixers and the producer to devote themselves to their artistic task undisturbed by technical matters. Similarly the technicians are assured that their adjustments will not be disturbed from optimum positions by inexperienced hands. The



Fig. 1. The two O.B. vehicles on the move in the Ticino area of Switzerland.

experience of the B.B.C in operating 4½-in. Marconi cameras by the "hands off" technique also affected the planning of the vehicles. A further reason was the real advantage of having smaller and lighter vehicles to operate over the roads of Switzerland, particularly in the mountainous Tessin region.

All the equipment can easily be removed from the vehicle when necessary, so that a complete studio can be set up in a suitable building in the shortest time. For example, during the Winter season, when outdoor activities are restricted by weather and daylight, local halls will often be converted into temporary studios. A telecine channel has been included so that the O.B. units can produce complete sections of programme ready for transmission without the intervention of a studio. This is particularly valuable where the programme is passed directly into the microwave link network.

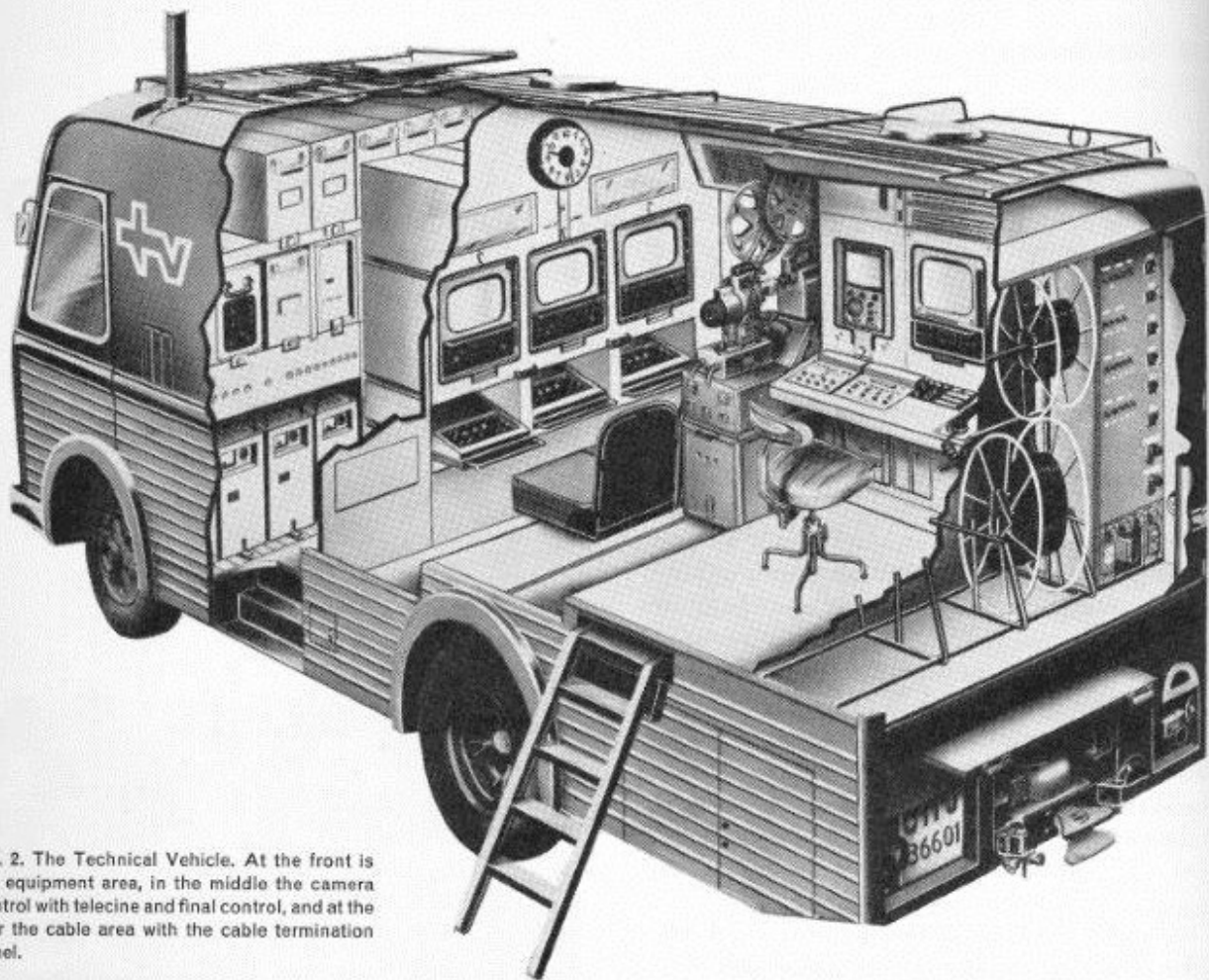


Fig. 2. The Technical Vehicle. At the front is the equipment area, in the middle the camera control with telecine and final control, and at the rear the cable area with the cable termination panel.

### THE TECHNICAL VEHICLE

Figure 2 shows how the Technical Vehicle is divided into two compartments with the three camera control positions appearing through apertures in the central partition. A fourth camera channel (normally held as a spare) can be mounted in openings in the door connecting the two compartments. Behind the camera control operator there is the vidicon telecine channel mounted on runners, and behind that again is the transmission control position.

The vision engineer seated here has a clear view of the camera monitors, the telecine machine and the transmission monitors themselves. This engineer is responsible for the outgoing signal and also operates the monitor switching, the vision and test signal patching and the telephone and talkback switching.

Forward of the partition is the equipment area which contains all the mobile cased units. These have plug-in connectors and can be withdrawn on their telescopic runners for servicing under operating

conditions. A folding bench provides additional space for maintenance work.

A picture monitor is fitted in the driving cab to give an additional commentator's cubicle. At the extreme rear of the vehicle is the stowage for cable drums and the connection panel to which all external cables are taken.

### EQUIPMENT IN THE TECHNICAL VEHICLE

The picture sources available are:

- The camera outputs
- The vidicon telecine channel
- The test signal generator output
- Off-air receiver output
- Remote signals from another unit or studio.

These signals appear as inputs to a remotely controlled relay matrix vision mixer, and are mixed or switched from the control panel in the Production

Vehicle, in addition to the monitoring outputs selected by the Transmission Control Engineer. The camera outputs are fed as non-composite signals through the picture monitors to the vision mixer.

Synchronizing pulses are added in the vision mixer so that a composite output can be fed to distribution amplifiers and passed to the outgoing line or radio link. Remote signals are first passed to an equalizing amplifier (which will compensate for the losses in up to one kilometre of cable) and can be selected to lock the Dual Synchronizing Generator by its Automatic Locking Unit. The non-composite output of this equalizing amplifier is fed to the vision mixer. Distribution amplifiers are provided to make available at the termination panel feeds of vision signals or sync pulses for remote monitors, etc.

Should a fault develop in this somewhat complex signal routing system, an emergency cut panel is provided to bypass the vision mixer. This cut panel may be controlled remotely from the vision production position, or directly by the transmission control engineer. Ample coaxial U-links are provided so that emergency or special routing of signals can be undertaken. The emergency cut panel also provides a useful facility during rehearsals, as the producer can take the remote control panel with him and select signals while he directs operations from near the cameras.

#### THE MARK IV CAMERAS

It has already been mentioned that the stability and performance of the Marconi Mark IV Cameras had been an important factor in the design concept of these vehicles. There have been articles in this journal<sup>2</sup> giving details of the design and performance of these cameras and their rapid adoption all over the world confirms that the design approach was the right one. Formerly it was scarcely possible for the operator to avoid "on air" adjustments, indeed, he was even misguidedly led to produce quasi-artistic effects by altering the operating characteristics of a channel which had already been nominally set up for optimum performance. The cameras use the  $4\frac{1}{2}$ -in. Image Orthicon and, of course, the invaluable zoom lens.

Type BD.873 Picture Monitors<sup>3</sup> are used for camera and transmission monitors, and the strobing facility and flexible input arrangements prove to be most valuable. Again the well-stabilized circuits and practical layout of controls are all in keeping with modern techniques. A small modification to the vision amplifiers has been adopted which increases the bandwidth at some sacrifice of sensitivity.

The development of transistors and printed circuit techniques has brought the most dramatic saving of bulk in the field of pulse generators. In a single case

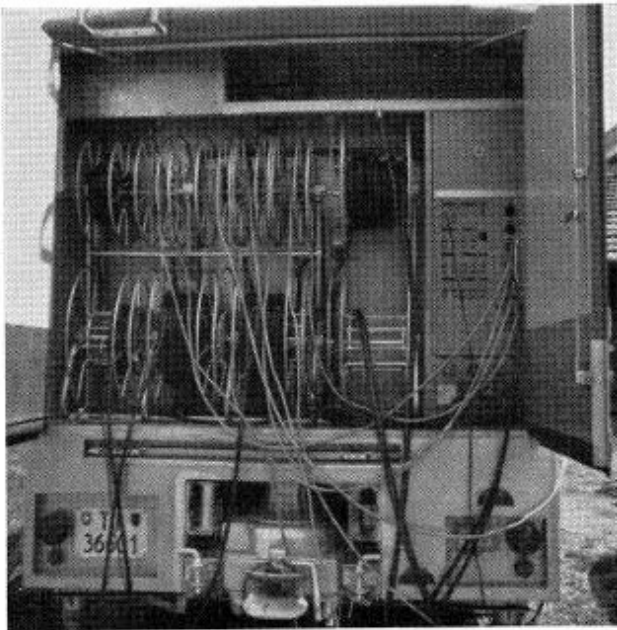


Fig. 3. The rear of the Technical Vehicle showing the cable mountings and the termination panel. Note the motorized winch.

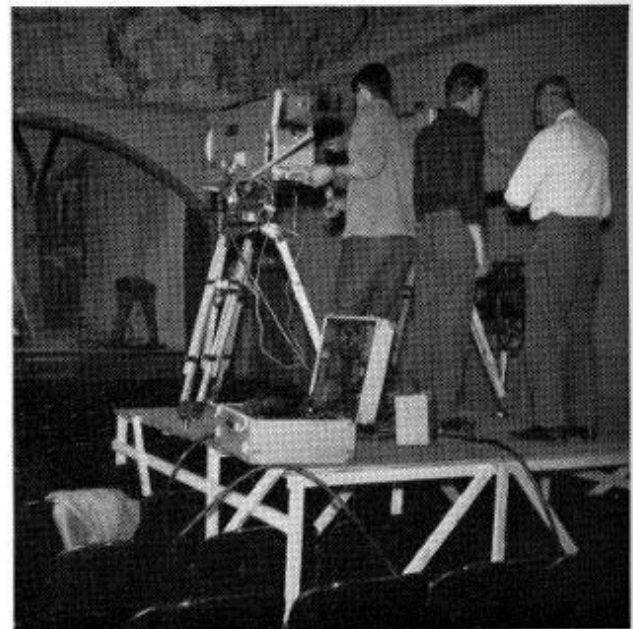
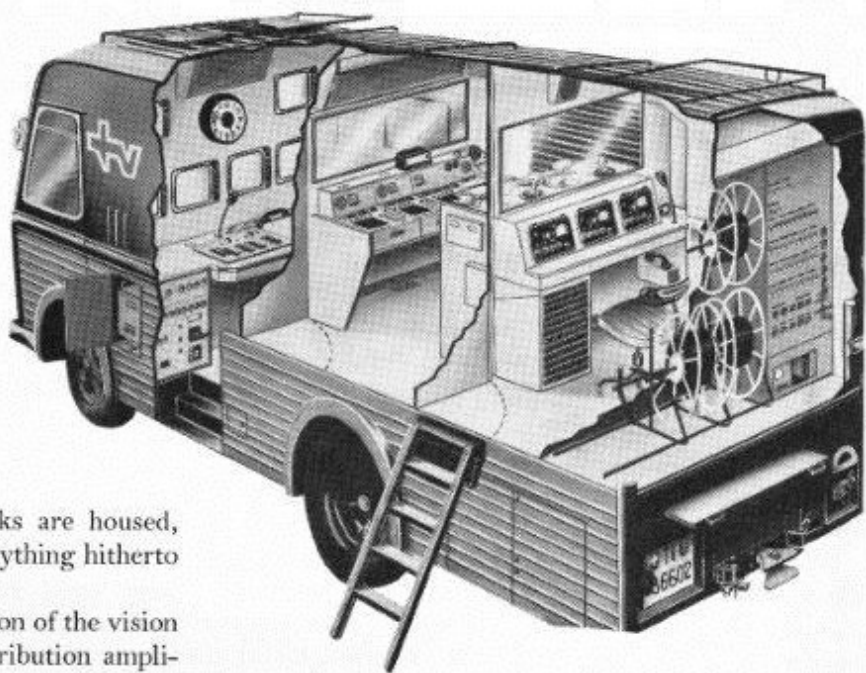


Fig. 4. Setting up the cameras in a small village hall, being used as a studio.



Fig. 5. The Programme Vehicle contains vision and sound production, the commentators' area and the cable area with termination panel.



two complete generators and genlocks are housed, and facilities provided in advance of anything hitherto available.<sup>4</sup>

It will be obvious from the description of the vision routing system that a number of distribution amplifiers are required, these are all of the Marconi BD.886 series. These are based on a plug-in unit, carrying the amplifier and self-contained power supply. A printed circuit board mounts the amplifier which uses close-tolerance long-life valves of the E88CC series. Vision and pulse amplifiers are mechanically similar, four being mounted across the width of a standard rack or six in a mobile case.

#### THE PROGRAMME VEHICLE

Apart from the driver's cab and the rear cable area (which are similar to the Technical Vehicle) there are three working areas in the Programme Vehicle, all acoustically isolated from each other. From the front these are: the vision production area, the sound control room and the commentators' area. Raised floors and plate-glass windows enable occupants of the sound and commentators' areas to see the monitors in the production area. There are six of these monitors, the lower row of four showing camera outputs, the upper left-hand showing incoming remotes or off-air picture and the upper right-hand showing the outgoing picture. On the desk below these monitors is the vision mixer control panel and telephone and talkback panels.

The Sound Control Area contains the sound desk and the magnetic tape machines and on the side wall a large sound jackfield which contains all incoming and outgoing programme and commentator lines.

While these vehicles are primarily designed for use in the Italian speaking area of Switzerland, events of major importance must be transmitted to all areas,

and therefore provision has been made for three commentators for the French, German and Italian languages. Separate transistorized sound consoles are provided for controlling microphone levels and for mixing effects—which can be live or recorded. A six channel continuous loop recorder is provided for identification announcements, internal signals, etc. The two drivers' cabs can be used as booths for two further commentators.

A comprehensive talkback system is installed, divided into two separate systems; one for the camera channels, camera control and telecine; the other serves the production areas. Microphones and loudspeakers or headsets are normally used, but external telephone lines can be connected to the system. Five incoming central battery or local battery lines may be fed through the transmission control to vision control, producer, sound control or to the commentators. A radio link can also be switched into this system.

#### POWER SUPPLY

Mains supply is taken via a five-core cable at 380/220 volts three-phase to the technical vehicle. There it passes through the main switch, fuses, phase lamps, voltmeters, ammeters, rotary phase meter and frequency meter. The supply is then split and fed to the two vehicles which are similar in general distribution system. Each has three single-phase voltage regulators and supplies 220 volts to equipment and lighting, clocks, etc., the load being balanced as far as

possible. Only the air-conditioning equipment and the telecine have three-phase supplies. Circuit breakers protect all circuits and there is a generous supply of outlet sockets for soldering irons, test equipment, heaters, etc.

The whole installation conforms to the regulations of the Swiss Electrical Authority and therefore Swiss equipment having their approval has been used. For use on other mains voltages a transformer is used with an isolated secondary to isolate the vehicles from

the supply. Of course, a mobile generator may also be used and a petrol-driven unit suitable for towing has been provided. Separate batteries are provided for the vehicle service and for the emergency internal lighting. In the event of mains failure this battery lighting automatically comes into operation.

### THE VEHICLES

"Berna" forward control chassis, of a type already well proven by the P.T.T., were fitted in England with

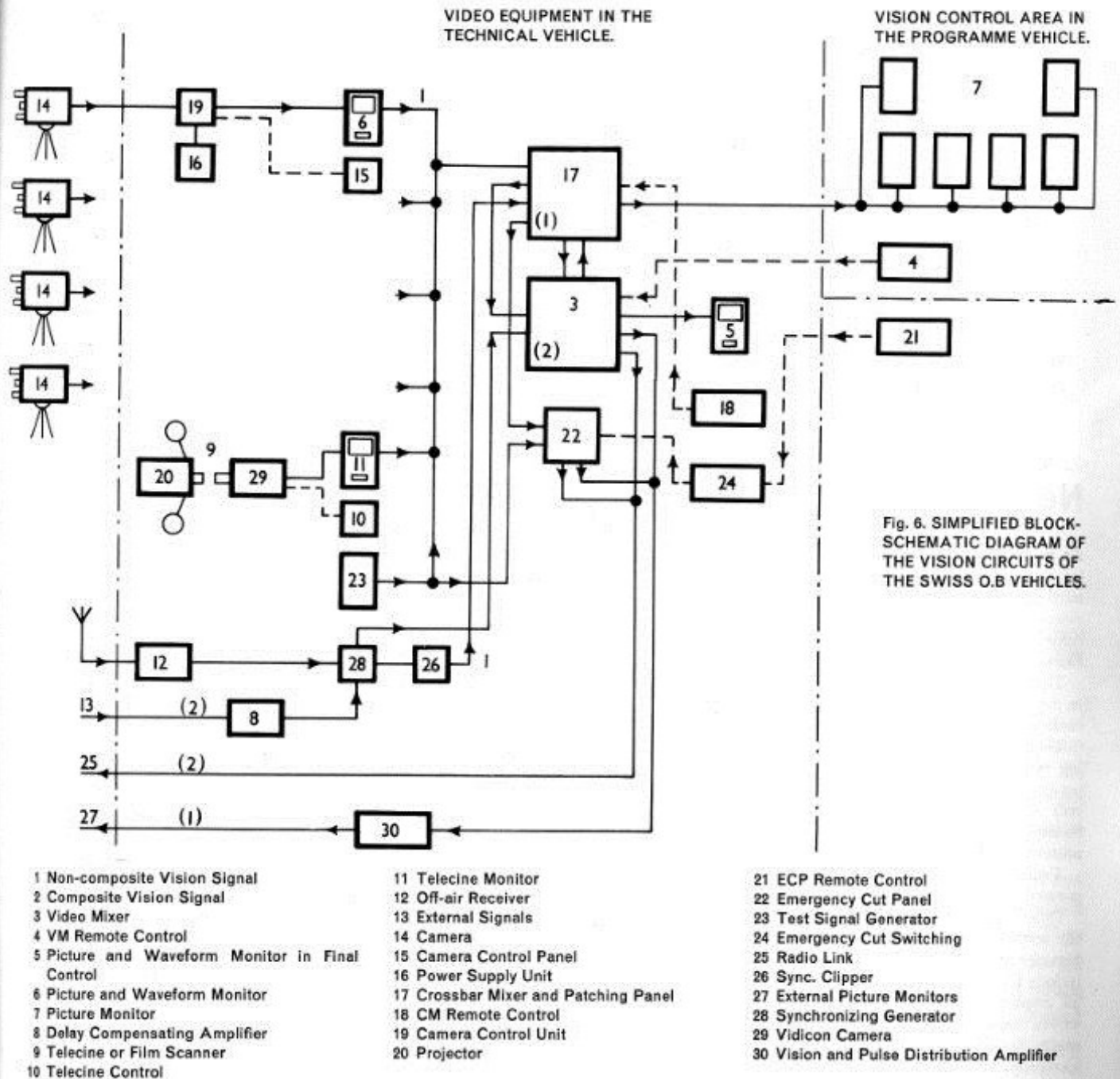


Fig. 6. SIMPLIFIED BLOCK-SCHMATIC DIAGRAM OF THE VISION CIRCUITS OF THE SWISS O.B. VEHICLES.

special light-alloy coachwork. All the details such as cab layout, heated windscreen, wipers, headlamps and direction "winkers" are all of types standardized by the P.T.T, and thus conform to Swiss regulations. The dimensions have been chosen to allow the vehicles to be taken on normal railway trucks through the Alpine tunnels, and another detail of special use in Tessin is that the equipment can all be sealed by customs officials. This means that the vehicles can be moved from one part of Switzerland to another via Italy, where this is quicker, the equipment remaining under Swiss customs seal.

Hydraulic jacks are fitted at the rear of each vehicle, operated by electric pumps, to stabilize the vehicles when parked and to assist in changing the rear wheels. The technical vehicle has a power-operated winch which from past experience is valuable in moving the vehicles in soft ground. It also carries a pneumatically operated telescopic mast for the receiving aerial.

The roofs are reinforced for use as camera or link platforms and have folding hand-rails. Poles are provided to rig cables across roadways at a height to clear traffic.

Both vehicles have an air-conditioning system for the operating areas and exhaust fans to remove the hot air from the equipment areas. The technical

vehicle has a battery-operated oil-burning heater which can warm up the cameras while the vehicle is in transit, thus making them available upon arrival when operating in extremely low temperatures.

Altogether, these vehicles represent a new concept in the design of O.B units for a special terrain, and embody the experience of the P.T.T as an operator of many vehicles in the area, the experiences of the Television Authority during several years of organizing programmes in Switzerland, and the experience of the Marconi Company in manufacturing very many different Television and Sound Outside Broadcasting vehicles for use in different parts of the world.

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