

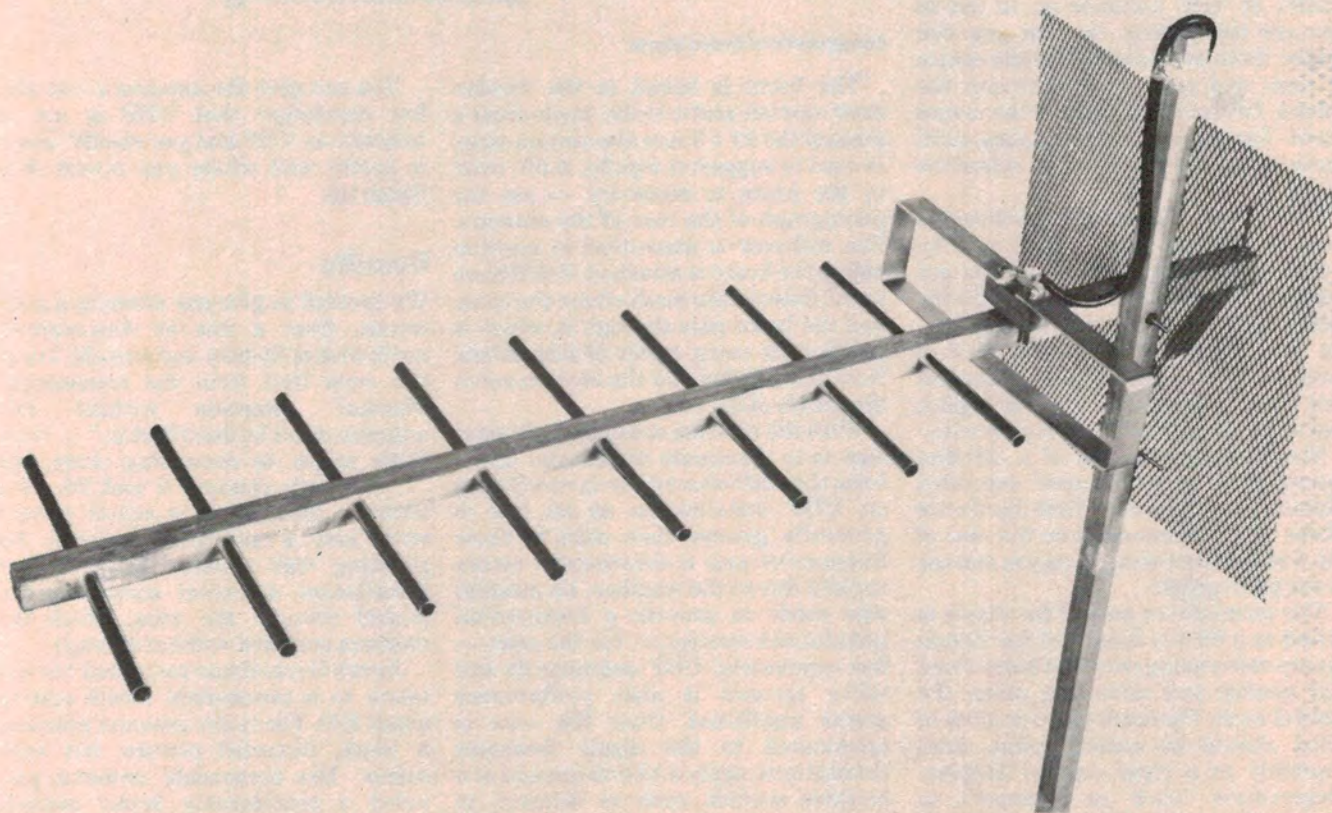
UHF TV has arrived ! — build yourself an antenna

This simple UHF antenna, from an idea provided by a reader, James Gerassimon of Penrith, NSW, proved to provide performance superior to some commercially available models.

NOW THAT 'ethnic' TV broadcasting is well under way on channel 28, and UHF repeater services for the existing VHF channels have sprung up, the time has come to exploit the advantages UHF TV offers. But first, you'll need a good antenna — assuming your TV receiver incorporates a UHF tuner! If you've bought a 'down converter' (or are thinking of doing so), then this antenna should help get you 'on the air'.

Available ready-built UHF TV antennas range in price from \$20 to \$100, and then there's the installation cost if you're not going to do it yourself. This antenna cost us well under \$10 in material. The single most expensive item will be the coax between the antenna and TV receiver and the cost of that will entirely depend on how long a run of cable you'll need for your installation.

The design is a fairly straightforward yagi type and features simple construction, rather than optimised performance — which is nonetheless very good. James Gerassimon's original model employed 'all metal' construction, whereas we opted for a wooden boom to simplify construction yet again. General construction is obvious from the photographs.



To make this antenna you'll need two metres of 10 mm dia. aluminium tube, one metre of 25 x 3 mm aluminium strip, a 300 mm square of Multimesh, one metre or more of 19 x 19 mm dressed western red cedar, plus some nuts and bolts. We bought the lot for about \$7!

Project 728

Construction

James glued each of his director elements to a small square of perspex, which he then secured to his boom — consisting of a length of 19 x 19 mm aluminium box-section tubing — using glue. All his elements were made from 12 mm wide by 3 mm thick aluminium strip.

We made our antenna using a wooden boom cut from a length of 19 mm square, dressed western red cedar. The elements are 10 mm diameter aluminium tubing, the folded dipole we made from 12 mm wide by 3 mm thick aluminium strip and for the reflector we used 'Multimesh' expanded aluminium.

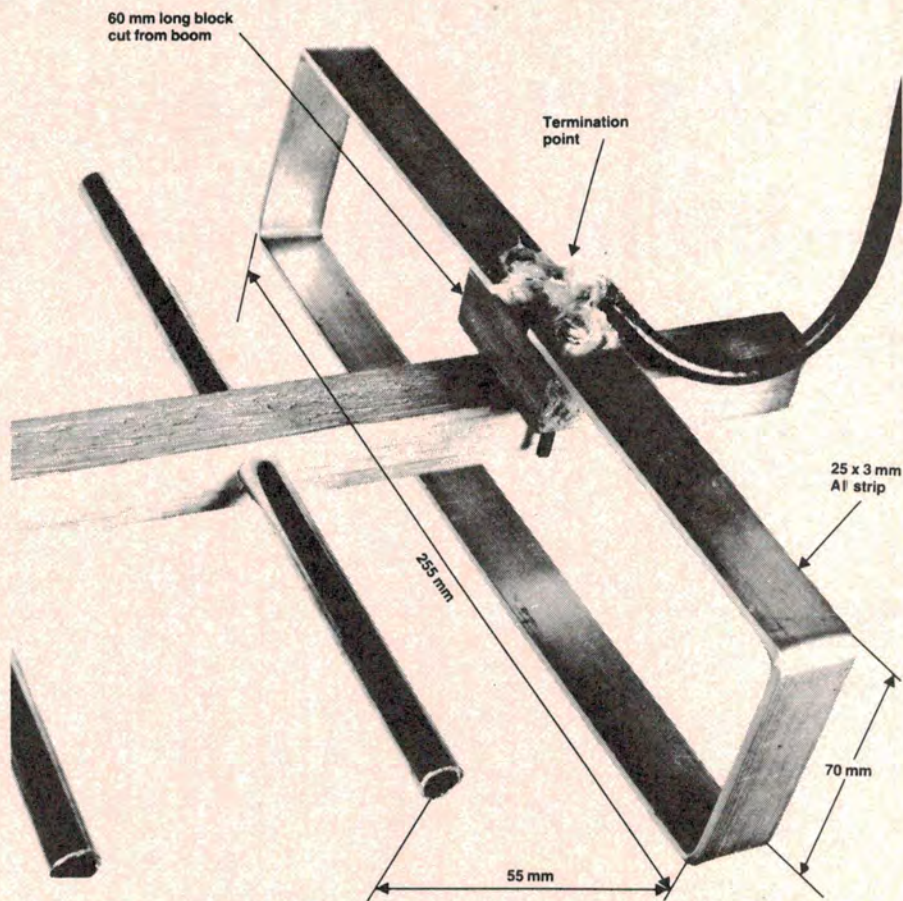
All dimensions are overprinted on the two photographs showing general construction and dipole construction.

Commence construction by cutting the boom to length. Measure the positions of all the holes and mark them clearly before drilling. The holes for the directors should be drilled using a 3/8-inch diameter drill bit. This is slightly smaller than the diameter of the directors (about 9.5 mm) and allows them to be force-fitted. When the drilling is finished, the directors can be fitted, tapping them into place with a wooden mallet or 'soft' hammer so as not to damage the tubing. So that you can centre them accurately, find the centre of each and run a mark around the tubing 10 mm either side of the centre mark. Tap the elements into place until these marks are visible either side of the boom.

The folded dipole was constructed from a 700 mm length of 12 mm by 3 mm aluminium strip. This was cut and bent to the dimensions shown in the folded dipole construction photograph. As the bandwidth of the antenna is quite broad, accuracy of measurement and cutting need not be too stringent; you've got about $\pm 2-3$ mm to play with.

The reflector consists of a 300 mm square piece of 'Multimesh' expanded aluminium, obtainable from hardware stores. This we mounted on the rear of the wooden mast section, as you can see in the photograph.

The termination part of the dipole is bolted to a 60 mm length of the 19 mm square cedar using two 4 BA bolts. Put a star washer and solder lug under the head of each. The boom and this block of wood should be coated before final assembly in a clear outdoor lacquer/preservative (such as 'Estopol') to protect the wood. Glue the dipole in place when everything is dry.



Construction of folded dipole.

The boom is bolted to the wooden mast section and a brace, made from a piece of the 12 x 3 mm aluminium strip, is used to support it rigidly. A 90° twist in the brace is necessary — see the photograph of the rear of the antenna. The reflector is assembled in position before the brace is attached. You'll have to cut holes in the mesh where the boom and the brace pass through it, which is easily done using a pair of sidecutters. Note that the hole for the boom is *not* in the centre of the mesh.

With the antenna assembled, the next step is to terminate the coaxial cable. Note that 300 ohm ribbon is *rarely* used on UHF installations as its loss is generally greater than coax at these frequencies and it deteriorates rather rapidly due to the weather. No attempt was made to provide a balanced-to-unbalanced connection for the coax — few commercial UHF antennas do and we've ignored it also; performance seems unaffected. Once the coax is terminated to the dipole feedpoint connections, apply a liberal amount of a suitable sealant, such as 'Silastic', to prevent water getting into the cable's insulation.

You can give the antenna a test run, but remember that UHF is not as tolerant as VHF and you should mount it pretty well where you intend it to finish up.

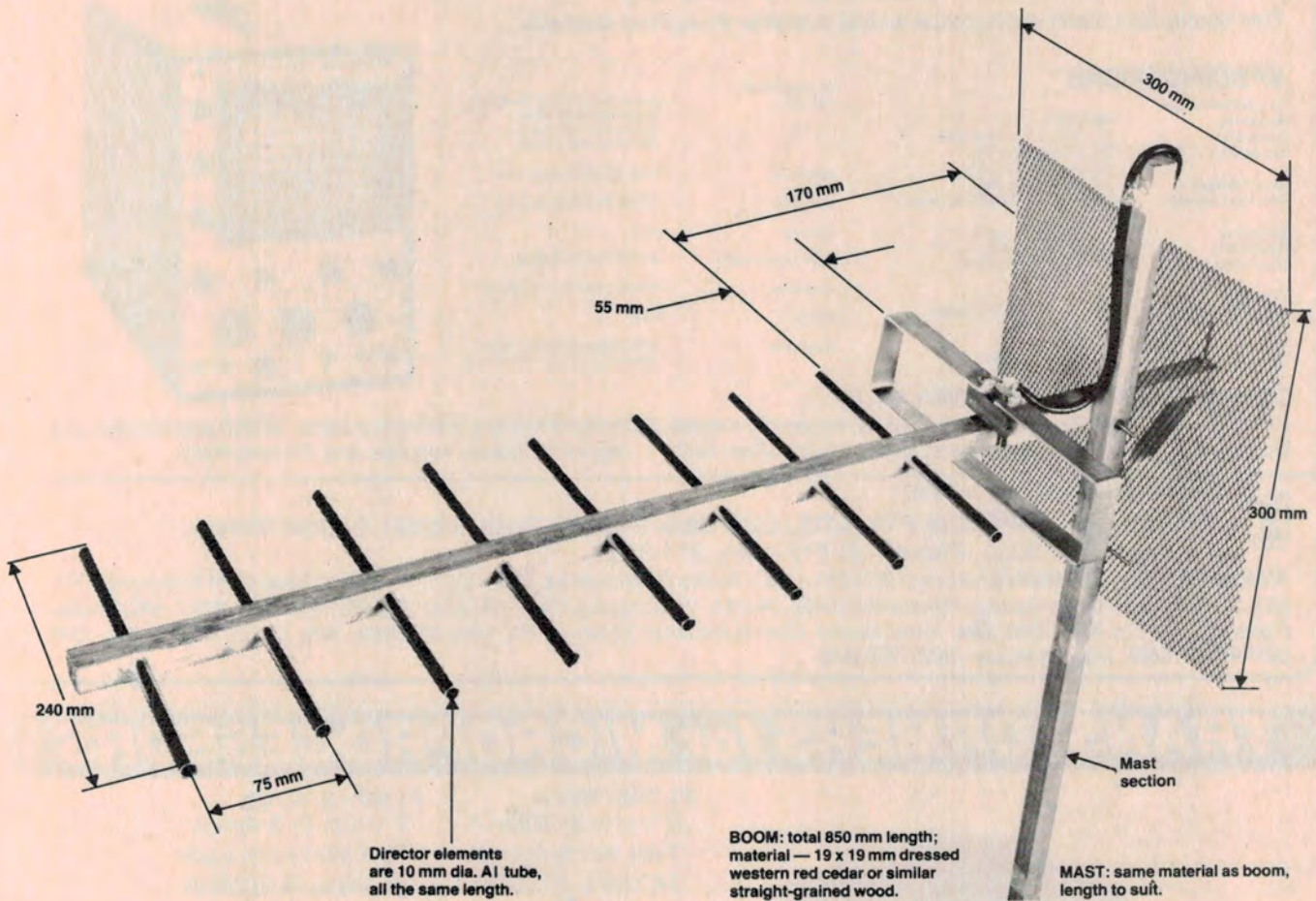
Results

We decided to give our antenna a *good* tryout, from a site at Annangrove, northwest of Sydney and some 55 km as the crow flies from the transmitter. 'Normal' reception without this antenna could be described as "... well, there might be something there, but ..." on both channel 0 and 28. This antenna brought up a colour picture with just a smidgin of noise. No ghosting was evident. Shortly after installation, a violent summer storm passed through the area, which the antenna survived without damage.

James Gerassimon compared his antenna to a commercial model costing about \$20. The latter antenna provided a weak, distorted picture, but with colour. His homemade antenna provided a considerably better picture, according to the details he supplied.

Good luck with yours!

UHF TV antenna



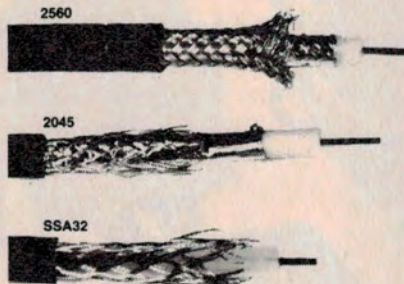
General construction. Note that a metal mast may be used instead of the wooden one.

INSTALLATION HINTS

You have to be a lot more careful when installing UHF TV antennas as UHF propagation is much more 'line of sight' than VHF. Also, UHF waves are absorbed and reflected by tiles, guttering etc. to a much greater extent than VHF.

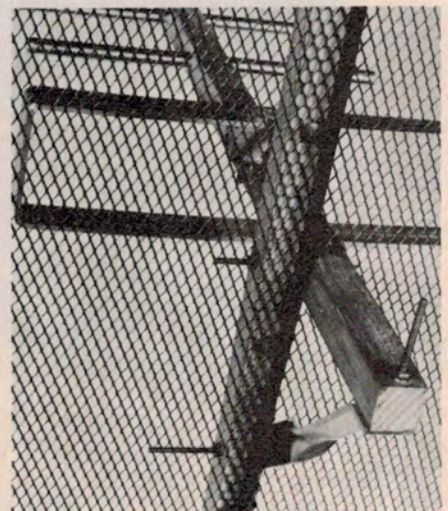
CABLE

Success will depend on the feedline chosen — choose a good quality, low loss coaxial cable from a reputable manufacturer. We don't recommend 300 ohm ribbon — neither do commercial manufacturers, it just doesn't work at UHF. Our antenna and the majority of commercial models are designed to feed 75 ohm cable. Use coaxial cables such as good quality RG59/U (from a variety of manufacturers), SSA32 (locally made by Hills) or 2045, 2560 and 2402 from Electrocraft. Those types having a foil shield and a braid over it, together with a 'foam' or 'fluted' dielectric are preferred as they will have the lowest loss and hence the best performance. Use as direct a route as possible when installing the cable to keep the cable length as short as possible, to minimise the loss.



MOUNTING

Mount the antenna as high as possible and with a clear view toward the transmitter sight. Close obstructions, such as trees, other buildings etc. can adversely affect the signal so a little planning can go a long way towards getting a good result. Do not mount your UHF antenna too close to your VHF TV antenna. Separate the two by 1½ to two metres, at least, with the UHF antenna higher than the VHF antenna.



Rear view showing support strap for the rear of the boom. The picture was taken when the reflector mesh was only thumb-tacked to the mast. It has since been more securely fixed with screws.