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M^2 Enterprises 2M-CP22 and 436-CP30 Satellite Yagi Antennas

Advanced Electronic Applications AEA IsoLoop 10- to 30-MHz Loop Antenna

Mosley TA-53-M Multiband Yagi Antenna

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M² Enterprises 2M-CP22 and 436-CP30 Satellite Yagi Antennas

Reviewed by Dick Jansson, WD4FAB, ARRL Technical Advisor

Amateur satellite communication continues to attract many hams. Satellites offer many modes—voice, CW, digital, video—to suit many different interests, from local and international rag-chewing on low-earth-orbit (LEO) satellites to DXing on the high-orbiting OSCARs 10 and 13. The selection is so varied that an adherent to one mode may never take the opportunity to sample the others!

Antennas for satellite work are major subjects of discussion. This month we review two of the newest commercial VHF and UHF circularly polarized (CP) Yagis for amateur satellite communications. These antennas were designed by Mike Staal, K6MYC, longtime KLM engineer. I'd heard good things about the M² VHF and UHF antennas, so I was anxious to check them out.

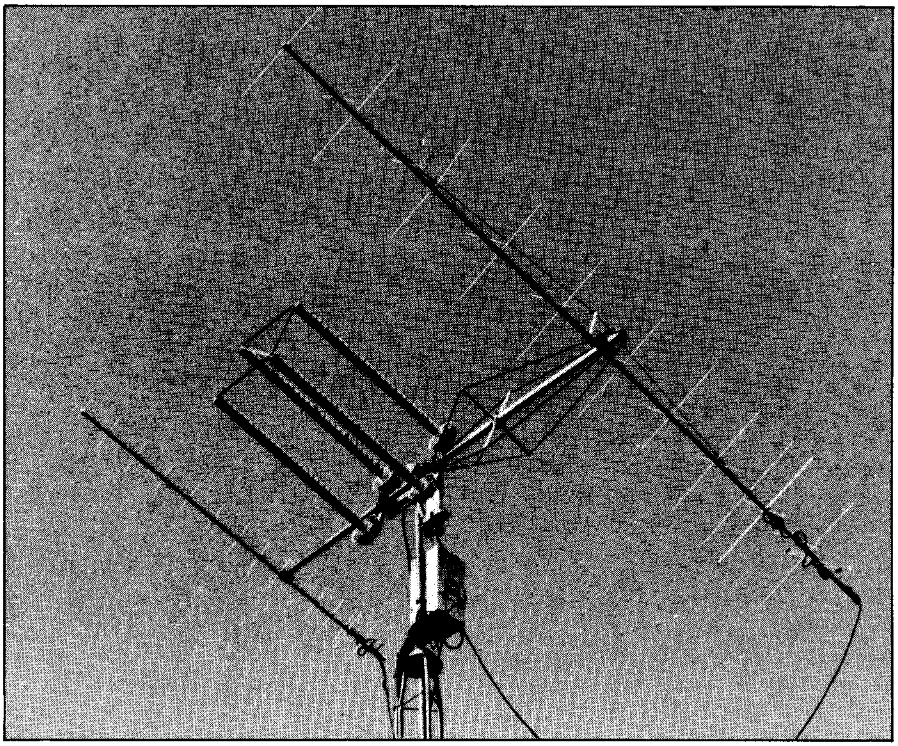


Fig 1—Satellite antennas at WD4FAB, from left: M² 436-CP30; array of 1269-MHz helixes (described in Chapter 23 of *The ARRL Handbook*); and the M² 2M-CP22. The M² antennas are mounted on insulated extensions of the horizontal cross boom. The 2-meter antenna's PVC cross-boom extension is braced with nonconductive guy wire and PVC struts. *(photos by the author)*

Design

The computer-optimized M² CP antennas, Fig 1, use refreshingly innovative principles and materials that should serve users well for many years. These antennas use proven assembly methods, such as insulated, through-the-boom, element mounting with stainless-steel element-retaining clips ("keepers"). All the other antenna hardware is also stainless steel, except for the U bolts that mount the boom and mast to the boom-to-mast plate. (The nuts and washers used with these U bolts are stainless steel, however.)

Like most CP Yagi antennas, the M²s use one set of elements oriented horizontally and another set oriented vertically. The vertical set is located ¼ wavelength forward of the horizontal set. When fed in phase, the two sets of elements generate a CP wave. Right-hand circular polarization (RHCP) or left-hand circular polarization (LHCP) depends on the feed sense. Mounting the antennas with the elements in an X configuration, with neither set horizontal or vertical, makes it quite difficult for birds to light on the elements and has no effect on antenna performance.

Probably the most notable design innovations in these antennas are the driven elements. The basic design is a 200-Ω folded dipole, with the main portion mounted through the boom, like the other elements. The driven half of this element consists of a pair of aluminum-rod half-elements protruding through Teflon insulators installed on opposite sides of an aluminum block. This block is contoured to the boom and mounted to it with a screw. The dipole halves are joined to the longer rod with two machined aluminum plates and set screws.

The magic of this design is in the driven-element center block. In addition to the protruding half elements, this block also supports three female F connectors. These are the same 75-Ω connectors used in television sets, but with a difference: M² uses sealed F connectors on the cables with a jam nut containing an O-ring gasket to fully close the open threaded end of the connector when it is attached to the female connectors on the block. Two of the connectors are joined with a half-wavelength 4:1 balun made of RG-6 coaxial cable. The third connector is for the input feed line. Moisture won't affect this block, as it's encapsulated with a sticky compound. Don't even consider fooling with the innards of this block, as you will have an awful mess on your hands.

Matching sections made of RG-6 cable join the two planes of elements. These cables are routed from the driven-element blocks to a T-shaped aluminum block. This block also contains a female N connector to which you attach the feed line to the station.

The use of 75-Ω cables and F connectors in the M² antennas is less of a compromise than you might think. The matching lines should ideally have an impedance of 70.7 Ω; 75 Ω line and connectors represent an insignificant difference. The balun connections don't have to be 50 Ω, either: The balun cables are ½ wavelength long, so the impedance is the same at each end.

The M² antennas are designed for RHCP. Polarization sense isn't switchable, unlike most commercial CP antennas.

The Bottom Line

For high-orbiting satellites like AO-13, these high-gain, well-built, wide-bandwidth antennas work wonderfully. But for low-earth-orbiting satellites (LEOs), such as the PACSATs, the lack of polarization-switching capability limits their usefulness.

Operations with OSCAR-10 were considerably more effective with the occasional use of LHCP when the satellite was off-pointed. With OSCAR-13, LHCP operation is needed only on rare occasions—at 436 MHz, when the satellite is off-pointed by 60° or more. I've never found switching from RHCP to LHCP with the 2-meter antenna to be of any help with AO-13. So, for OSCAR 13, the fixed polarization sense of these antennas poses no problem. For stations in North America, operation on the LEO PACSATs, such as AO-16, on the other hand, *requires* CP switchability. The polarization sense of an approaching satellite can differ from that when it's moving away from the observer.

So why did M² choose not to include CP sense switching? On one hand, the improved performance by the absence of losses of a CP-switching relay helps AO-13 operators. On the other, those interested in the PACSATs have limited operating flexibility with these antennas. Several polarization-switching schemes can be applied to these antennas, but they require some fussing and careful measurement with reasonable test equipment. Caveat emptor.

Assembly

These antennas arrived well protected in their UPS-shippable boxes. Small parts are bagged, and the elements for each antenna come in a single bundle. You must separate the elements into two bundles, one for each plane.

Assembly instructions are complete, albeit terse. Two complete assembly diagrams are included—one marked in inches and one in centimeters.

The 2-meter antenna's boom is made of two 1-inch sections, two 1¼-inch sections and one 1½-inch center section. The boom-section swaging results in an excellent fit. For the 436-MHz antenna, two 1-inch boom sections are used, also with a good-fitting swaged coupling.

The documentation recommends assembling the elements one plane at a time. I suggest following this instruction. Install one element at a time, after carefully measuring each element, by sliding insulators on from each end as you place the element into the correct boom hole. Select the correct element and *carefully* measure each element for proper centering. Some of the element lengths differ by 1/16 inch or less, so use great care in measuring. Further, the director lengths are not of a uniform taper (a progressive shortening from the driven element forward). It's very easy to make a mistake here if you're not careful.

Pressing on the keepers while keeping the elements centered is a challenge. The kit includes a piece of aluminum tubing intended for this job. Pressing on keepers with the bare tube is hard on the hands; use heavy gloves or add a handle to the tube to make the job easier.

When all of the passive elements have been assembled on the boom, it's time to complete the driven elements. Mount the driven element shorting blocks on the ends of each pair of rods, carefully measuring the block position. The instructions for installing the shorting blocks are slightly ambiguous. They call for placing the blocks "...at the ends of the driven-element rods" (2-meter antenna) and 1/8 inch from the ends of the rods (436-MHz antenna). As the main rod and the half-element rods are not exactly the same length, it's uncertain which rod the instructions refer to! In practice, which you choose makes very little difference in the antenna match. These shorting blocks give you some tuning latitude, if the proper measurement equipment is available. In any case, measuring the shorting-block position from the aluminum center block and placing them exactly equidistant from it is important to antenna performance.

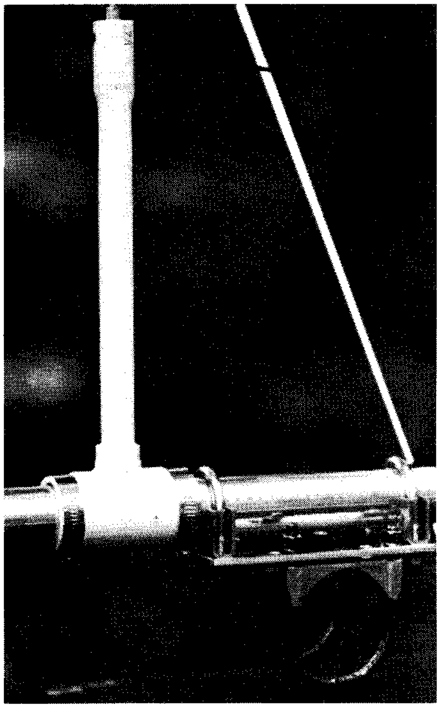


Fig 2—One method of bracing the 2M-CP22's boom when the antenna is mounted on a horizontal mast requires only some PVC pipe and two stainless-steel hose clamps.

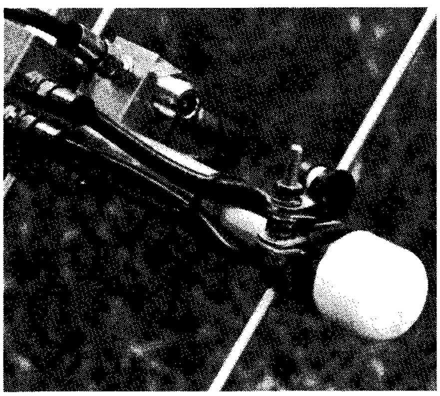


Fig 3—Cushioned cable clamps provide a strain-relieved boom-end attachment for coaxial feed lines. On this antenna, the feed line will run through the cushioned clamp to the N connector on the feed-point block (upper left). Also shown is a PVC boom-end cap.

Balun attachment comes next, then mounting the **T** block with the phasing lines to each antenna. Line positioning and dress are important, as the lines are in the fields of the antenna elements. Mispositioning can cause detuning.

I made a couple of small changes to the M² antennas. Antenna booms are some of the insect world's most favorite places to build homes, so I closed the boom ends with ¾-inch PVC pipe caps. The open end of the cap may need to be notched with a drill and file to fit around element insulators. I glued the PVC caps onto the boom ends using silicone adhesive.

Another area that needed attention in my installation was the 2-meter antenna's boom brace. (The 436-MHz antenna is short enough that it doesn't need a brace.) M² provides a black Dacron cord for this purpose. M² doesn't provide a support post for the stay, apparently on the presumption that you'll mount the antenna on a vertical mast and attach the brace to it. In installations like mine, where a horizontal cross boom supports both antennas, there's no attachment point for the stay.

Fig 2 shows how I adapted a 1½- × ½-inch PVC reducing **T** for this purpose by sawing out the side opposite the ½-inch branch. With a sharp knife, I carved out the ridges inside the **T** to make it fit well over the 1½-inch boom section. I secured the **T** with a pair of stainless-steel hose clamps, then glued in an 18-inch extension of ½-inch PVC pipe. Use a ½-inch PVC cap, or fill the end of this short pipe and drill a hole to pass the rope. Anchor the rope to the **U** bolts provided, and include at least one of the supplied turnbuckles. Be sure to safety-wire the turnbuckle. This arrangement braces the antenna's boom independently of the mounting arrangement.

Route the coaxial feed line from the reflector end of the boom, as shown in Fig 1. This keeps the cable from affecting the antenna's radiation pattern. Fig 3 shows how I attached the feed lines to the booms using a pair of cushioned cable clamps (such as the ADEL MS21919). The two clamps, 7/8 and 3/8 inch, respectively, are held at the boom end with #8-32 stainless-steel hardware.

Installation

Mounting CP Yagi antennas requires somewhat greater consideration than conventional horizontally polarized antennas. Stray metallic objects near the plane of the

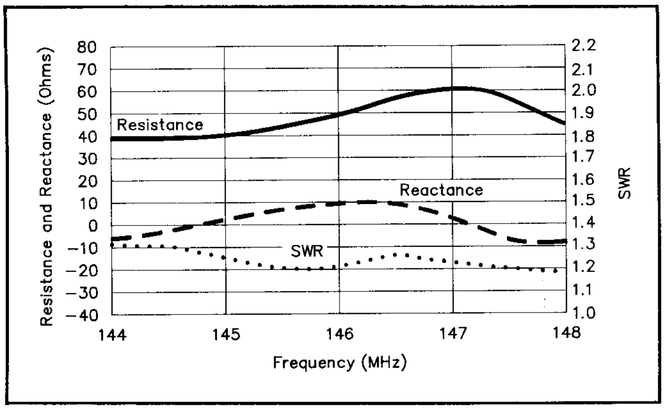


Fig 4—Resistance, reactance and SWR curves for the M² 2M-CP22 satellite antenna. The solid line is resistance, the dashed line is reactance, and the dotted line is SWR. The 2M-CP22 antenna has a good match across the band.

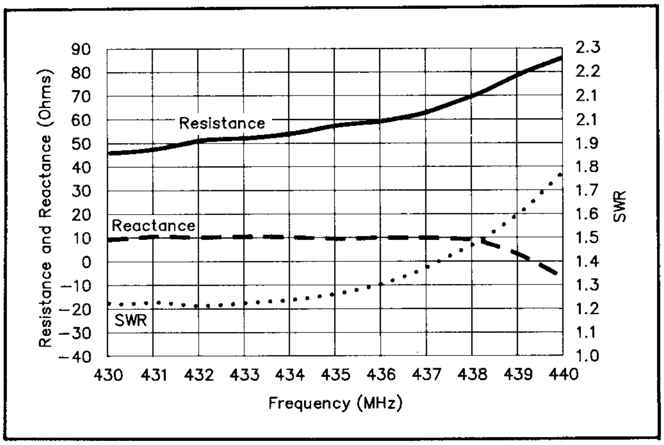


Fig 5—Resistance, reactance and SWR curves for the M² 436-CP30 satellite antenna. The solid line is resistance, the dashed line is reactance, and the dotted line is SWR. This antenna presents a good load from less than 430 MHz to more than 440 MHz, well beyond the satellite band.

elements affect antenna performance. As shown in Fig 1, I placed each antenna at least ¾ wavelength from the metallic portions of the elevation axis. This distance is more than adequate. The elevation-axis boom is a 1½-inch steel pipe. This pipe is extended with a piece of 2-inch PVC pipe for the VHF antenna mount. As PVC isn't very stiff, I made a nonmetallic truss from four Phillystran ropes.[1] It may *look* awful, but it works and is quite stiff.

I used a piece of 1½-inch fiberglass tubing to mount the 436-MHz antenna ¾ wavelength from the steel-pipe cross boom. This tube extends the pipe and is attached to it with a machined adapter. I filled the ends of the nonmetallic booms with wooden dowels to avoid crushing the tubing where it's clamped to the antennas.

Performance

Before putting these antennas on the air, I made some measurements on one of the AMSAT Phase-3D antenna test ranges. I used a Hewlett-Packard 803A VHF bridge, along with a Measurements, Inc, generator as an RF source and a dual-band handheld transceiver as a tuned detector, to measure the antenna impedances.

Fig 4 shows the measured results for the 2M-CP22, indicating good performance across the band. SWR in the satellite range (145.8-146 MHz) is quite good—about 1.2:1. Fig 5 shows the same data for the 436-CP30. This antenna displays good RF characteristics across the 430- to 440-MHz band segment. This antenna should perform well below 430 MHz, covering the band's ATV segments. (I didn't take data below 430 MHz.) The antenna's electrical characteristics are more than adequate for its intended application.

[1]Phillystran is a nonconductive guying material made by United Ropeworks, Inc, 151 Commerce Dr, Montgomeryville, PA 18936, tel 215-368-6611, fax 215-362-7956.

The real performance evaluation of an antenna comes in live operational tests. A technician can measure the network until hell freezes over, but that would not answer the question of how it works. As qualitative as they are, these tests are meaningful when compared against experience with similar antennas. The VHF antenna, with its 18-foot, 6-inch boom and 22 elements, provides more than enough gain. Lengthy evaluations using this antenna, including the completion of the last 25% of my Satellite DXCC, proved that it's an unqualified success for the satellite service. Two-meter signals were always adequate on OSCAR 13's uplink and downlink.

I was somewhat concerned that the 30-element UHF antenna wouldn't perform as well as I was accustomed to. Its 9.7-foot boom is just two-thirds the length of the 40-element antenna I previously used. Operating experience has shown, however, that the M² antenna has gain comparable to the 40-element antenna. This may result partly from its lack of a lossy polarization-switching network, as previously discussed. Operating with this 30-element Yagi has not left me wanting for performance.

M²'s well-constructed satellite antennas warrant your consideration.

Price: 2M-CP22, $229; 436-CP30, $229. Manufacturer: M² Enterprises, 7560 N Del Mar Ave, Fresno, CA 93711, tel 209-432-8873.

AEA ISOLOOP 10- to 30-MHz LOOP ANTENNA

Reviewed By Brian Battles, WS1O

I've been a ham since 1976, but I've never considered myself a DXer. Not because I don't care for the sport of DXing, but mostly because I've never had the equipment—or the time—to make a serious attempt at working DX. I don't have a tower or beam antennas, and I've never owned a power amplifier. Because I've achieved unspectacular performance from my 133-foot wire dipole for 10 through 80 meters (which I feed with 50 feet of ladder line and a tuner), I figured I'd try the IsoLoop.

To the untrained eye, it looks as if a miniature alien spacecraft has landed on my house, but installing the IsoLoop turned out to be a good move. I mounted the antenna in the horizontal plane on the mast that supports my 2-meter vertical and my HF dipole. The IsoLoop can handle masts up to 2 inches in diameter. I used the 50-foot control cable that AEA supplies with the antenna to interconnect the control box and antenna. The mast is attached to the chimney about 35 feet above the ground. I didn't expect to see much of an improvement over the dipole with this 43-inch-diameter loop of flat aluminum, but I was pleasantly surprised.

Overview

This IsoLoop is the second-generation model.[2] It now comes fully assembled and covers 10-30 MHz (the first version covered 14-30 MHz), but its power handling—150 watts—and principle of operation haven't changed: It's an electrically small, inductively-coupled antenna with a very low radiation resistance and a remotely controlled, high-Q matching network located at the feed point.[3] The antenna's

[2]See Product Review, *QST*, Apr 1991, pp 45-46.
[3]For more on the theory and operation of small loop antennas, see the following: T. Hart, "Small, High-Efficiency Loop Antennas," *QST*, Jun 1986, pp 33-36; J. Hall, ed, *The ARRL Antenna Book*, 15th ed (Newington: ARRL, 1991), Chapter 5.

The Bottom Line

A small, efficient multiband antenna, the IsoLoop is just the ticket for antenna-restricted environments. But it costs enough that you should consider other options.

bandwidth is very narrow (10 kHz is typical at the low-frequency end, 100 kHz at the high end), and the matching network has a big job stepping the 50-Ω coax impedance down to the antenna's very low feed-point impedance with minimal loss. The sub-20-pound antenna uses a round, continuous, wide anodized-aluminum strap as its radiator (the earlier version used straight tubing sections). The benefit of the new design, presumably, is less loss in the loop itself. The new radiator has no junctions. Even low-loss connections can be problematic in such low-impedance systems, so AEA eliminated them in this antenna. Another of the newer antenna's features is a completely sealed feed system. It uses a redesigned, more rugged plastic housing for its gear-driven high-voltage tuning capacitor and exposes no connections to the weather when mounted horizontally with the supplied stainless-steel hardware.

The IsoLoop's LC-2 control box, also revised, goes in your shack. It's about 3 inches tall, 4 inches wide and 6 inches deep. The front panel has two large buttons for tuning (designated by large, raised arrows on the surface of each), thumbwheel controls for **SENSITIVITY** and **SPEED**, and four LEDs. On the back are jacks for 12 V dc input (from the supplied power cube), receiver audio in and out, and the control cable to the antenna. You remotely tune the IsoLoop by pressing the front-panel up- and down-arrow buttons until the antenna is matched at the desired frequency. The **SPEED** control makes it easy to find resonance: Transmitting with a few watts while monitoring the SWR, you move through the tuning range rapidly to get close, then slowly tweak the tuning to zero in on the peak, just like the earlier IsoLoop. It sounds confusing, but once you try it, it's simple.

The LC-2 control box lets you tune the antenna without transmitting, as follows: Tune to a spot close to where you want to operate, preferably where there's just band noise. Rock the tuning up and down with the buttons until the received noise peaks. What about the **SENSITIVITY** control and LEDs? They serve as an amplified relative signal-strength meter that lets you tune the antenna a bit more precisely, still without transmitting. Use the supplied cable to feed your transceiver's audio output to a jack on the control box (you can also run a cable from the LC-2's audio-output jack to an external speaker). Then, tune the IsoLoop until it lights the red, yellow and green LEDs, which means the antenna is properly tuned (or at least, that it's hearing the loudest noise from the transceiver). The **SENSITIVITY** control lets you adjust the display for best resolution while you're tuning. I found it equally quick and convenient to tune by ear, or by transmitting and watching the SWR meter. The LED approach is useful for shortwave listening, though.

Performance

Since I put up the IsoLoop, I've worked a couple of dozen new countries that had I barely, if ever, heard before—including some rather rare ones. Most stations I asked told me that there was no difference in signal strength when I switched between the IsoLoop and the dipole, although a few said that the IsoLoop adds one or two S units. No stations reported that the IsoLoop gave a weaker signal.

I couldn't convince my boss at HQ to send me on a DXpedition to Aruba or Trinidad to see how easy it would be to travel with the IsoLoop and find out what results I'd get from "the other end." From my results at home, I think it's safe to say that it would perform at least as well as a wire, but not as well as a Yagi.

Because the IsoLoop has such high Q, it minimizes interference from nearby frequencies—rather like an external preselector. Don't be tempted to use the internal automatic tuner in your radio to reduce the system SWR. AEA warns against this in the IsoLoop manual. The reason: Antenna matching done at the IsoLoop end maximizes radiated power; matching done at the transmitter end increases line loss and makes your radio happy, but doesn't increase the IsoLoop's radiated power. If you tune the antenna properly and adjust it when you change frequency, you should never need to use your rig's internal tuner. The IsoLoop works so well for such a small antenna because the tuning network is located at the feed point, rather than in the shack, and because its feed efficiency is very high. Unlike reviewer experiences with the first IsoLoop, I had no trouble tuning the redesigned antenna for a 1:1 SWR in the 10-meter band.

For me, one benefit of the IsoLoop is that it reduces the racket from my computer and TNC. On some bands, the ladder line and dipole pick up a barrel of hash from the digital toys. With the IsoLoop, a lot of this goes away.

The IsoLoop manual is well written and makes installation and operation easy. The antenna is omnidirectional when mounted horizontally. When I mounted it vertically (AEA supplies the hardware), it seemed to exhibit a figure-8 pattern, based on the signals I could hear and work. The vertical-mount configuration may yield a bit more gain; it sounded as though stations I regularly heard on DX nets and a few APLink stations were marginally louder.

The IsoLoop won't work as well as a Yagi, and it may look odd sitting on your roof, deck or a pole in your yard, but it gives you six HF bands in a single, small antenna without the need for a tuner, long wires or a large, cumbersome tower and beam setup. For those who need such an antenna, the IsoLoop's performance makes it a good value over a several-year period, because the antenna works well and looks like it should hold up over the long run.

Manufacturer's suggested retail price: $349.95. Manufacturer: Advanced Electronics Applications Inc, PO Box C2160, 2006 196th St SW, Lynnwood, WA 98036; tel 800-432-8873 or 206-774-5554.

MOSLEY TA-53-M MULTIBAND YAGI ANTENNA

Reviewed by Jeff Bauer, WA1MBK

Quintbander? That moniker just doesn't roll off the tongue as smoothly as *tribander* does. Like many others licensed before the 1979 World Administrative Radio Conference (WARC-79), in which US amateurs obtained allocations at 12, 17 and 30 meters, I find myself referring to multiband Yagis as tribanders, even if they're not. But in the wake of WARC-79, tribanders and "traditional-band" rigs are turning into the hula hoops of ham radio.

Description

The Mosley TA-53-M is a five-band, trap-resonated Yagi antenna similar in concept to the popular triband TA-33, but it uses two driven elements. Its driven elements, reflector and director work as a three-element antenna for 20, 17, 15, 12 and 10 meters. The antenna uses two aluminum-tubing phasing lines between the driven elements. The coaxial feed line attaches to the phasing lines partway between the driven elements by means of two formed-aluminum straps that are drilled for the feed-line mounting hardware.

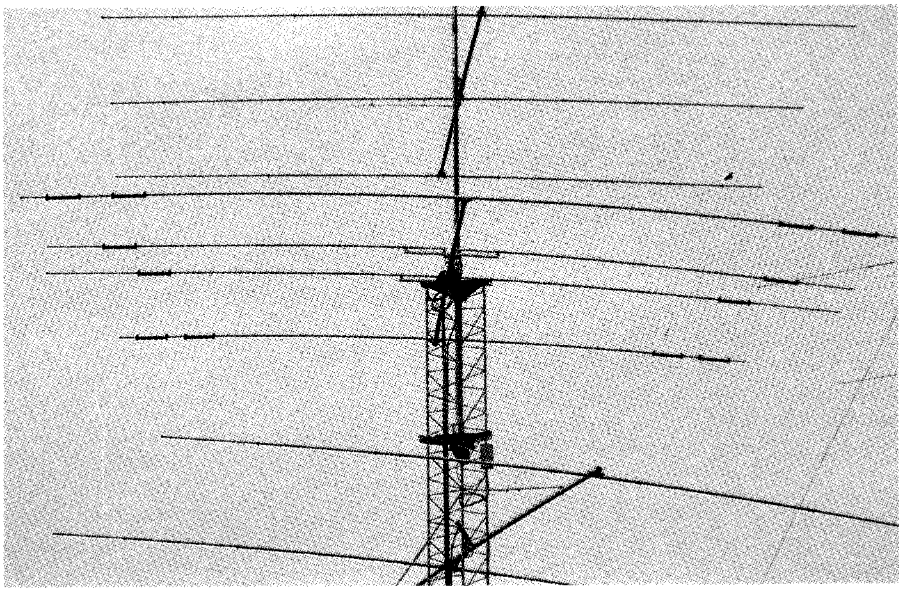
The shortest element is 20 feet, 5 inches long; the longest is 26 feet, 5 inches. The boom length is 14 feet, and the antenna's turning radius is 14 feet, 11 inches. At 55 pounds, this is no lightweight antenna—but it's no monster, either. Mosley specifies its front-to-back ratios as shown in Table 1.

Mosley recommends that you not use a ferrite balun, but suggests using a choke balun made of a few turns of the feed line coiled near the feed point to keep RF currents from flowing on the outside of the coax shield.

The antenna is shipped via UPS in two boxes. The trap box weighs 23 pounds, and

Table 1
Mosley's Claimed Front-to-Back Ratios for the TA-53-M

Band (MHz)	*F/B Ratio (dB)*
14	10
18	12
21	13
24	5
28	16



the boom/element box weighs 40 pounds. Somewhere in the shipping process, our trap box was bent slightly. This wasn't Mosley's fault, of course; both boxes are clearly marked with bright red stickers instructing package handlers to treat the boxes with care.

Assembly

Putting this antenna together is a snap. All elements and traps are color-coded, making parts identification easy. Like other Mosley antennas, the TA-53's traps and telescoping elements are locked in place with self-tapping screws. Virtually no measurement is required during assembly of the TA-53-M. The elements are premeasured and predrilled, making for fast and almost idiot-proof assembly. What few measurements that *are* required during assembly—the element placements on the boom and the feed-line tap point between the two driven elements—are *critical* with this antenna. If the feed-line attachment point off by half an inch, matching suffers.

The element spacings affect antenna performance, too. When the review antenna was initially installed, its SWR did not dip properly on a couple of bands. I had put the end caps on the boom early in the game and thought that having the director and reflector elements snug up to the end caps would be close enough. Was I wrong! A word to the wise: Do not assume that the colored ink markings on the boom are accurate element-spacing measurements. Grab a tape measure and work from one end of the boom to the other, and maintain the specified element spacings *exactly*. Then trim the boom-end caps to fit. Without the caps, the array is likely to collect insects and whistle or howl as the wind blows by the ends of the boom.

Test Setups

Some people have voiced concern that this antenna's performance suffers when installed near guy wires or other antennas. At W1AW, the TA-53-M was tested on a free-standing (unguyed) 60-foot tower in the following four configurations:

- At 60 feet, with no other antennas on the tower.
- At 60 feet, 10 feet above a 40-meter inverted V.
- At 60 feet, 10 feet above a 40-meter inverted V, and 14 inches below a four-element 2-meter Yagi.
- At 60 feet, sandwiched between a three-element 15-meter Yagi at 68 feet and a three-element 17-meter Yagi at 50 feet.

In the second and third test setups, the TA-53-M's SWR and directional properties remained what the antenna showed by itself. Although the test location is by no means a pure antenna-measuring environment, two transceivers used in the testing showed Mosley's front-to-back ratio claims to be accurate. (More on this later.)

Only in the last setup did the antenna show signs of performance deterioration. Specifically, the SWR curves became *much* sharper, and the front-to-back ratio fell off considerably. But this was admittedly a worst-case installation and any antenna that covers 15 or 17 meters would have behaved the same. Mosley clearly warns users about such interaction in the manual under **WATCH OUT FOR ARTIFICIAL GROUND**. To wit, "Artificial ground is presented to an antenna through various means. Guy wires up under the antenna, roof top, [and] other resonant antennas near by are the most common. The antenna should be at least [¼ wavelength] from any artificial ground at the lowest operating frequency of the antenna.... With this in mind the antenna should be at least 17 feet away from any artificial ground."

The manual goes on to say how you can identify an interaction problem: "A sign of artificial ground will be a shift lower in frequency of the SWR curves and possibly a dip that doesn't reach 1:1 at its lowest point. Also, the SWR will rise at a faster rate when tuning to the higher portions of the band."

This rings true with my experience. Sandwiching the TA-53-M (or any other similar antenna) between two monobanders is certain to cause a performance slide. But in the test setups in which the TA-53 shared tower space with the 40- and 2-meter antennas, it showed no ill effects from its proximity to them. Mosley specifies 8 to 12 feet of vertical separation between the TA-53-M and other antennas on the same support.

The Bottom Line

The TA-53-M's rugged, broadband coverage of five ham bands comes at the expense of low front-to-back ratio.

Documentation

The photocopied manual includes a 2-page part list, 8 pages of assembly instructions, and 7 pages of diagrams. The manual is of poor production quality compared to what other manufacturers offer with their products. A company like Mosley that produces high-quality antennas should ship their products with top-notch manuals, in substance and form. This isn't such a manual, but it is adequate.

Good Points

This is a no-tune antenna. All elements are measured, cut and drilled at the factory, so no trial and error is involved in assembly. This makes for fast and relatively trouble-free assembly.

The cast-aluminum boom, mast and element clamping blocks are well-designed and -machined. They fit perfectly and have no rough edges or barbs. Mosley did their homework with these blocks, as they have to provide clearance for a screw head on the driven element brace-to-mast junction. The blocks provide this clearance regardless of their positioning. This is more than just a nice touch; it's good engineering.

During the course of testing the TA-53-M, we called Mosley (anonymously) to obtain specifications (front-to-back ratios aren't specified in the documentation). This was a pleasant experience. Mosley's telephone representative was friendly and happy to read a rather long list of numbers over the phone. She went the extra mile by offering to either mail or FAX, at our choice, the requested information. Now *that's* customer service!

Rough Edges

Generally speaking, the antenna performs quite well. It covers all five bands with SWRs under 2:1 from band edge to band edge and has a directivity pattern that I'd expect from a three-element Yagi. But in designing this antenna, Mosley traded off front-to-back ratio for broadband coverage, as Table 1 shows. With the arguable exception of its 10-meter performance, this antenna's front-to-back ratios are rather dismal. Better performance isn't unusual in tribanders and monobanders. Depending on your reasons for buying a directional antenna, this performance characteristic could sway you away from the TA-53-M.

The TA-53-M's traps, element sections and boom are color-coded with marker ink. Stamped part numbers would be better because they don't fade and are less likely to be scratched into obscurity than ink markings.

Only one of the two factory feed-line attachment clips fit snugly, so I had to fabricate the other. For me this was a minor inconvenience, but not all antenna purchasers are prepared to do such metal-shop work to assemble an antenna. A nice touch would be for Mosley to flatten and drill the phasing lines at the feed-line attachment point, like they prepare the ends of these lines. This would render measuring and installing the feed clips unnecessary, and it would practically guarantee efficient power transfer at this current node. An insulating support between the phasing lines and the boom would further ruggedize the assembly.

If the boom- and mast-clamping blocks were welded or otherwise attached to the boom-to-mast plate, securing the array to a mast would be a much easier job. Juggling these blocks, the antenna, **U** bolts, lock washers and nuts is quite a trick—even for an experienced tower climber!

The traps and telescoping element sections are held in place with sheet-metal screws. Adding lock washers at these points seems like a good idea.

Summary

The TA-53-M is not for everyone. Most big-gun contesters and DXers probably aren't interested in a trapped, multiband antenna on a 14-foot boom—except as a multiplier-hunting antenna and for between-contests DXing on the two upper WARC-79 HF bands. For the rest of us, this rugged antenna is worthy of *serious* consideration. Through a single feed line, it provides gain and directivity on all the amateur bands between 10 and 20 meters. Miles of coax and antenna switch banks are rendered unnecessary with the TA-53-M. Its price is reasonable, considering the antenna's ruggedness.

For those upgrading from wires or a vertical, using the TA-53-M will be an exciting experience. It's a thrill to sweep the horizon, beaming in on a signal. It's also a real kick to null out QRM with a directional antenna. And you enter a new world when your radiator is up atop the ground clutter.

Price: $526.95. Manufacturer: Mosley Electronics, Inc, 1344 Baur Blvd, St Louis, MO 63132, tel 314-994-7872 or 800-966-7539 (orders only).

New Books

THE 1992 TRANSCRIPTS AND PROCEEDINGS: THE UNOFFICIAL PROCEEDINGS OF CERTAIN DAYTON EVENTS

By Richard Boyd, KE3Q

Published by LTA, PO Box 77, New Bedford, PA 16140, tel 216-533-0087. 1992. Paperback, 8½ × 11 inches, various page lengths, some with black-and-white diagrams. Four volumes: DXing, Antennas, Contesting transcripts and a Sweepstakes bonus, all for $29.

Reviewed By Brian Battles, WS1O
QST *Features Editor*

Missed the Dayton HamVention this year? Attended it but missed some forums? Went to the forums but didn't take notes? Rich Boyd, KE3Q, comes to the rescue with this series of verbatim transcripts of notable sessions held at Dayton.

One 84-page volume covers the DX Dinner, DX Forum and a brief interview with an official from the Philippines regarding the status of Spratly Island. This word-for-word transcript covers DXing in Asia; the developments in Albania; DXCC Computerization; VP8SSI; a presentation by Romeo Stepanenko, 1S1RR/YAØRR/XYØRR/3W3RR; Effective QSLing; the 1992 YASME Expedition; YXØAI; and more. The DXCC Countdown at the dinner is particularly entertaining. The interesting and witty speakers transcribed include Bob Eslaire, W9UI; Wayne Mills, N7NG; Yaesu's Chip Margelli, K7JA; Tom Warren, K3TW; the DXAC's Ted Pauck, K8NA; ARRL Roanoke Division Director John Kanode, N4MM; ARRL HQ's Tom Hogerty, KC1J; Don Daso, WA8MAZ (now WZ3Q); Terry Dubson, W6MKB; Tony de Prato, WA4JQS; Martti Laine, OH2BH; Ed Kritsky, NT2X; Lloyd (W6KG) and Iris (W6QL) Colvin; and Albania's Agim Muco.

A heftier tome is entitled *The Antenna Forum*, and has 87 numbered pages of transcripts, with a half-inch-thick section that consists of diagrams, plots and graphics. Topics include "Large 10-Meter Antennas, Design, Construction and Applications" by John Brosnahan, WØUN; "Yagi Stacking Update and Beverage Antenna Applications" by Frank Donovan, W3LPL; "Some Additional Yagi Design Ideas Based on Computer Modeling" by Jim Breakall, WA3FET; "Strengths and Weaknesses of Antennas" by Dave Leeson, W6QHS; and "Yagis vs Quads, Additional Data" by Carl Luetzelschwab, K9LA.

Contesters will enjoy the transcripts of the Contesting forums, which is nicely complemented by *Top Ops Talk Sweepstakes*, the most fun to read of the set. It's 41 pages of a fast-paced conversation between Trey Garlough, WN4KKN; Jeff Steinman, KRØY; Tim Duffy, K3LR; and Randy Thompson, K5ZD. These veteran contesters discuss operating strategy, travel, QTH advantages, operating techniques, equipment, the "Qs that got away," their analysis and recap of past Sweepstakes, and the inevitable sprinkling of gibes, wisecracks and clowning around.

Boyd doesn't waste much space on editorial comments, other than a few notes to set the scenes or introduce the speakers. His parenthetical comments and "stage directions" make it easier to visualize what's happening at times when the speakers' words alone could be confusing. If you couldn't get to Dayton this April or missed some useful forums, pick up a couple of these transcripts and picture yourself sitting in the front row as you read. If you enjoy DXing, contesting or experimenting with antennas, add all four volumes to your library.

Strays

TOYS FOR TOTS RALLY

☐ The second annual rally to collect toys for underprivileged children in the Southland is being held Saturday, November 28, from 10 AM-4 PM, at Jun's Electronics, 5563 Sepulveda Blvd, Culver City, California. Toys are being collected for the US Marine Corps Toys for Tots program. This event is endorsed by the Los Angeles Council of Radio Clubs.

In conjunction with the rally, special-event station KA6RJF will operate on 10 meters. Amateurs are invited to stop by after attending the nearby TRW swapmeet. For information, contact Bruce Nolte, N6TFS, PO Box 41446, Los Angeles, CA 90041; tel 213-257-5502.

QST congratulates...

The following amateur on 60 years of ARRL membership:

- Harold Chase Jr, W1EES, W Suffield, Connecticut

I would like to get in touch with...

☐ anyone who can help an old-timer upgrading his old Yaesu FT-101E. I need FT newsletters from that period. Stefan Thorhallsson, TF3S, PO Box 354, 121 Reykjavik, Iceland.