

# ARES(R) Trailer Tower / TA33Jr 3-element 3-Band Yagi Installation

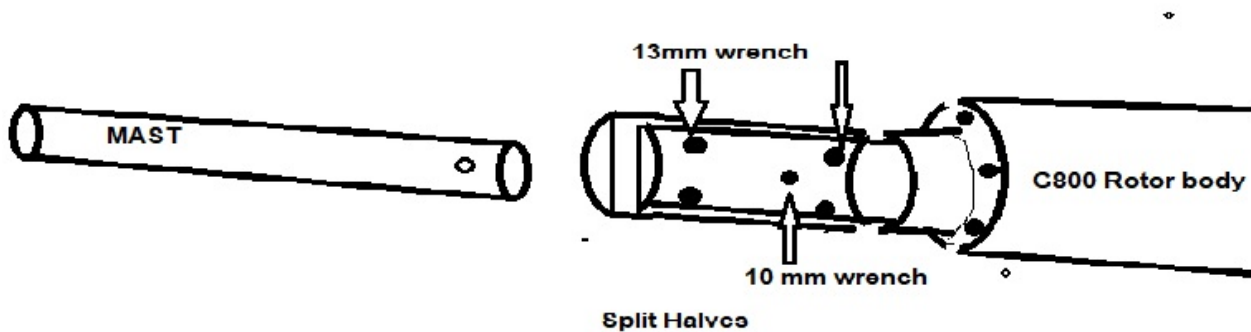
## DISCLAIMER

These instructions are done to the best of my ability but I cannot guarantee that they are perfect, so users of the tower accept liability.

Failure to follow these instructions, however, is **likely to result in damage or harm.**

## 1. MAST INSTALLATION

The mast is removed before travel to limit height and length of the trailer.



## BE CAREFUL ON LADDERS!

The split halves of the G800 cradle for the mast are tightened with 13mm wrenches on bolts both on the split halves and on the body of the rotor, to affix the split halves to the rotor body. However, it would be difficult to prevent rotation of the mast with just these bolts alone without crushing the mast, so a through-bolt (10 mm wrench) is used to pin the mast to the rotor.

Align the blue paint on the mast with the blue paint on the split halves so that you install this at the correct rotation. The nut and head of the through bolt is difficult to deal with because it dives between extrusions of the split halves so I have added some rubber spacers.

**THESE BOLTS ONLY NEED TO BE SNUG NOT GORILLA TIGHT!! The through bolt will prevent slipping.**

## 2. TOWER TOP THRUST BEARING

Spin the thrust bearing to loosen it up; it should spin with only modest rotational effort. It should not bind. The mast must be pretty close to CENTERED through the top Thrust Bearing. Eyeball this and be sure you aren't putting in an undesired "tilt" angle before snugging up the bolts to the mast to keep it centered. Again, SNUG but not gorilla tight.

## 3. TEST THE TOWER SAFETY STOP - IMPORTANT!!

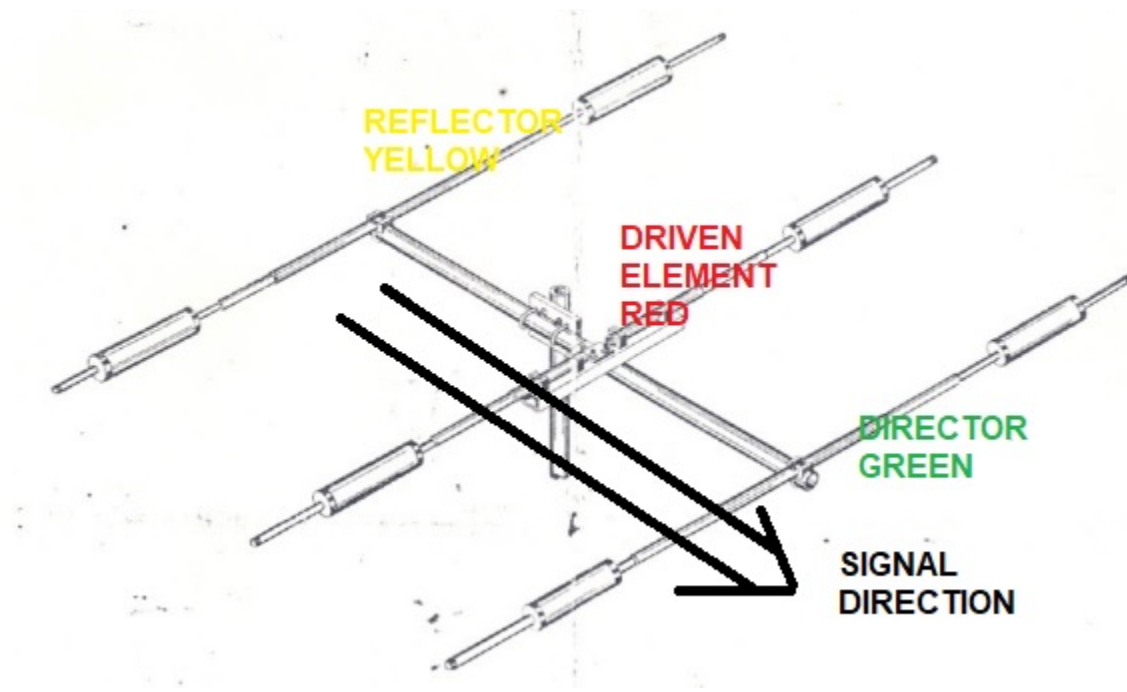
Be certain the spring is working and hinges are greased and the safety stop foot extends by itself to block dropping of the tower.

Be CERTAIN the rope to the safety stop will release the safety stop and pull it away from the inner tower. Otherwise you won't be able to retract the tower. If there is any concern about the condition of the rope, add an additional rope.

## 4. UNDERSTANDING POSITION OF ELEMENTS ON BOOM

ELEMENT	COLOR
REFLECTOR	YELLOW
DRIVEN ELEMENT	RED
DIRECTOR	GREEN

The DRIVEN ELEMENT (RED) and the PARASITIC DIRECTOR (GREEN) both go on the same side of the boom so that they are closer; the PARASITIC REFLECTOR (YELLOW) goes on the opposite side of the boom so that it is farther away. This makes the spacing on the REFLECTOR to the DRIVEN ELEMENT larger than the spacing of the DIRECTOR to the DRIVEN ELEMENT, in accordance with MOSLEY instructions.



Each element has colored tape to show where it goes. Older tape markings may still be present that had the driven element on the wrong side. Newer tape on the DRIVEN ELEMENT is RED and there is RED tape on the boom where it should go.

Our parasitic elements are set to Mosley "CODE I" which is supposedly the "CW" setting but turns out to be fairly high in the bands. This may be because we broke one turn of some of the traps. To partially compensate we have further lengthened each parasitic by about 1 inch on each side, 2" total on each parasitic.

This makes our lengths of elements as follows:

ELEMENT	TOTAL LENGTH
Director (Green)	23 feet 11 inches <i>Electrically shorter than the Driven Element due to less turns on coils.</i>
Driven Element (RED)	23 feet 9 inches
Reflector (Yellow)	26 feet 10 inches

## 5. GENERAL UNDERSTANDING OF THE ROTATIONAL LIMITS OF THE ROTOR.

The potentiometer / gearing of the rotor allow it to spin slightly more than one full rotation. As it is wired right now, on the compass directional indicator, it can go Counter Clock Wise ("Left") to WEST but not much more. It can go CLOCKWISE ("Right") all the way around past North, East, South and to West but not much farther.

YOUR INSTALLATION OF THE BOOM MUST BE SUCH THAT DIRECTIONS WORK OUT PROPERLY.

When the BLUE PAINT STRIPE is UP, the compass indicator will show approximately EAST.

## 6. GENERAL UNDERSTANDING OF INSTALLATION LIMITATIONS

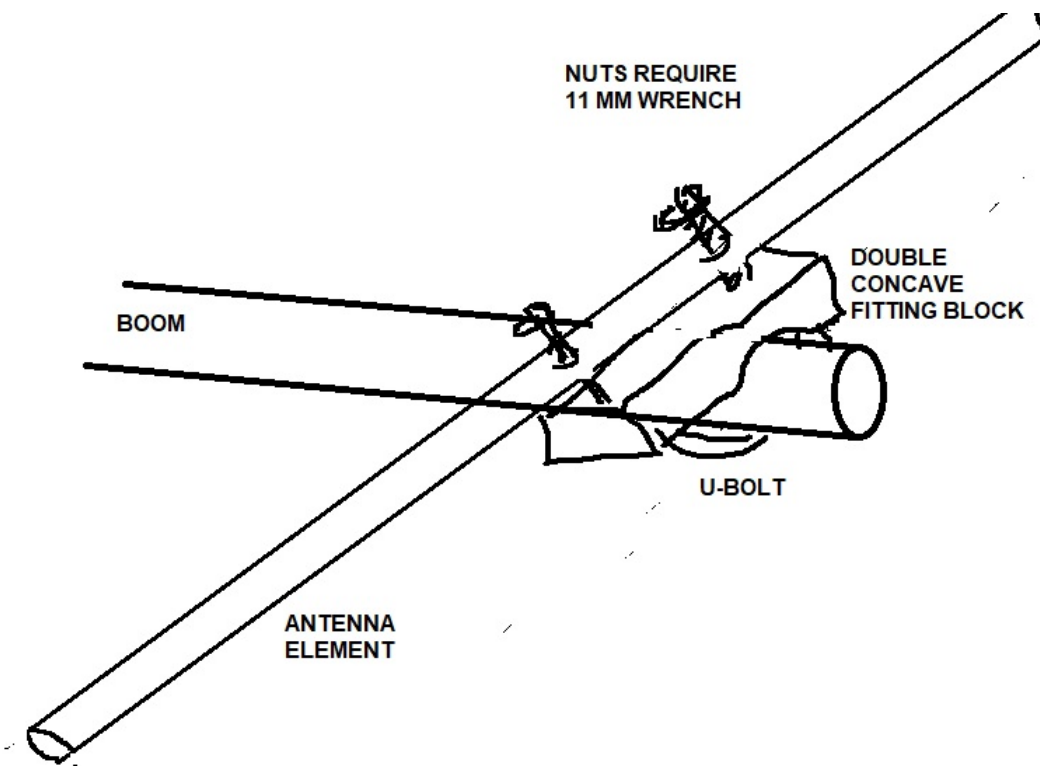
When loaded with even two, or all three elements, the boom and beam are VERY UNWIELDY and unsafe for one person on a ladder to manage!!! The following instructions are designed to allow you to install the system safely without having to raise and lower the tower.

*The BEAM ONCE ANY PART IS INSTALLED CANNOT BE ROTATED AROUND when the tower is nested on its cradle -- it will bend and break the elements.*

The general idea to installing the boom and antenna is to install ONLY the PARASITIC REFLECTOR on the REFLECTOR (back) end of the boom, which makes a manageable mass to work with and then install just this portion on the mast, turned to such an angle that the REFLECTOR is

- a) parallel to the ground
- b) HIGH in the sky, not low to the ground

The crude drawing below shows how the ELEMENTS are affixed to the BOOM. DO NOT LOSE THE DOUBLE CONCAVE FITMENT BLOCKS!! They are \$\$\$ and can only be replaced from Mosley. The Elements ride on TOP of the mast.



Once the boom is somewhat snugged to the mast (13 mm wrench, and these will need to be a bit tight but still NOT gorilla tight) then the DRIVEN ELEMENT can be installed up next to the mast, and finally the DIRECTOR down low to the ground. Notice that when the tower is rotated vertical the BEAM will be pointing to the TAIL of the trailer.

Make sure the elements are roughly at right angles to mast, not drooping much more one way than the other. (The elements are thin and they do droop)

## **7. GETTING THE MAST DIRECTION CORRECT BEFORE INSTALLING THE BOOM/DIRECTOR**

Since the trailer is only rarely going to be parked with its tail in any pre-configured direction, there will need to be an adjustment based on the direction the trailer tail is pointing, so that the REFLECTOR end of the boom goes high and not low.

***Therefore, using a compass, measure the direction the TAIL of the installed trailer is pointing, and then use the ROTATOR CONTROLLER to turn the mast to face THAT SAME DIRECTION.***

This will allow you to install the REFLECTOR high in the sky and then leisurely install the DRIVEN ELEMENT and DIRECTOR from the ground.

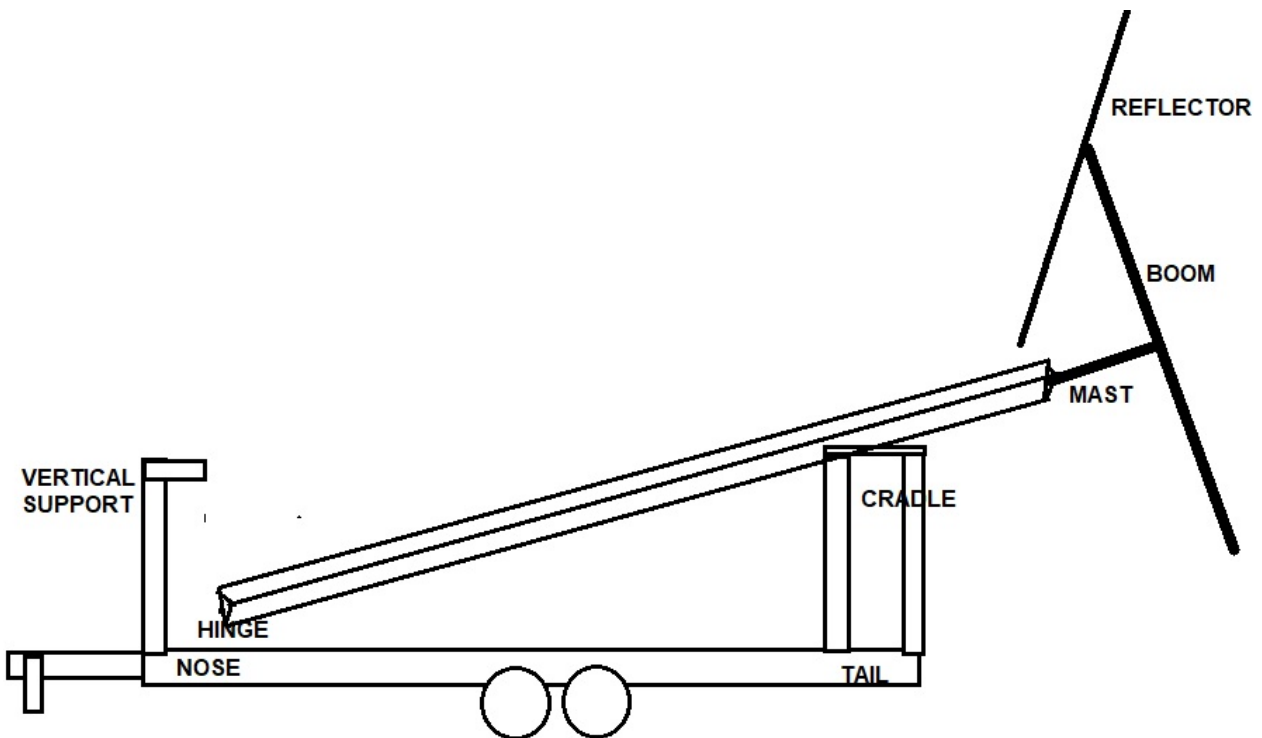
**CAUTION:**  
**DO NOT FORCE THE MAST BY HAND.** You will likely break the rotator. If the rotator is broken and the beam must be rotated manually with ropes, you'll need to loosen the rotator halves and remove the center bolt, so that the mast can spin in the rotator halves.

If you don't have 120VAC available, the rotator can be turned using 12-13.8VDC on the larger WHITE and BLACK wires from the rotator. One polarity will rotate it one direction and the other polarity will rotate it the other direction. It has mechanical protection limits. If it STOPS, that means you have hit a limit. Reversing your polarity will cause it to move again, the opposite direction.

## 8. INSTALL THE BOOM WITH REFLECTOR

Install the reflector on the boom, **11mm wrench** to tighten up the nuts on the U-bolt. These will need to be fairly tight, but not gorilla tight. Test that it doesn't seem to rotate on the mast. Make sure it is perpendicular to where the mast will be. **Be certain the WEEP HOLES on the Traps will be on the DOWN-FACING surface.**

Using a 6 foot ladder and a helper stabilizing the bottom end of the mast, set the loosened U bolts of the mast plate on the mast and tighten using **13mm wrench**. Fairly tight, so that it won't slip, but not gorilla tight.



*Installation of the MAST with the REFLECTOR High. This is done because with just one element, the boom and one element can be more easily manhandled by two volunteers. One will have to be on a ladder and is at a disadvantage. Their ground helper can greatly stabilize the assembly. (In this drawing, the reflector is supposed to be looking parallel to ground.....)*

## 9. INSTALL THE DRIVEN ELEMENT

Using a 6 foot ladder and likely a helper, install the DRIVEN ELEMENT on the bottom half of the boom, snugged up nearly to the mast. 11 mm wrench. One of the elements is grounded under one of the bolts. It does not matter which way the driven element goes on, whether grounded side this way or that. **Be certain the WEEP HOLES on the Traps will be on the DOWN-FACING surface.**

Using a zip tie, secure the feed line to the MAST. The coiled portion of the feed line acts like a BALUN

## 10. INSTALL THE DIRECTOR

The DIRECTOR now goes at the ground-ward end of the boom, 11mm wrench. Be sure the elements are all somewhat in the same plane (they droop). **Be certain the WEEP HOLES on the Traps will be on the DOWN-FACING surface.**

## 11. FREE UP ALL THE LINES

You should have a feedline and a rotator control line. If you wish, you can zip tie these at the top of the INNER TOWER, but you CANNOT attach them to OUTER (lower) Tower unless you do not plan to extend the tower at all.

### GUY ROPE LINES

You should install three 50 foot 1/4" or better nylon guy rope lines to the top of the INNER TOWER and position them so they will not be fouled when the tower is rotated to vertical.  
**DONT FORGET THIS STEP!!**

Be sure that the ROTATOR control lines and the FEEDLINE will not be snagged and broken when rotating the tower to vertical -- it is a good idea to assign one person to watch over these.

## 12. ROTATING THE TOWER VERTICAL

**EXTEND THE LATERAL STABILIZERS AND BE CERTAIN OF THE HITCH SUPPORT BEFORE ATTEMPTING TOWER ROTATION.**

I will often arrange for the trailer to be slightly "nose down" to make sure that once the tower is vertical it will not tend to fall back. Be certain that whatever is holding the nose of the trailer (truck hitch, etc) is STRONG and STABLE.

Tower rotation takes 2-3 people. Try to stay as far OUT on the tower as possible -- you have much more leverage that way. Lift the tower out of the cradle (it often has a minor snag there) and "walk" it to vertical.

- SECURE THE TOWER VERTICAL with multiple secure ratchet straps or ropes.
- SECURE THE BASE PLATE with two 7/16" x 3.5" steel bolts with oversized washers so they have good "purchase." The wrench(es) needed are 5/8 or 16mm (they are interchangeable).

## 13. EXTENDING THE TOWER

WHILE CONTINUOUSLY PULLING ON THE SAFETY STOP ROPE TO RETRACT THE SAFETY STOP, extend the tower carefully while helpers watch for any problems. DO NOT OVEREXTEND the tower. You should have several feet of overlap. The winch is a type that is NOT supposed to



windmill downward. Once you have the desired height, allow the safety stop to insert itself underneath a rung.

**I SUGGEST FOR FIELD DAY TO EXTEND ONLY ABOUT HALF WAY  
which will give us 30+ feet.  
And then PRAY if a Thunderstorm Approaches!!!**

## PYLONS

Secure the guy ropes to avoid bending of the tower in wind gusts. In a field where you do not know where gas lines, water lines etc, I suggest using "dog leash" spirals at an appropriate angle, spiraled as deeply as possible. Consider using a pole or "breaker bar" to help turn.

## 14. GROUNDING

- The tower needs to be GROUNDED for lightning dissipation. Use the biggest, shortest, straightest wires possible to the best ground (or multiple grounds) possible.
- As much as possible, allow ground wires to lay on the GROUND
- DO NOT ADD INDUCTANCE TO GROUND WIRES -- NO COILING!!
- BE VERY CAUTIOUS INSTALLING LONG GROUND RODS TO AVOID HITTING UNDERGROUND
  - WATER LINES
  - HIGH VOLTAGE POWER LINES
  - IRRIGATION LINES
  - GAS LINES
  - SEWER LINES
- USE THE 811 SERVICE EVERY TIME POSSIBLE

# GETTING TOWER DOWN AND STOWED

## 1. ROTATE THE BEAM SO THAT IT FACES THE TAIL OF THE TRAILER

This will allow you to remove TWO elements (Driven Element and Director) when you rotate the tower downward and next it in the cradle.

There should be TWO ELEMENTS on the side of the boom to the REAR of the trailer, and only ONE element on the side of the boom toward the FRONT of the trailer when you have it positioned correctly.

## 2. RETRACT THE TELESCOPING TOWER DOWN TO SAFE LOWERING HEIGHT

**DO NOT EVER PUT EXTREMITIES INSIDE THE OUTER TOWER  
WHILE LOWERING THE TOWER TO AVOID AMPUTATION**

**WHILE CONTINUOUSLY PULLING ON THE SAFETY STOP RELEASE**, retract the tower by reversing the direction of the winch

Without an antenna, we have had this tower somewhat "stick" at one point on the way down. You may need to jiggle or pull on a ROPE that connects to the inner tower and goes around the lowest point so that you can pull on it without ever putting an extremity inside the tower.

**CAUTION  
DO NOT RETRACT THE TOWER SO FAR THAT IT SHEARS OFF  
THE ROTATOR CABLE  
FROM THE ROTOR MOTOR**

**When the tower is cradled, REMOVE the Rotator cable for safety and grease the connector to protecte it from rain.**

**USE HELPERS TO OBSERVE THE RETRACTION AND LOOK OUT FOR PROBLEMS**

## 3. ROTATE THE TOWER INTO THE CRADLE

Verify that the boom is pointed so that TWO elements will be on the GROUND side. Verify that the tower is retracted to the proper amount. **DO NOT EVER** try to rotate down an extended tower with an antenna. The torque will be enormous and may harm or damage equipment or persons.

Using 2-3 people, remove the two forward bolts holding the hinged base plate down. Requires 5/8" wrenches or sockets (equivalent to 16mm) to remove the 7/16" x 3.5" bolts. (Once the tower is safely cradled, secure the bolts for travel either on the hinge plate or on the floor board.

Using 2-3 people, start to gently rotate the tower downwards toward the cradle and **STAY AS FAR OUT AS YOU CAN** because this gives you much more "moment arm" and will reduce the forces you have to support. Work together as a team. If you aren't holding much that means someone else is holding too much!

<b>REMOVE THE ROTATOR CABLE CONNECTOR</b>
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#### **4. REMOVE THE DIRECTOR AND DRIVEN ELEMENTS**

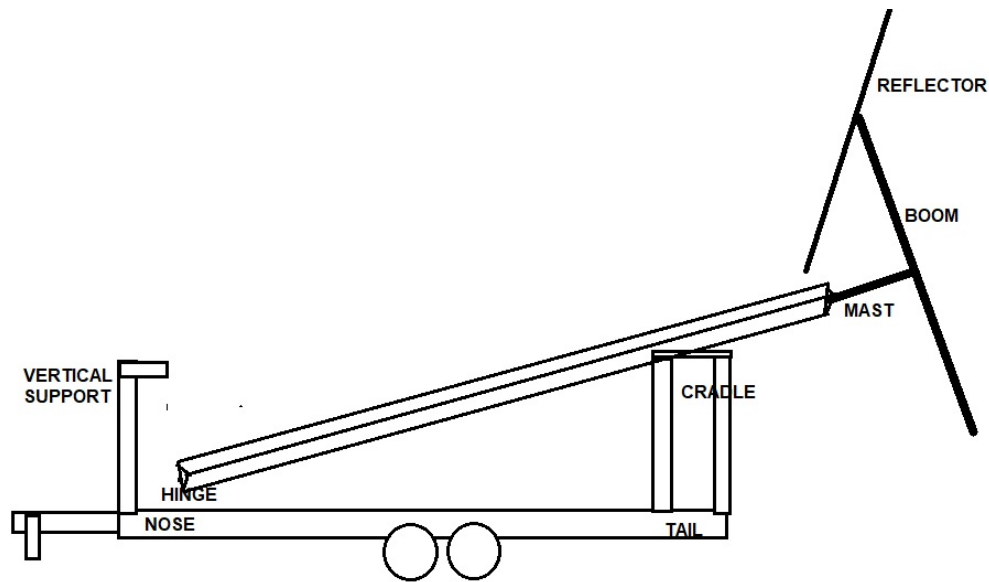
<b>BE CAREFUL ON LADDERS!</b>
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Release the feed line from the mast.

Using an 11mm wrench loosen the nuts on the Director U-bolt and remove it. Re tighten (gently) the nuts so they will not work loose and be lost during travel. You may wish to install a zip-tie "keeper" at the end of the threads.

Using an 11 mm wrench loosen the nuts on the Driven Element U-bolts and remove it. Re tighten (gently) the nuts so that they will not work loose and lost during travel. You may wish to install a zip-tie "keeper" at the end of the threads.

#### **5. REMOVE THE BOOM AND REFLECTOR**



**This requires at least two people.** The torque is excessive for one person to manage. One person can be on the ground stabilizing the boom, while the other on the ladder loosens the nuts with a 13 mm wrench and then removes the boom from the mast.

CAREFULLY get the assembly down and onto the ground safely. Gently tighten the nuts on the U-bolts so they will not come loose and be lost during travel. You may wish to install a zip-tie keeper at the end of the threads.

## 6. REMOVE THE REFLECTOR

Using an 11 mm wrench, loosen the nuts on the Reflector U-bolt and remove it from the boom. Gently tighten the nuts on the U-bolt so that they will not come loose and be lost in travel. You may wish to install a zip-tie keeper at the end of the threads.

## 7. REMOVE THE MAST

Loosen the bolts securing the clamping halves just enough to allow some space, and remove the through-bolt that is the main securement. Loosen the screws on the thrust bearing by just one turn each and the mast should be removed easily. Tighten the safety nuts on the thrust bearing screws so that they will not be lost during travel. You may wish to circularly tape the screws as additional protection.

Replace the through-bolt back in the halves so it will be safe for travel.

## 8. STORE THE ELEMENTS

The elements may be stored by securing them alongside the TOWER, using provided paracord or zip-ties. BE CERTAIN that the WEEP HOLES on the traps are DOWNWARD.

Important to keep the elements from being crushed if the truck TURNS, so keep them centered and extending only a little bit in the front. See the photo to show how they are tied to the tower.



Storing the Elements without having to disassemble them. Note raised up to avoid being damaged by the edge of the hinged base. Centered, within the "yoke" so they can't be crushed by the truck gate.

Note the mast is stored in the hose clamps on a rear support and rests on a part of the trailer.

## **9. STORE OTHER MASTS & ROPES, WIRES ETC**

- The 6-foot beam mast can be stored on the rear post using the hose clamps, and its bottom resting on the trailer lip.
- The 14-foot Moxon mast can be stored either secured on the floor of the trailer or tied to a rail.
- Likewise any grounding rods.
- Ropes and wires (including rotator control cable and ground wires) need to be safely secured, either in some secured box on the trailer or in a vehicle. Guy ropes go back onto a extension - cor rollup.
- Don't let anything be free to fly out of the trailer during travel!

## **10. ADD SAFETY FLAGS BEFORE TRAVEL**

Travel is only possible during daylight hours without lighting on the end of the tower. During daylight hours two red flags must be affixed to the rear end of the tower.