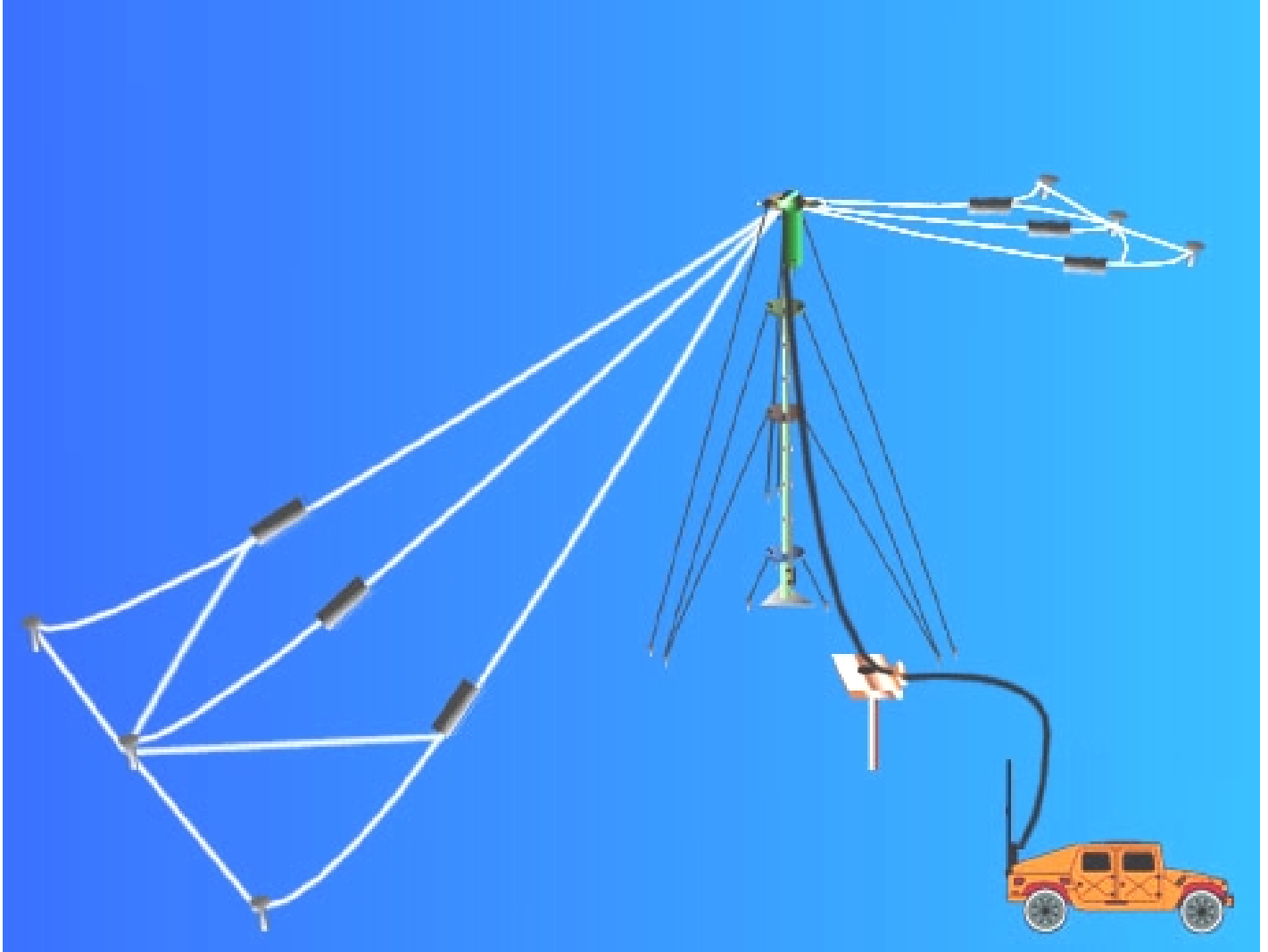


## APPENDIX G

### ANTENNA ERECTION AND RECOVERY REFERENCE GUIDE ANTENNA SYSTEM NSN: 5985-01-455-9286

#### G-1 Scope

This appendix is a reference guide for HF antenna system NSN: 5985-01-455-9286 and can replace contractors Technical Manual TM-1099, TM-H2270/2 and EL1142A which came with the antenna system.



#### **WARNINGS:**

**SITE SAFETY PRECAUTIONS:** HF Radio sites are potentially dangerous areas. A number of hazards exist during the deployment, operation, and tear down of tactical antenna systems, and it is important that a safety program be implemented in accordance with MIL-STD 882 and the safety section of MIL-STD-1472. The following hazards are particularly associated with HF antennas, including the FANLITE Antenna:

- Electrical Shock
- RF Burns

- Collision
- Radiation Hazards
- Construction Hazards.

Electrical Shock: Make certain that the deployment site is free of overhead wires, which must be considered dangerous electrical shock hazards. Ensure that no overhead wire is closer than 100 feet from the mast.

RF Burns: Contact with the transmitting antenna can cause painful injury from RF burns. Ensure that all power is "OFF" or isolated before deployment, tear down, or during maintenance operations.

Collision: The mast, guy ropes, and antenna element wires are deliberately toned down to make them difficult to see. There is a very real collision risk from personnel, vehicles, and low flying aircraft. When the tactical situation permits, ensure guy ropes and antenna elements are clearly marked to prevent personnel injuries and equipment damage; also ensure that the selected deployment site is well clear of helicopter landing zones.

Radiation Hazards: At only one kilowatt, the radiation from the antenna is not considered to be of sufficient intensity that a hazard to personnel is likely. However, a potential hazard exists to nearby ordinance and fuel. Generally, a transmit antenna should not be deployed within 700 feet of explosive devices or within 170 feet of a fuel handling site.

Construction Hazards: Antenna erection requires two persons to safely perform this task. To reduce the possibility of injury, mast and antenna deployment should normally be conducted in daylight and during dry, windless weather (UNDER 25 MPH, 40 KPH). The construction team leader must emphasize the increased risks when conditions are less than ideal. Antenna setup and tear down should not be attempted during thunderstorms due to lightning risk. All team members should wear hard hats/Kevlar/gloves and goggles during mast and antenna deployment and tear down. Eye protection. Safety glasses, goggles, OSHA approved eye wear. Keep all unnecessary personnel away from the area while deploying or retracting the mast. Avoid placing hands between sliding clamp assemblies or joints while raising and lowering the mast. Failure to observe all warning may result in severe injury or DEATH.

- G - 1 Select site for antenna.
- G - 2 Lay out components and inventory.
- G - 3 Set up mast.
- G - 4 Set up antenna.
- G - 5 Perform Equipment recovery operations.
  - Disassemble
  - Clean
  - Repair
  - Repack
  - Lighting Strike info.

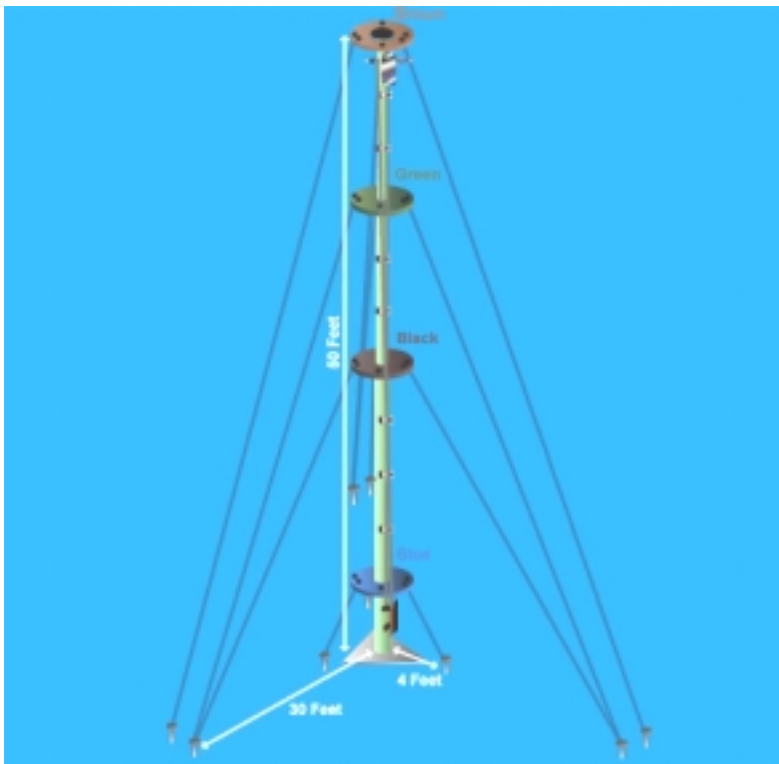
### **Planning The Antenna Erection**

Consideration must be given to the impact that terrain has, i.e.; vegetation, obstacles, and other circumstances may have on the antenna deployment. Divide the tasks necessary to complete the job as evenly as possible between personnel available. A crew of two is the minimum number of persons required to perform this task safely. To avoid unnecessary lengthy trips to the far ends of the deployed antenna, plan ahead so that you arrive there with all the equipment and supplies you need to terminate and tension the element wires.

### **Alignment of Antennas**

The broadband Fan Configuration is omni directional up to about 750 miles. However, better low angle performance for greater ranges will be obtained when the distant station is about 20° off the center line of the antenna i.e.; more or less in line with the outside elements of the antenna.

For best performance on most occasions, the centerline of the “main lobe” of the directional configurations should be aimed straight at the distant station. This means that the end of the antenna, which is terminated with load assemblies, must be pointed in the required direction. In the case of a “Sloping Vee” the vee legs are laid out equally either side of the required bearing. If using a magnetic compass, do not forget to allow for magnetic deviation.



Space and clearance requirements:  
MAST: 50 feet vertical and 72 foot diameter circle.  
Antenna: 150 feet X 45feet  
Personnel Clearance: 10 feet all sides  
Overall Size: 170 X 65 feet  
Distance to Armament: 700 feet (1KW)  
POL: 150 feet

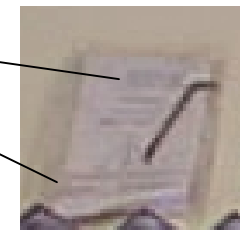
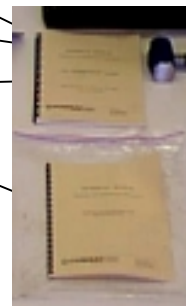
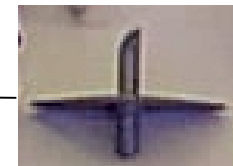
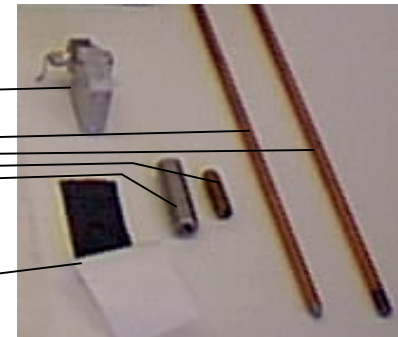
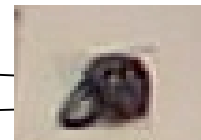
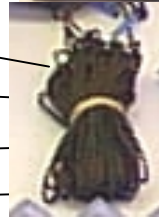
Mast Inventory and Identification of Parts

ITEM	NAME	P/N	QTY
1	MAST CTM15	33117	1 EA



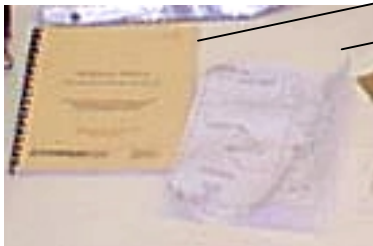
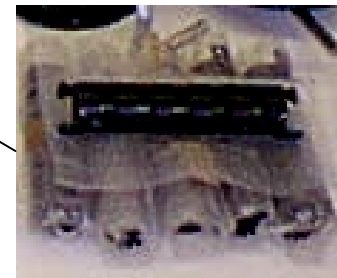
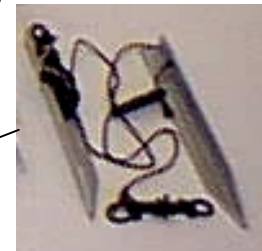
# Antenna Inventory and Identification of Parts

ITEM	NAME	P/N	QTY
1	BAG, MAST STORAGE	A424	1 EA
2	GROUND STAKE, 15" STEEL	32223	9 EA
3	15 M HALYARD	31340	1 EA
4	WEAK LINK	3/33784	1 EA
5	LIGHTNING PROTECTION ASSY	JH10	1 EA
6	UPPER GROUND ROD	JH11	1 EA
7	LOWER GROUND ROD	JH12	1 EA
8	GROUND ROD COUPLER	JH13	1 EA
9	GROUND ROD DRIVING CAP	JH14	1 EA
10	WEATHER PROOF SEALANT	WK-1	6 IN
11	GUY REEL ASSY (120)/REEL & GUY ROPES	33194	1 SE
12	GROUND SPIKE, TRIANGULAR	34385	1 EA
13	HAMMER, 3 LB	Q76	1 EA
14	BOX END WRENCH	BP162	1 EA
15	CSA CARRYMAST CTM15 MANUAL	TM-H2270/2	1 EA
16	LIGHTNING PROTECTION KIT MANUAL		
17	CARRY MAST FIELD INSTRUCTIONS MANUAL		



# Antenna Inventory and Identification of Parts

ITEM	NAME	P/N	QTY
18	BAG, LFH STORAGE	DG33778	1 EA
19	CABLE, COAXIAL 50 FOOT	SL30082-50	1 EA
20	CABLE, COAXIAL 100 FOOT	SL30083-100	1 EA
21	INNER TENSIONER	SL33776	2 EA
22	LOAD ASSEMBLY	SL33812	6 EA
23	BALUN	SL31992SH1	1 EA
24	GROUND PEG, 12"	DG33779	4 EA
25	REEL ASSY/ANTENNA LFH	SL33775SH2	2 EA
26	ILLUSTRATED PARTS LIST (MANUAL)	EL1142A	1 EA
27	OPERATION AND MAINT MANUAL	TM-1099	1 EA



Group - Item	Part Number	Qty.	NSN
<b>0000</b> Antenna System	CTM15/LFH230KIT	1	5985-01-455-9286
<b>0100</b> Accessory Kit & Mast	CTM15S	1	
<b>0101</b> Accessory Kit	SL33406	1	
<b>010101</b> Bag, Storage	A424	1	5985-01-371-5891
<b>010102</b> Ground Spike Triangular	34385	1	4030-01-412-8739
<b>010103</b> Ground Stake, 15 inch Steel	32223	9	4030-01-371-9460
<b>010107</b> HAMMER 20oz	33009	1	
<b>010108</b> BOX WRENCH 10mm	BP162	1	
<b>010109</b> PIN, STRIGHT, HEADLESS	32211	1	5315-01-469-5908
<b>010110</b> CSA CARRYMAST CTM15 TM	TM-H2270/2	1	
<b>010111</b> CARRYMAST (Field Instructions) TM	EI-1128-A	1	
<b>010112</b> Guy Reel Assembly	33194	1	
<b>01011201</b> Reel	SL33150	1	5985-01-371-5739
<b>01011202</b> Guy Rope #4 Brown-top	33198SH4	3	4010-01-371-9567
<b>01011203</b> Guy Rope #3 Green-mid 1	33198SH3	3	4010-01-371-9568
<b>01011204</b> Guy Rope #2 Black-mid 2	33198SH2	3	4010-01-372-4418
<b>01011205</b> Guy Rope #1 Blue-bottom	33198SH1	3	4010-01-371-9569
<b>0102</b> Mast Assembly CTM 15	33117	1	
<b>010201</b> Mast Outer Casing Assembly	33192SH1	1	5985-01-371-6867
<b>01020101</b> Tube Assembly, Mast Bottom	33157SH1	1	
<b>01020102</b> Base Plate	F178	1	
<b>01020103</b> Screw	BH74N or M6X16Pan HD	2	
<b>01020104</b> Handle Assembly	33190D1	1	5340-01-384-3480
<b>0102010401</b> Handle	30734	1	5340-01-367-0329
<b>0102010402</b> Compass	32998	1	6605-01-383-2149
<b>0102010403</b> Compass Holder	32748	1	6605-01-367-6506
<b>0102010404</b> Level	30264	1	5985-01-377-9150
<b>0102010405</b> Level Holder	30738	1	5340-01-366-0439
<b>0102010406</b> Clamp Spindle	33405	1	
<b>0102010407</b> Strap Handle	32655	1	5340-01-367-0330
<b>0102010408</b> Screw	BH167C	2	5305-01-393-8533
<b>010202</b> Guy Ring (Brown)	33103D1	1	4030-01-371-9565
<b>010202</b> Guy Ring (Green)	33103D2	1	4030-01-372-4411
<b>010203</b> Guy Ring (Black)	33103D3	1	4030-01-372-4412
<b>010204</b> Guy Ring (Blue)	33103D4	1	4030-01-372-4413
<b>010205</b> Mast Tube 10th, O.D. 55.5mm	AC100G	1	5985-01-414-0042
<b>010206</b> Mast Tube 9th, O.D. 60.5mm	AC99G	1	5985-01371-6871
<b>010207</b> Mast Tube 8th, O.D. 65.5mm	AC98G	1	5985-01-371-6870
<b>010208</b> Mast Tube 7th, O.D. 70.5mm	AC97G	1	5985-01-371-9118
<b>010209</b> Mast Tube 6th, O.D. 75.5mm	AC96G	1	5985-01-371-9117
<b>010210</b> Mast Tube 5th, O.D. 80.5mm	AC95G	1	5985-01-371-6869
<b>010211</b> Mast Tube 4th, O.D. 85.5mm	AC94G	1	5985-01-371-6868
<b>010212</b> Mast Tube 3th, O.D. 90.5mm	AC93G	1	5985-01-367-4631
<b>010213</b> Mast Tube 2th, O.D. 95.5mm	AC92G	1	5985-01-376-4630
<b>010214</b> Tube, Assembly, Mast-top/insert	33156	1	5985-01-384-9643
<b>010215</b> Circlip	A189N	1	5325-01-371-8267
<b>010216</b> Clamp Assembly #10 (top), O.D. 55.5mm	33109-10	1	5340-01-372-6840
<b>01021601</b> Adjuster Nut	32710	1	5310-01-365-6099
<b>01021602</b> Nut Hex Self Lock	BJ73	1	5310-01-379-0024
<b>010217</b> Clamp Assembly # 9, O.D. 60.5mm	33109-9	1	5340-01-372-6841
<b>01021701</b> Adjuster Nut	32710	1	5310-01-365-6099
<b>01021702</b> Nut Hex Self Lock	BJ73	1	5310-01-379-0024
<b>010218</b> Clamp Assembly # 8, O.D. 65.5mm	33109-8	1	5340-01-375-4947
<b>01021801</b> Adjuster Nut	32710	1	5310-01-365-6099
<b>01021802</b> Nut Hex Self Lock	BJ73	1	5310-01-379-0024

<b>010219</b>	Clamp Assembly # 7, O.D. 70.5mm	33109-7	1	5340-01-372-8132
	<b>01021901</b> Adjuster Nut	32710	1	5310-01-365-6099
	<b>01021902</b> Nut Hex Self Lock	BJ73	1	5310-01-379-0024
<b>010220</b>	Clamp Assembly # 6, O.D. 75.5mm	33109-6	1	5340-01-372-8133
	<b>01022001</b> Adjuster Nut	32710	1	5310-01-365-6099
	<b>01022002</b> Nut Hex Self Lock	BJ73	1	5310-01-379-0024
<b>010221</b>	Clamp Assembly # 5, O.D.80.5mm	33109-5	1	5340-01-372-6842
	<b>01022101</b> Adjuster Nut	32710	1	5310-01-365-6099
	<b>01022102</b> Nut Hex Self Lock	BJ73	1	5310-01-379-0024
<b>010222</b>	Clamp Assembly # 4, O.D. 85.5mm	33109-4	1	5340-01-372-6843
	<b>01022201</b> Adjuster Nut	32710	1	5310-01-365-6099
	<b>01022202</b> Nut Hex Self Lock	BJ73	1	5310-01-379-0024
<b>010223</b>	Clamp Assembly # 3, O.D. 90.5mm	33109-3	1	5340-01-372-3771
	<b>01022301</b> Adjuster Nut	32710	1	5310-01-365-6099
	<b>01022302</b> Nut Hex Self Lock	BJ73	1	5310-01-379-0024
<b>010224</b>	Clamp Assembly # 2, O.D. 95.5mm	33109-2	1	5340-01-372-3090
	<b>01022401</b> Adjuster Nut	32710	1	5310-01-365-6099
	<b>01022402</b> Nut Hex Self Lock	BJ73	1	5310-01-379-0024
<b>010225</b>	Clamp Assembly #1, O.D. 100.5mm	33109-1	1	5340-01-372-3772
	<b>01022501</b> Adjuster Nut	32710	1	5310-01-365-6099
	<b>01022502</b> Nut Hex Self Lock	BJ73	1	5310-01-379-0024
<b>0200</b>	Antenna (Fan Lite Dipole), 2.0 - 30.0 MHz	LFH230K	1	
<b>0201</b>	Reel Assembly, Element Wires	SL33775SH2	2	5985-01-371-5745
<b>020101</b>	Reel	SL33150	2	5985-01-347-2835
<b>020102</b>	Wire Assembly, Short (Inner Aerial Wire)	SL33774SH2	1	5985-01-371-5739
<b>020103</b>	Wire Assembly, Long (Outer Aerial Wire)	SL337715H2	2	5985-01-371-5747
<b>0202</b>	Inner Tensioner	SL3776	1	4030-01-372-4417
<b>0203</b>	Balun	SL31992SH1	1	
<b>0204</b>	Load Assembly	SL33812	6	5985-01-371-5744
<b>0205</b>	Ground Peg	DG33779	4	4030-01-371-9461
<b>0206</b>	Pouch	A450	1	5985-01-371-5889
<b>0207</b>	Transit Bag	33778	1	5985-01-371-5890
<b>0208</b>	Coax, 50ft	SL30082	1	5995-01-377-6667
<b>020801</b>	Cable, 50ft	RG-213/U	1	6145-00-660-8711
<b>020802</b>	"N" Connector	UG-21DU	2	5935-01-539-0848
<b>0209</b>	Coax, 100ft.	SL30082-100	1	
<b>020901</b>	Cable, 100ft	RG-213/U	1	6145-00-660-8711
<b>020902</b>	"N" Connector	UG-21DU	2	5935-01-539-0848
<b>0210</b>	Operation & Maintence TM	TM1099	1	7610-10-372-1298
<b>0211</b>	Illustrated Part List TM	EI 1142-A	1	
<b>0300</b>	Lightning Protection Kit	LPK	1	
<b>0301</b>	Lightning Protection Assembly	JH10	1	
<b>0302</b>	Upper Grounding Rod	JH11	1	
<b>0303</b>	Lower Grounding Rod	JH12	1	
<b>0304</b>	Grounding Rod Connector	JH13	1	
<b>0305</b>	Grounding Rod Driving Cap	JH14	1	
<b>0306</b>	WEATHER Proof Sealant	WK-1	1	
<b>0307</b>	Lightning Protection Kit (manual)	LPK1, 1KW	1	
<b>0400</b>	15 m Halyard	31340	1	
<b>0500</b>	Weak Link	33784	1	
AAL	Heavy duty Mast transit Bag	33424	1	
AAL	Antenna Wire 500 FT	E114	1	



## G-3 Mast Erection

### G-3.1 Mast Deployment

Decide on the location for the antenna mast. Ensure you have sufficient coaxial cable to reach the mast base from the radio. NOTE: The antenna and radio is designed to operate with the provided coaxial cables. The total run of cable should not exceed 150 feet. Align one set of mast guy ropes in the opposite direction to the pull of the Sloping Vee or Sloping Long Wire antennas to simplify deployment and to oppose the tension of the antenna wire. Remember to attach a halyard to the top of the mast before raising it. Erect the mast in accordance with the instructions. Lay out the mast, stakes, hammer and reel of guy ropes on the ground. Place triangular base plate on ground with one point facing directly upwind; hammer into ground.



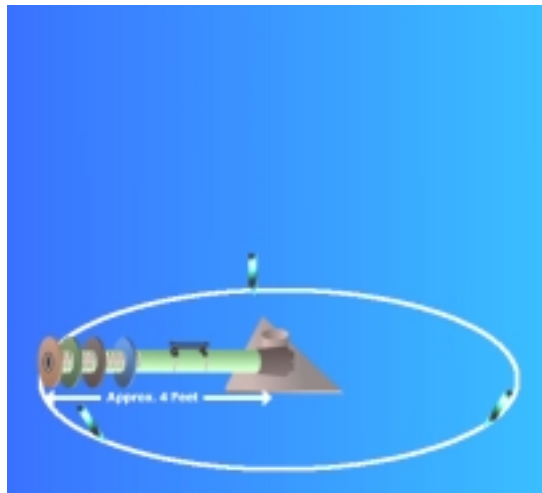
Locate the center of the antenna field location.

Place the base plate on the ground with front corner facing upwind.

Drive the plate into the ground using the hammer, until the plate is flush to the ground.

### G-3.2 Lay Out The Stakes

Drive 3 base stakes about halfway into ground 4ft from the base plate with a 30° tilt away from the base plate. Drive stakes approximately on line with the point of the base plate



Use the mast as a ruler to locate the radius for the stakes.

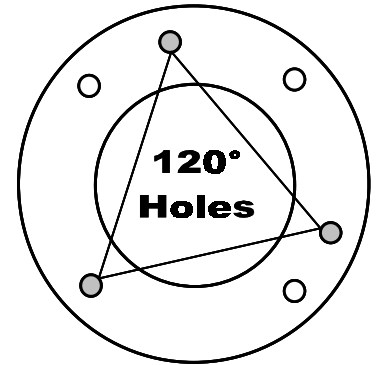
Place the first stake on line with the corner of the base plate, about 4 feet out from the center of the base plate.

NOTE: Drive the stakes about half way in and at a 30° tilt away from the mast.

Stand Up MastStand the mast up, while attaching tensioner ends of blue guy ropes to blue guy plate in the 3 appropriate (120° apart) holes Figure 2. Attach “fixed” clip ends into the 3 guy stakes (this is done so you can watch the bubble level while adjusting the tensioners). Snug down 3 blue tensioner ropes and do final bubble leveling by driving the 3 stakes further into the ground until the ropes are tight..

**NOTE:**

**These stakes and guy ropes are all that will support the mast until it is fully extended. Ensure that additional personnel are provided and briefed on their duty in high wind situations.**



Locate the reel of guy ropes and remove the first three guys marked with a blue band. Clip the fixed ends to the stakes and the other end to the blue stay plate on the mast. Use the 3 holes which are spaced 120° apart. Use the guy adjusters and the level to coarse level the mast. Fine level the mast by driving the stakes further into the ground. Drive pin through hole in rear of plate.

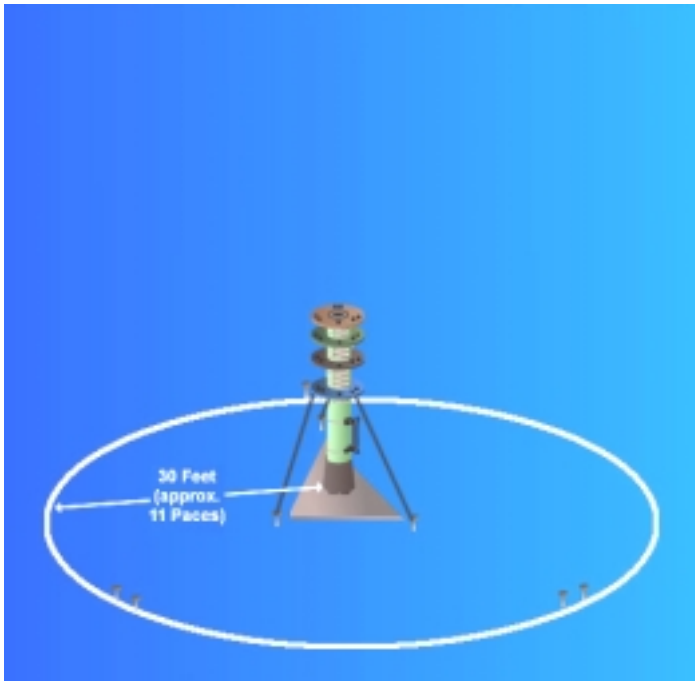
**G-3.4 Lay Out Outer Stakes**

Attach black (no tensioner) guy rope clip to the black guy plate: pick up a hammer and 2 stakes; start out along the line of the base plate/blue 1st guy rope until a red band is found on the rope.

**Note:**

**The ropes used for the black guy plate are the only ropes with a stake-positioning (red) band.**

This is the proper place for the 1st stake; drive the stake in with a 30° tilt away from the mast. Drive the second stake one pace beyond and to the right or left of the first stake with a 30° tilt, away from the mast.



Locate the guy ropes with the black band and attach the fixed clip to the black stay plate and walk away from the mast along the blue guy line until you locate the red band on the guy.  
This is the proper place to drive the next stake. Use the same 30° tilt away from the mast for all stakes. Add Guy Ropes Attach tensioner end to of the black guy to the 1<sup>st</sup> stake; also attach the other tensioner end clipped to it (green guy rope), unroll it while walking toward the mast. Ensure that the green end is at the outer end of the guy rope.



Attach the snap link to the bottom hole of the stake.  
Attach the next end of a guy rope to the top hole of the stake.

### G-3.6 Add Guy Ropes

Separate the snap links from each other and attach the green rope snap link onto the green plate at one of the 120 degree holes. Attach the next snap link (brown) to the top (brown) stay plate 120 degree holes.



Return to the mast with the green guy rope and attach it to one of the 120° holes in the green stay plate. Attach the next guy rope to the top brown guy plate 120° holes.

### G-3.7 Add Guy Ropes 2nd

Walk out to the far guy stake, reeling extra line off until the end of the rope appears, then snap the tensioner end onto the upper hole of the second, or farthest stake from the mast.



Walk back to the last stake and continue one pace beyond (3') and one pace to the left or right of this stake. Drive another stake here. Attach the end of the brown rope to the top hole in the stake

### G-3.8 Add Guy Ropes 3rd

Repeat this procedure for the remaining two guy lanes of the mast. Ensure that all guy line tension adjusters are fully backed off. This ensures enough slack in the guy lines to fully extend the mast without having to stop and adjust the guy ropes.



**NOTE:** It is important that all tensioners at the stake ends of the guy ropes are fully backed off before attempting to raise the mast in the next steps.

### Add Guy Ropes 4th

Locate and attach the halyard pulley end, clip into the top (brown) guy plate, down wind side also, twist the locking clamps on the mast to the upwind side to avoid catching the halyard on the clamp possibly flipping it open.



Attach the pulley end of the halyard to the top brown stay plate on the down wind side of the mast. Rotate the mast so that the handle is also facing down wind. Loosen the clamp on the largest tube on the mast and rotate the top sections as a unit, of the mast so that the cam clamps are facing upwind.

### G-3.10 Push Mast Up

Using two people, loosen the topmost cam clamp and push the tube up. Close the clamp. Loosen the next clamp and repeat this process until all tubes are fully extended. Two persons should now push up the mast by opening a clamp, pushing up a section, and re-closing the clamp. If there is a serious wind you may need to station someone directly upwind to provide a counter pull to the winds push (s)he will assist by pulling against the wind with the loose guy ropes. After pushing the mast all the way up, one person should stay at the base of the mast and make corrections on the desired "straight up" condition of the mast while the other moves to each level of guy ropes, beginning with the 2nd level (black), Figure 3, and tightening each trio, then moving up (to brown, then to green) until the mast is fully snug and secured.



#### **WARNING:**

**Two personnel are required to perform the task of raising the mast. More personnel are required in windy weather. The additional personnel will use the guy ropes to provide a counter pull to the wind.**

#### **NOTE:**

**Gloves should be worn for these steps to prevent pinching hands and to provide a firm grip on the mast as it is raised.**

Attach the balun to the fixed hook on the halyard.

**DO NOT HOIST THE BALUN AT THIS TIME.**

Connect the antenna cable to the balun by removing the screw on cap on the RF connector on the bottom of the balun then screwing the RF connector on the end of the RF cable with the strain relief stocking onto the RF connector of the balun. Twist the cable to form a 6 to 8 inch loop of cable with the strain relief below the loop. Connect the snap link of the strain relief to the cup hook on the balun. This will ensure that the RF connector on the cable is not supporting it's own weight.

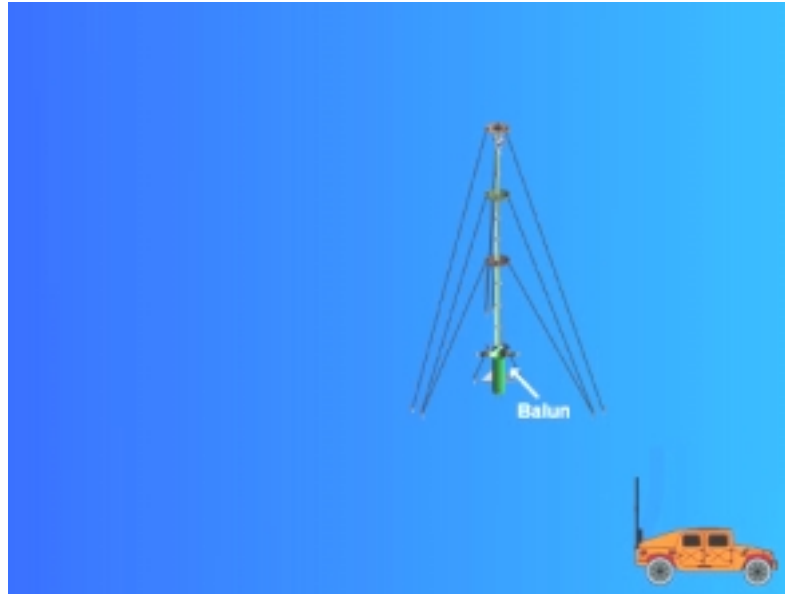
Attach Balun / Antenna

**NOTE:**

In the following steps one of the individuals will walk out around the the down wind stake with the two guy ropes connected to it and proceed in a direction which will place him at the landing point for the ends of the antenna elements.

**NOTE:**

Define down wind – 1. in the same direction that the wind is blowing 2. on or toward the lee side 3. with or in the direction of the current or stream of air. Face away from the wind, this, is the down wind direction.



Attach the BALUN to the fixed hook on the halyard.

Do not hoist the balun.

Begin Adding Antenna Wires Attach the first wire end to a solid point at the base of the mast. This wire should have a white band with the number "1" on it.



**CAUTION: The wire will hang up in the connector clips occasionally, and loose ends of the wire with connectors will whip around the reel and strike the operator of the reel possibly causing painful injury(s). Wear gloves and exercise caution to prevent this kind of injury.**

Connect the first end of the antenna wire (marked with a white band which has the number 1) to a solid point on the mast, walk away from the mast along the orientation axis (long) of the antenna while unrolling the first wire marked 1 - 2  
G-4.2 Unreel the wire till you get to a pair of snap links. Unclip the snaplinks and attach the links to a resistor. Slide the rubber "O" rings back toward the snap links and attach the spade lugs of the wire to the resistor binding posts.

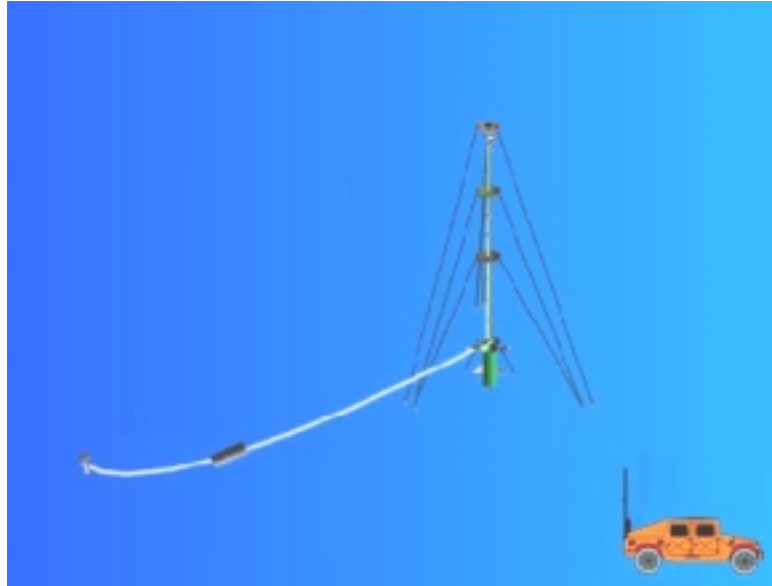




While unrolling the wire watch for a set of snap links, when you find them STOP, unhook the snap links from each other, insert a load resistor by connecting the snap links onto the strong points of the load resistor, one to each end of the resistor, slide the "O" rings on the antenna wires toward the snap link. Connect the spade lugs to the binding posts, one to each end of the load resistor.

G-4.3 Continue unrolling the antenna wire until you encounter the next set of snap links, disconnect the links and connect the snap link marked with #2 to the side of the multi connector, with the unused bow shackle.

Pick up the stake and stretch the antenna element, resistor, multi connector, rope, and stake until the antenna element is straight and lies in the intended direction of antenna orientation. DO NOT DRIVE THE STAKE INTO THE GROUND AT THIS TIME. Return to the base of the mast.

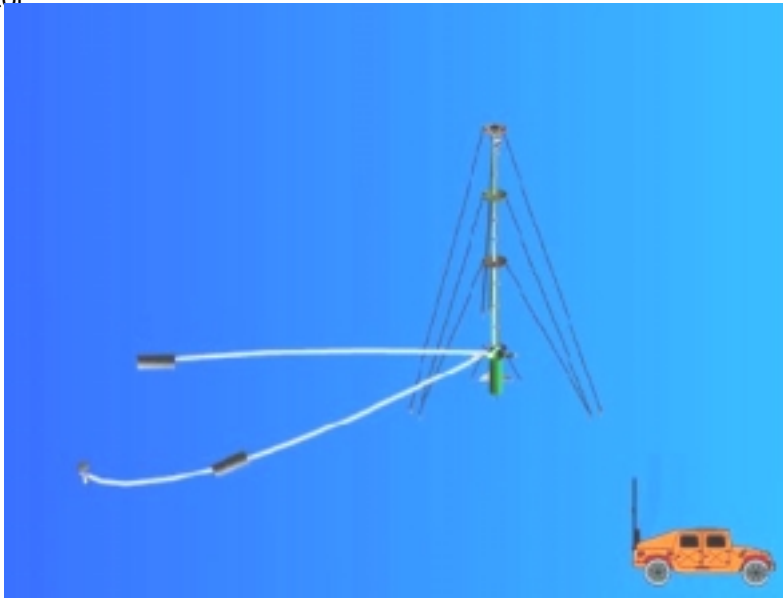


Attach the end of the next wire to the base of the mast as you did for the first wire. Unroll the wire until you find two snap links connected together.

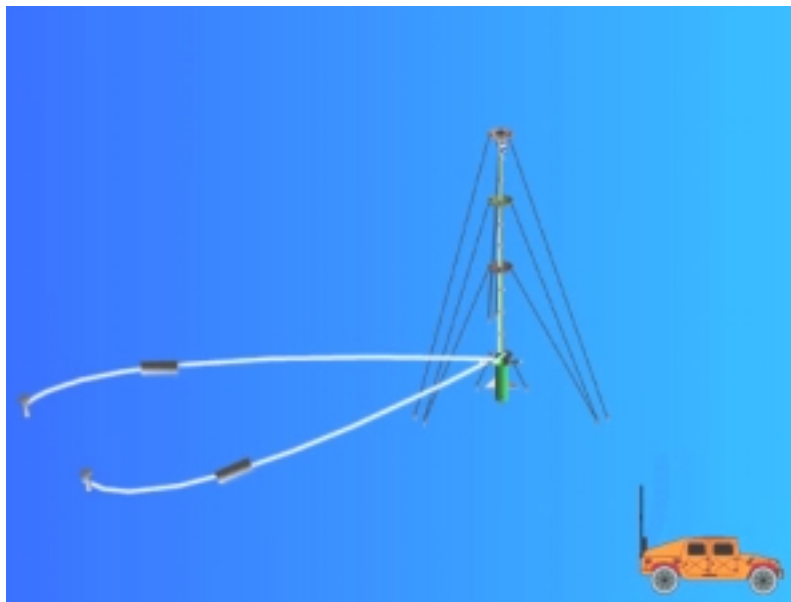


Return to the mast and take the next wire element (#3-4) at the #3 point and secure it to the mast or balun as you did for the #1-2 wire. Pick up another resistor, and a plain 15" stake, and begin walking at about a 20° angle off to one or the other side of the center wire.

Insert a load resistor



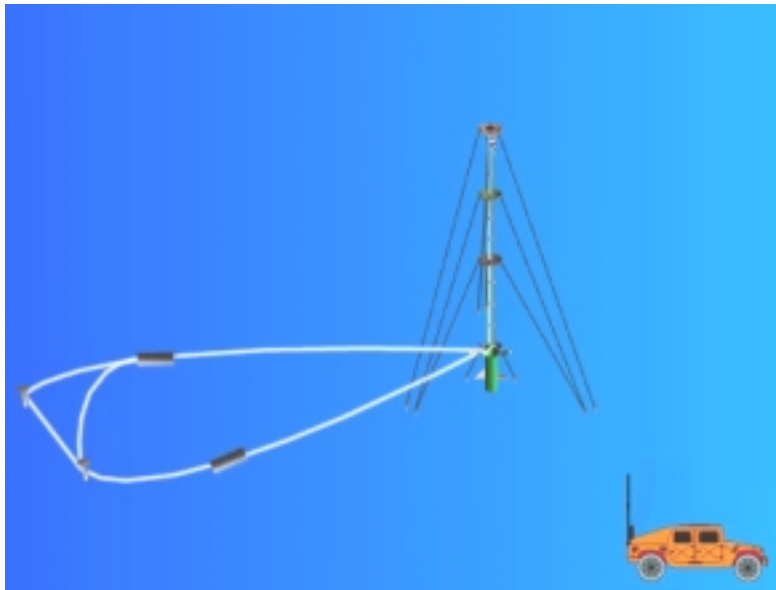
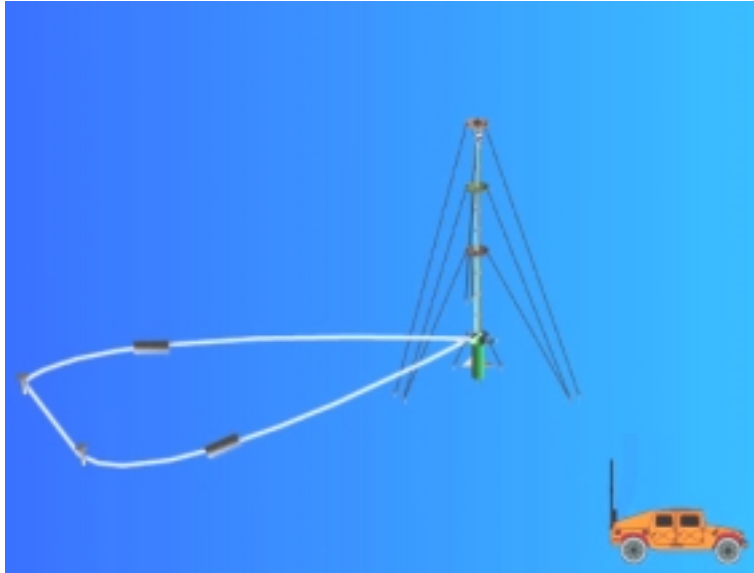
Continue to unroll the wire till you come to a snap link. Attach the snap link to a stake. Drop the stake on the ground. Stretch the wire out until it is straight.



G-4.7 Continue Second Wire 2nd

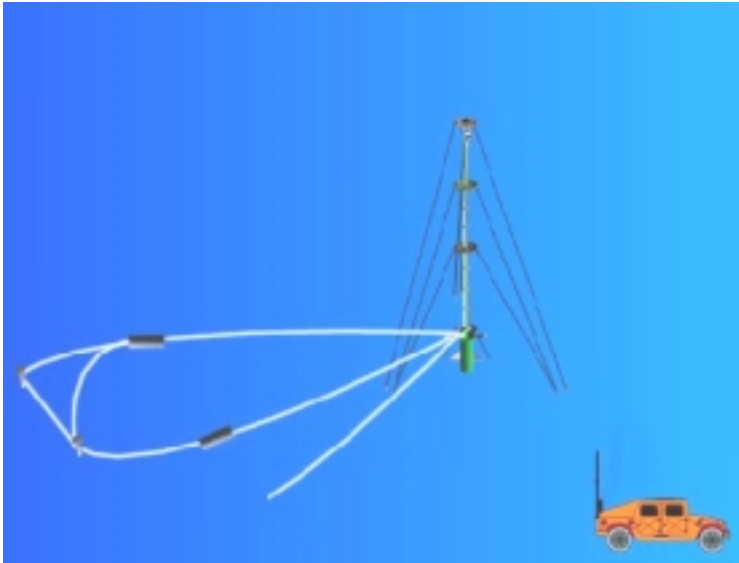
Walk toward the first stake until you come to a snap link.

Connect the snap link to the bow shackle you connected the first wire to.



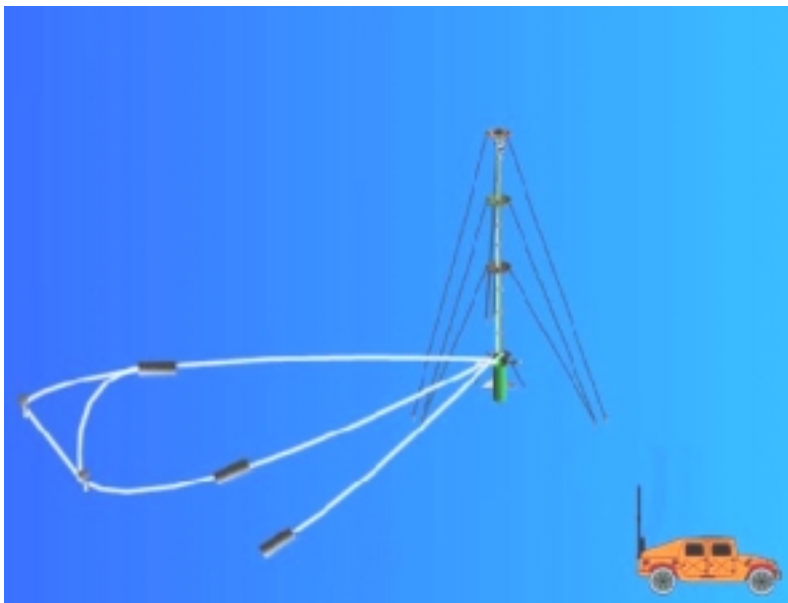
Turn outward and face the load resistor in the outer antenna element wire, unroll wire while walking toward that outer resistor. The snap link end will appear, with only a drop lead and the number 4 on the white band. Put the spool down and connect the snap ring to the bottom (downstream) side of the resistor strong point.. Now connect the upstream spade lug and then the two downstream spade lugs at the binding post connections on the resistor (one upstream, and two downstream). Return to the base of the antenna mast.

Lay Out Third WireTake the next wire element (#3-4) at the #3 point and secure it to the mast or balun as you did for the #1-2 wire. Both personnel should pick up another resistor, and a plain 15" stake, and begin walking in opposite directions to each other at about a 20° angle off to one or the other side of the center wire.

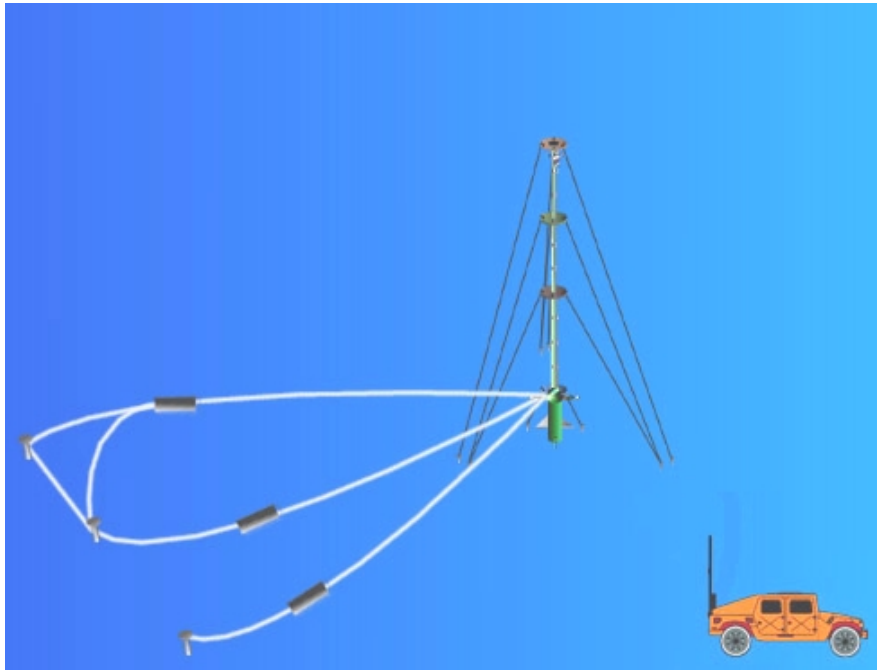


#### G-4.10 Insert Load Resistor

Insert a load resistor as you did in the first wire.

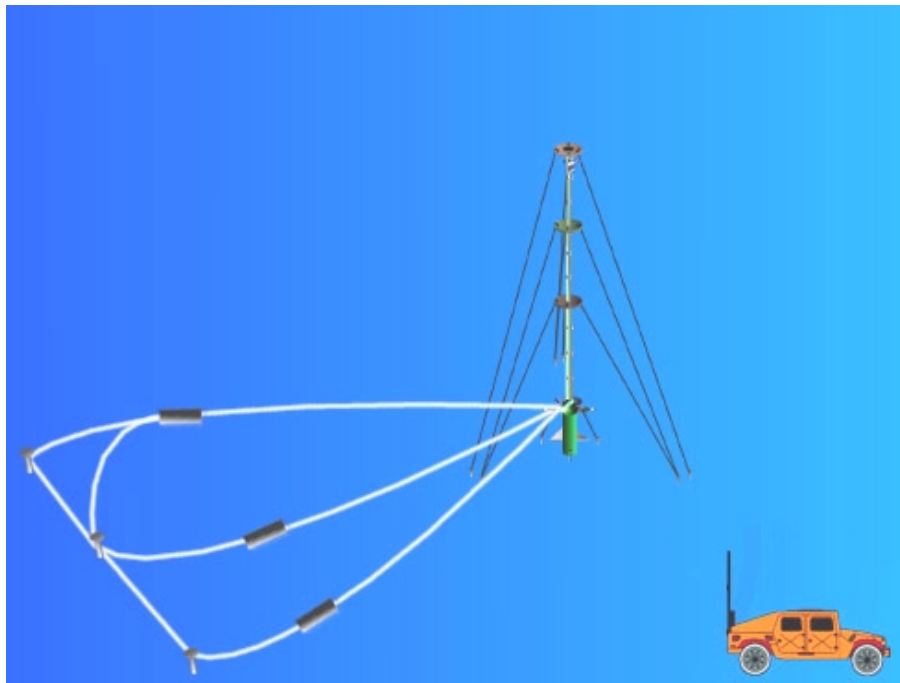


G-4.11 Continue Third Wire Continue unrolling the wire until the next snap link is found in the wire. Connect the snap link to the stake, stretch the wire straight then drop the stake on the ground.



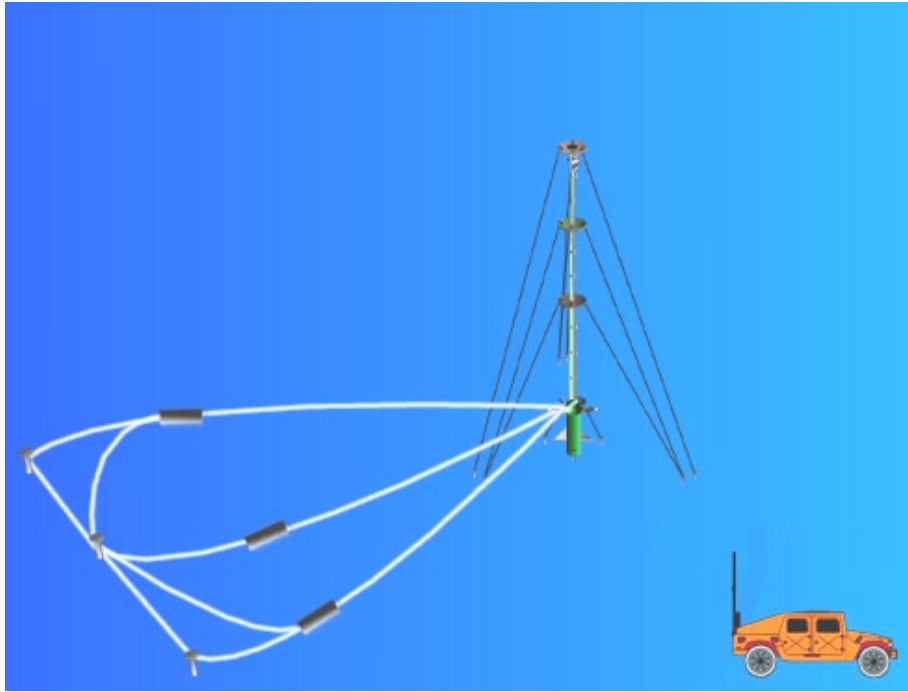
#### G-4.12 Continue Third Wire

Turn toward the multi connector in the center antenna wire and keep unrolling the wire. A snap link and drop wire will appear. Connect the snap link to the bow shackle. You should now have three snap links in one bow shackle. Connect all of the spade lugs on the drop wires to the binding posts on the multi connector.



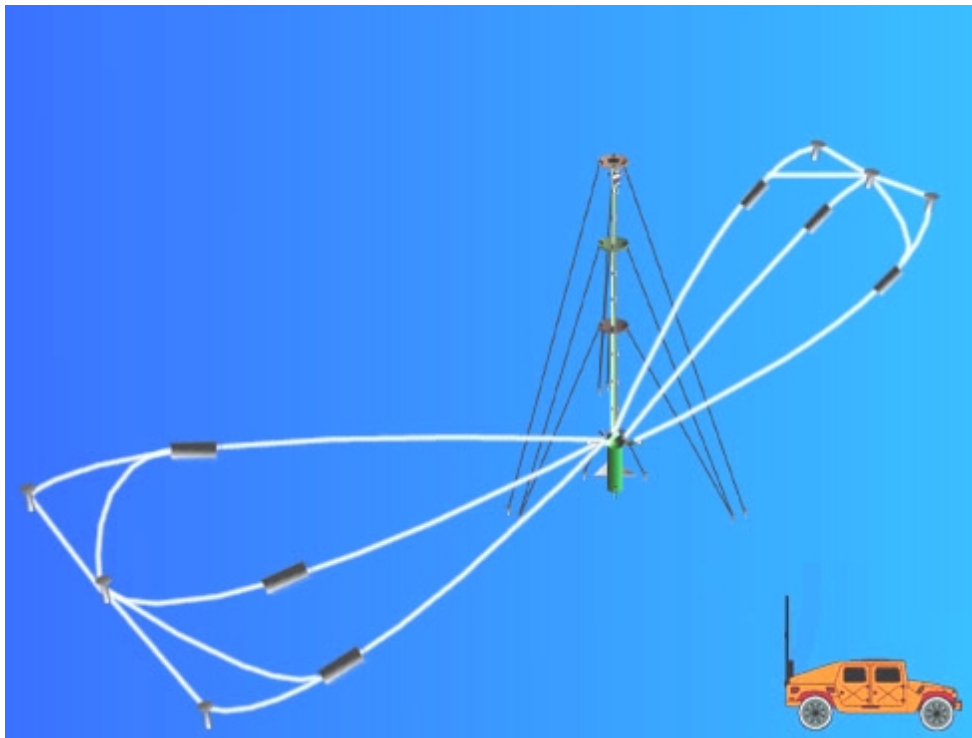
#### G-4.13 One Side of Antenna Finished

Turn outward and face the load resistor in the outer antenna element wire, unroll wire while walking toward that outer resistor. The snap link end will appear, with only a drop lead and the number 4 on the white band. Put the spool down and connect the snap ring to the bottom (downstream) side of the resistor strong point. Now connect the upstream spade lug and then the two downstream lead spade lugs at the binding post connections on the resistor (one upstream, and two downstream).



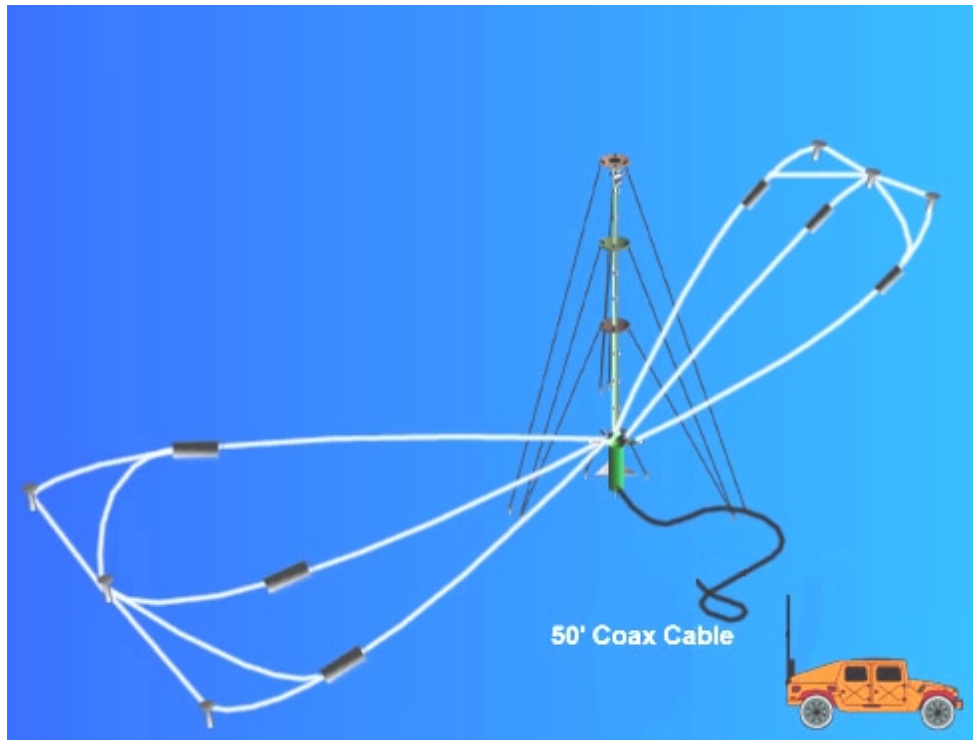
This is what the layout of the first side of the antenna should look like at this point in time.

Process Is Paralleled For The Other Side Of The Antenna The installation of this side of the antenna will vary in that the antenna elements are walked out around the close outer guy stake and inside the outer guy stake. The antenna element end points will be approximately inline with the unbent side. During hoisting of the balun the second person will guide the antenna elements and balun with the coaxial cable.



#### G-4.15 Attach Coaxial Cable

Attach the 50' piece of coaxial cable to the bottom of the balun leaving a 6 – 8" loop of cable and connect the free end of the strain relief to the cup hook on the balun. Attach all of the snap links to the balun bow shackles. Keep snap links on the same side of the balun, as the wires. NOTE: Ensure that the strain relief is supporting the cable NOT the cable connector.



Fasten 12 inch rope loop of Weak Link to mast carrying handle. Attach balun to fixed hook of halyard and hoist carefully and slowly. Use the coaxial cable to guide the balun. Tie a noose in the down line of halyard so that the second Weak Link snap hook just reaches it. Snap Weak Link to the noose. Tie the up line to the mast handle so that there is a slack loop of about 5 feet below the Weak Link.

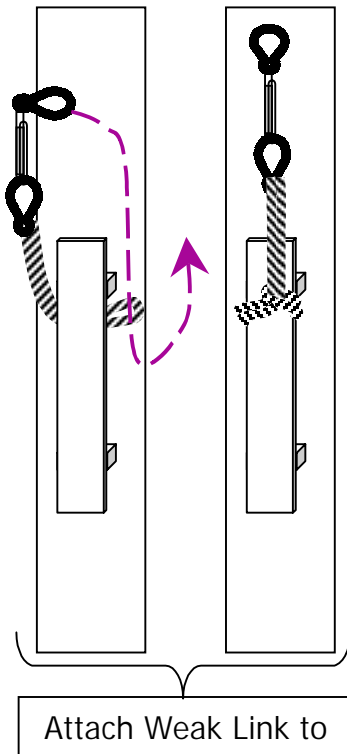
During hoisting of the balun the second person will guide the antenna elements and balun with the coaxial cable. Hoist the balun, coax, and wires, slowly, ensuring that nothing is caught while performing hoisting operations on the balun. Weak Link will snap at ~100 lbs (heavy ice/wind) causing a drop of balun/antenna elements of about 5 feet. Weak Link designed to provide 2 uses. Now you are ready to tension the wires, using a mirror image technique.

**NOTE: In the following steps it is not necessary, nor is it required that the antenna elements be stretched tight. The normal tension on the elements is ~ 10 - 20 lbs of tension. Some sag in the elements is desired.**

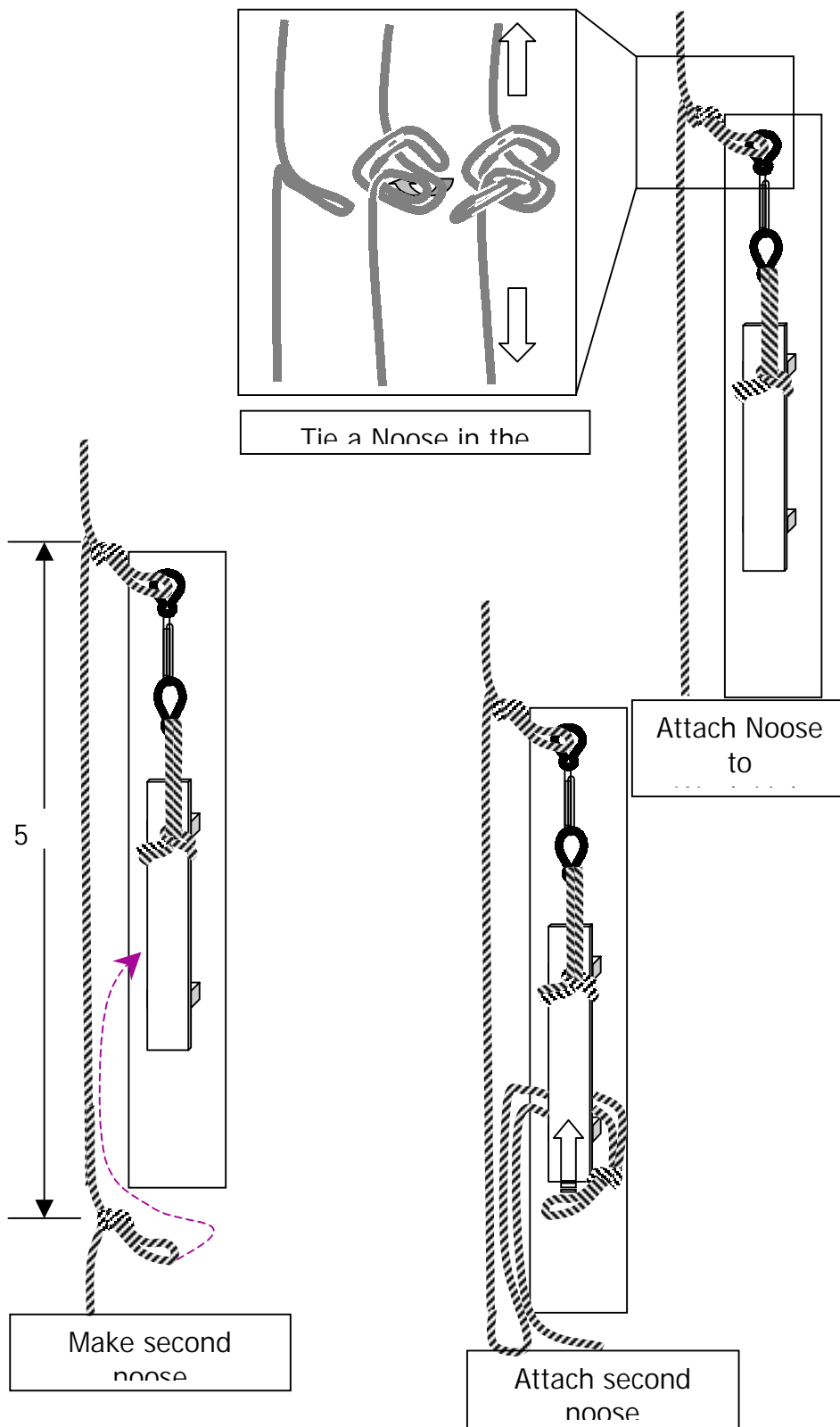
Each individual should walk out to the stake at the #2 point (stake/rope/multi connector) and while walking slowly backwards and away from each other, pull the center (#1 - 2) wire snug. Drive in the stake (the one with the multi connector and rope tensioner). Each individual should move to a diagonally opposite outer wire. There should already be a stake attached to the antenna element wire there. Pick the stake up, pull against each other and away from the center stake you just drove in, positioning for the corner stake will become obvious; as far away from the mast and from the center stake as you can comfortably tension it (remember, 10 – 20 lbs of tension).



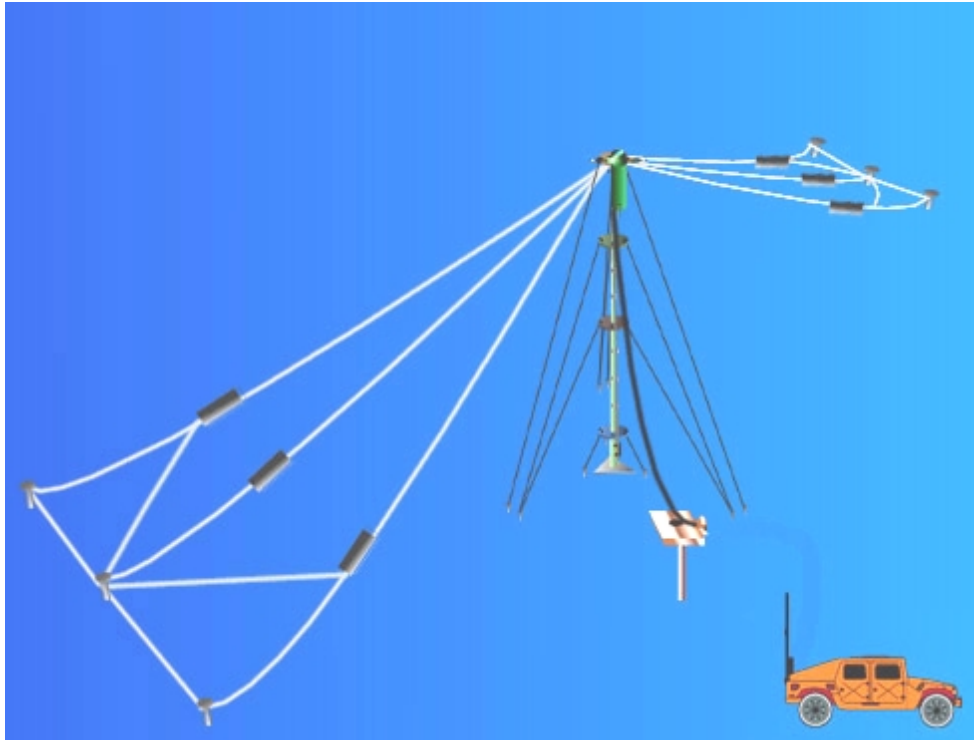
Fasten 12 inch rope loop of Weak Link to mast carrying handle. Attach balun to fixed hook of halyard and hoist carefully and slowly. Use the coaxial cable to guide the balun. Tie a noose in the down line of halyard so that the second Weak Link snap hook just reaches it. Snap Weak Link to the noose. Tie the up line to the mast handle so that there is a slack loop of about 5 feet below the Weak Link.







## G-4.18 Lightning Arrestor



Install the lightning arrestor.

Connect the 50' coaxial cable to the top of the lightning arrestor, and the 100' coaxial cable is connected to the radio. Tape the 50' coaxial cable to the bottom of the mast. Also tape the coaxial cable connections at the lightning arrestor to waterproof them.

Prepare the ground rod by screwing the section with a point, into the driving cap. Hammer the rod into the ground until the bottom of the driving cap is 1-2 inches from the ground. Unscrew the cap from the ground rod and replace it with the coupler. Screw the other ground rod into the top of the coupler and the driving cap onto the top of the second ground rod section. Continue driving the ground rods into the ground until the bottom of the driving cap is 6 – 8 inches from the ground. Remove the driving cap from the ground rod and replace it with the lightning arrestor assembly, screw it fully onto the ground rod.

**WARNING: Never use the lightning arrestor as a driving cap for the ground rod. This will damage the lightning arrestor and present an electrocution hazard to personnel.**

Attach the coaxial cable coming down from the balun to the top of the lightning arrestor and tape the connection to prevent the entry of water. Also tape the coaxial cable to the base of the mast at a level about 3 feet above the ground.

The transmitter side of the radio is connected to the bottom side of the lightning arrestor assembly and the connection is taped to waterproof the connection.

## G-5.1 Recovery

NOTE: When preparing to recover the antenna wire elements, unclip them from the balun and clip them to the mast, or a stake, so you have something to give you tension to pull or roll against.

Preparation for movement is the exact reverse sequence of erection. Lower the balun slowly, because there is a heavy mass of wires, coax, etc, and if time permits, they should be let down some, then pulled away some more. The wire sequence of rollup is 4 -3, 4 -3, 2-1 on each of the reels.

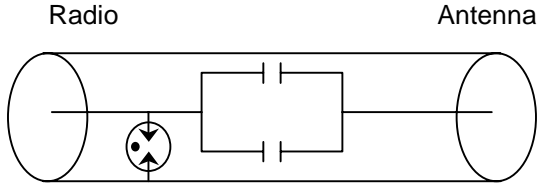
NOTE: The halyard can be rolled right over the top of the wires on one spool.

## G-5.2 PERFORM AFTER A LIGHTNING STRIKE

The following are steps to necessary to ensure that the radio, transmission line, and antenna are in operable condition after a lightning strike.

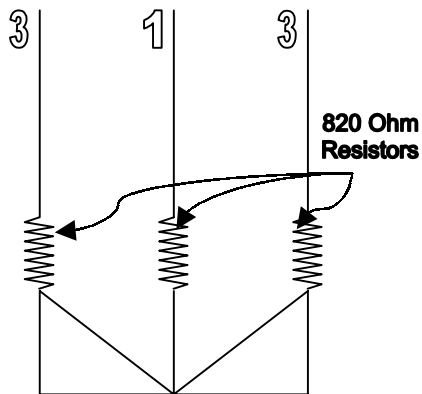
1. Make a continuity check of the lightning arrestor using an ohmmeter set to the highest range:
  - a. From the shell to the center conductor of each side of the arrestor - Open Circuit.
  - b. From the center of one to the center of the other connector - Open Circuit.

Figure 1. Arrestor Equivalent Diagram



2. The next step is to test the radiating elements of the antenna.
3. Lower the Balun and disconnect the radiating elements from one side.

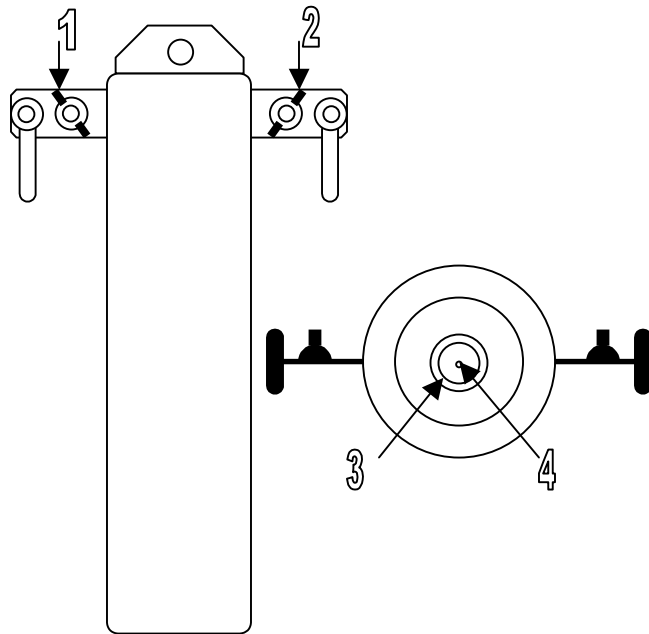
Figure 2. Antenna radiating element electrical diagram.



4. Locate the two elements that have the white band marked "3" along with the element marked with a "1" (see fig. 2).
5. Check continuity from the metal clip on the element marked "1" to one of the elements marked "3". The resistance should be 1640 Ohms. Record the reading.
6. Repeat this procedure with the remaining element marked "3". Record the reading.
7. Repeat this procedure with the elements on the other side of the balun.
8. If the resistance readings are not 1568 to 1722 ohms then you need to perform the next procedure. If the readings are within 1568 to 1722 ohms then skip the next step.
9. With the ends still disconnected from the balun, check the appropriate resistors (see fig. 2) in the failed legs. Check resistance across the resistor terminals with the wing nuts on them using an Ohmmeter. They should read 779 to 861ohms. If they are not within spec, replace the resistor that is not within specification then perform step 3 again.

10. Make the following resistance readings on the balun using an ohmmeter set to the lowest range (See Figure 3).

Figure 3. Balun Side and Bottom Views



11. From point 1 to point 2 - 1 to 2 ohms or less.
12. From point 1 to point 3 - 1 to 2 ohms or less.
13. From point 1 to point 4 - 1 to 2 ohms or less.
14. From point 2 to point 3 - 1 to 2 ohms or less.
15. From point 2 to point 4 - 1 to 2 ohms or less.
16. From point 3 to point 4 - 1 to 2 ohms or less.
17. Disconnect both of the coaxial cables from the balun, the lightning arrestor, and the radio set.
18. Make the following resistance checks on the cables:
19. From the center conductor to the center conductor on the other end of the cable - 0 to 1 ohms or less (use lowest ohm scale).
20. From the shell to shell on the other end of the cable - 0 to 1 ohm or less.
21. From the center to the shell of either end of the cable - infinite resistance (use highest ohms scale).
22. Also perform a visual check of the cable for obvious burn through, or other damage.  
NOTE: Use caution when performing this step as the cable may have sharp burrs or wires protruding from the cable. Wear gloves and use a rag to clean the cable. Wires protruding from the cable will snag the rag and not your hand.
23. If the cable is not within these specifications contact your maintenance facility to arrange for repair or replacement.  
NOTE: Cables are assembled from the following parts. Cable RG-213, NSN 6145-00-660-8711 50 or 100 feet, and connector UG-218U NSN 5935-00-666-1656 – 2 each per cable.
24. Repeat steps 18 through 23 for the other cable.
25. Re install all components of the antenna system if all has checks have passed.
26. Reconnect the antenna system to the radio.

27. At the VRC-100
  - a. Turn on the appropriate input power to the radio.
28. AT the RSC
  - a. Set the RSC function switch to "STBY".
  - b. Press the "SETUP" button.
  - c. Press the "TEST" button.
  - d. Press the "BIT" button.
  - e. Press the "T/R" button.
29. After 15 seconds ~ the display on the RSC should show the following information:
  - T/R TEST
  - PTT FOR XMT BIT
  - RCV BIT - GO
  - RTN
30. If the "RCV BIT - GO" is not showing contact maintenance personnel for assistance, otherwise press the "Push To Talk" button on the handset.
31. The transmitter should start clicking for about 15 seconds while tuning and at the end of this time it should show the following information on the RSC display.
  - T/R TEST
  - XMT BIT - GO
  - RTN
32. Press the RTN Button if there are no faults shown.
33. The radio should be safe to operate, shut the radio off and restart as you would for Normal Operations.
34. If the radio set failed at any step above contact your maintenance personnel.