



AN/MPQ-4A Counter Mortar Radar



AN/MPQ-4A Counter Mortar Radar



The AN/MPQ-4 Counter Battery Radar System was used to locate enemy mortars and small artillery units, as well as to correct the fire of friendly mortar and artillery fire. It used a rectangular single curved parabolic reflector fed by a Foster Scanner operating in KU-Band to scan a required sector of 25 degrees. The transmitter was a self-oscillating magnetron type. The projectile traces were displayed on a B-scope. The radar provided quick identification to pinpoint enemy mortar positions in map coordinates, enabling artillery units to launch counter attacks.

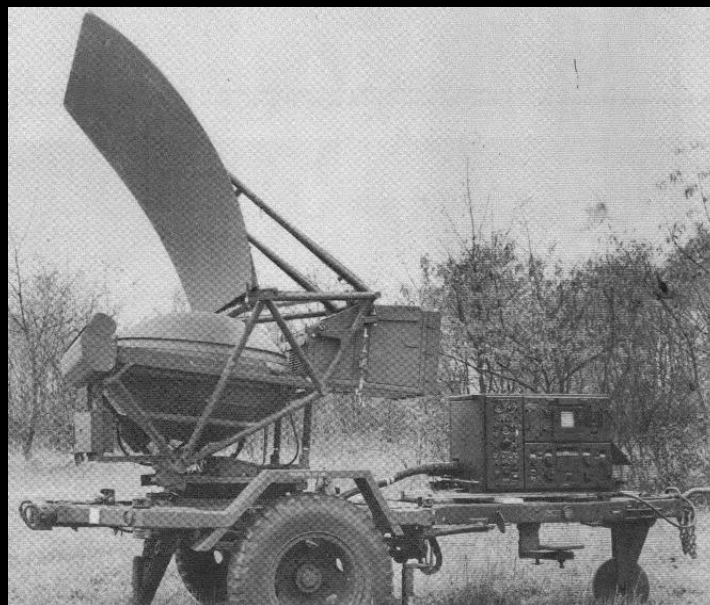
The radar could be set up in less than 15 minutes. All the equipment was mounted on two 2-wheel trailers. One trailer carried the primary radar equipment, while the other trailer carried the primary power supply (a petrol engine generator set) and auxiliary equipment such as the cable set and spare parts.

The radar was introduced in 1958 and remained one of the primary US counter-battery systems into the late 1970s. It was replaced by the AN/TPQ-36.

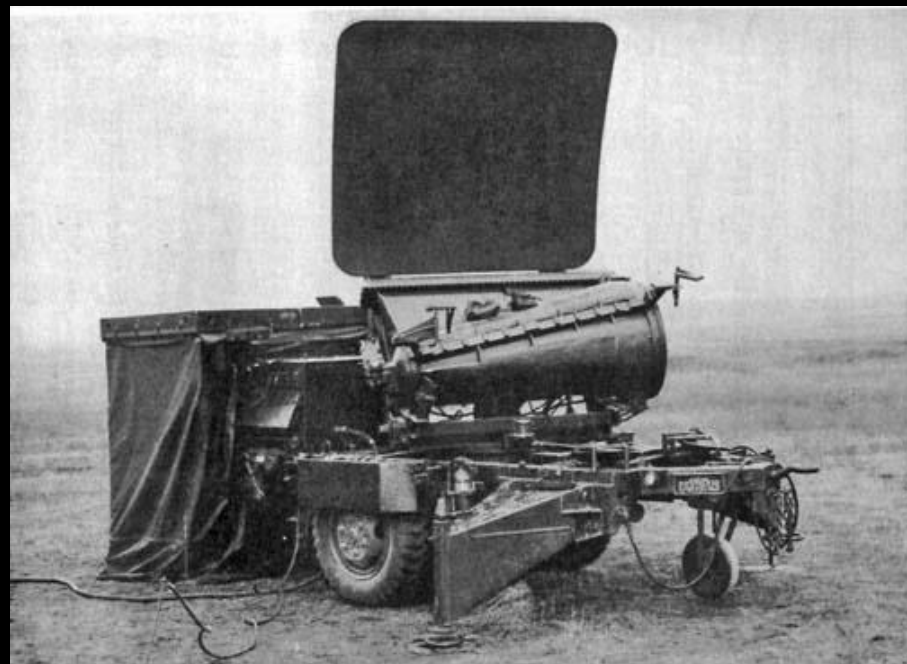
Or Blah, Blah, Blah.



AN/MPQ-4A Counter Mortar Radar



**Prototype –
Lunenburg Lens Scanner**





AN/MPQ-4A Counter Mortar Radar



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DEPARTMENT OF DEFENSE
STILL MEDIA RECORDS CENTER
WASHINGTON, D.C. 20374-1681

SDAN: CC-46476
SAVRIN:
SERVICE ID: AVGG-C-0269D-1/AGA68
PHOTOGRAPHER: Spec. 5 Walter Bisson

111-CCV-619

DATE: 26 Jan 1968

Song Be, Vietnam...The AN/MPQ-4A signal-controlled counter mortar radar commanded by Chief Warrant Officer Rowland Smith. Smith is assigned to Hq. Btry., 2nd Bn., 320th Arty., 1st Bde., 101st Abn. Div., with ten persons under his command. Powered by a 1.5 kilowatt generator, the counter mortar radar unit generates and transmits two beams of radio frequency. These beams are transmitted up to a maximum range of 10 kilometers. When a projectile breaks both beams it is indicated on a scope from which a computer analyzes the origin of the projectile and gives appropriate coordinates.

OFFICIAL U.S. ARMY PHOTO (RELEASED)

DoD Photo of an AN/MPQ-4A Radar at Sông Bé Base Camp in southern South Vietnam.



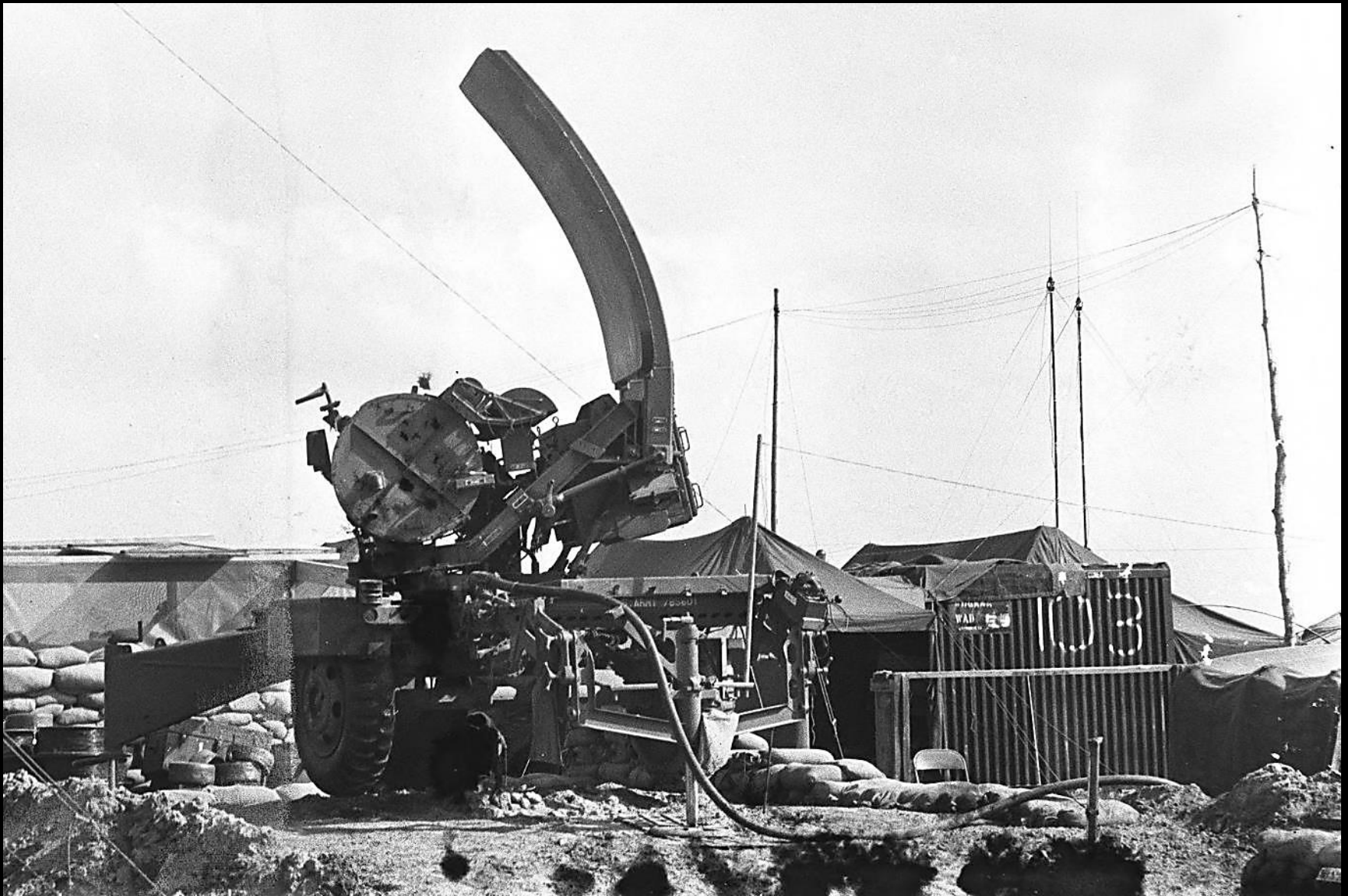
AN/MPQ-4A Counter Mortar Radar



An AN/MPQ-4A Radar at unknown location in South Vietnam.



AN/MPQ-4A Counter Mortar Radar



Although not of FSB Ripcord, I used this photo as the “prototype” for the AN/MPQ-4A layout on the diorama.



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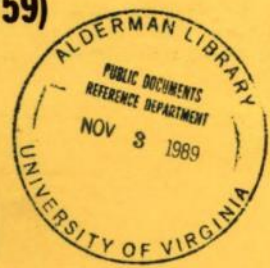
D 101.11:
11-5840-208-10

TM 11-5840-208-10

TECHNICAL MANUAL

**OPERATOR'S MANUAL
FOR**

**RADAR SET AN/MPQ-4A
(NSN 5840-00-543-0759)**



This copy is a reprint which includes current pages from Changes 1 through 4.

**HEADQUARTERS, DEPARTMENT OF THE ARMY
APRIL 1977**

Many Unclassified Technical Manuals are available on the web as downloadable PDFs or viewable pages.



AN/MPQ-4A Counter Mortar Radar



TM 11-5840-208-10

Table 1-1 Dimensions and Weights

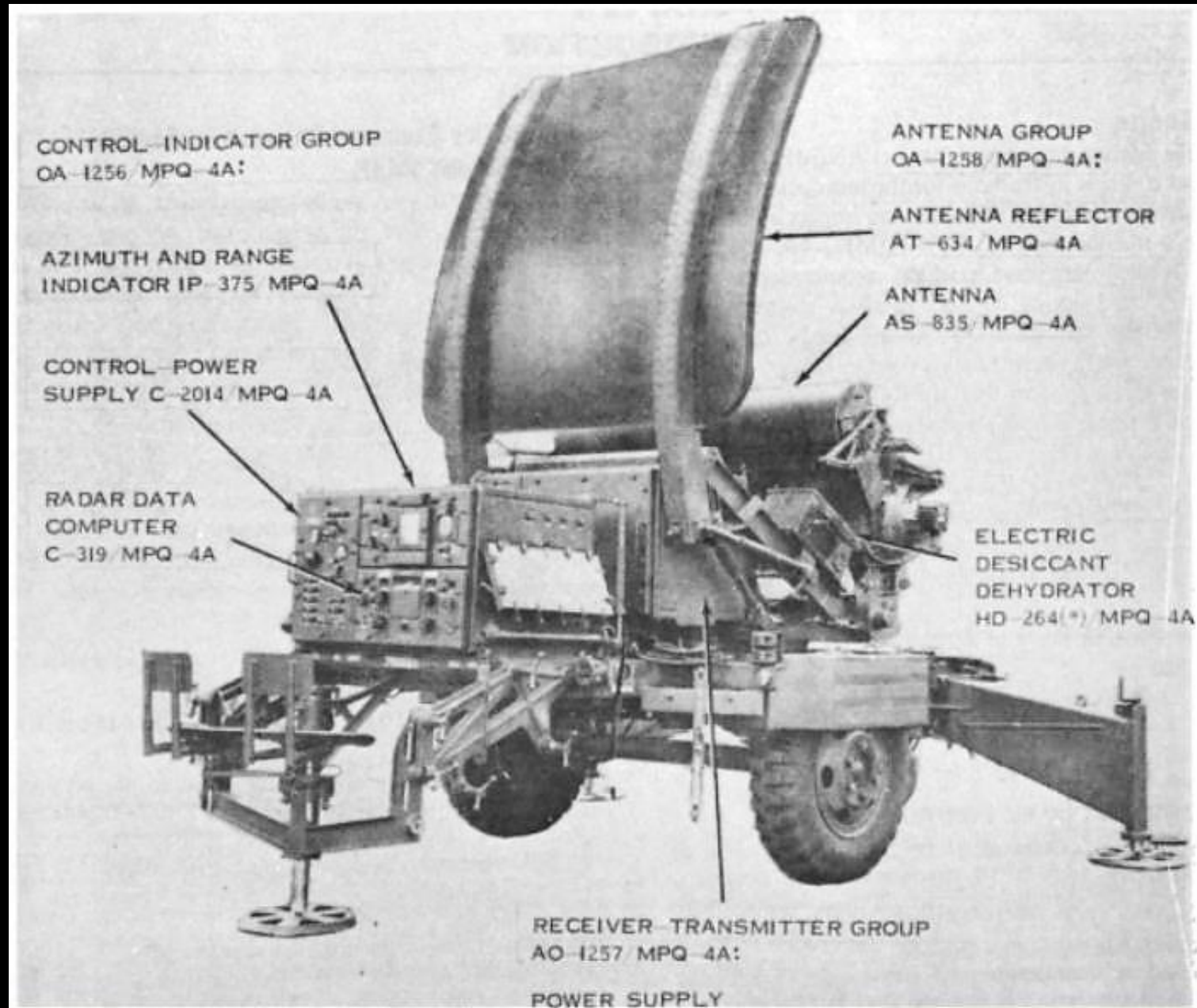
NSN	Qty	Nomenclature	Fig No	Dimensions (in)			Wt (lb)
				Depth	Width	Height	
5840-00-543-0537	1	Antenna Group OA-1258/MPQ-4A, including:	1-2	66	90.53	66.5*	1,998
5840-00-574-7526	1	Antenna AS-835/MPQ-4A	1-2	34 od (large end)	66	15 od (small end)	1,109
5840-00-588-0854	1	Cavity, Tuned FR-111/MPQ-4A	1-5	4.5	5.66	9.61	10
5840-00-574-2496	1	Circular Polarizer MX-2219/MPQ-4A	1-1	15	76	13	39
5985-00-537-4386	1	Coupler, Directional CU-399/MPQ-4A	1-6	5	2.63	2.13	2
5840-00-583-0305	1	Mount, Telescope, Assembly	4-4				
5840-00-543-0543	1	Pedestal, Antenna AB-486/MPQ-4A	1-1	48	42	19.5	546
5840-00-543-0535	1	Reflector, Antenna AT-634/MPQ-4A	1-2	2.5	90.53	66.5	283
1240-00-593-6415	1	Telescope, Azimuth: M62A2F	1-1				
4440-00-542-4159	1	Dehydrator, desiccant, Electric HD-264/MPQ-4A or HD-264A/MPQ-4A	1-2	20.62	13.75	10.19	46
5840-00-543-0538	1	Control-Indicator Group OA-1256/MPQ-4A, including:	1-2	31.34	53.12	28.42	571
5840-00-586-7738	1	Computer, Radar Data CP-319/MPQ-4A	1-2	26	20	12	120
5840-00-543-0536	1	Control-Power Supply C-2014/MPQ-4A	1-2	17.12	16.6	24.34	111
5840-00-543-0544	1	Indicator, Azimuth and Range IP-375/MPQ-4A	1-2	25.78	12.25	23.87	100
5840-00-586-7739	1	Receiver-Transmitter Group OA-1257/MPQ-4A including:	1-2	30.28	49.32	29.5	560
5840-00-543-0545	1	Amplifier, Intermediate Frequency AM-1538/MPQ-4A	1-3	19.5	2.5	2.5	4
5840-00-543-0546	1	Amplifier, Trigger Pulse AM-1537/MPQ-4A	1-4	18.62	5.22	8.30	13
5840-00-557-8255	1	Control-Monitor C-2102/MPQ-4A	1-2				
5840-00-543-0665	1	Control, Receiver C-2105/MPQ-4A	1-3	10.68	3.38	3.72	2
5840-00-543-0542	1	Control, Receiver C-2016/MPQ-4A	1-3	9.5	5.38	5.1	4
5840-00-543-0534	1	Duplexer CU-476/MPQ-4A	1-3	6	6.56	5	4
5840-00-542-6253	1	Power Supply PP-1588/MPQ-4A	1-2	24	8.3	14.1	46.5
2330-00-709-5847	1	Chassis, Trailer: 2 1/2-ton, 2-wheel, M454	2-2	192	96	36.75	1,858
5840-00-614-5218	2	Seat, Equipment Operator	2-4				
5840-574-7527	2	Support, Operator's Seat MT-1798/MPQ-4A	1-8	7.5	7.5	20.5	12
5410-00-936-8720	1	Shelter, Electrical Equipment S-134A/MPQ-4A	1-8	51.5b	41b	13b	175
5410-00-631-5697	2	Blower Assembly, Shelter Intake HD-339/MPQ-4A	1-8	15.1	11.62	11.62	20
5840-00-591-4743	1	Stand, Control-Indicator MT-1733/MPQ-4A	1-7	48.76	24.5	7.75c	15
8130-00-281-8183	1	Reel, Cable RC-413/MPQ-4A	1-8	28	12	28	14
8130-00-292-1109	1	Reel, Cable RC-419/MPQ-4A	1-8	36	30.5	36	30
5120-00-614-6467	1	Wrench, Tee Handle (compartment catch release tool)					
5995-00-542-6664	1	Cable Assembly, Special Purpose, Electrical CX-2771/U (W701)	2-14		101 ft		
5995-00-542-6257	1	Cable Assembly, Special Purpose, CX-3898/U (W702)	2-14		0 in lg 6 ft		
5995-00-542-6248	1	Cable Assembly, Special Purpose, CX-4103/U (W703)	1-8		8 in lg 150 ft		
5995-00-578-6889	2	Cable Assembly, Power, Electrical CX-3904/U (W704, W708)	2-14		0 in lg 3 ft		
5995-00-280-3416	4	Cable Assembly, Radio Frequency CX-783A/U (W705, W706, W707, and W741)	2-14		0 in lg 3 ft		
5995-00-578-6890	1	Cable Assembly, Power, Electrical CX-3902/U (W709)	2-14		0 in lg 3 ft		
5995-00-542-6251	1	Cable Assembly, Power, Electrical CX-3905/U (W710)	2-14		0 in lg 6 ft		
5995-00-542-6414	1	Cable Assembly, Power, Electrical CX-4062/U (W716)	2-14		6 in lg 4 ft		
5995-00-578-6891	1	Cable Assembly, Power, Electrical CX-3902/U (W717)	2-14		6 in lg 4 ft		
5995-00-542-6415	1	Cable Assembly, Power, Electrical CX-4104/U (W718)	2-14		0 in lg 4 ft		
5995-00-542-6416	1	Cable Assembly, Power, Electrical CX-4016/U (W719)	2-14		0 in lg 3 ft		
5995-00-553-8193	1	Cable Assembly, Power, Electrical CX-4015/U (W720)	2-14		9 in lg 4 ft		
5995-00-542-6413	1	Cable Assembly, Power, Electrical CX-4010/U (W721)	2-14		2 in lg 2 ft		
5995-00-553-8192	1	Cable Assembly, Power, Electrical CX-3901/U (W722)	2-14		0 in lg 6 ft		

Technical Manuals usually provide Dimensions and Weights Tables.

Although this TM didn't include a dimensional diagram of the radar, it did include many overall and detail photos with captions explaining the various components and equipment.

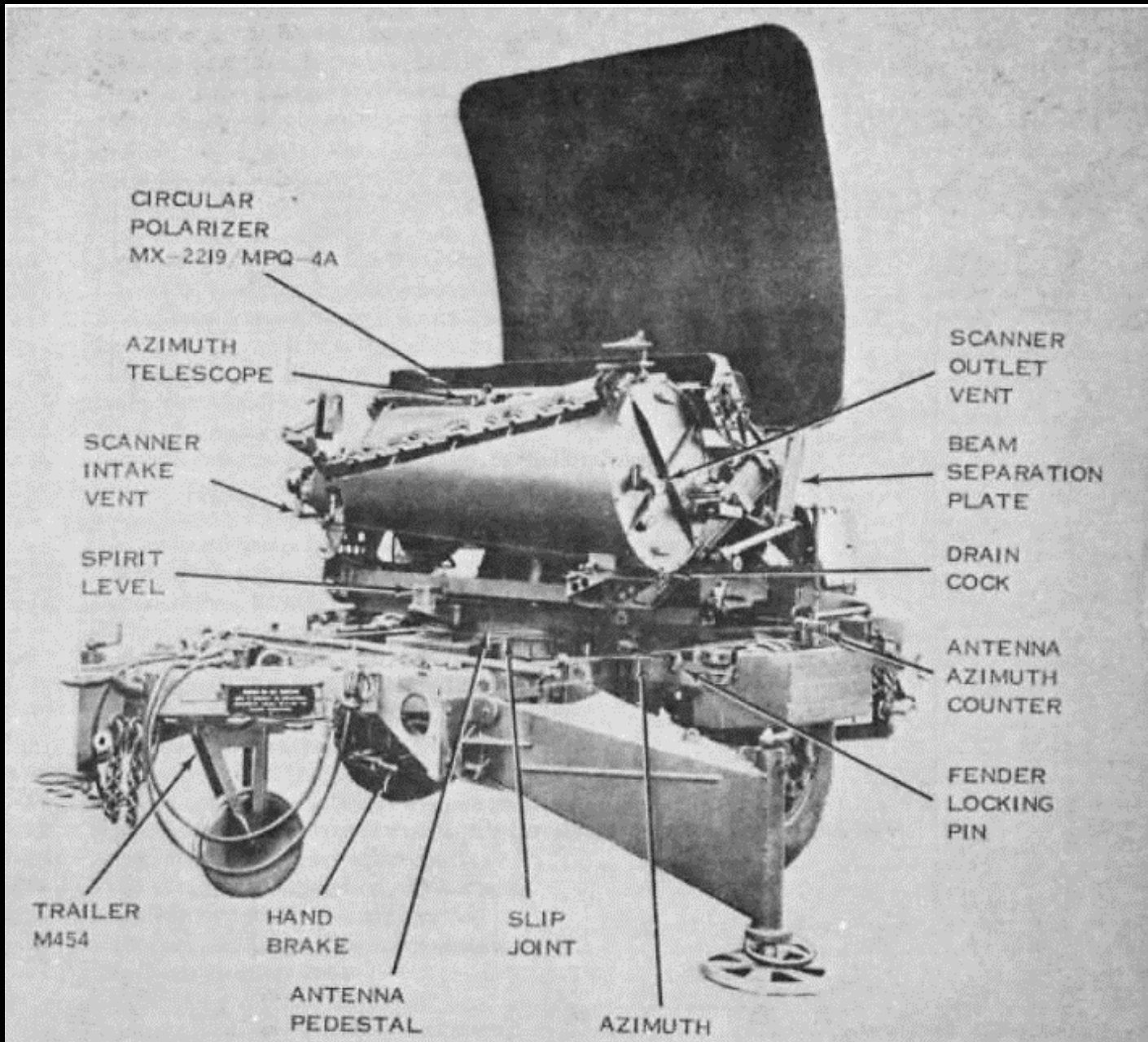


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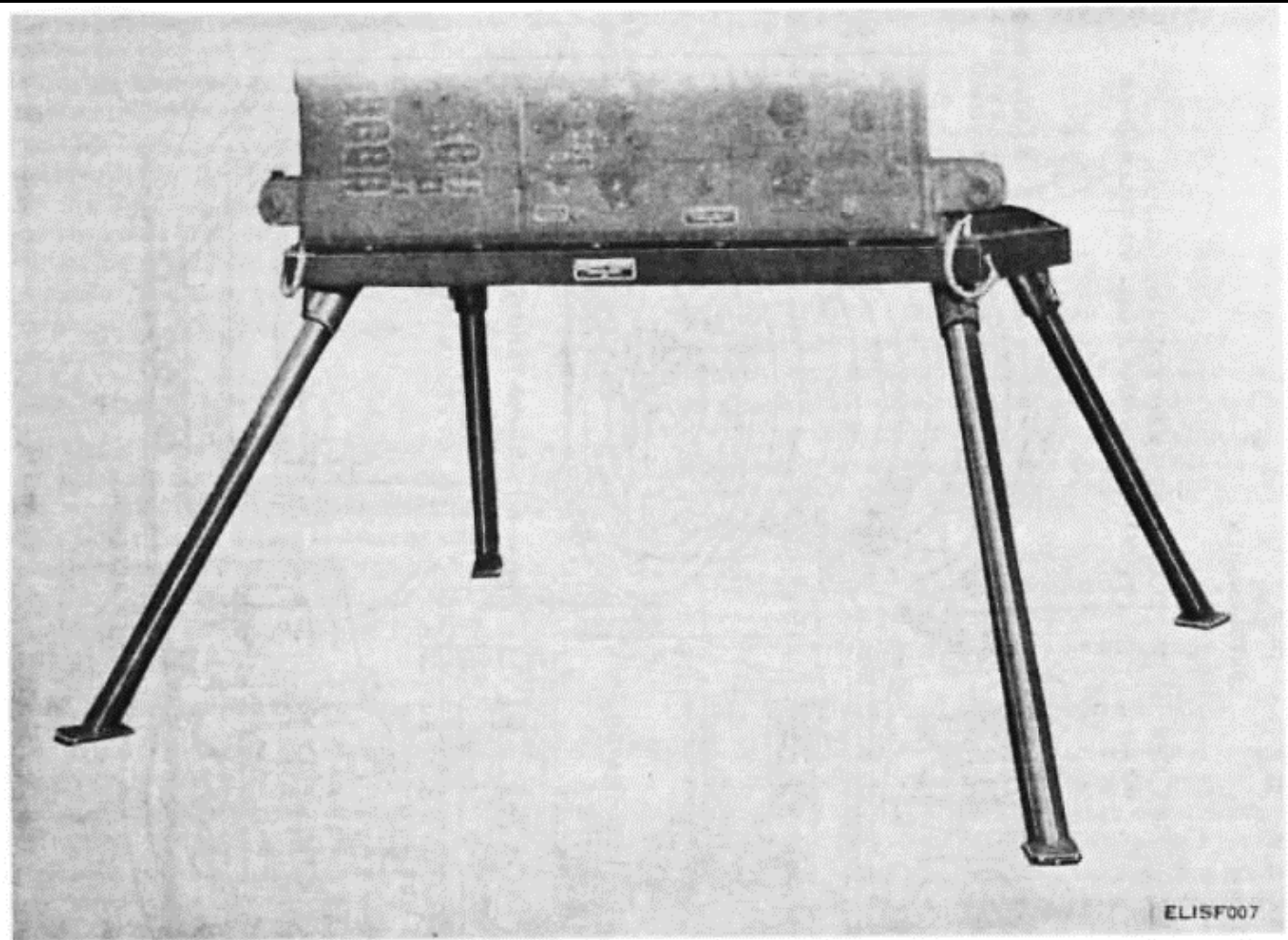
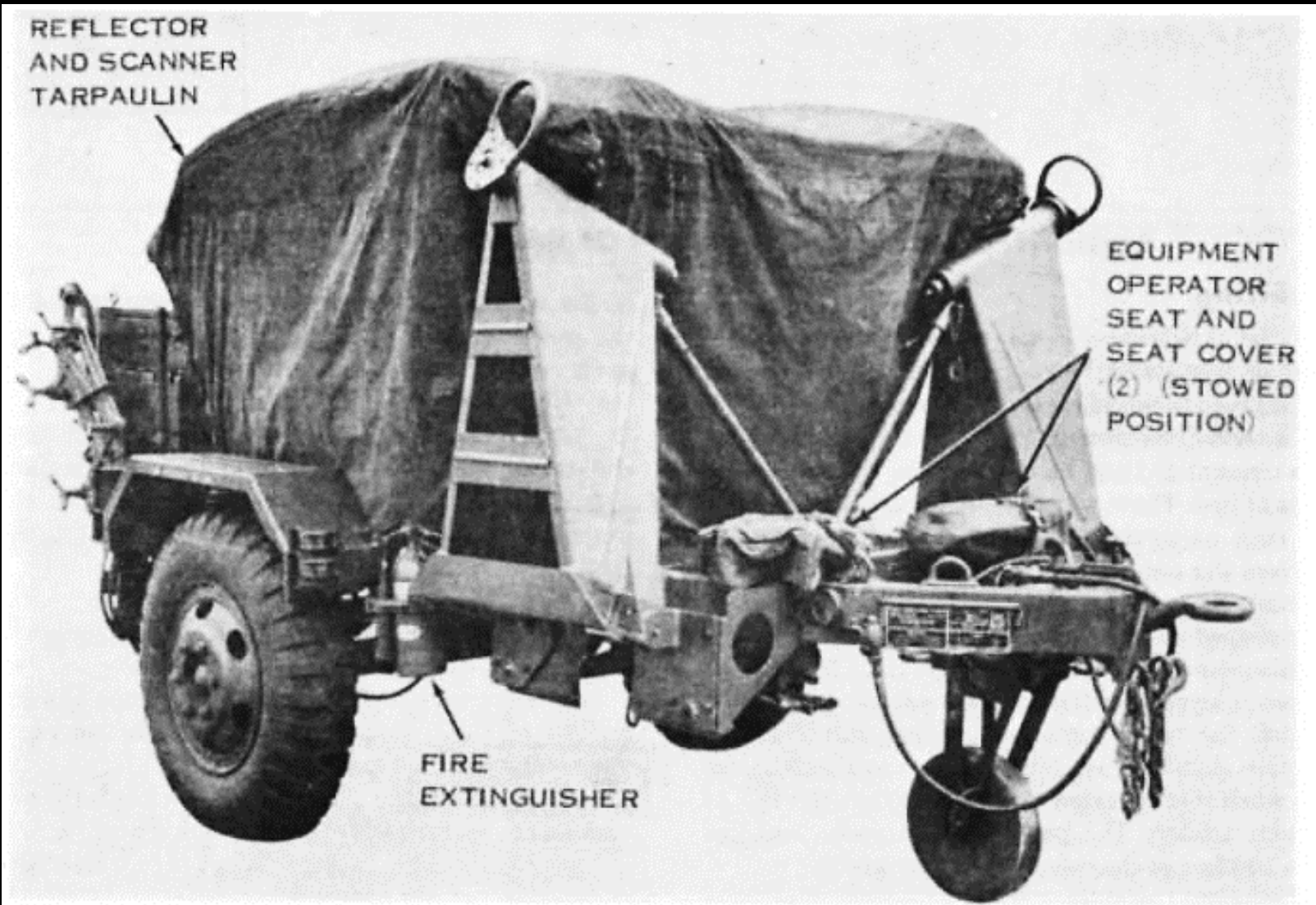


Figure 1-7. Control-Indicator Stand MT-1733/MPQ-4A.

The Control-Indicator Group Box could be dismounted and placed on a pedestal stand.



AN/MPQ-4A Counter Mortar Radar

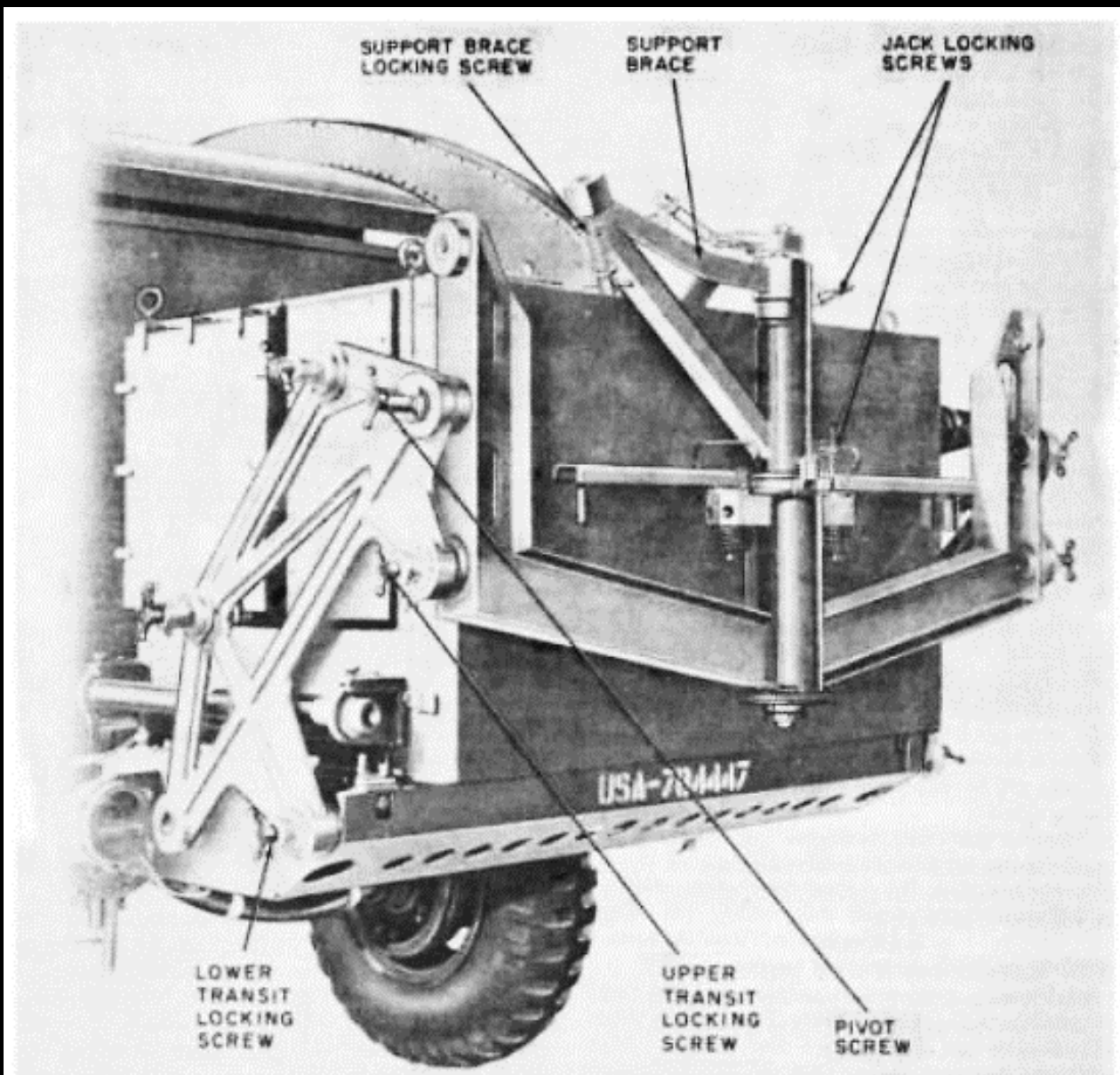


ELISF010

Figure 2-2. Radar Set AN/MPQ-4A, prepared for transit.



AN/MPQ-4A Counter Mortar Radar

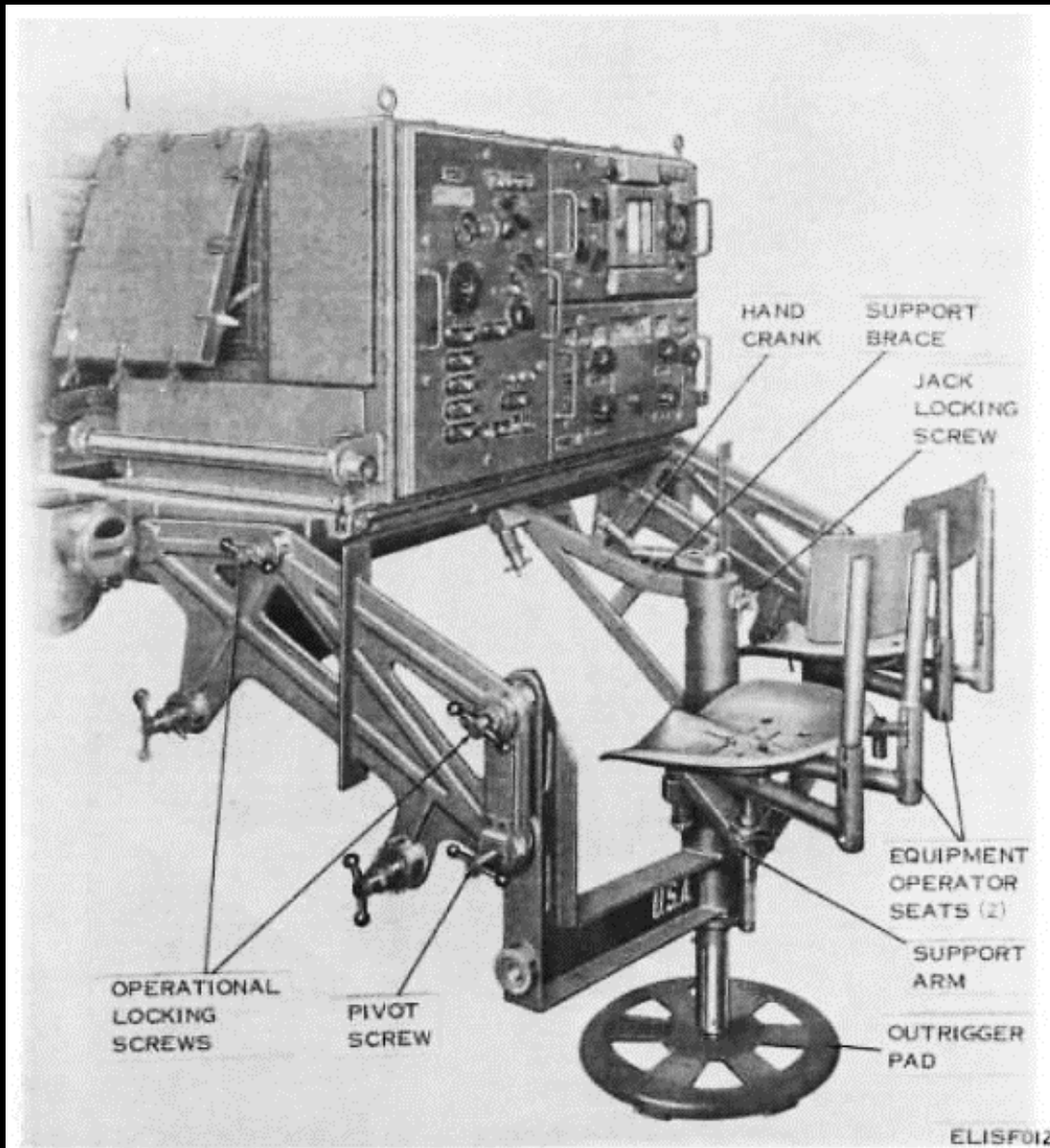


ELISF011

Figure 2-3. Rear outrigger arm in transit position.



AN/MPQ-4A Counter Mortar Radar

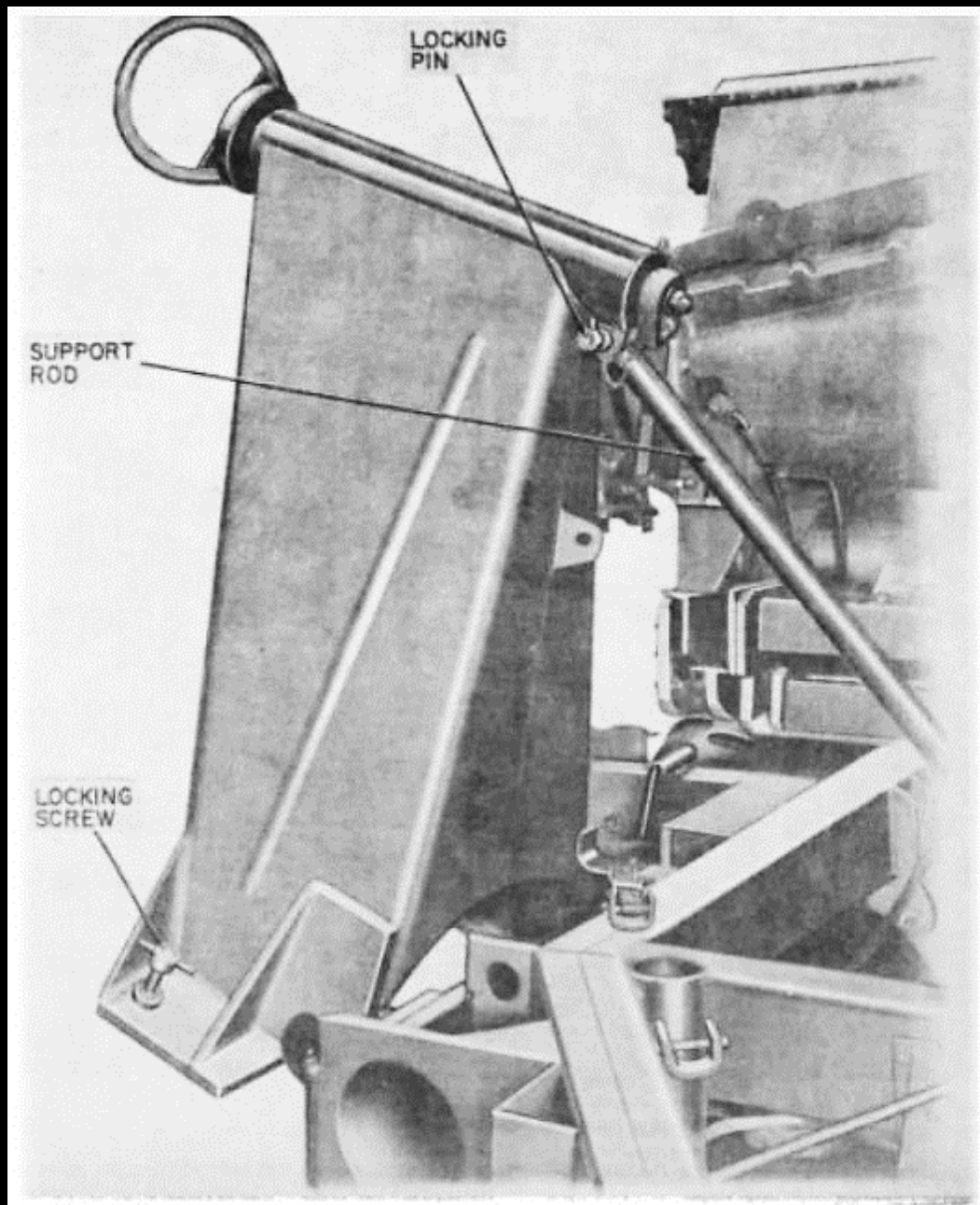


ELISF012

Figure 2-4. Rear outrigger arm in operational position.

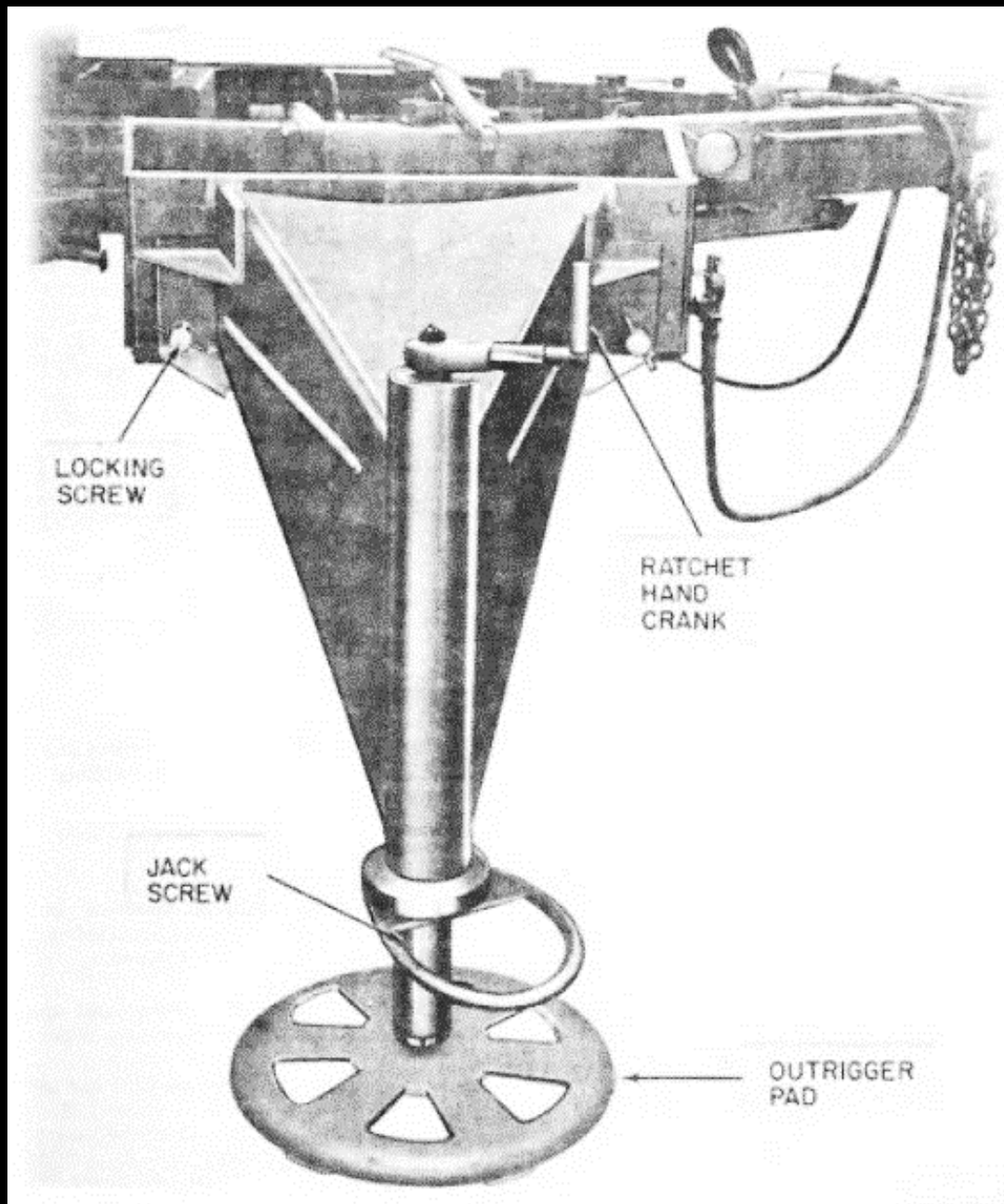


AN/MPQ-4A Counter Mortar Radar





AN/MPQ-4A Counter Mortar Radar





AN/MPQ-4A Counter Mortar Radar

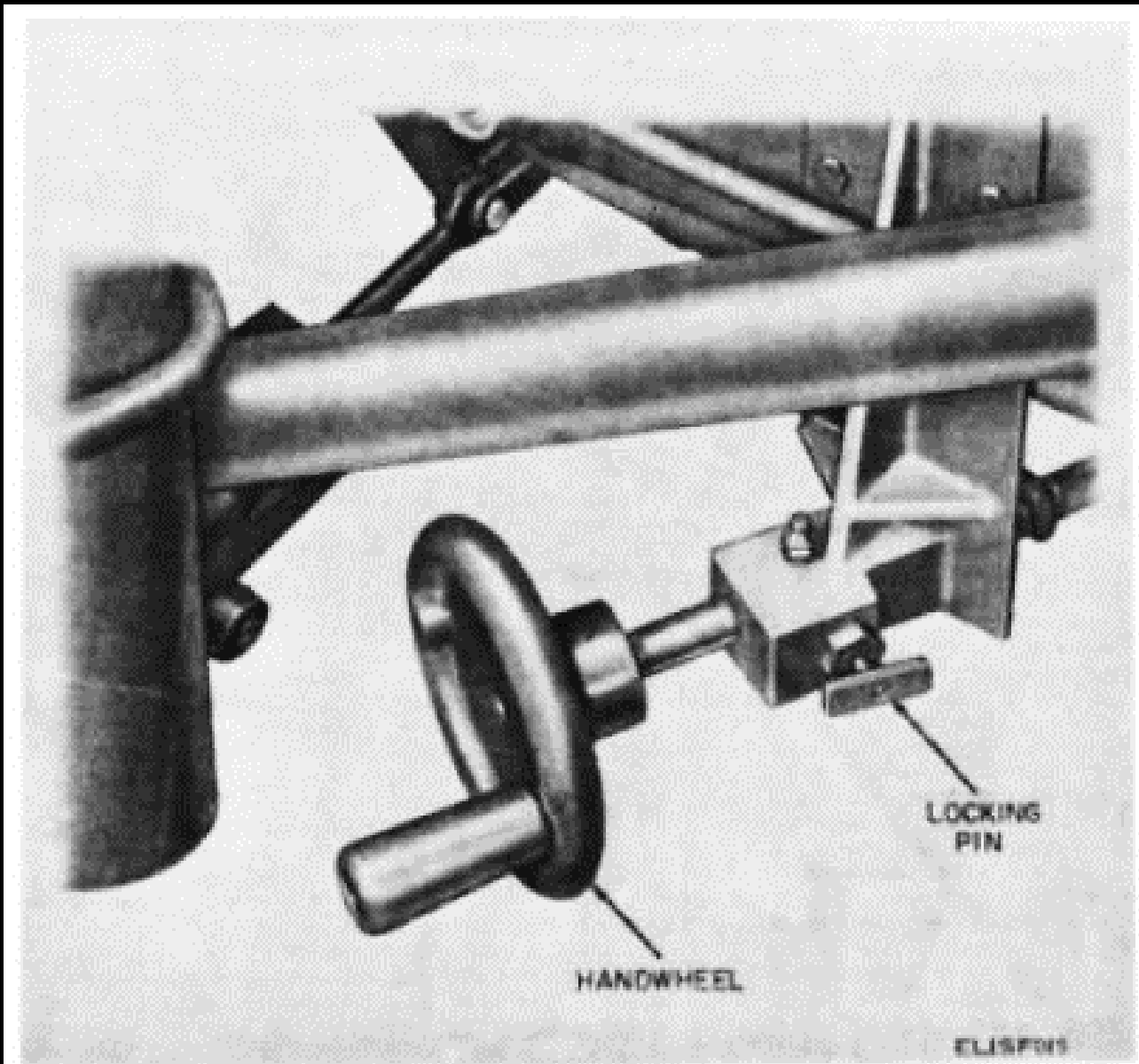


Figure 2-7. Azimuth handwheel and locking pin.



AN/MPQ-4A Counter Mortar Radar

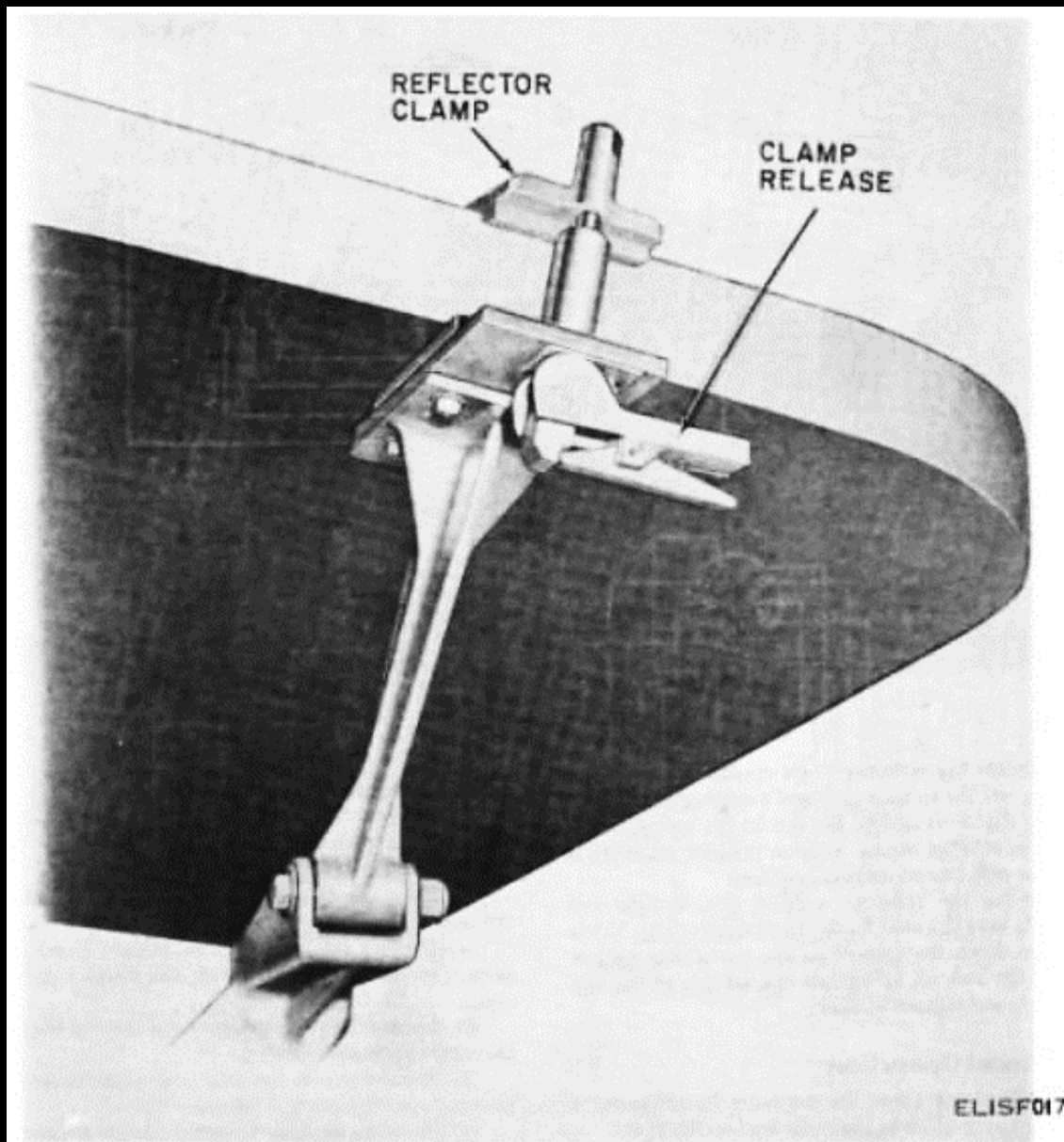


Figure 2-9. Antenna Reflector AT-634/MPQ-4A in transit position, partial view.



AN/MPQ-4A Counter Mortar Radar

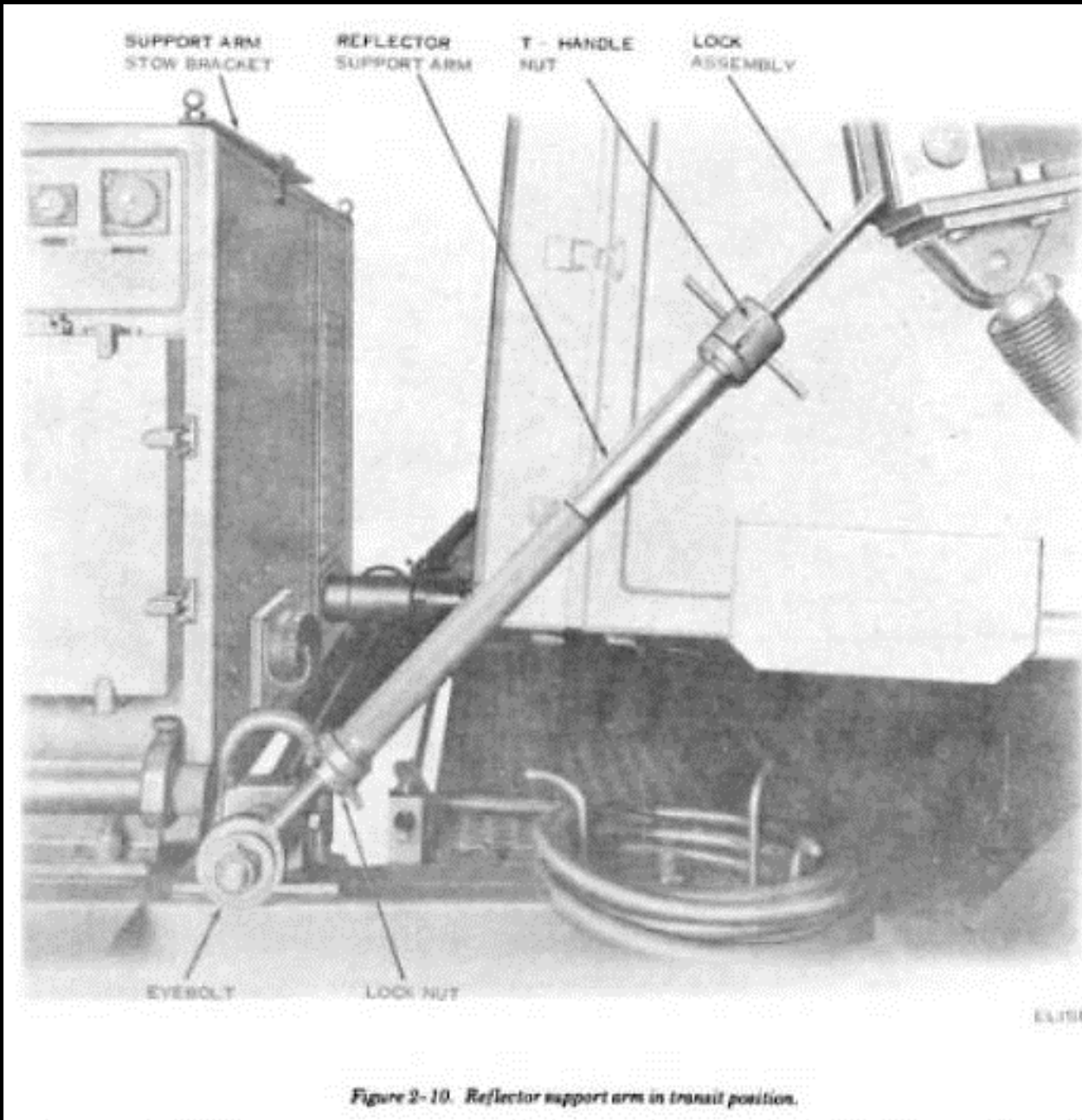


Figure 2-10. Reflector support arm in transit position.



AN/MPQ-4A Counter Mortar Radar

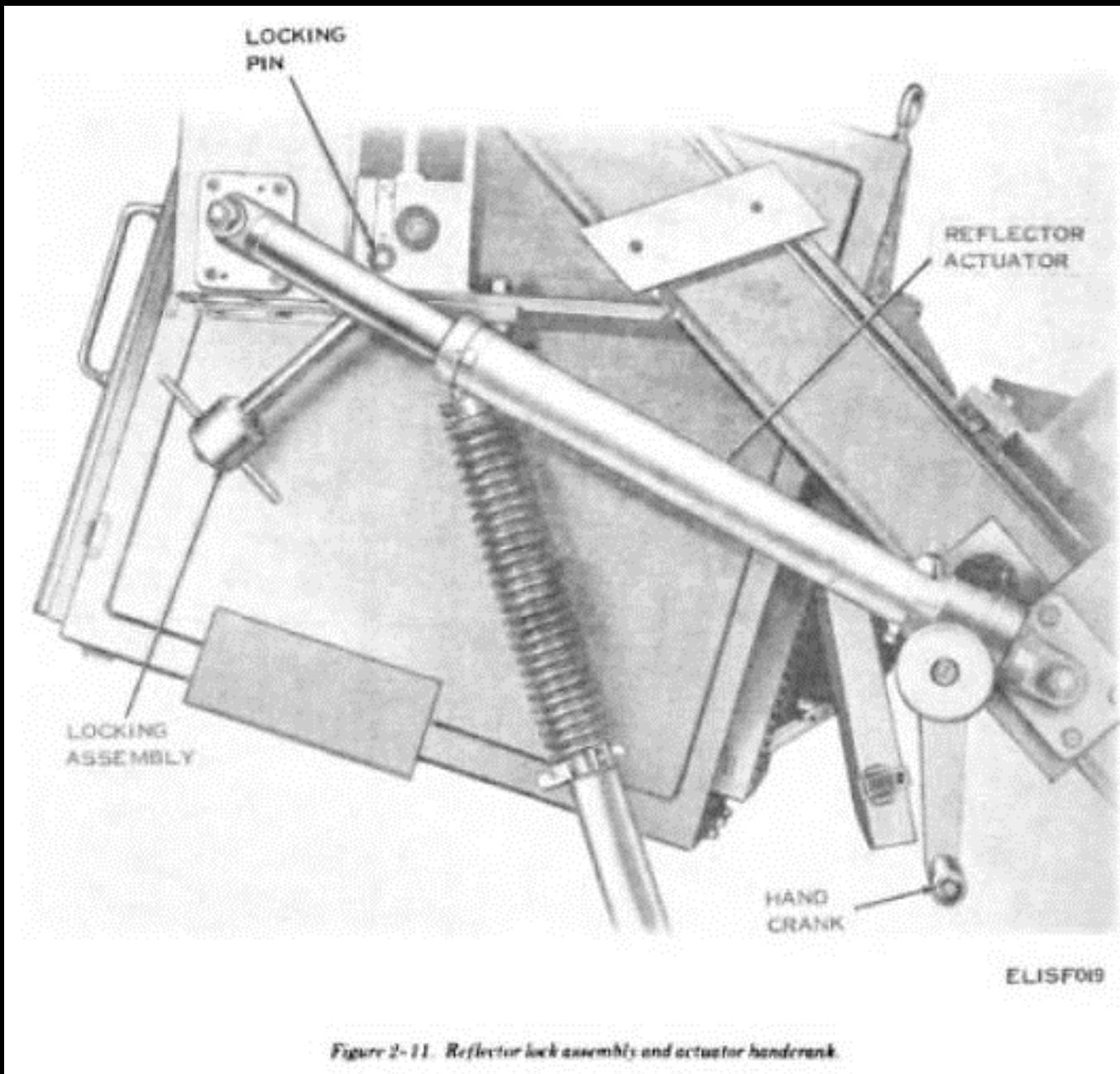


Figure 2-11. Reflector lock assembly and actuator handcrank.



AN/MPQ-4A Counter Mortar Radar

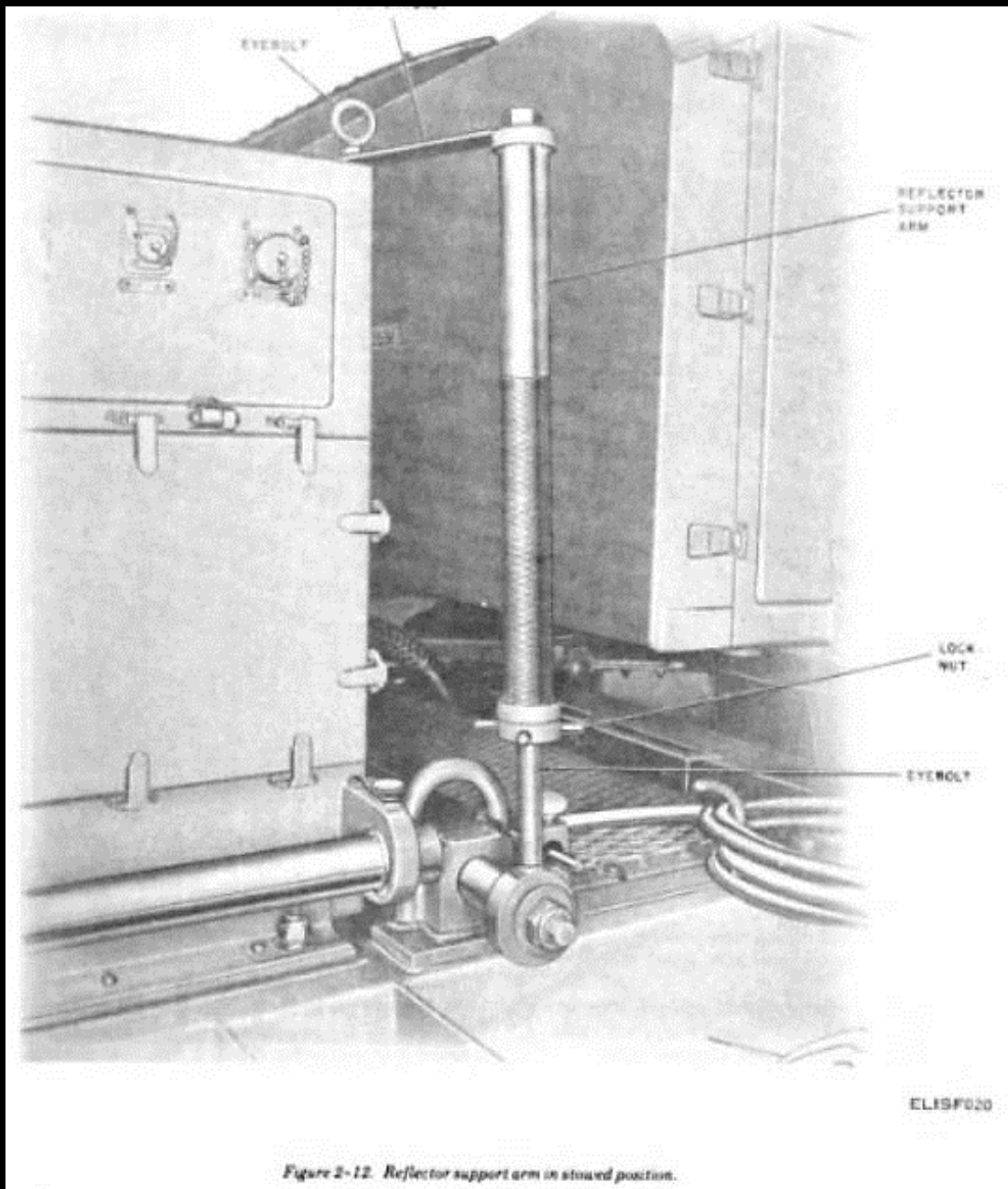


Figure 2-12. Reflector support arm in stowed position.



AN/MPQ-4A Counter Mortar Radar

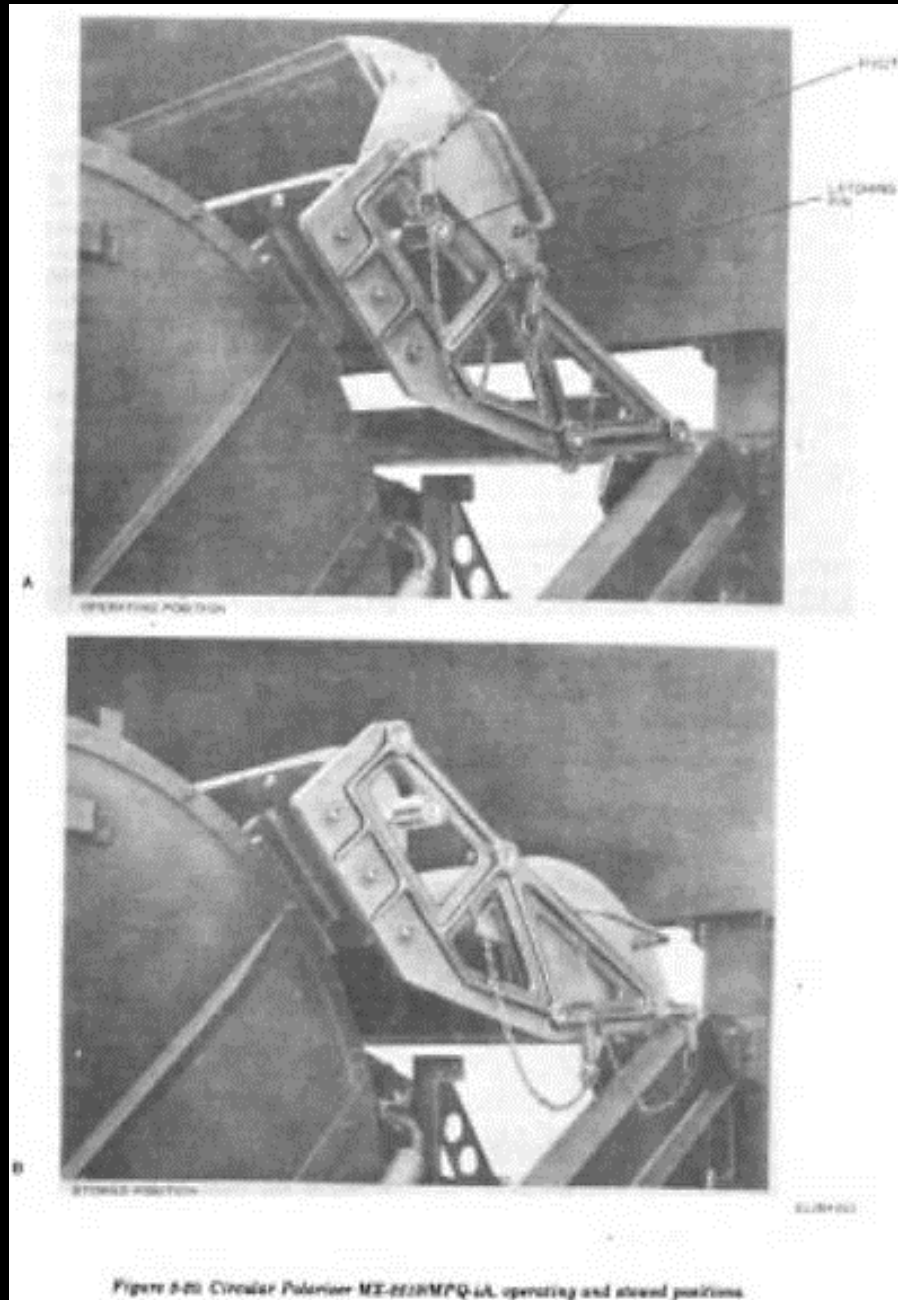


Figure 8-20 Circular Polarizer AN/MPQ-4A, operating and stored positions.



AN/MPQ-4A Counter Mortar Radar

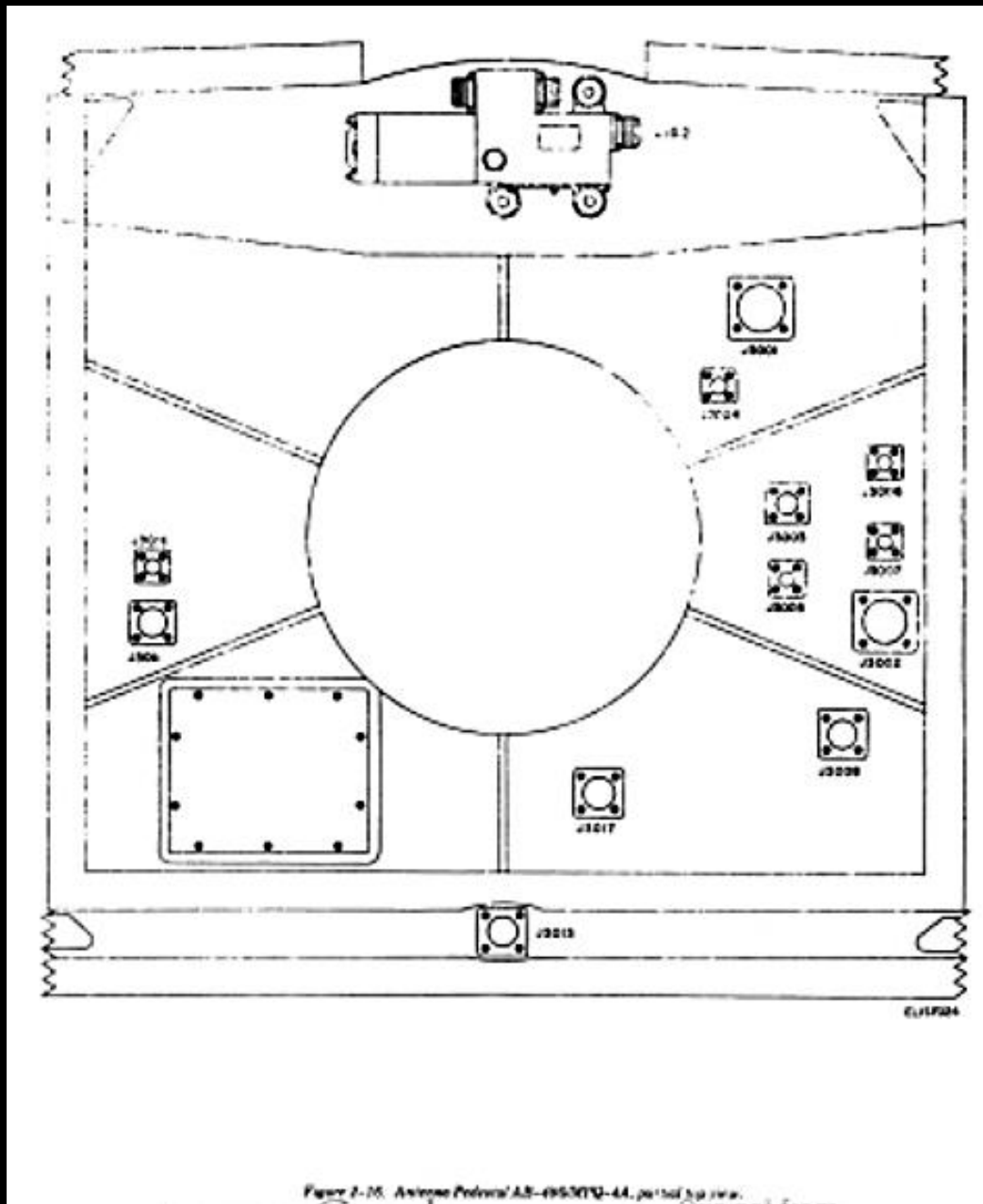


Figure 2-25. Avionics Reference AS-4953070-44, part 501 3/9 2/94.



AN/MPQ-4A Counter Mortar Radar



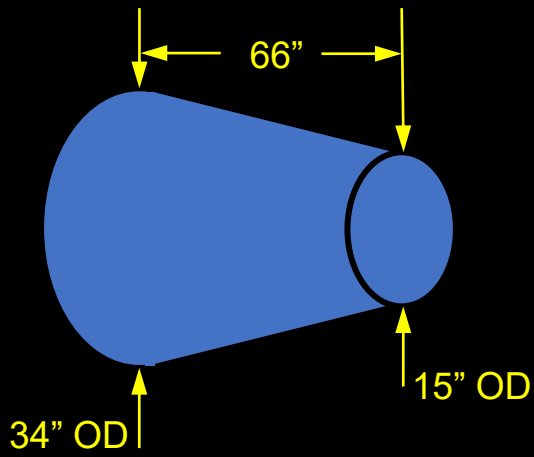
Nomenclature	Fig. No.	Dimensions (in)			Wt (lb)
		Depth	Width	Height	
Antenna Group OA-1258/MPQ-4A, including:	1-2	66	90.53	66.5 ^a	1,998
Antenna AS-835/MPQ-4A	1-2	34 od (large end)	66	15 od (small end)	1,109
Cavity, Tuned FR-111/MPQ-4A	1-5	4.5	5.66	9.61	10
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Coupler, Directional CU-399/MPQ-4A	1-6	5	2.63	2.13	2
Mount, Telescope, Assembly	4-4				
Pedestal, Antenna AB-486/MPQ-4A	1-1	48	42	19.5	546
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Telescope, Azimuth: M62A2F	1-1				
Dehydrator, desiccant, Electric HD-264/MPQ-4A or HD-264A/MPQ-4A	1-2	20.62	13.75	10.19	46
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Computer, Radar Data CP-319/MPQ-4A	1-2	26	20	12	120
Control-Power Supply C-2014/MPQ-4A	1-2	17.12	16.6	24.34	111
Indicator, Azimuth and Range IP-375/MPQ-4A	1-2	25.78	12.25	23.87	100
Receiver-Transmitter Group OA-1257/MPQ-4A including:	1-2	30.28	49.32	29.5	560

Technical Manuals usually contain dimensional and weight data tables for the equipment they cover.

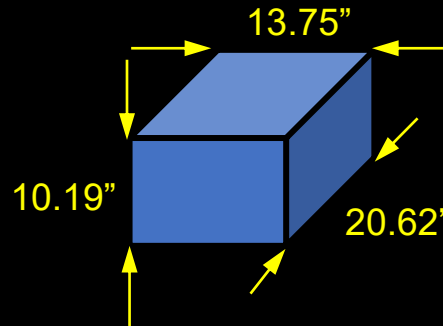
These dimensions were used to create scaled “shapes”.



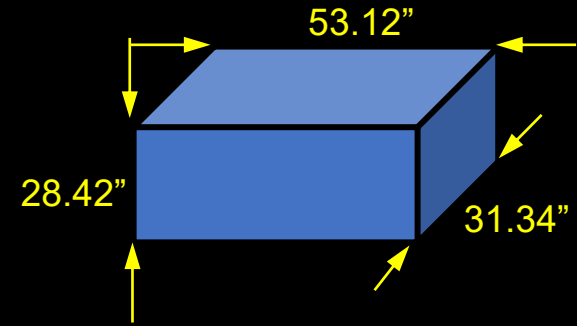
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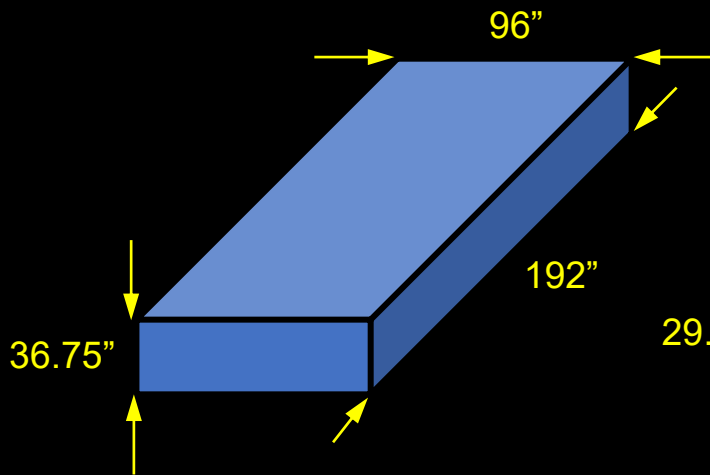
Antenna AS-835



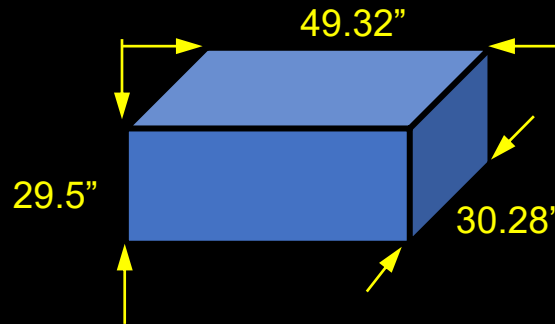
Desiccant Dehydrator



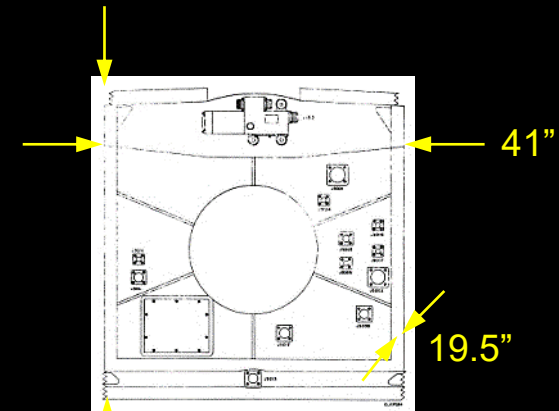
Control-Indicator



M454 Trailer



Receiver/Transmitter Box



Antenna Pedestal

The scaled "shapes" of the major radar components.



AN/MPQ-4A Counter Mortar Radar



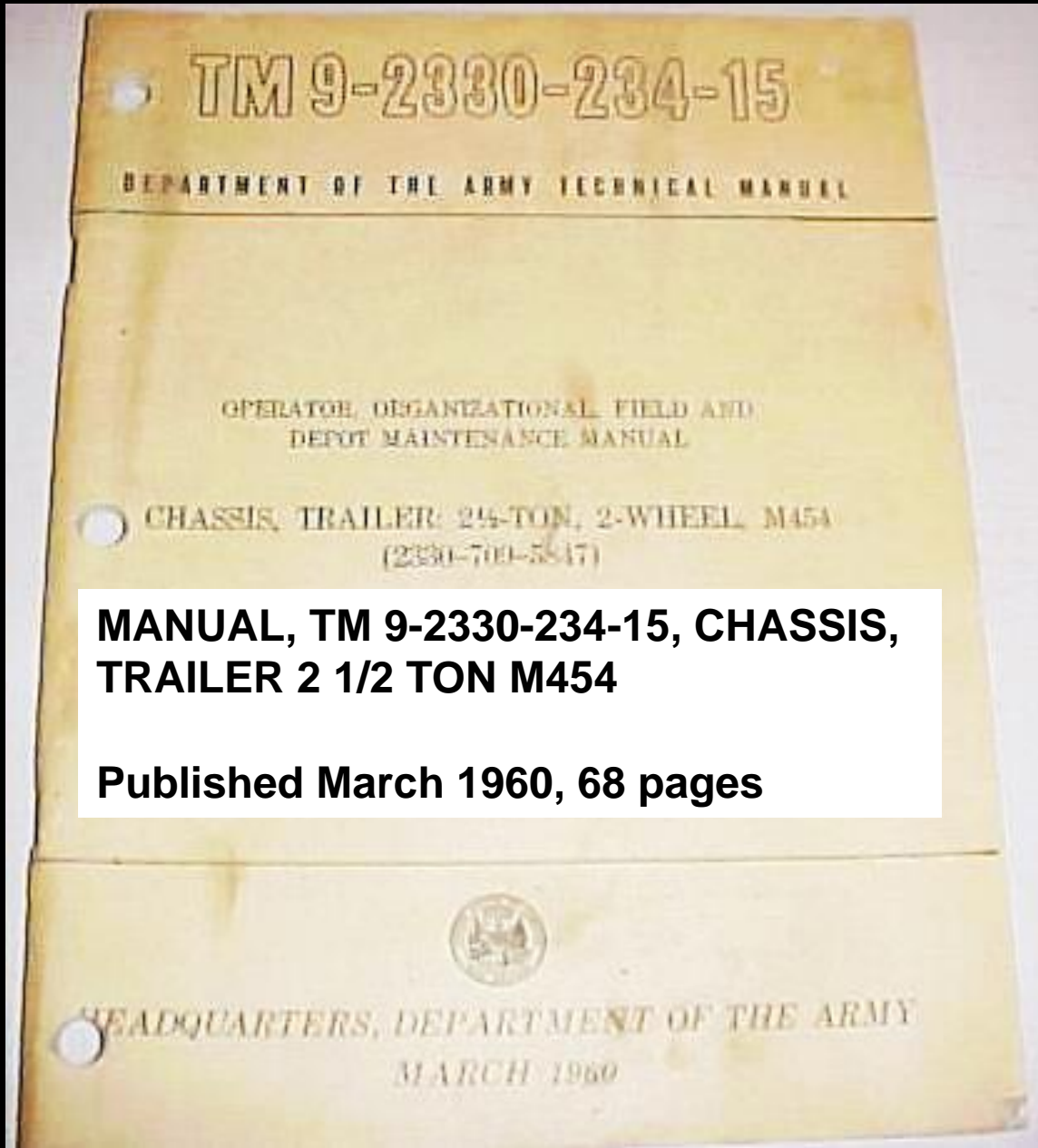
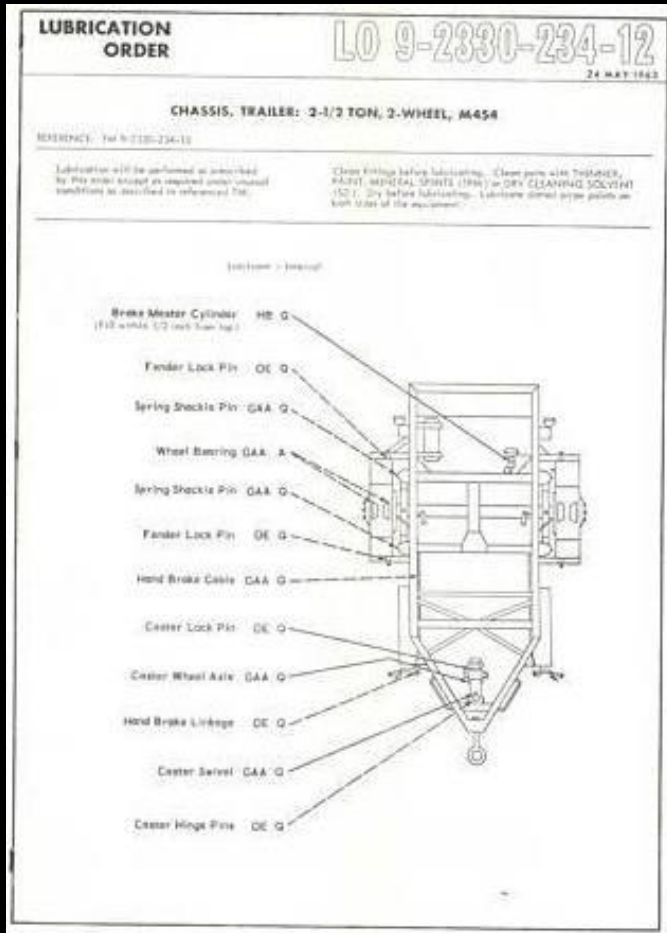
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		Depth	Width	Height	
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Control, Receiver C-2105/MPQ-4A	1-3	10.68	3.38	3.72	2
Control, Receiver C-2016/MPQ-4A	1-3	9.5	5.38	5.1	4
Duplexer CU-476/MPQ-4A	1-3	6	6.56	5	4
Power Supply PP-1588/MPQ-4A	1-2	24	8.3	14.1	46.5
Chassis, Trailer: 2 1/2-ton, 2-wheel, M454	2-2	192	96	36.75	1,858
Seat, Equipment Operator	2-4				
Support, Operator's Seat MT-1798/MPQ-4A	1-8	7.5	7.5	20.5	12
Shelter, Electrical Equipment S-134A/MPQ-4A	1-8	51.5 ^b	41 ^b	13 ^b	175
Blower Assembly, Shelter Intake HD-339/MPQ-4A	1-8	15.1	11.62	11.62	20
Stand, Control-Indicator MT-1733/MPQ-4A	1-7	48.76	24.5	7.75 ^c	15

The Trailer Dimensions give the overall Length and Width of the Radar, and the height to the top of fenders (maybe).

The Trailer description (M454) also gives information for finding a TM for it.



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The only copy I found on the web was only available for purchase.



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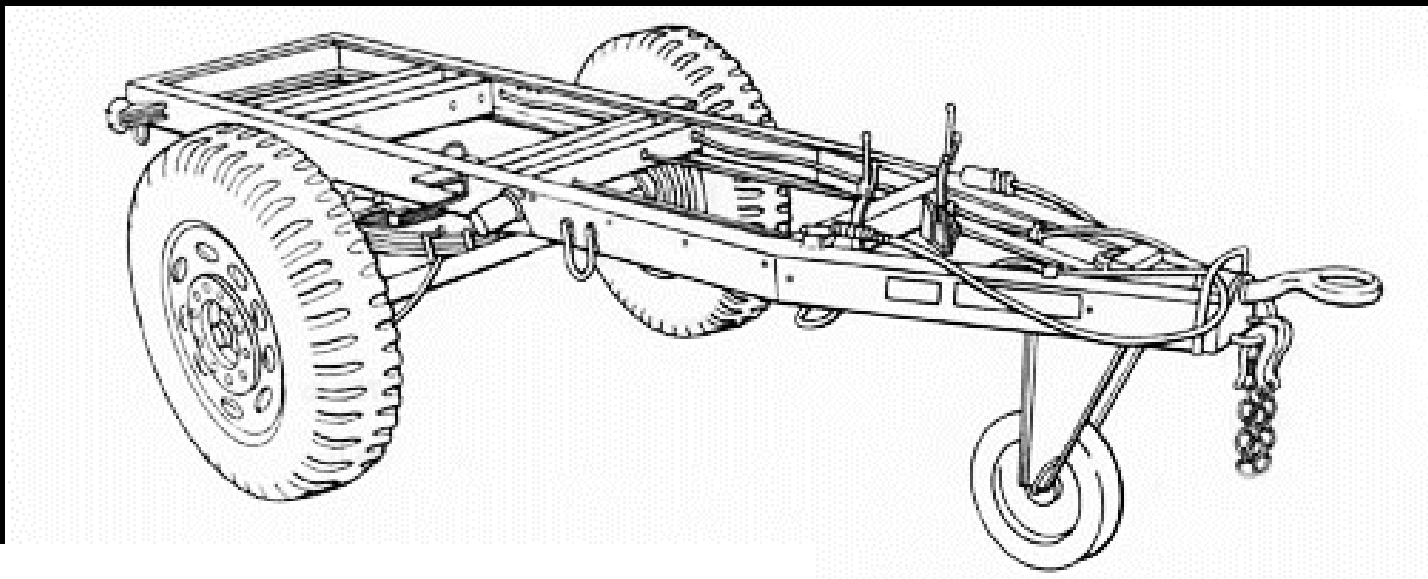
11.00 x 20.00
Military Tires
43.5" dia

43.5"



The Tires used on US Army 2-1/2 ton Trucks and Trailers were usually the same size.

Without the M454 Trailer TM's dimensions, the tire diameter will allow scaling of photos of the AN/MPQ-4 Radar trailer.



Characteristics of the Chassis, Trailer, 1 1/2 Ton, Two Wheel, M103

Net weight	1,660 lbs
Max gross wt	5,750 lbs
Total length	163.25 in (1/72: 2.267361")
Total width	82.25 in (1/72: 1.142361")
Lunette height	34.25 in (1/72: 0.475694")
Ground clearance	16.125 in (1/72: 0.223958")
Height to top of tire	40 in (1/72: 0.5555556")

The manual for the M103 trailer chassis is TM 9-8226 (April 1955) which covers all the 1 1/2 ton two wheel trailers of the time. TM 9-8226 was replaced by TM 9-2330-213-14&P. The October 1990 version supersedes TM 9-2330-213-14&P dated 30 September 1985.

I did find a TM for the M103 Trailer that, although smaller, seemed to use similar components to the M454, such as the Lunet, Hitch Support, Manual Brake Handles, and some Suspension Components.



AN/MPQ-4A Counter Mortar Radar



Fortunately, while searching the internet for information, I found the following pictures of a stored AN/MPQ-4 Radar. Unfortunately, unknown location & source.

This included an overall sideview that I could use to create a scale drawing.



AN/MPQ-4A Counter Mortar Radar





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SOUTH CAROLINA
CONFEDERATE RELIC ROOM &
MILITARY MUSEUM

AN/MPQ-4A Counter Mortar Radar





SOUTH CAROLINA
CONFEDERATE RELIC ROOM &
MILITARY MUSEUM

AN/MPQ-4A Counter Mortar Radar





AN/MPQ-4A Counter Mortar Radar



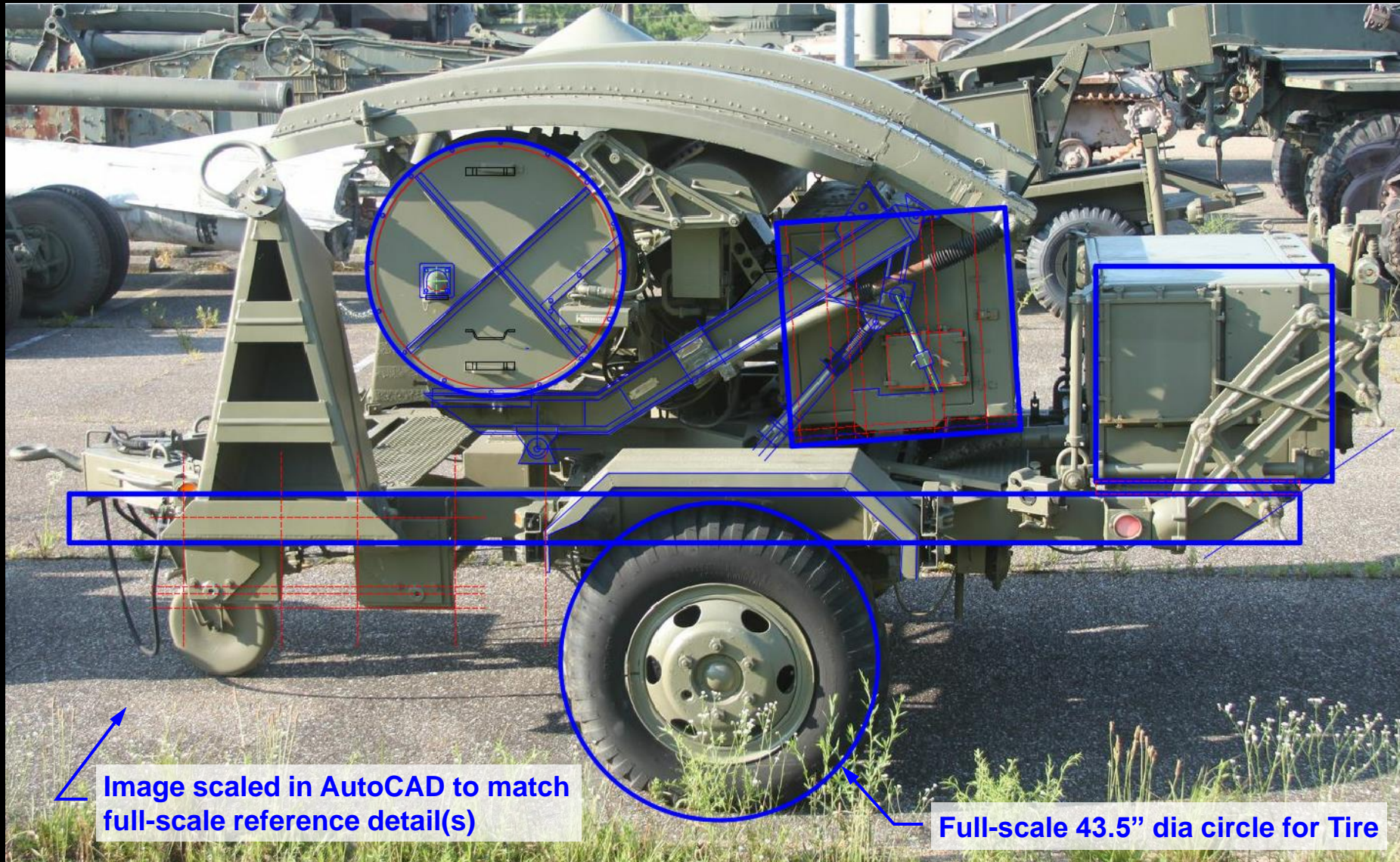


AN/MPQ-4A Counter Mortar Radar





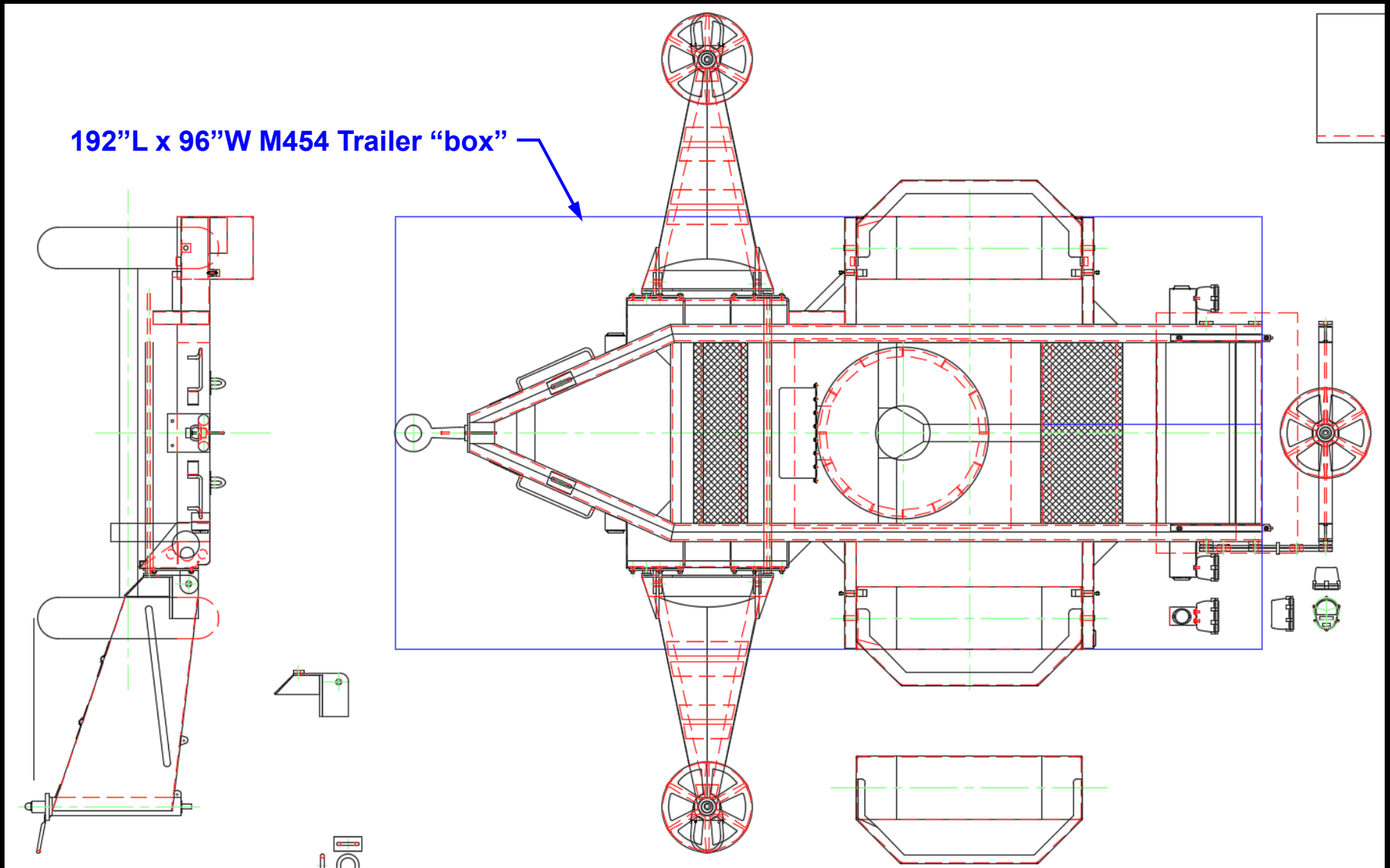
AN/MPQ-4A Counter Mortar Radar



I used this overall sideview to help create the full-scale working drawing.



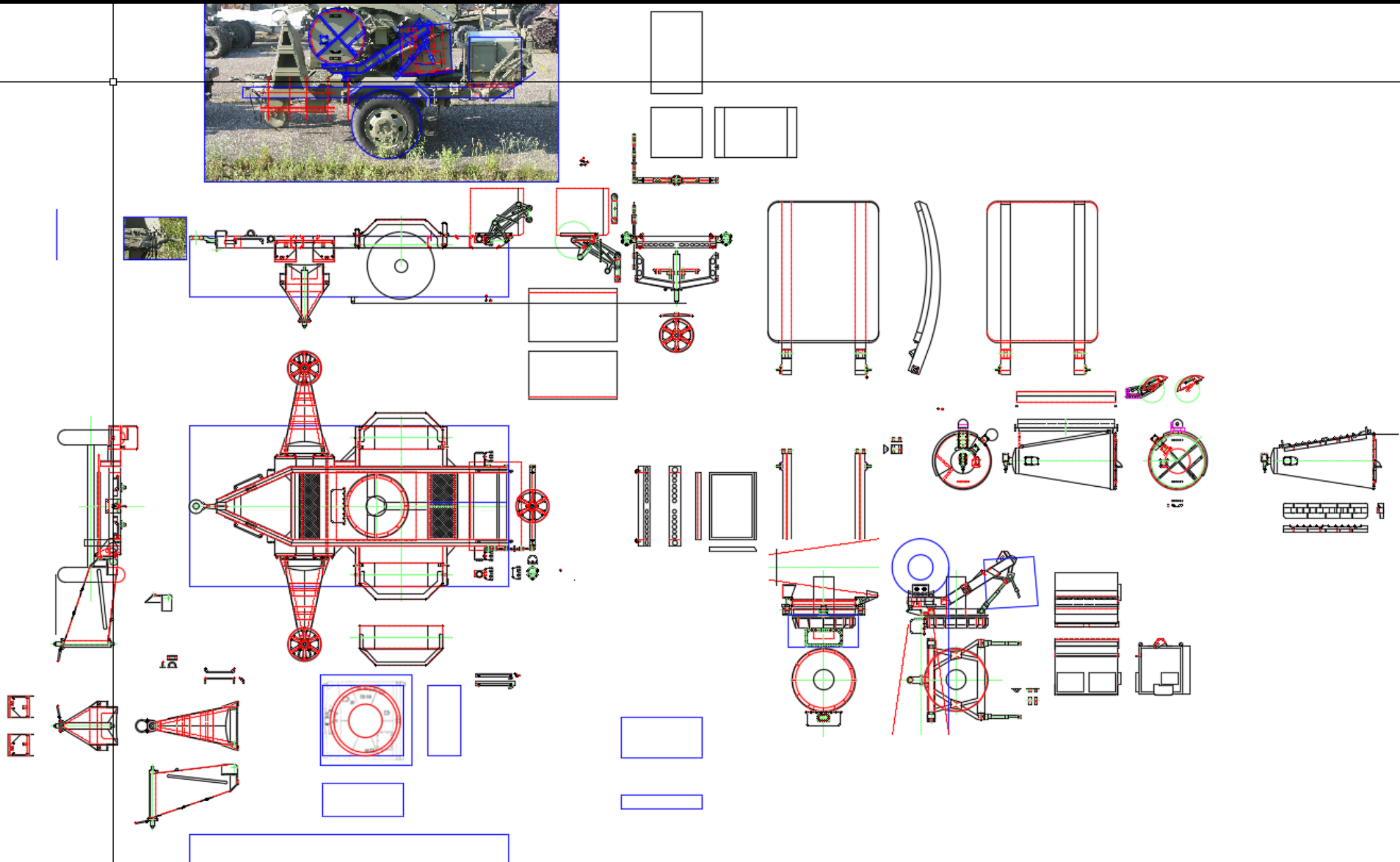
AN/MPQ-4A Counter Mortar Radar



As I worked on the scale drawing, I inserted boxes sized for the TM Dimensions to help ensure that each major component didn't "grow" larger than it should.



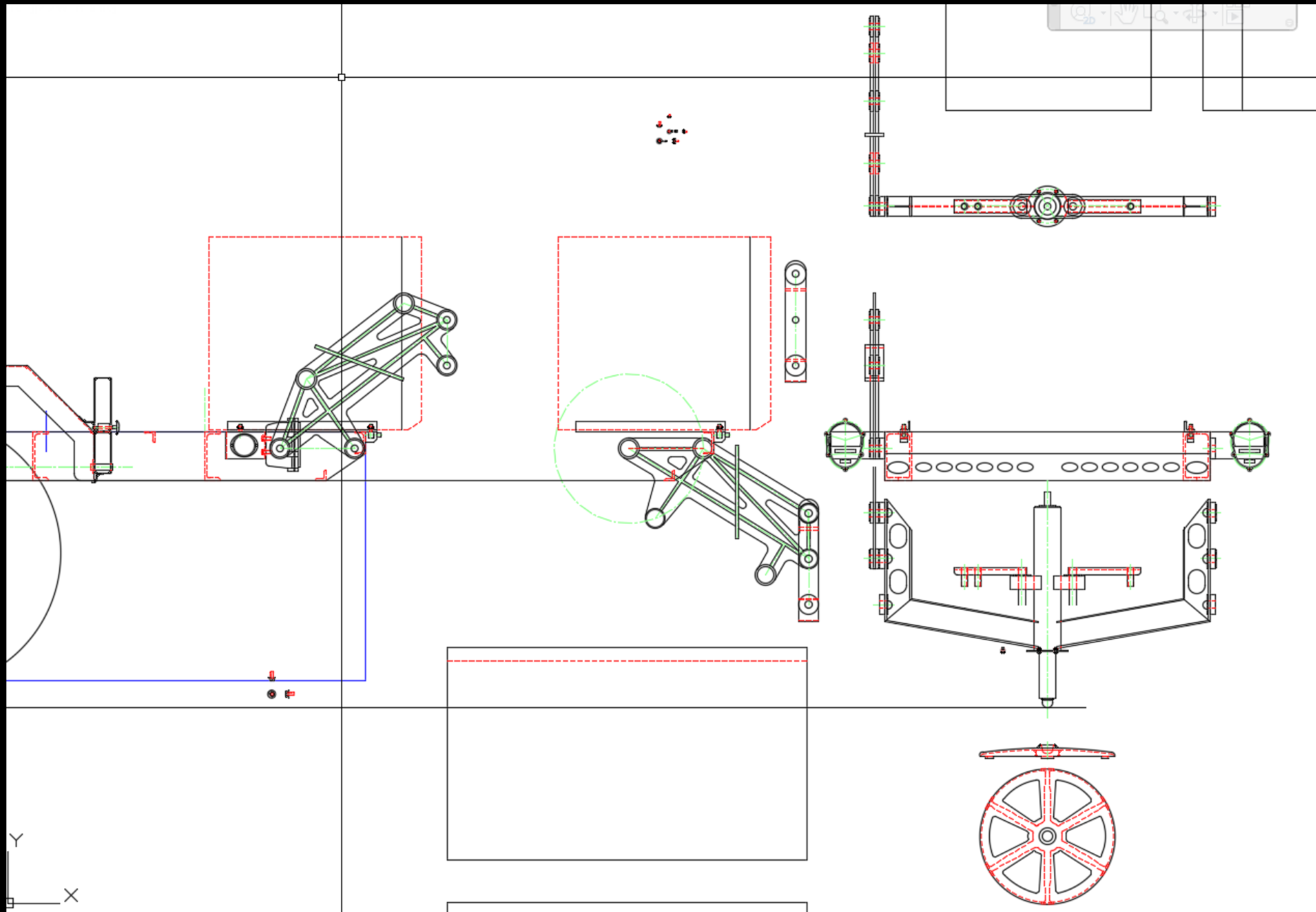
AN/MPQ-4A Counter Mortar Radar



Once I created the trailer Frame, I was able to work out dimensions and configurations of other parts.

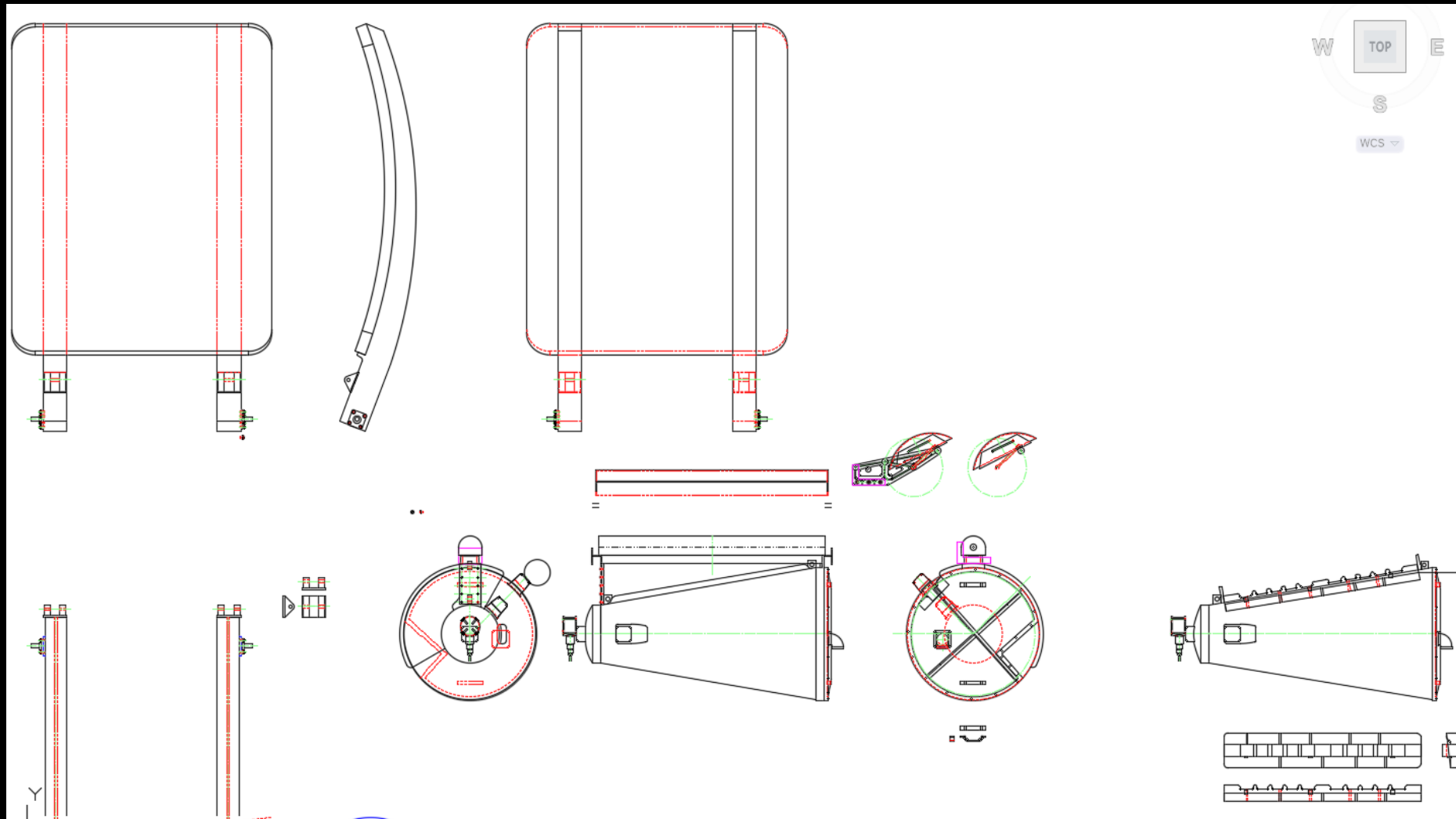


AN/MPQ-4A Counter Mortar Radar





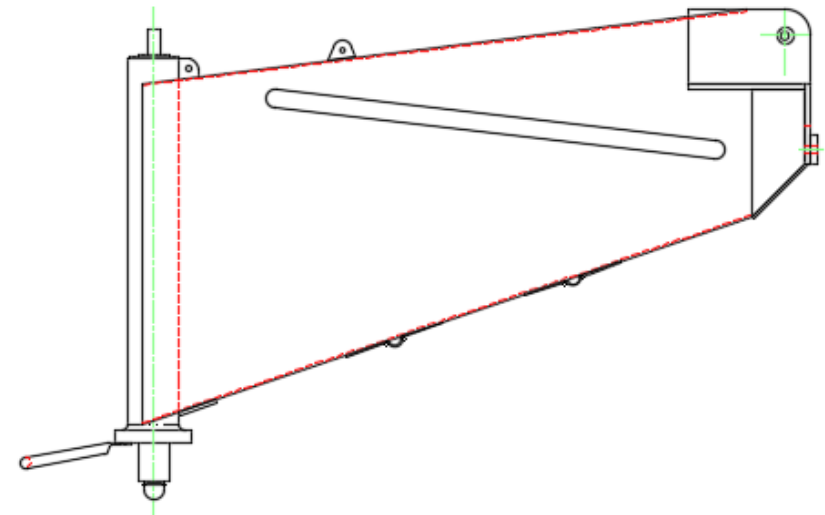
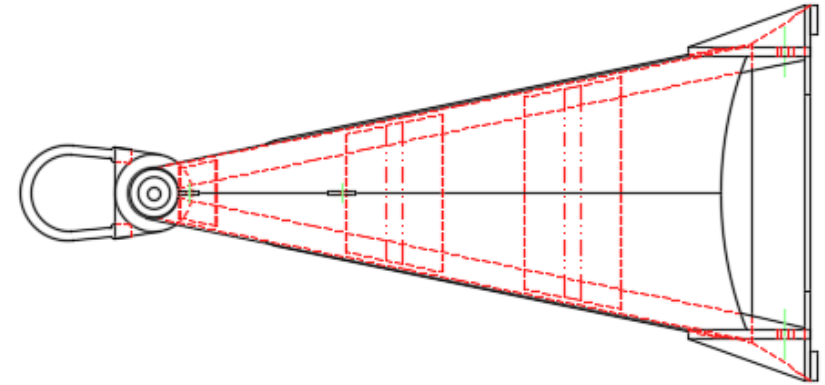
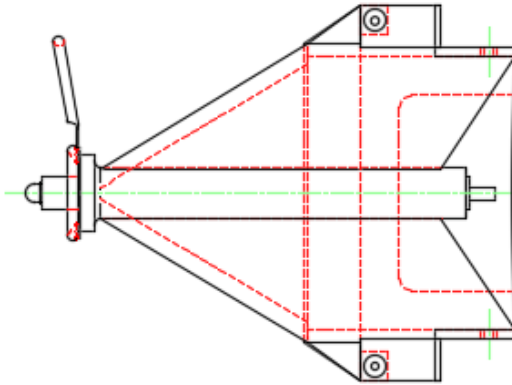
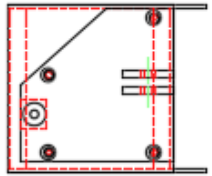
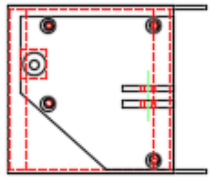
AN/MPQ-4A Counter Mortar Radar



Even though the TM provided overall dimensions for the major components, it wasn't clear what exactly was included in the dimensions.



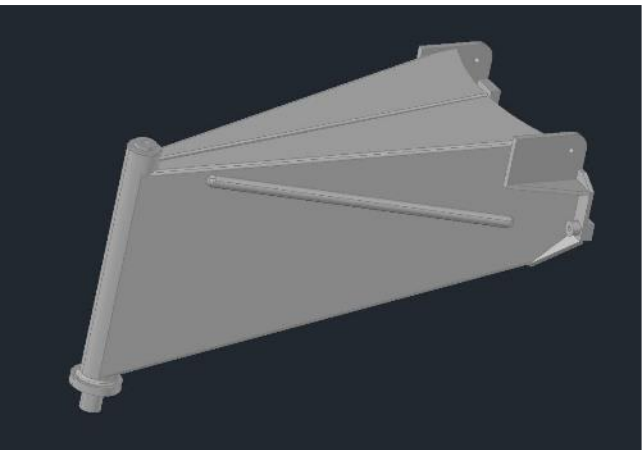
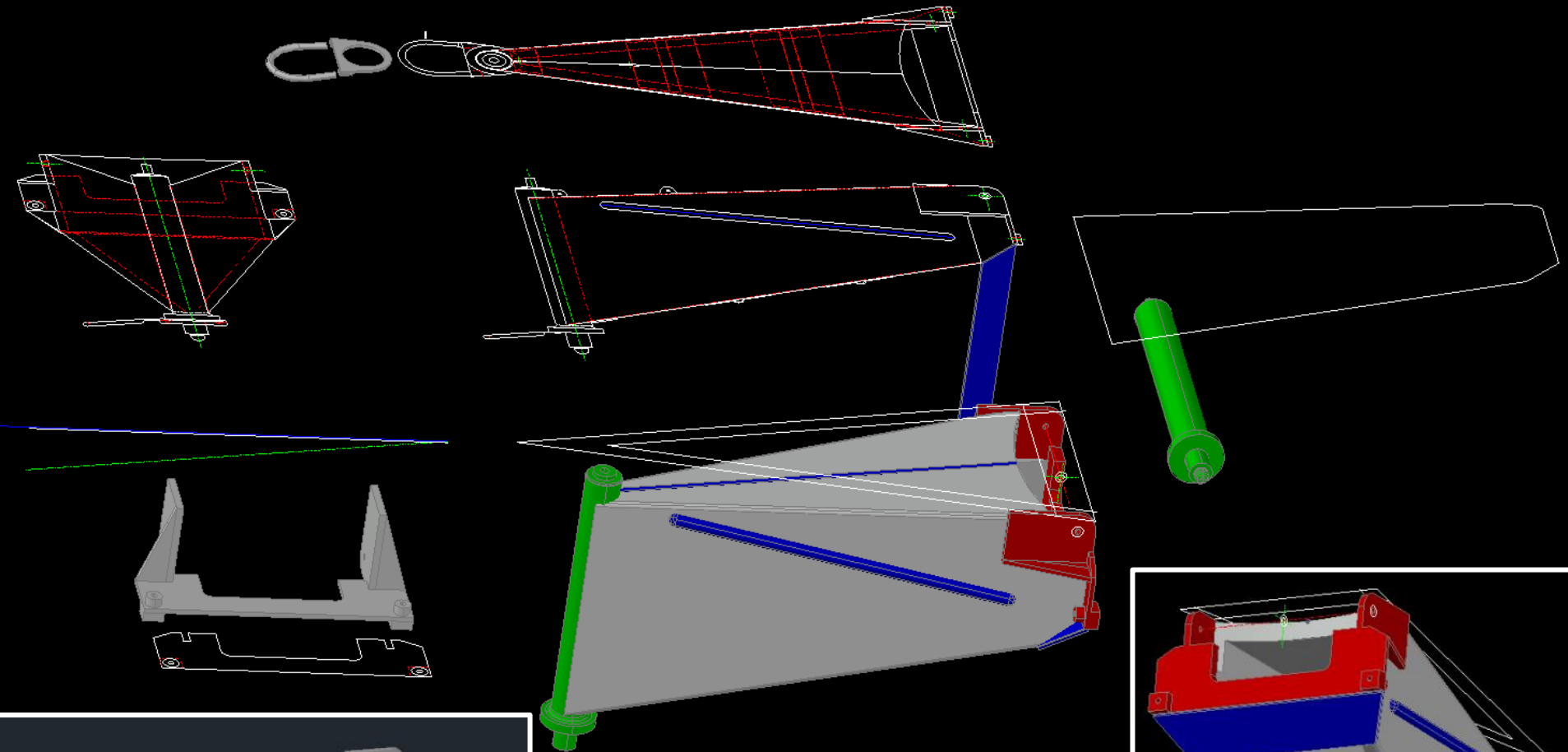
AN/MPQ-4A Counter Mortar Radar



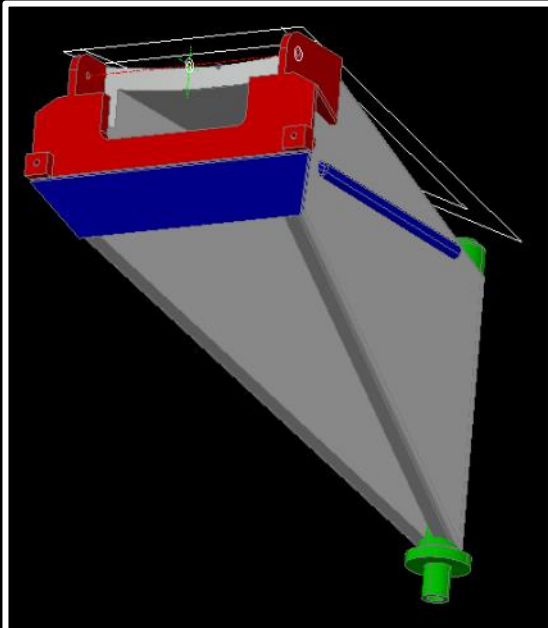
After finishing 3-view drawings of each major part, I could then create 3D shape files for each.



AN/MPQ-4A Counter Mortar Radar

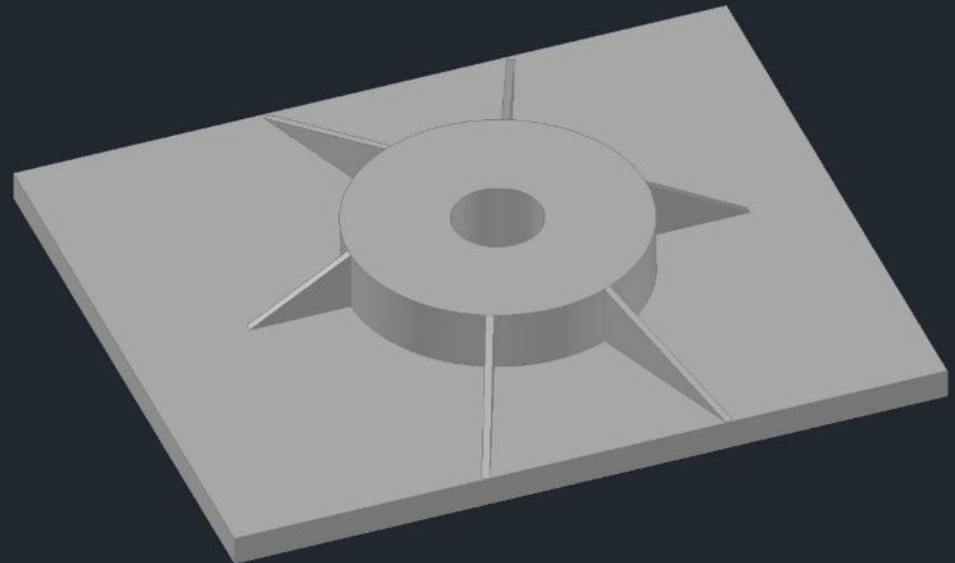
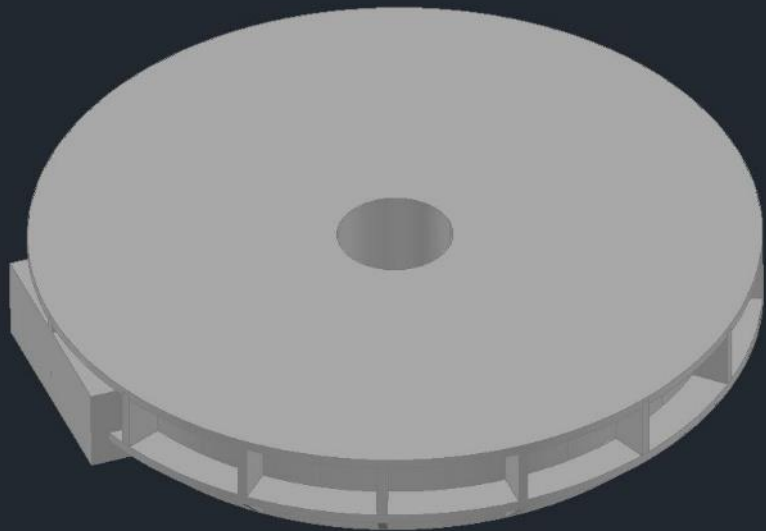
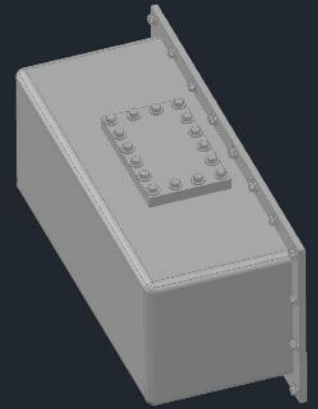
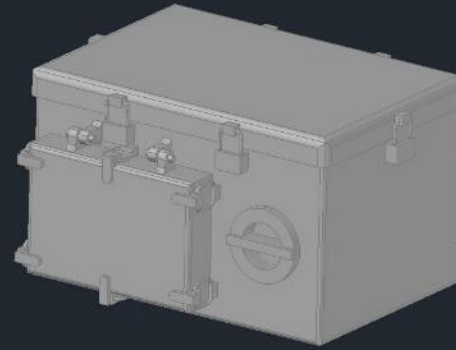
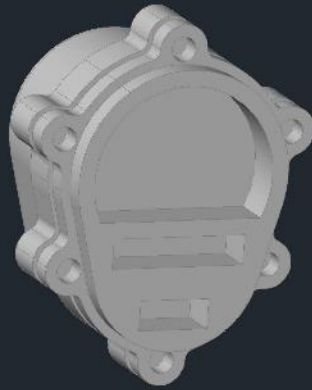
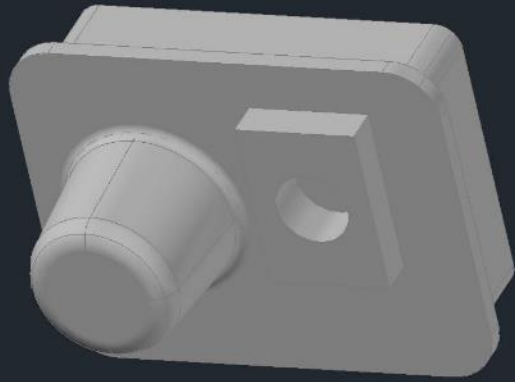


Each 3D shape file was created with subparts that were then combined into a single shape.



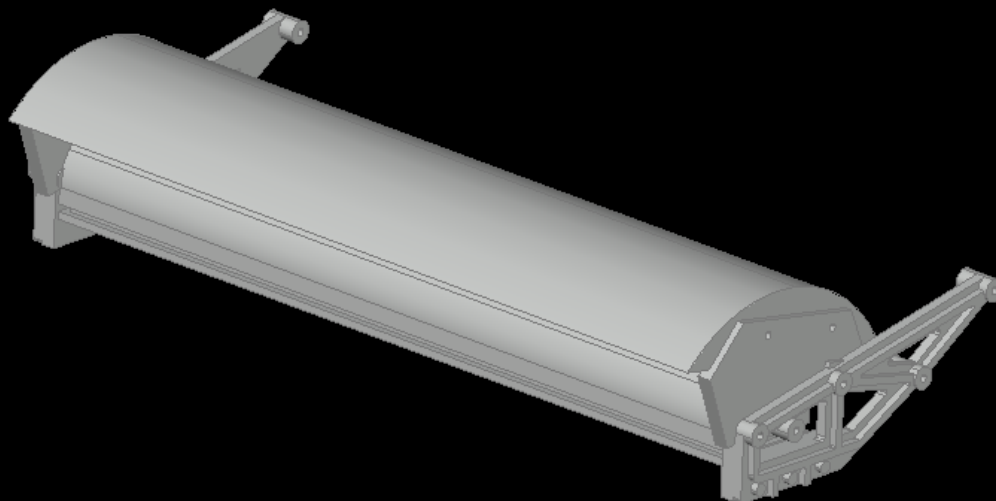
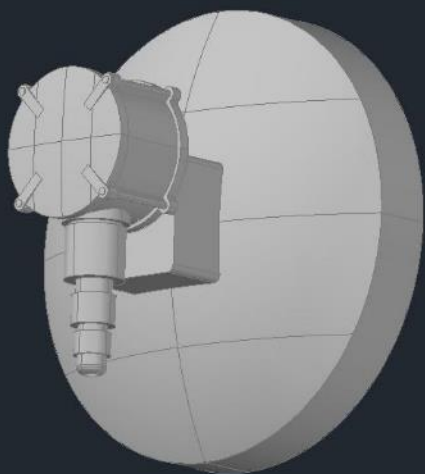
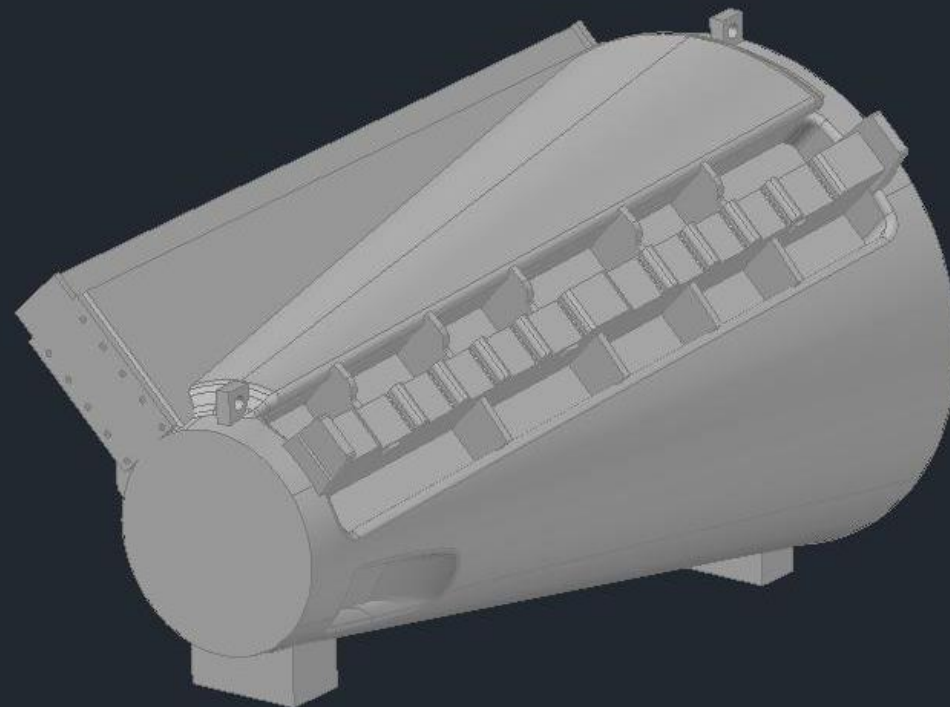
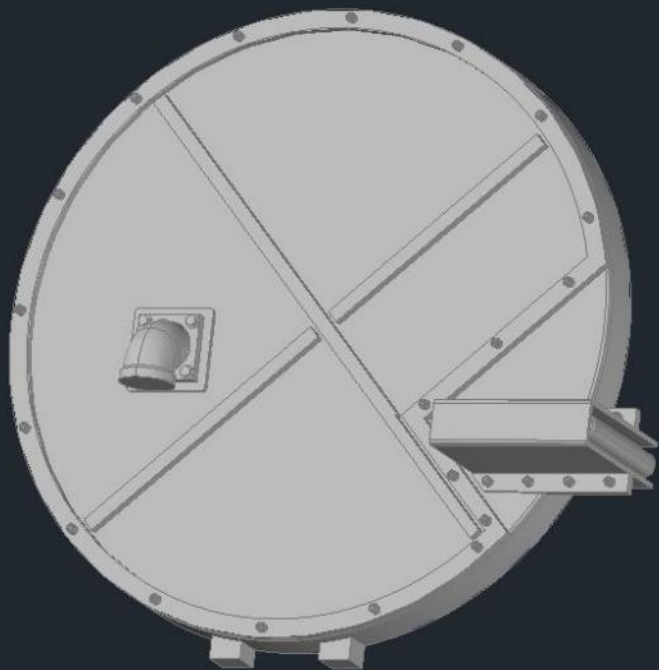


AN/MPQ-4A Counter Mortar Radar



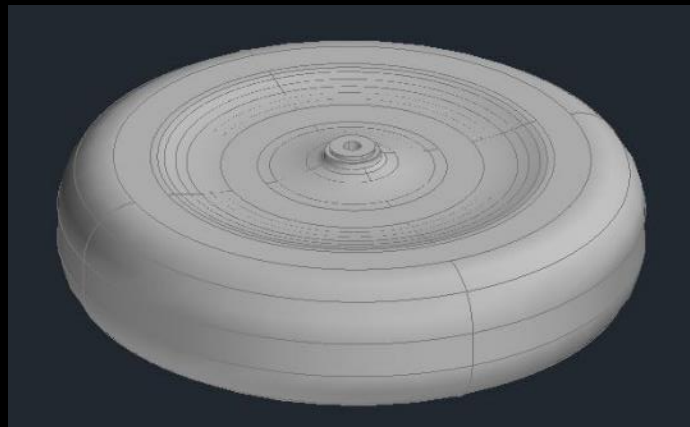
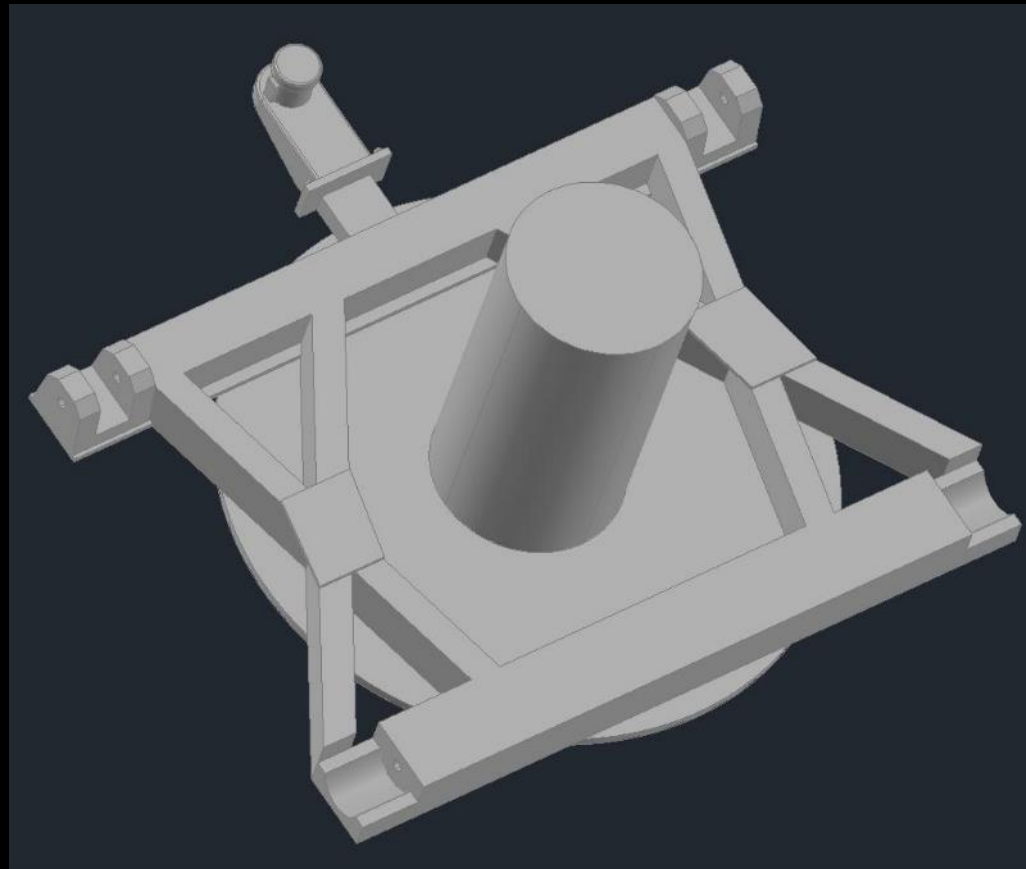
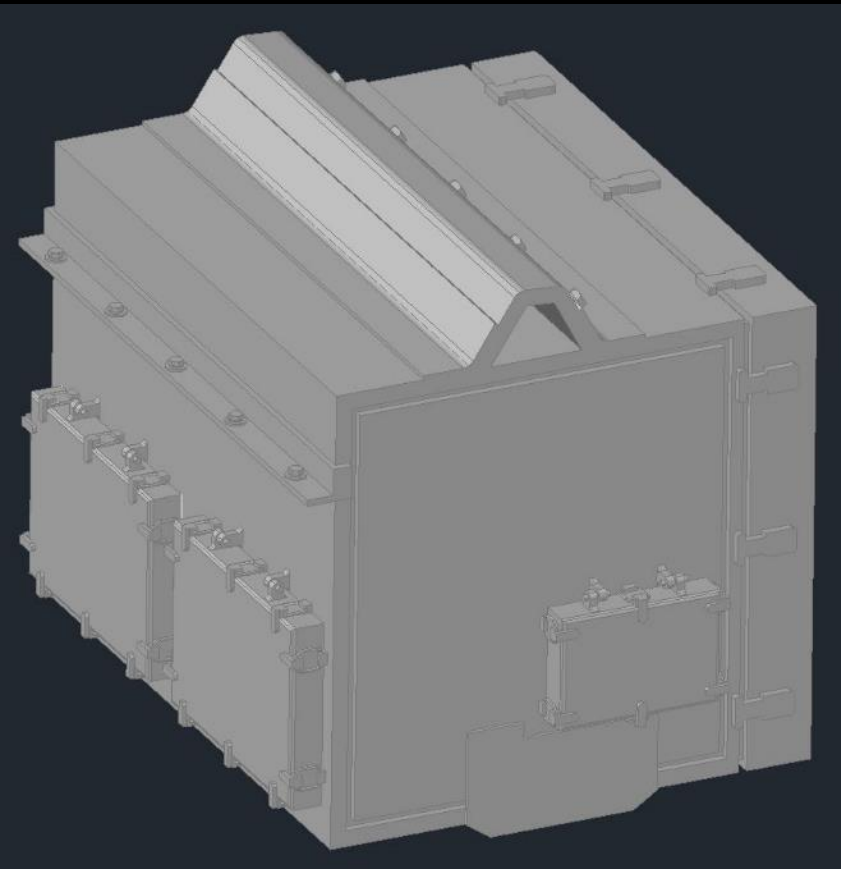


AN/MPQ-4A Counter Mortar Radar





AN/MPQ-4A Counter Mortar Radar

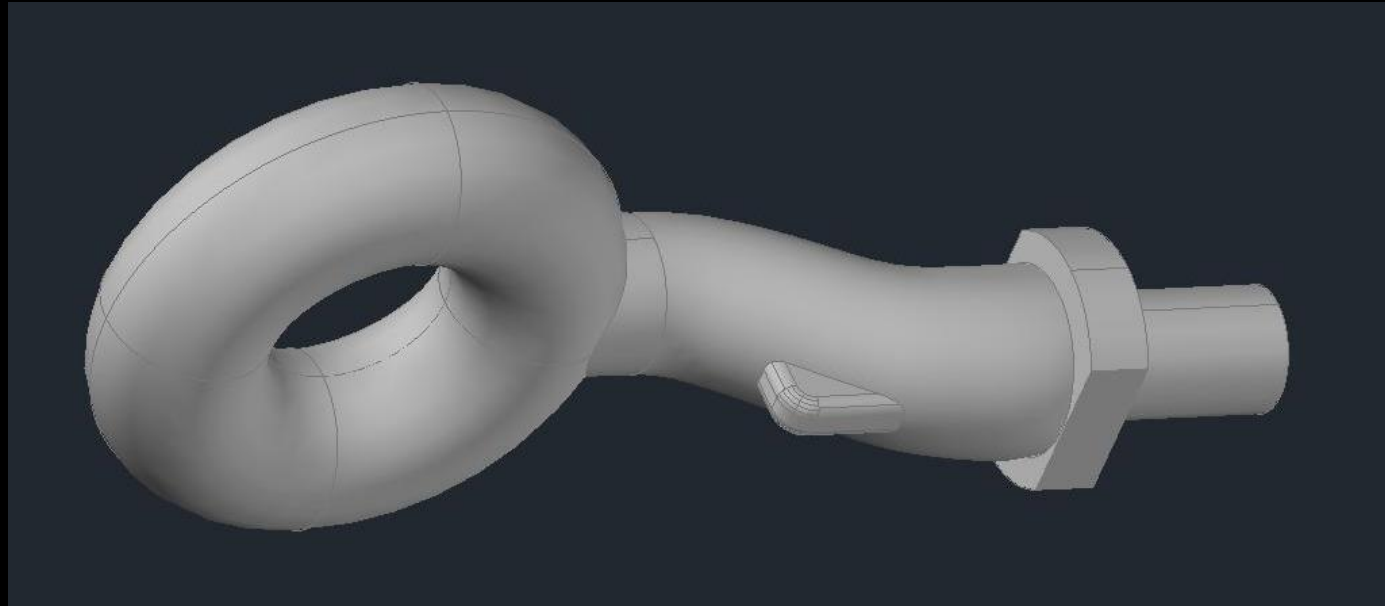




AN/MPQ-4A Counter Mortar Radar

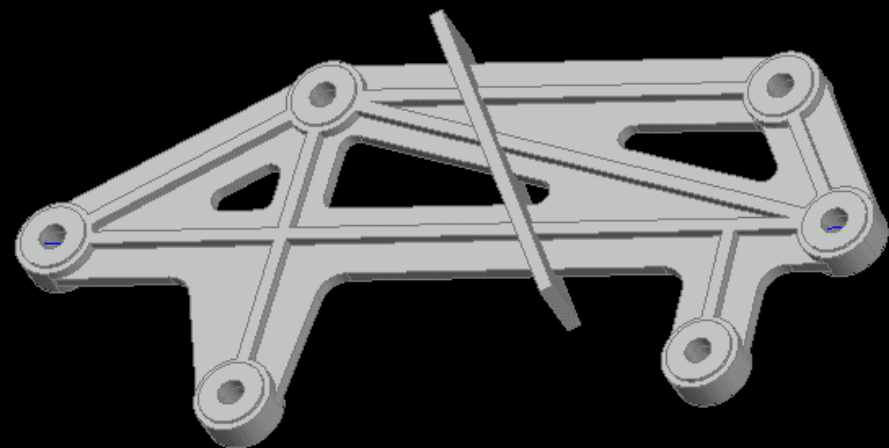
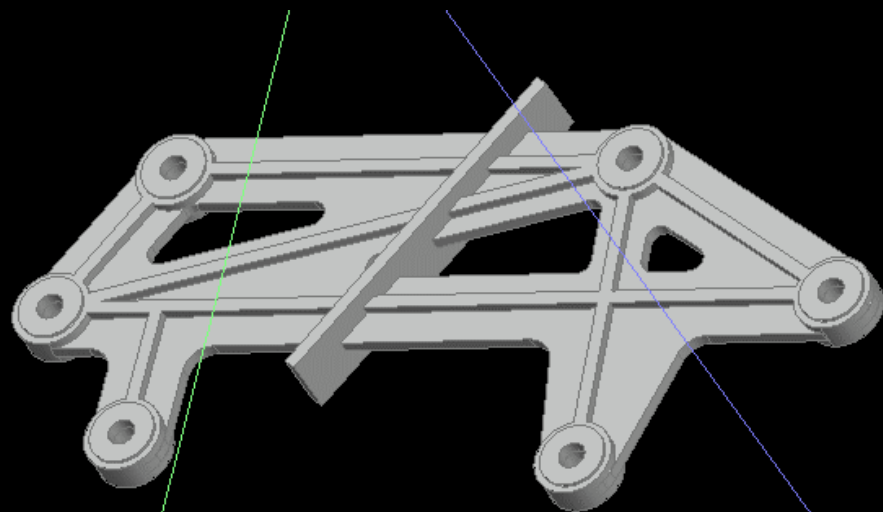
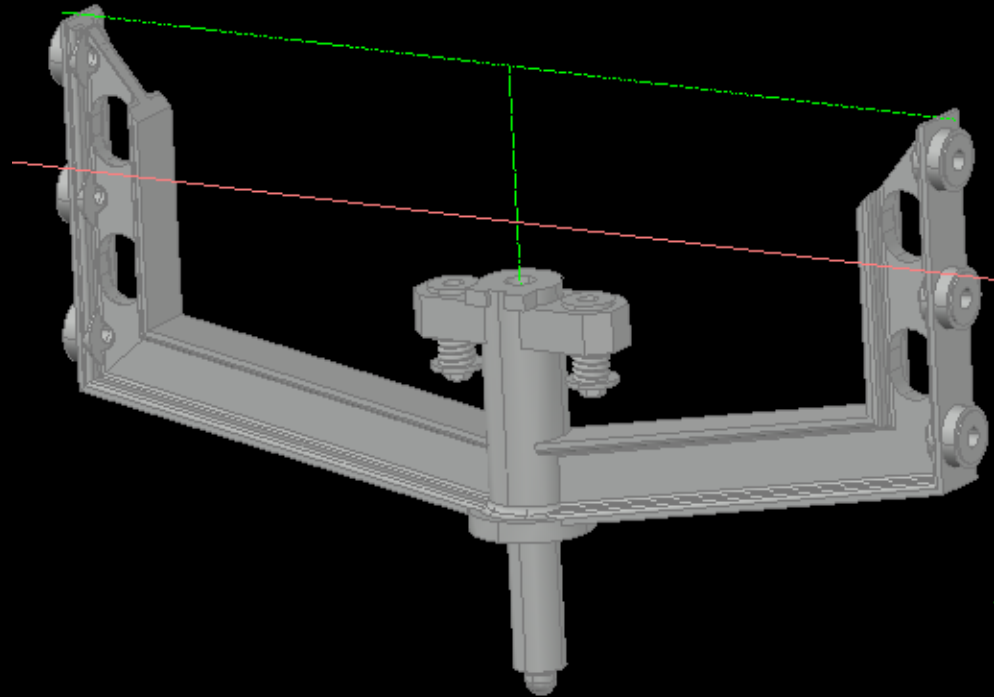
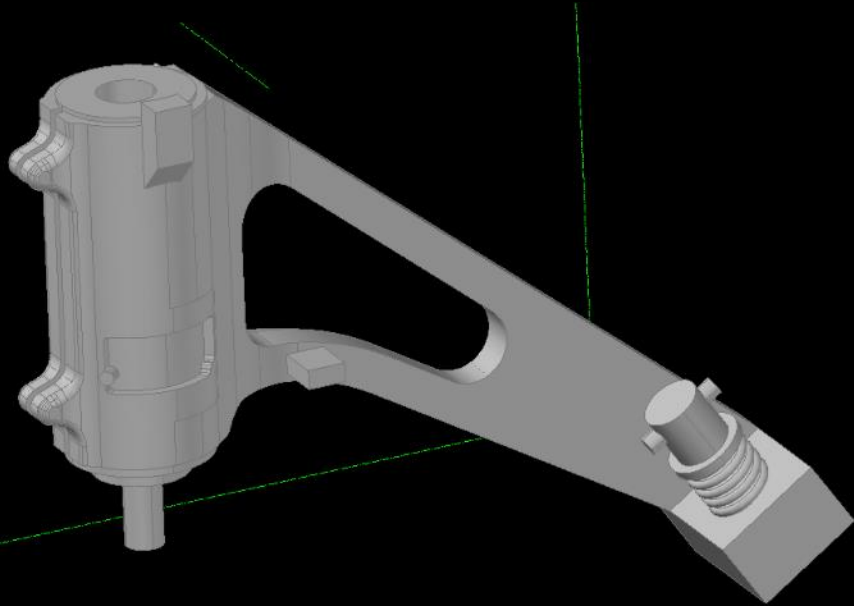


For some parts I was able to compare the look of the shape part to real photos.



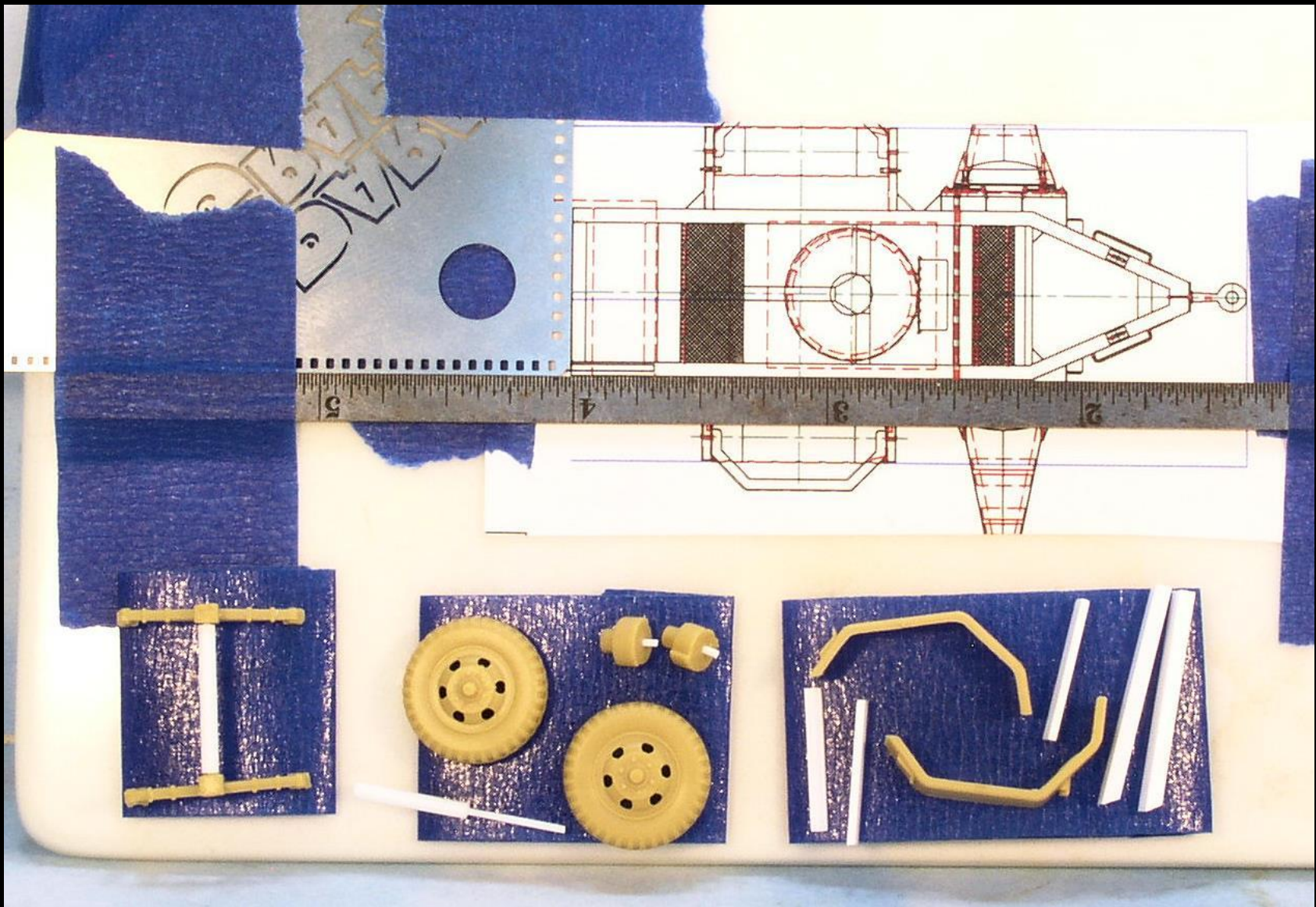


AN/MPQ-4A Counter Mortar Radar





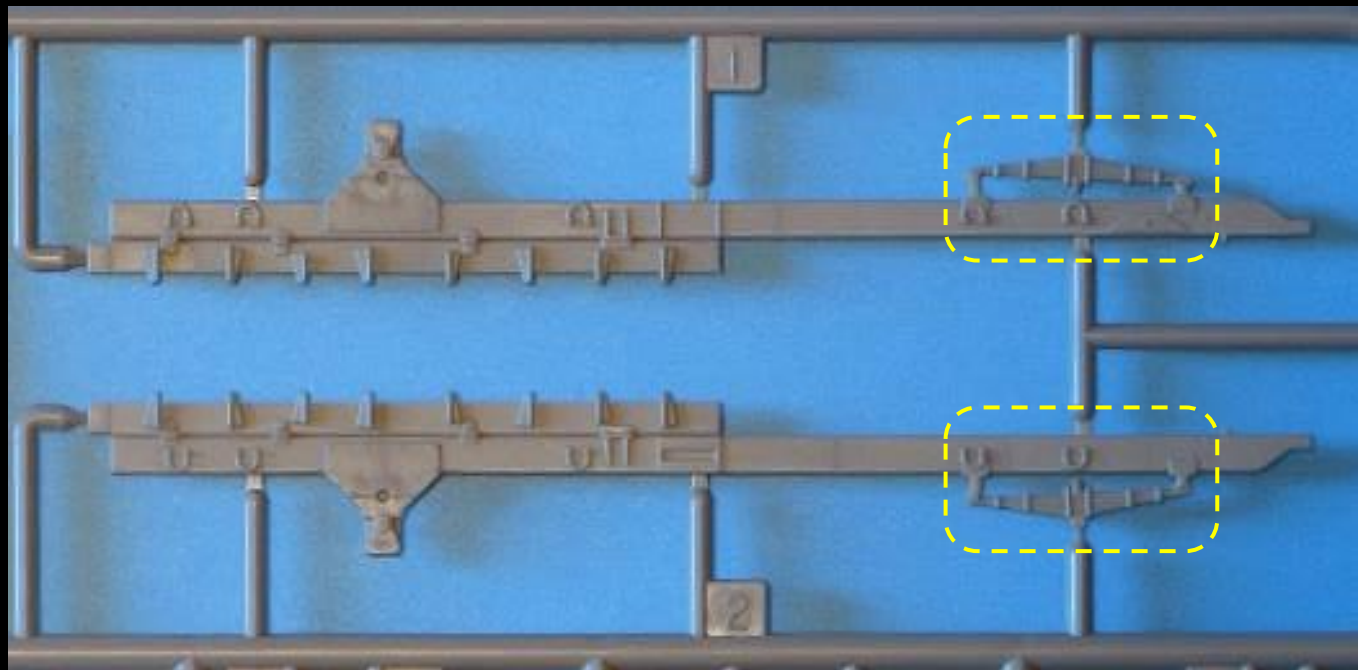
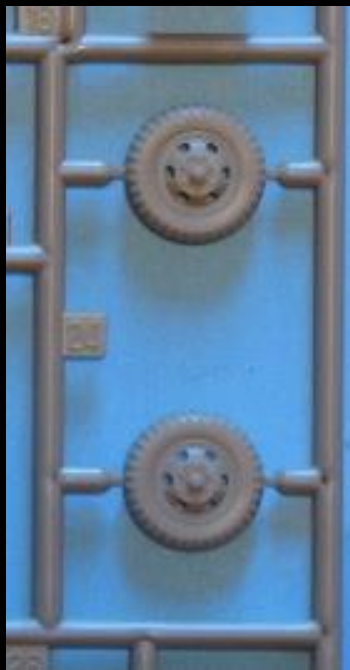
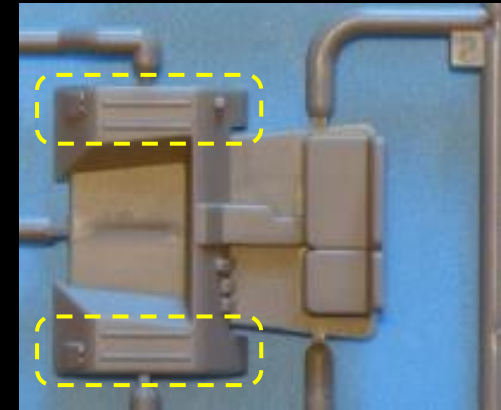
AN/MPQ-4A Counter Mortar Radar



Five parts came from a styrene injected model kit.



AN/MPQ-4A Counter Mortar Radar



2 Front Wheels, Front Leaf Springs from the Frames, and parts of the Front Axel.
I also cut the Front Fenders off to use them, but later decided against them.



AN/MPQ-4A Counter Mortar Radar



The Trailer Frame was made using a 1/72 scale printed drawing and styrene structural shapes & sheet.



AN/MPQ-4A Counter Mortar Radar

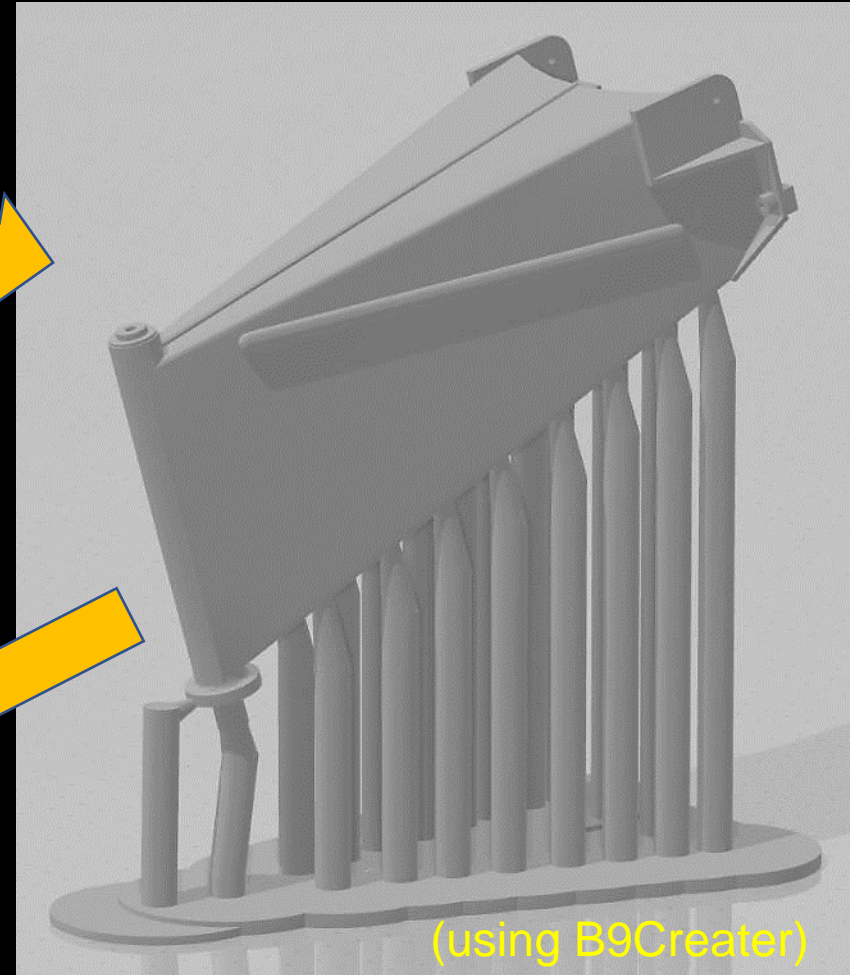


3D Shape file (.stl)

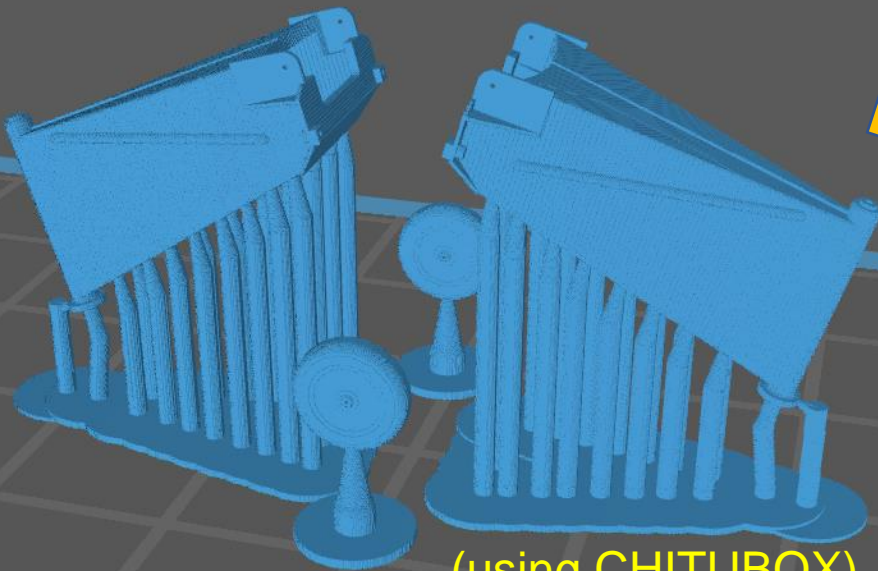


(using AutoCAD)

3D Shape file with supports added (.stl)



(using B9Creator)



(using CHITUBOX)

Multiple 3D Shape files with
supports combined (.photon)

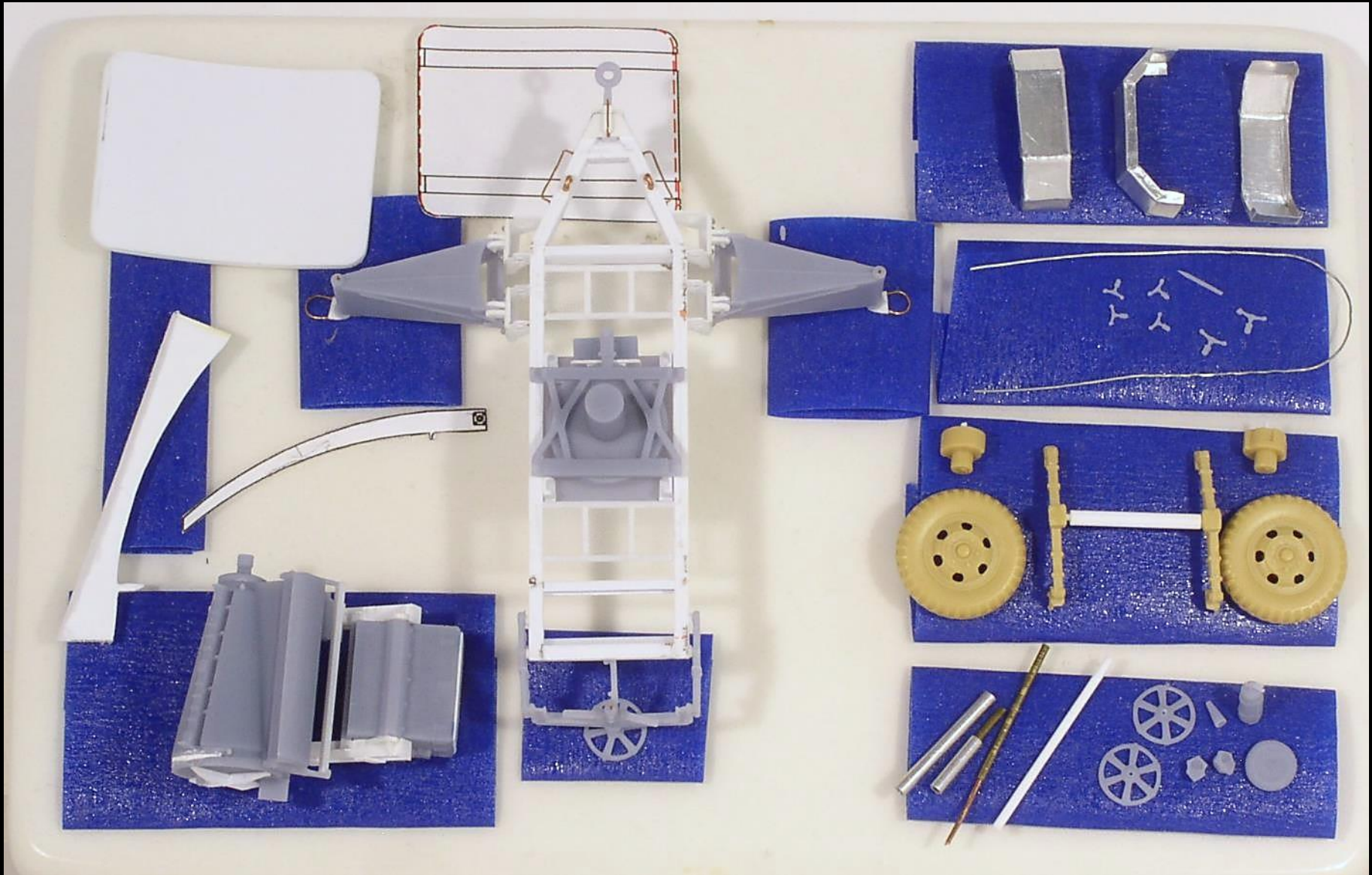


More progress.

I made a second, more accurate Trailer Frame.



AN/MPQ-4A Counter Mortar Radar



Most of the Trailer assembled along with the Antenna & Receiver/Transmitter.



AN/MPQ-4A Counter Mortar Radar





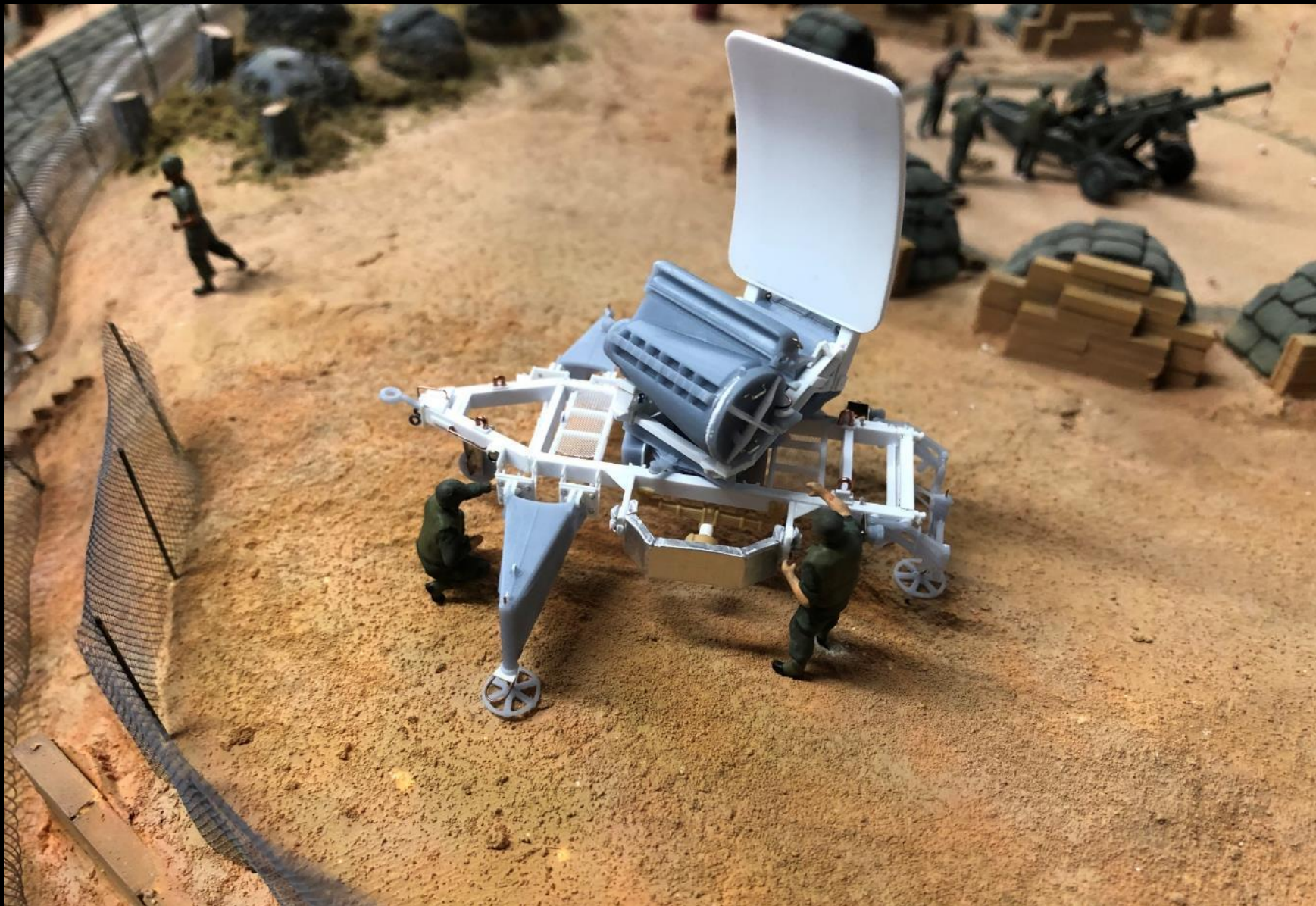
AN/MPQ-4A Counter Mortar Radar



During diorama construction, I needed to test the placement of the Radar.



AN/MPQ-4A Counter Mortar Radar



Besides testing its location, I also added a couple figures to the diorama.



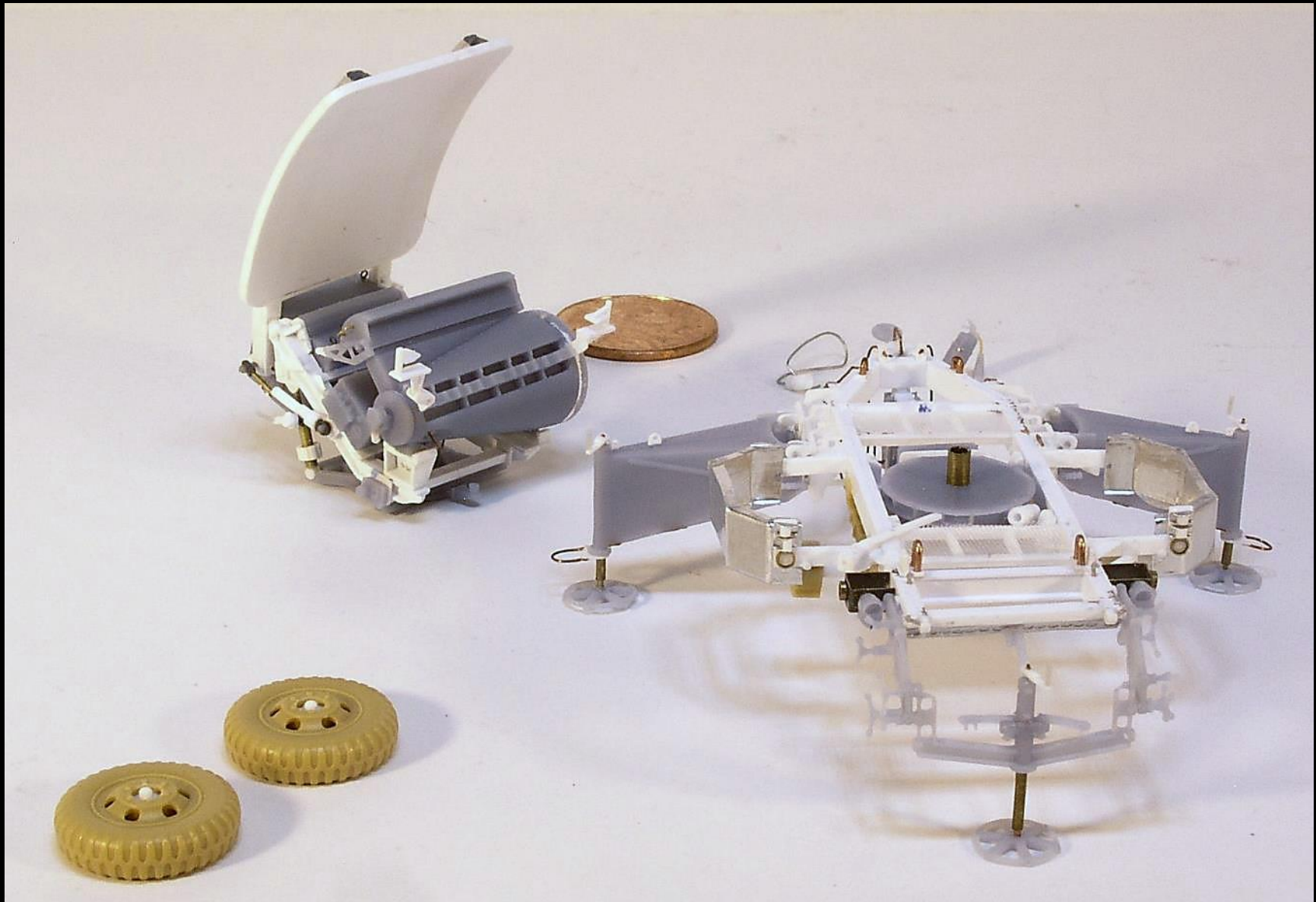
AN/MPQ-4A Counter Mortar Radar



Can you see the white and gray spec?



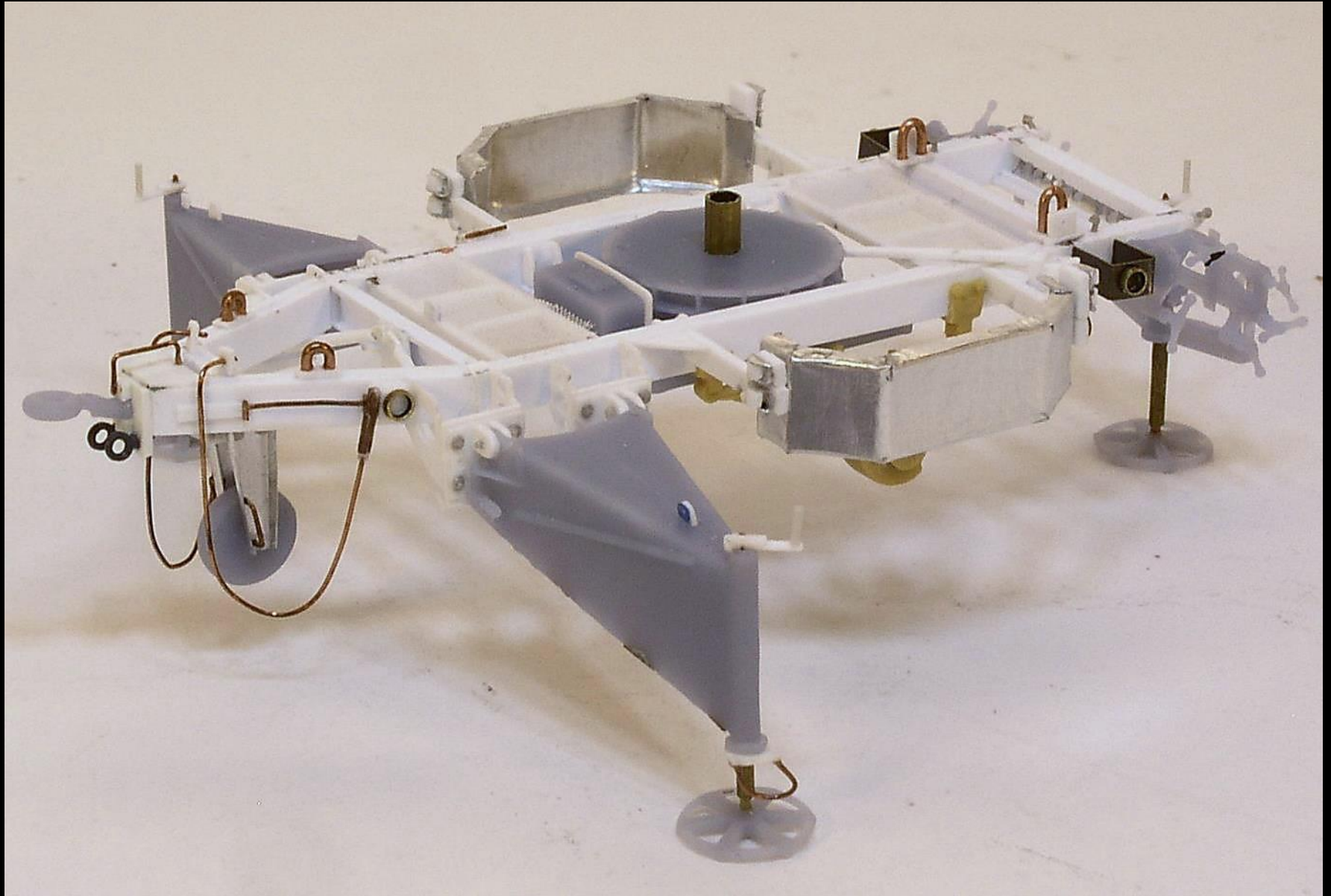
AN/MPQ-4A Counter Mortar Radar



All of the details have been added, and the radar is ready for paint.

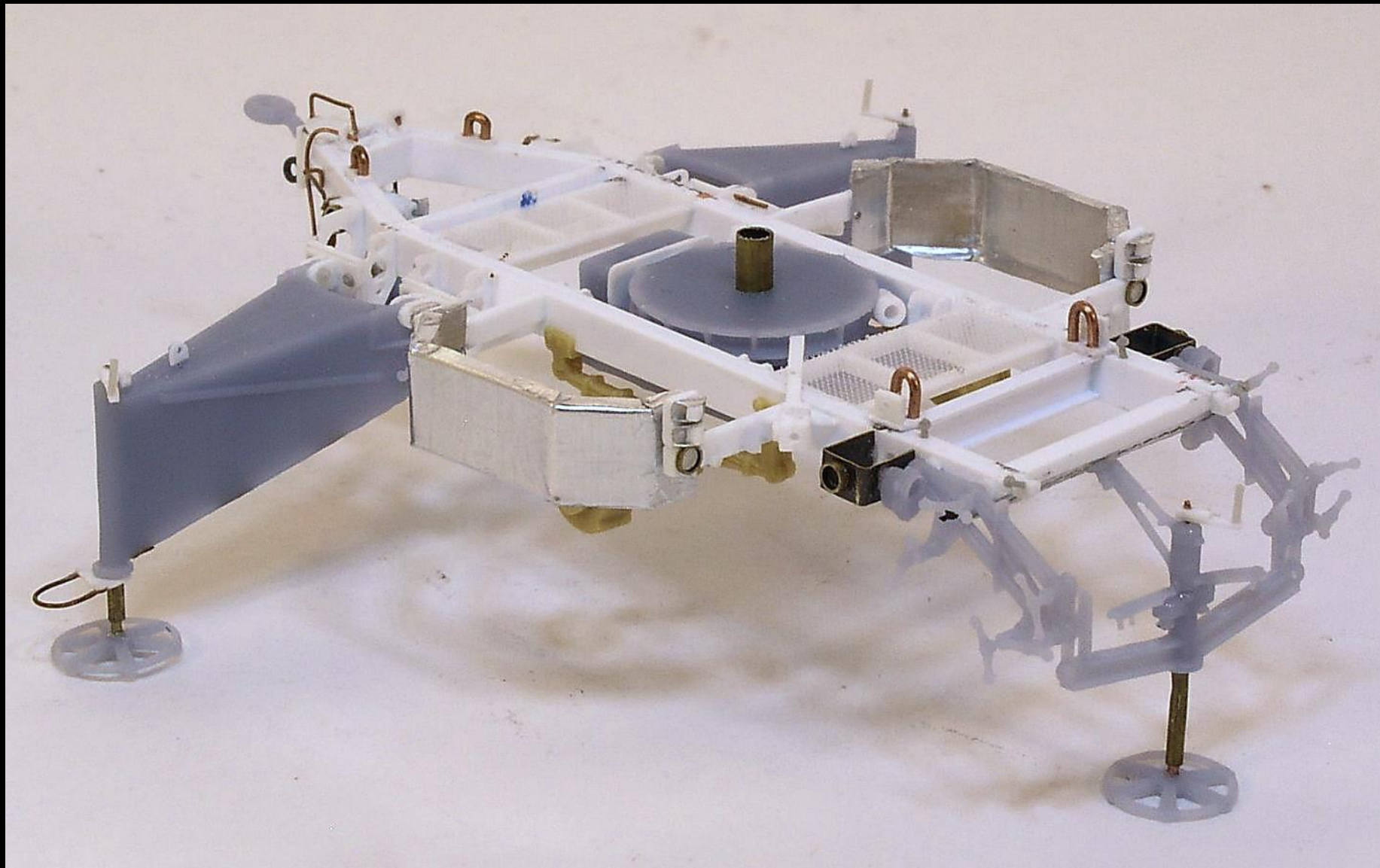


AN/MPQ-4A Counter Mortar Radar



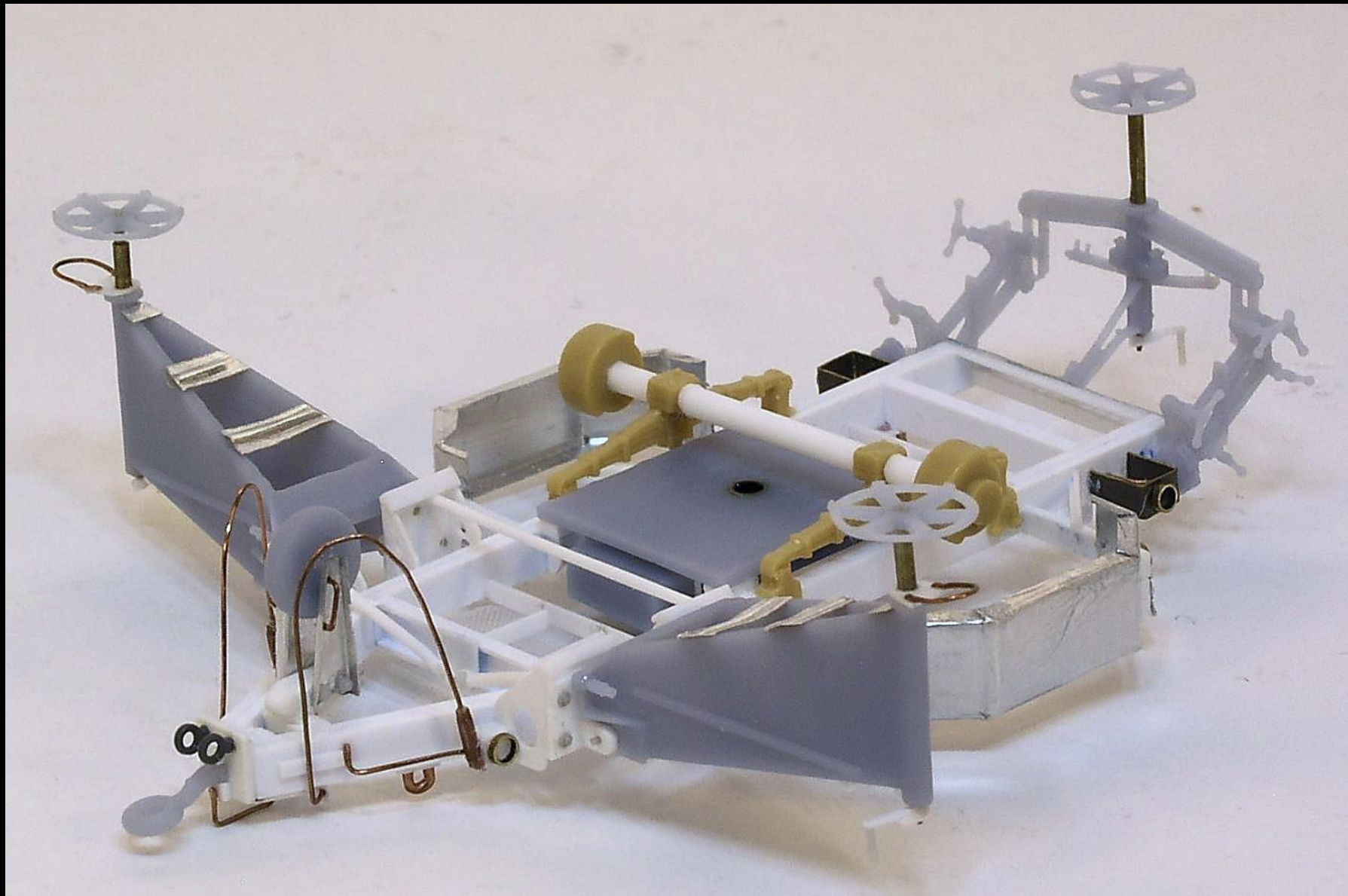


AN/MPQ-4A Counter Mortar Radar





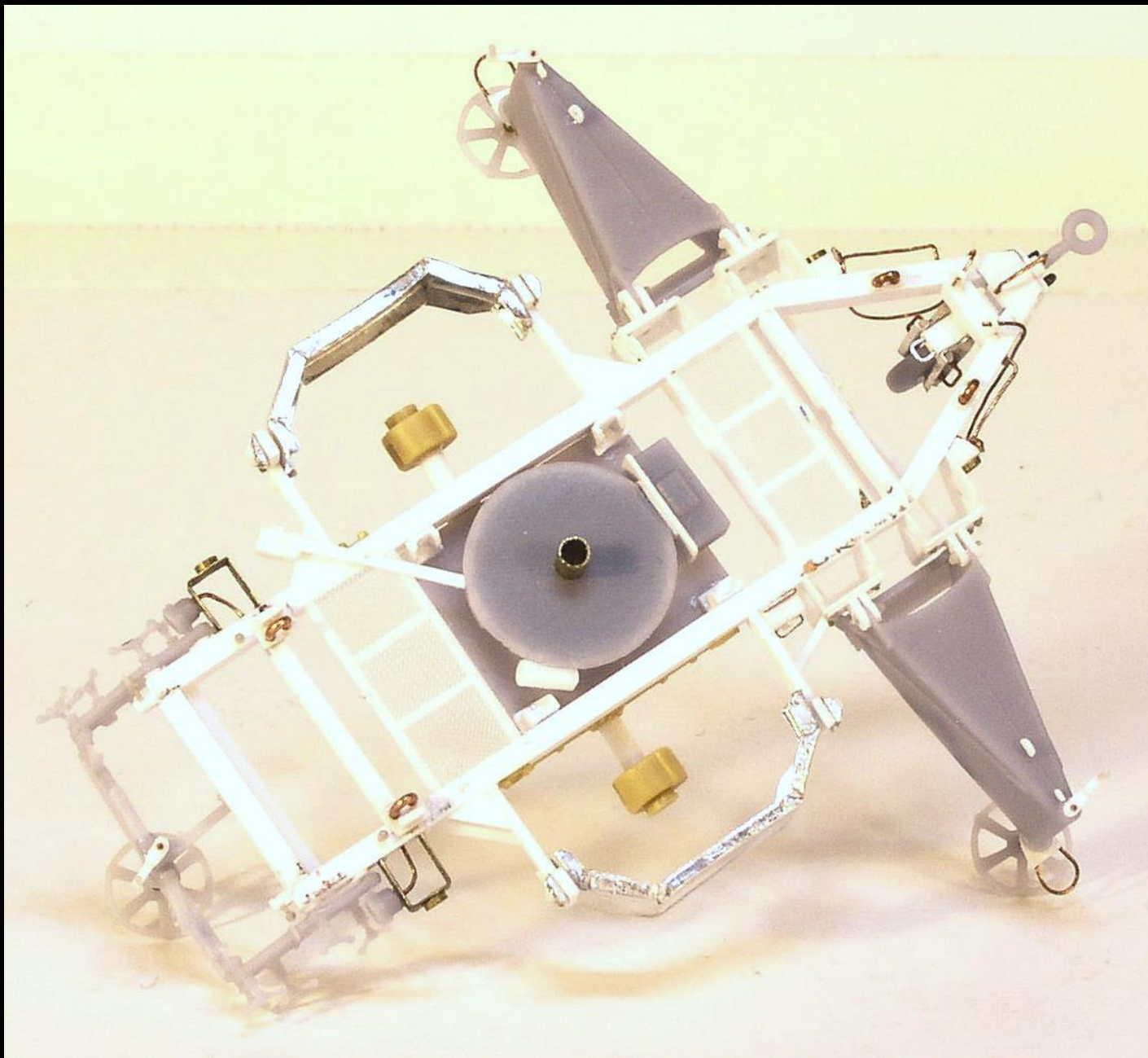
AN/MPQ-4A Counter Mortar Radar





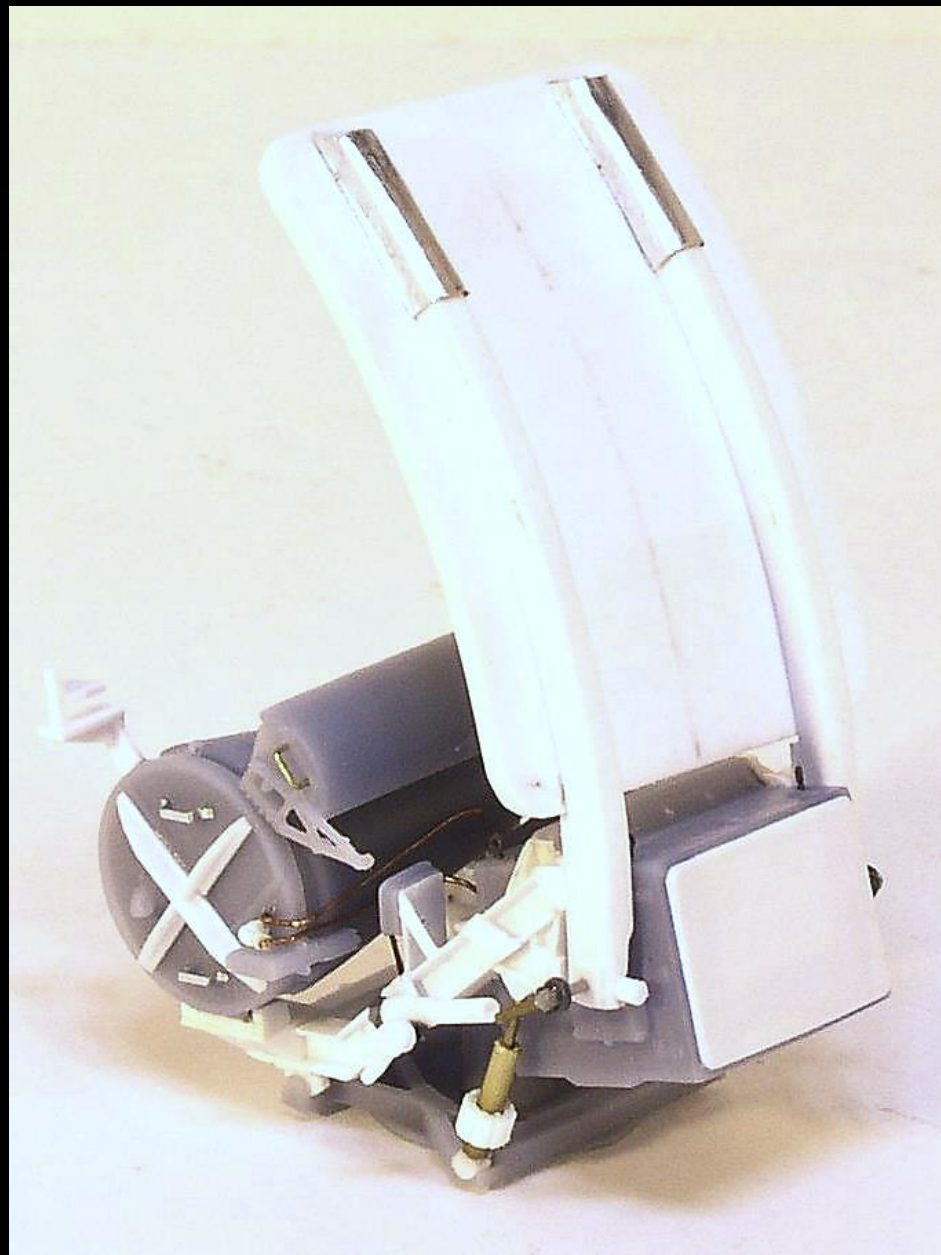
SOUTH CAROLINA
CONFEDERATE RELIC ROOM &
MILITARY MUSEUM

AN/MPQ-4A Counter Mortar Radar



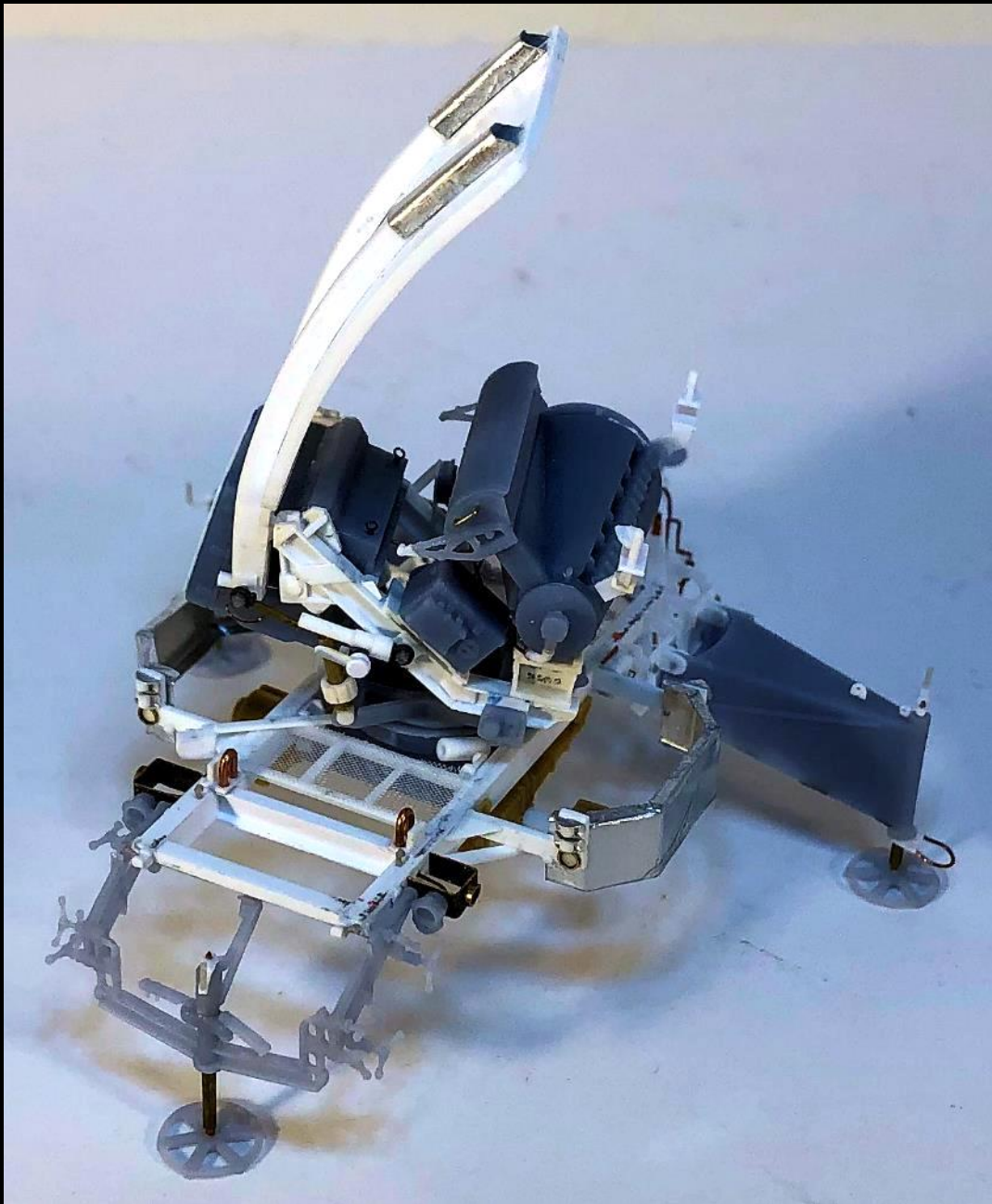


AN/MPQ-4A Counter Mortar Radar



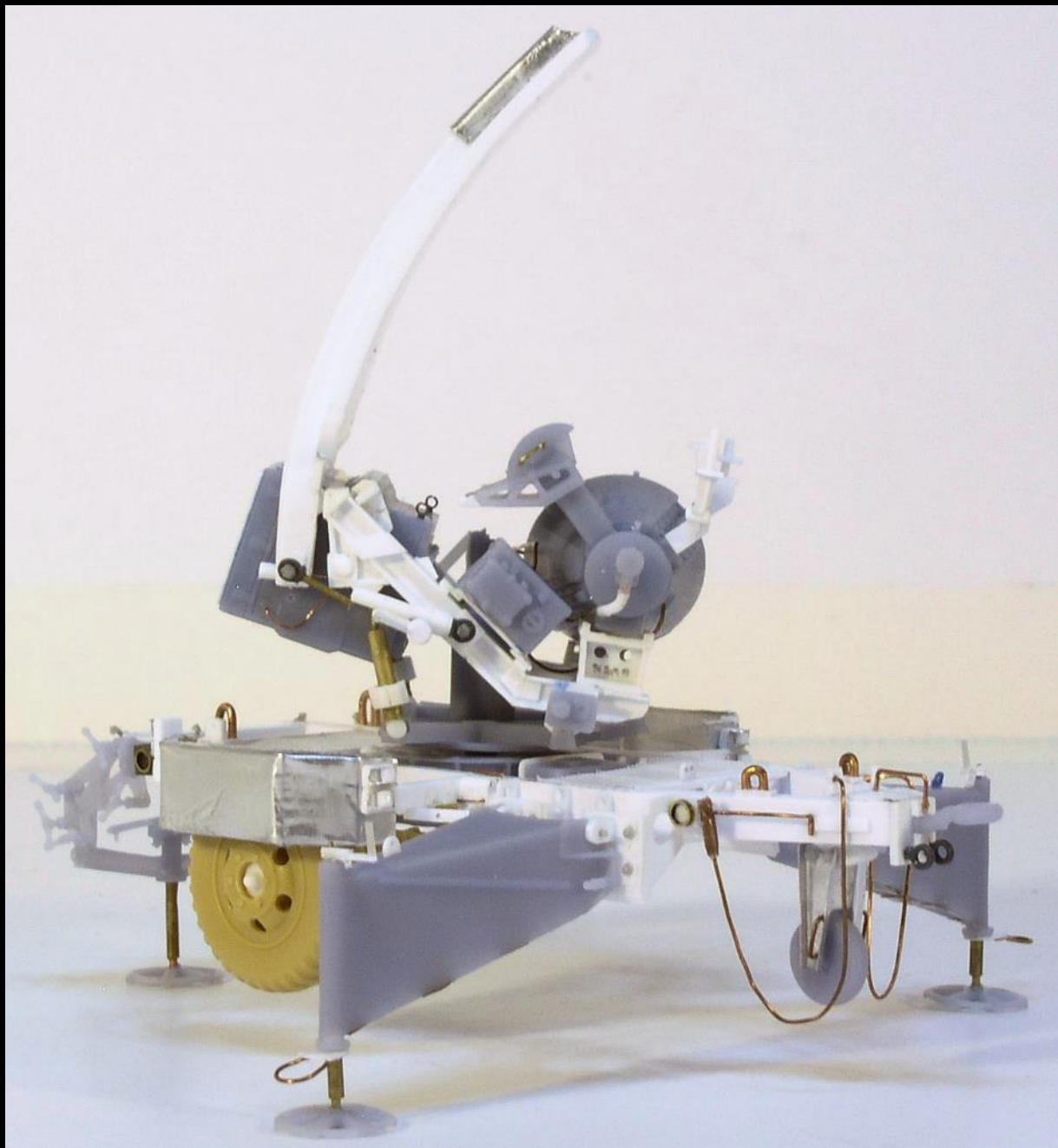


AN/MPQ-4A Counter Mortar Radar



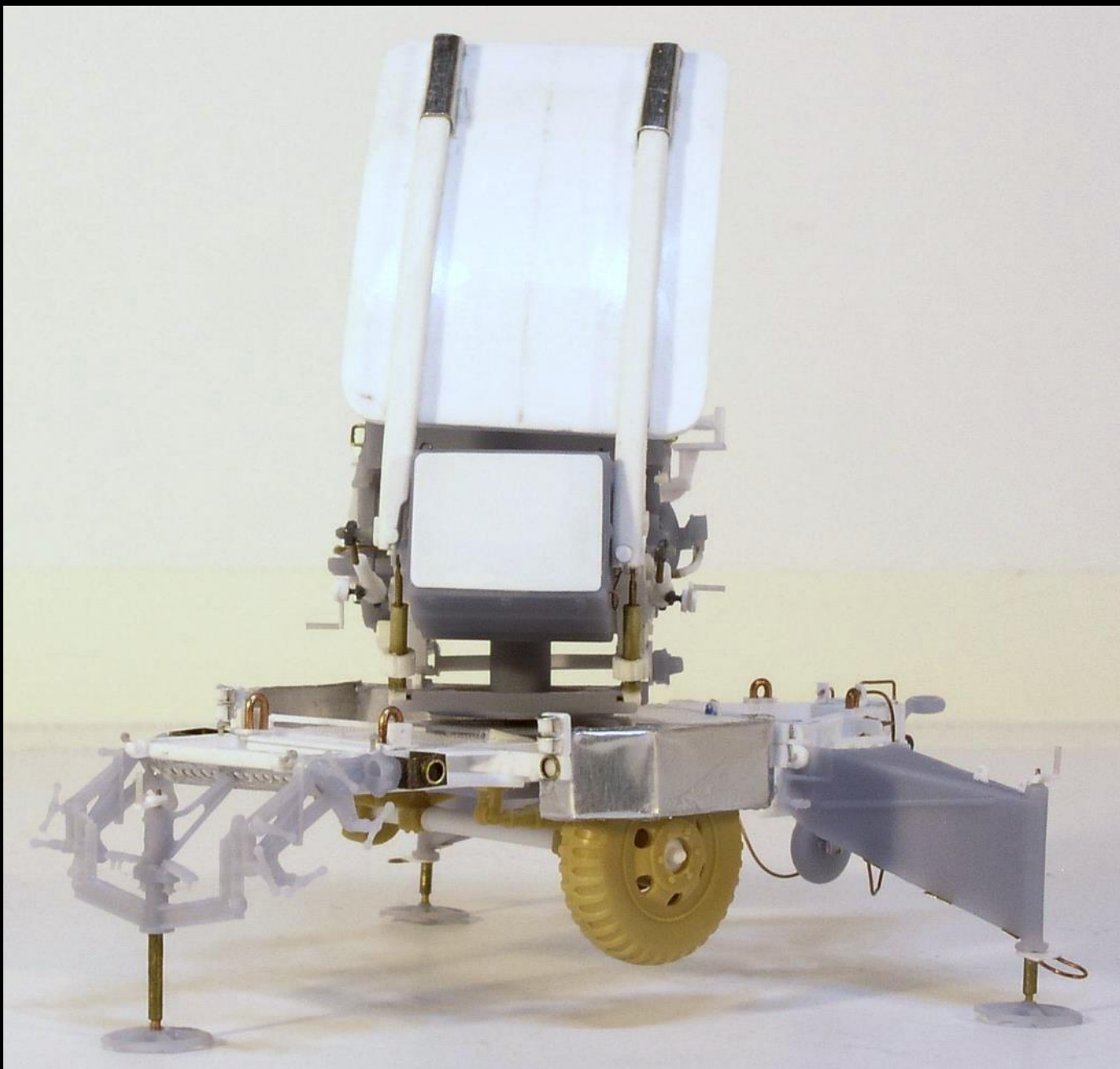


AN/MPQ-4A Counter Mortar Radar



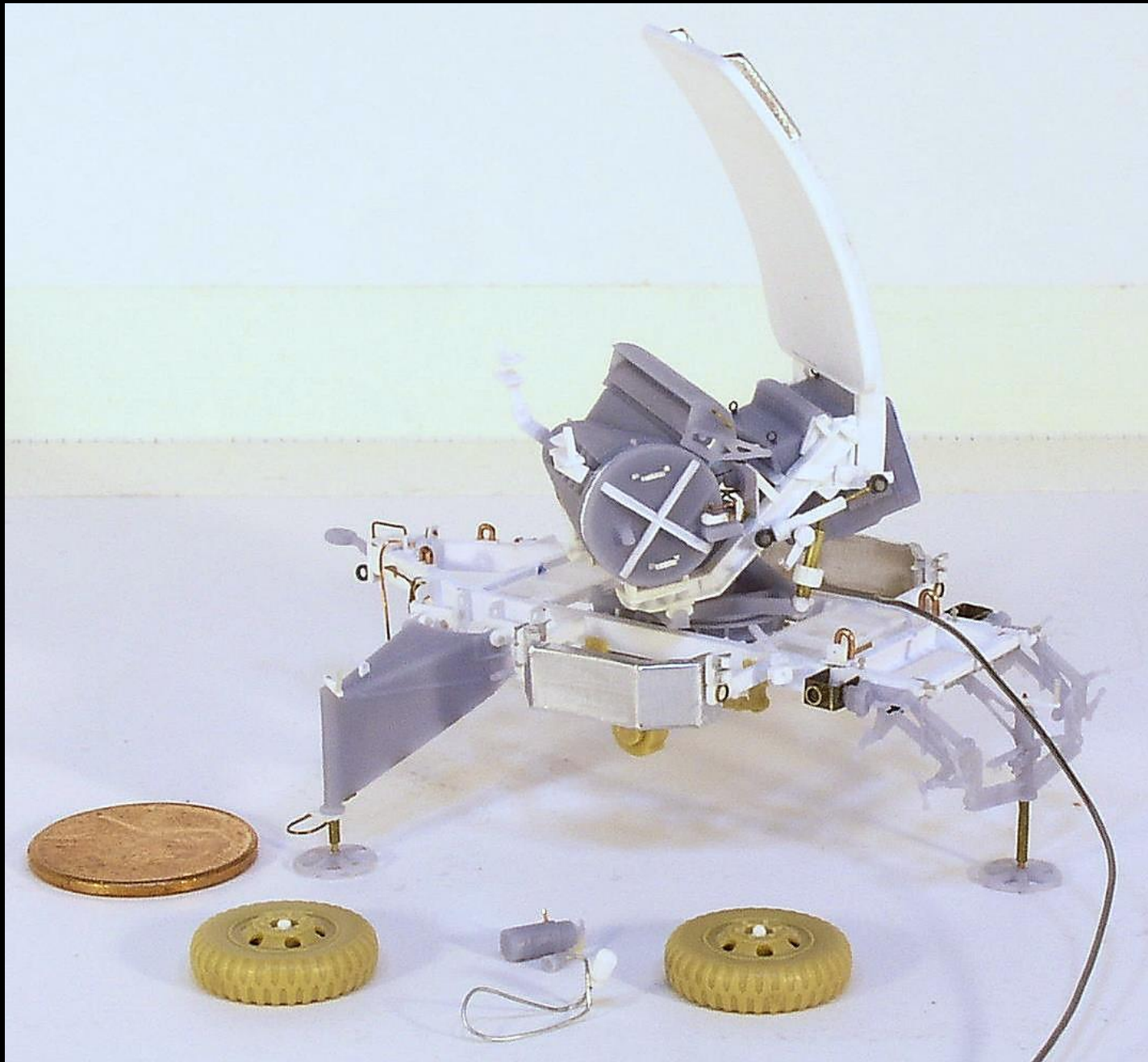


AN/MPQ-4A Counter Mortar Radar



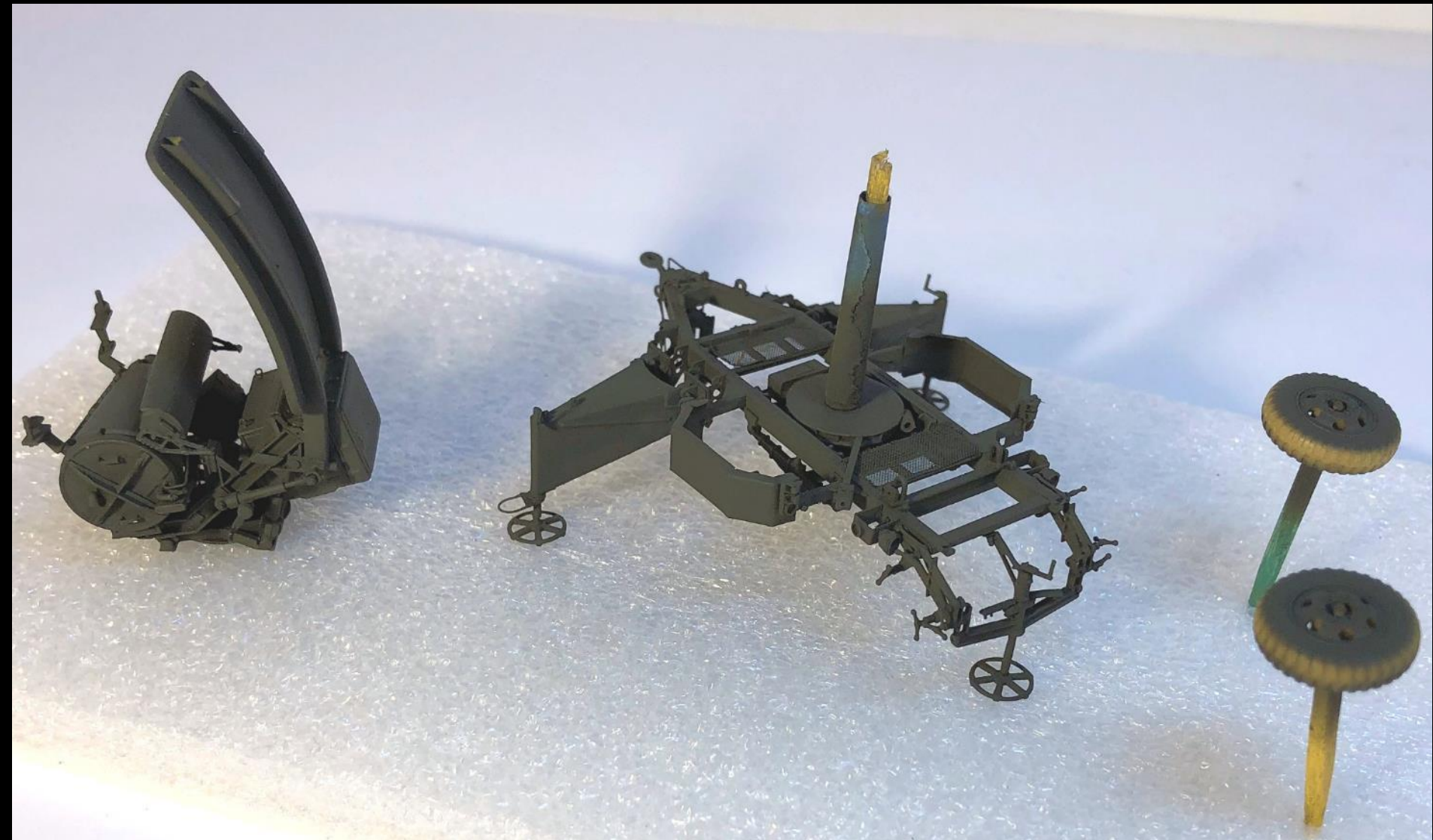


AN/MPQ-4A Counter Mortar Radar





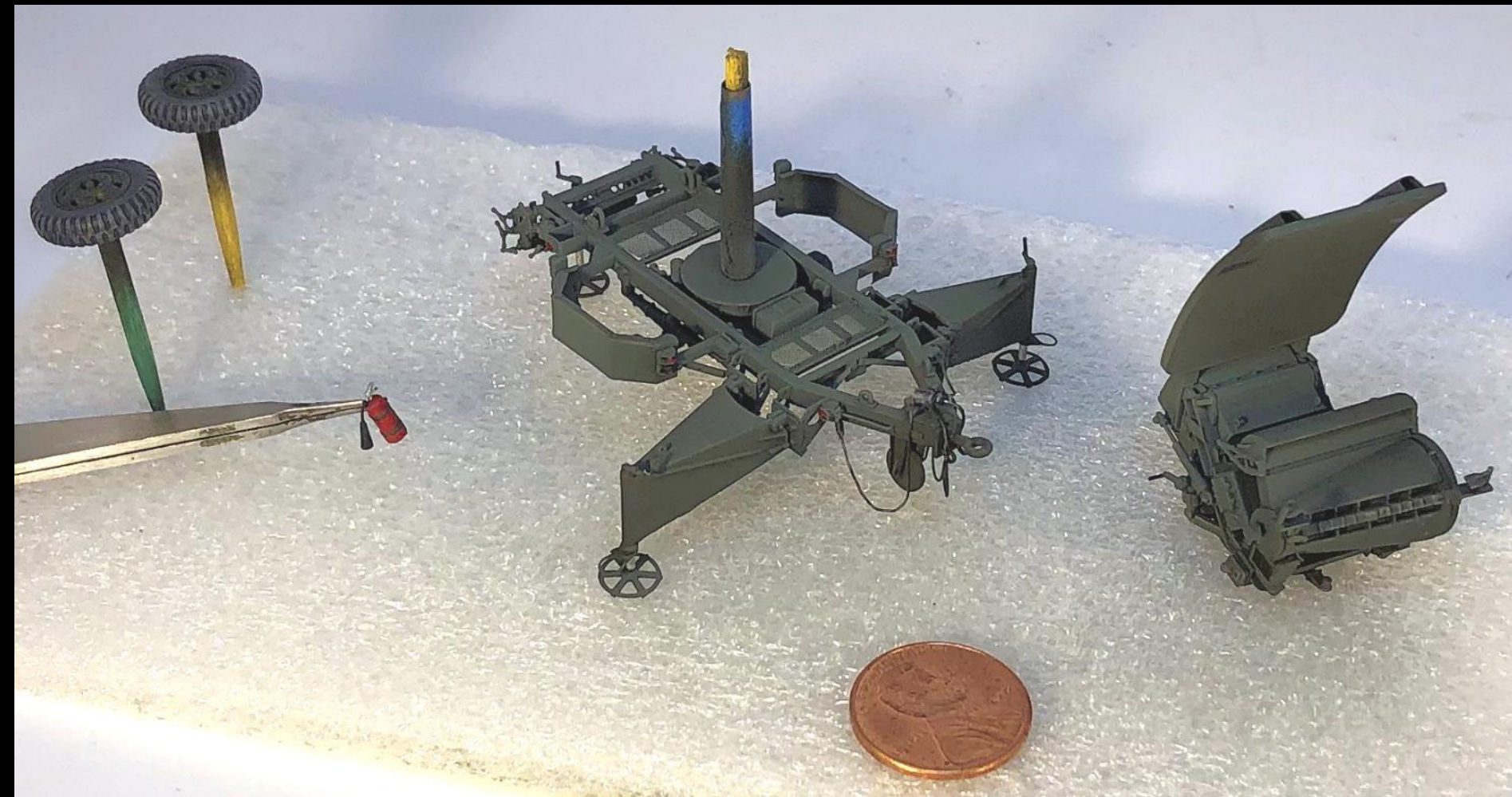
AN/MPQ-4A Counter Mortar Radar



Painted with Tamiya flat Olive Drab (OD) acrylic paint.



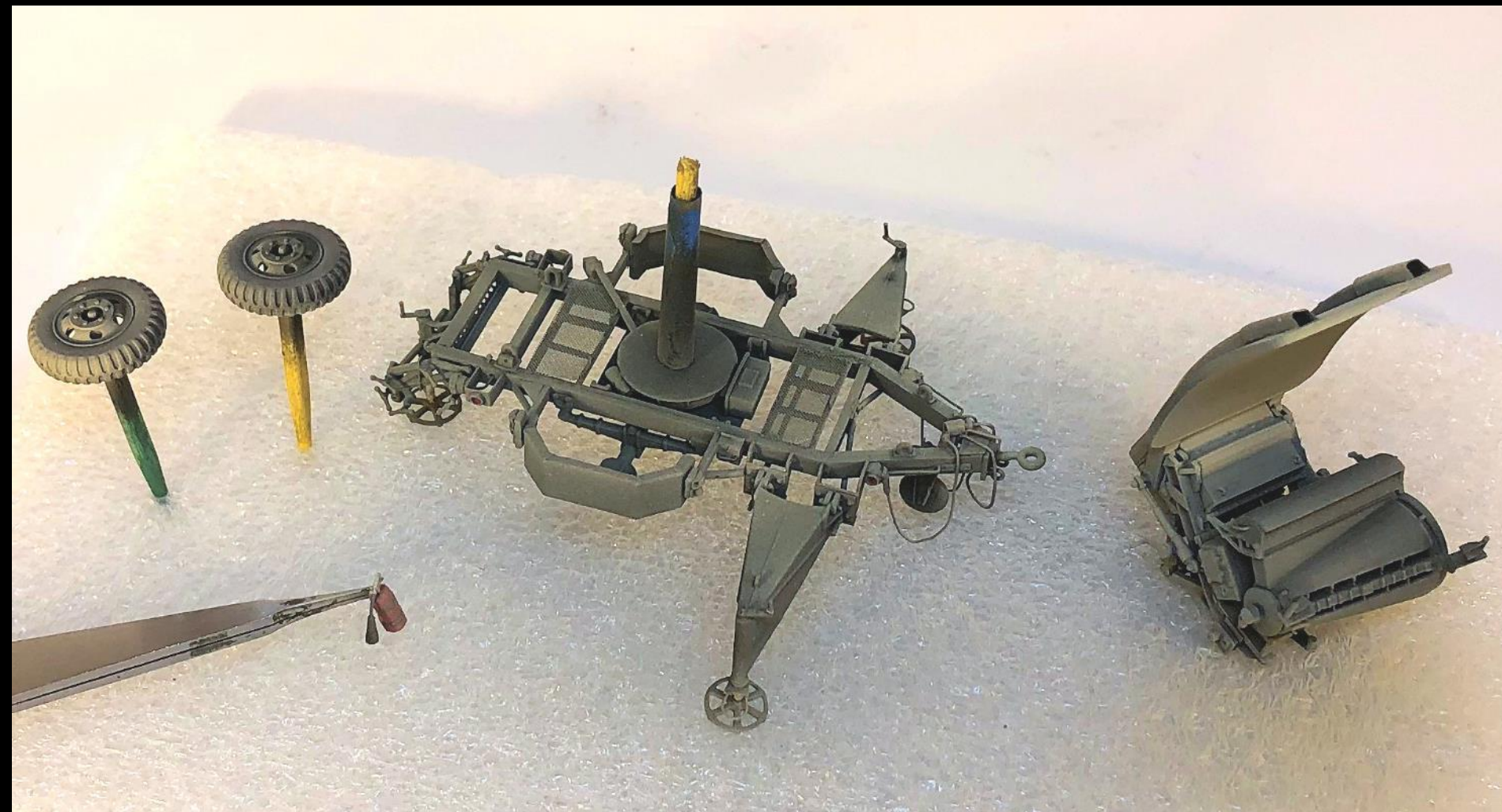
AN/MPQ-4A Counter Mortar Radar



Detail paint added along with a mist of lightened Tamiya flat Olive Drab (OD) acrylic paint.



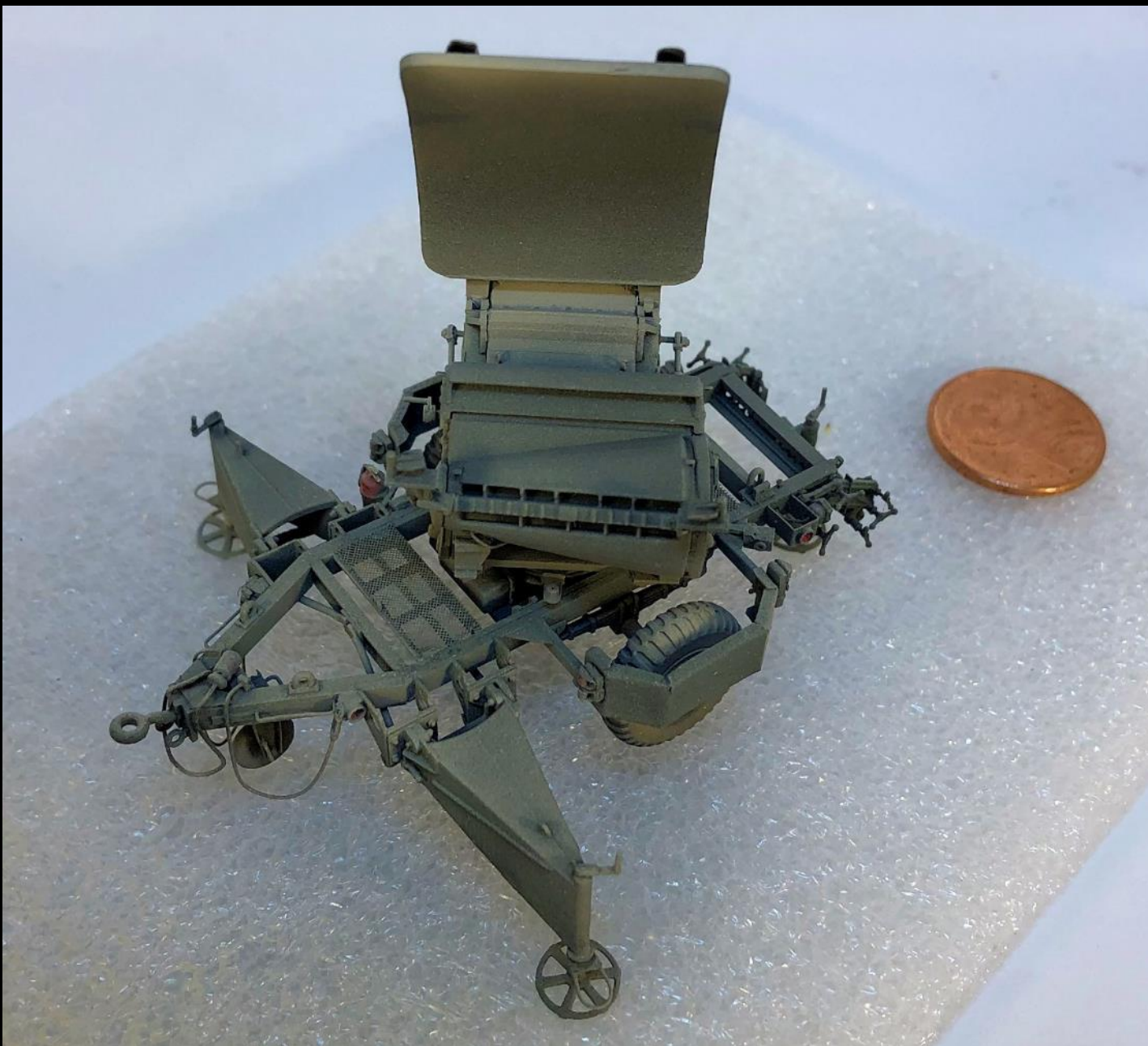
AN/MPQ-4A Counter Mortar Radar



Tamiya flat Khaki acrylic paint sprayed
onto the upper surfaces to replicate dust.



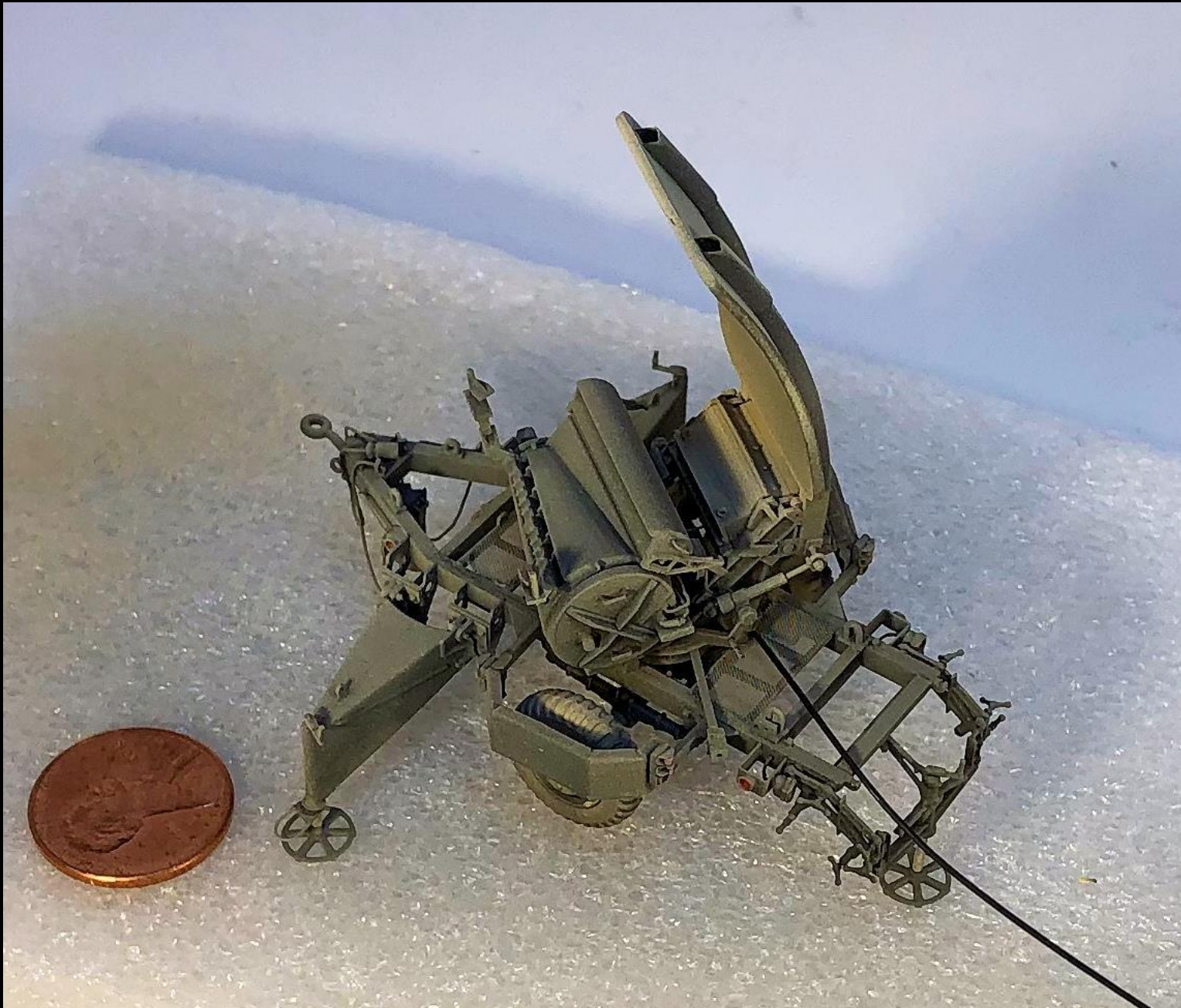
AN/MPQ-4A Counter Mortar Radar





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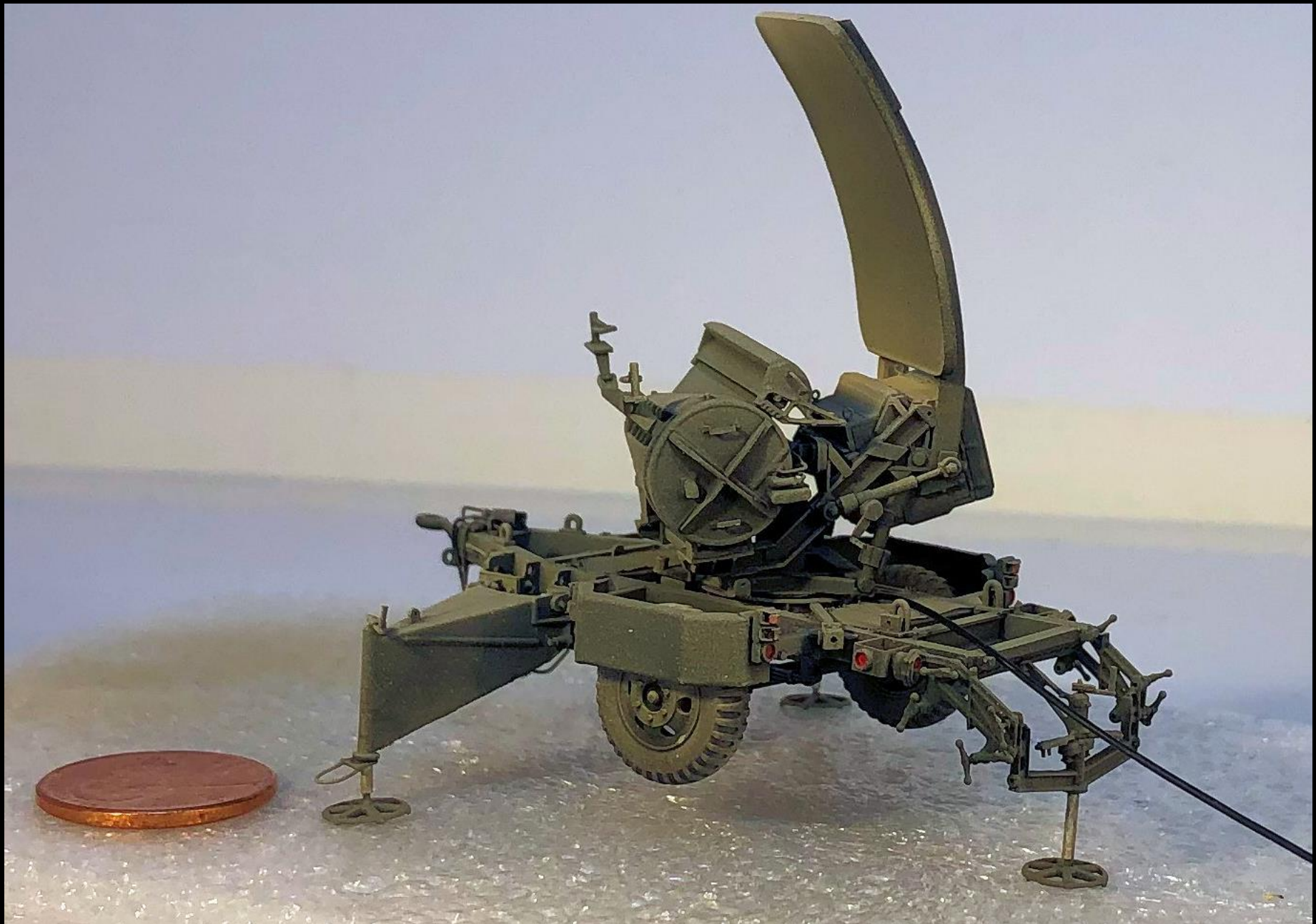
AN/MPQ-4A Counter Mortar Radar





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AN/MPQ-4A Counter Mortar Radar



Scaffold placed over the diorama for placing the Radar and other final details.



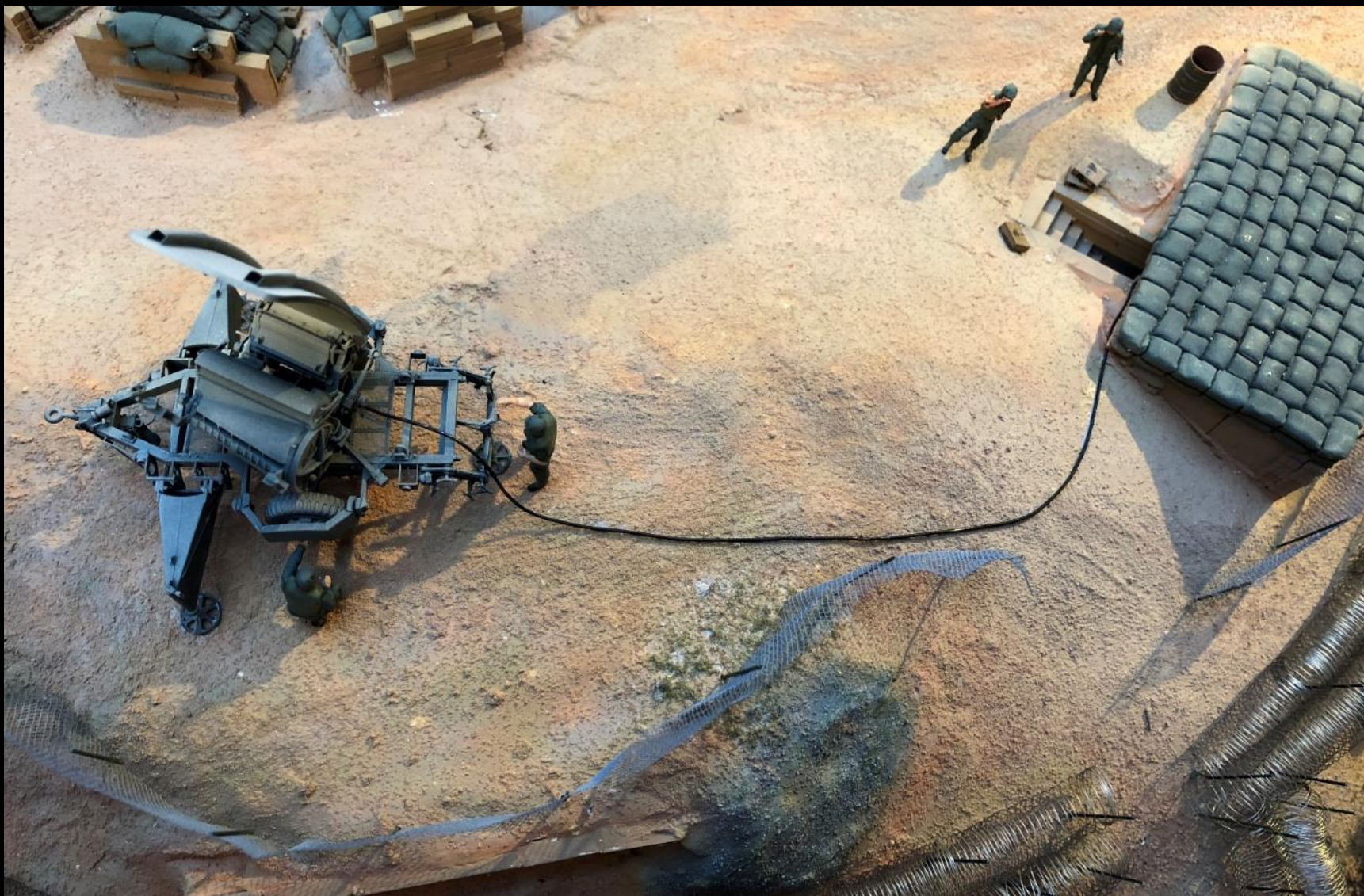
AN/MPQ-4A Counter Mortar Radar



Gluing the Radar onto the top of the mountain.



AN/MPQ-4A Counter Mortar Radar



The Radar glued in place with a painted lead wire added to the Control Bunker.



AN/MPQ-4A Counter Mortar Radar





AN/MPQ-4A Counter Mortar Radar



Any Questions?

