CHAMELEON ANTENNA

CHA MPAS 2.0 - MIL

Instructor Briefing
& Field Guide

Service-neutral training package | 60-90 minute adaptable class

PUBLIC-SOURCE TRAINING AID

Purpose: prepare operators to select, deploy, verify, recover, and troubleshoot the MPAS 2.0 - MIL safely within unit authorization and the supported radio system.

Based on the official CHA MPAS 2.0 - MIL Operator's Manual, Rev. 3/10/2026

Version 1.0 | 20 JUL 2026

How to use this package

- Default audience: radio operators, team communications specialists, supervisors, maintainers, and instructors with basic HF familiarity.
- Default duration: 60 minutes classroom plus 30 minutes hands-on. Expand to half-day training by adding multiple configuration lanes and an on-air exercise under unit authorization.
- Service-neutral: no branch-specific doctrine, frequency plan, call signs, COMSEC procedures, or classified tactics are included.
- Authority: the current Chameleon manual controls product assembly and ratings. Radio, amplifier, coupler, safety, spectrum, COMSEC, and unit publications control the complete system.
- Instructor adaptation: replace generic radio-chain examples with the receiving unit's approved radio, coupler, amplifier, power source, antenna analyzer, and local SOP.

Essential limitation

This is a manufacturer training aid, not a government technical manual, authorization to transmit, statement of interoperability for every radio, or guarantee of communication range.

TRAINING OUTCOMES

Learning objectives

1. Identify

Account for the kit and name the function of every component.

2. Select

Choose a configuration from distance, propagation, frequency, support, time, and signature constraints.

3. Deploy

Build whip and wire configurations without damaging components or creating avoidable hazards.

4. Integrate

Connect the antenna, coax, coupler/tuner, radio, amplifier, and power system within the lowest rating.

5. Verify

Use inspection, analyzer/SWR data, coupler status, receive checks, and a controlled low-power transmit test.

6. Recover

Teardown, inspect, maintain, inventory, and repack the complete system.

CAPABILITY SNAPSHOT

System at a glance

1.8-54 MHz	< 5 min	< 15 min	8 lb 12 oz	1 person
DOCUMENTED COVERAGE	VERTICAL WHIP SETUP	WIRE SETUP	COMPLETE KIT WEIGHT	CREW

Core capability

Broadband, modular HF/VHF-Low antenna with vertical-whip and wire options. The manual identifies ground-wave, sky-wave, NVIS, and ALE-compatible use when integrated with a suitable authorized system.

Range language

Manufacturer planning bands: ground 0-50 km, short 0-500 km, medium 500-2500 km. These are planning categories, not guaranteed ranges; terrain, frequency, ionosphere, noise, power, mode, and station performance control results.

Tuning boundary

The current military manual specifies continuous 1.8-54 MHz coverage and requires an antenna tuner or coupler below 10 MHz. In practice, use the approved wide-range coupler whenever the complete installed load is outside the radio's permitted SWR.

COMPONENT ACCOUNTABILITY

Kit contents and functions

Component	Function
Matching transformer	Mounting base and broadband impedance transformation
9 ft 4 3/4 in whip	One-section radiator or top of two-section vertical
8 ft 9 in extension	Bottom section; improves lower-frequency vertical performance
Ground spike	In-ground mechanical mount and counterpoise connection
73 ft antenna wire	Longer-range and NVIS-capable wire configurations
25 ft counterpoise	Required RF return path for all documented configurations
50 ft paracord + throw bag	Raises and supports the antenna wire
50 ft 50-ohm coax	BNC-to-BNC feed line with integrated RFI choke
Anti-oxidant compound	Protects bare aluminum extension joints

EXPECTATION MANAGEMENT

What the system is - and is not

It is

Modular: one kit supports multiple radiation patterns and deployment speeds.

Broadband: the transformer enables wide frequency use with an appropriate coupler.

Manpackable: one operator can carry and erect the documented configurations.

It is not

Self-tuning: broadband does not mean resonant or low SWR everywhere.

Range-guaranteed: an antenna cannot control the ionosphere or path noise.

Authorization: physical compatibility does not approve a frequency, emission, power level, or operational use.

Primary strength

The operator can trade speed and footprint for efficiency and radiation geometry: whip for rapid local/medium paths; wire for stronger lower-band, NVIS, and longer-range options.

Primary risk

Using the wrong geometry, omitting the counterpoise, overestimating SSB power ratings for high-duty modes, or trusting a shack-side 1:1 tuner indication without checking the complete RF system.

Start with the communications requirement

1 **Who**

Which authorized stations must exchange traffic?

2 **Where**

Distance, azimuth, terrain, support points, and occupied areas?

3 **When**

Time window, setup deadline, duration, and recovery deadline?

4 **How**

Ground wave, NVIS, or oblique sky wave? Primary and alternate?

5 **System**

Approved radio, coupler, amplifier, mode, power, coax, and connectors?

6 **Verify**

What measurable condition proves the link and installation are acceptable?

Propagation in one decision frame

Ground wave

Planning band: 0-50 km.

Follows/uses the near-surface path. Strongly affected by frequency, terrain, conductivity, antenna efficiency, polarization, and obstructions.

NVIS

Planning band: 0-500 km.

High-angle sky wave fills the normal HF skip zone. Requires a usable frequency below the path critical frequency and a deliberately low wire geometry.

Oblique sky wave

Planning band: 500-2500 km.

Lower-angle energy supports medium-range paths when the operating frequency is between the usable lower and upper limits for the path.

No fixed frequency is always best

Day/night, season, solar conditions, path length, noise, and required reliability change the usable band. Use approved propagation tools, ALE/link-quality data, current spectrum authorization, and an alternate-frequency plan.

Instructor prompt: Ask students why a fast vertical and a low wire should both be available even when they cover the same nominal frequency range.

OPERATOR DECISION SUPPORT

Configuration selection matrix

Configuration	Best initial use	NVIS	Pattern tendency	Setup
1-section whip	Fast manpack / local path / upper HF	No	Omnidirectional	< 5 min
2-section whip	Command post / improved vertical efficiency	No	Omnidirectional	< 5 min
Inverted L	Fixed site / NVIS / medium-range path	Yes, low height	Broadside low band; mostly omni high band	< 15 min
Sloping wire	Hasty wire / NVIS / medium-range path	Yes, low height	Mostly omni low band; slight high-end direction high band	< 15 min

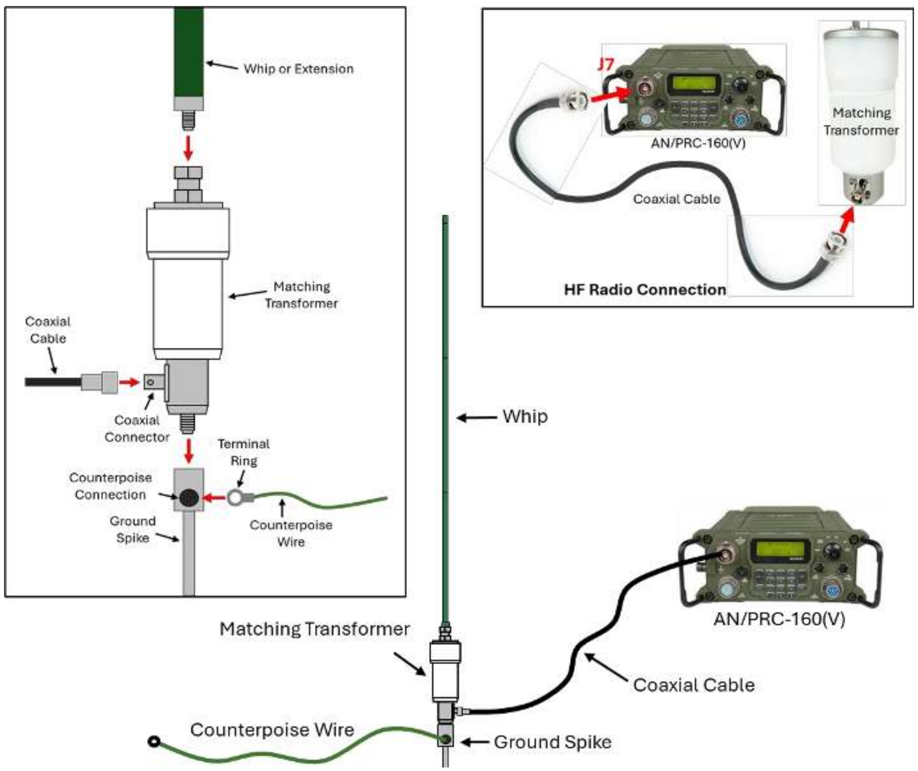
Selection rule

Pick the geometry from the path first, then confirm frequency, supports, coupler range, power, signature, and safety. Do not choose only by setup speed. If the primary configuration cannot support the path, establish an alternate geometry before the communications window.

CONFIGURATION EMPLOYMENT

Vertical Whip - 1 Section

OFFICIAL CONFIGURATION



Mission fit

Fastest manpackable option; clear site, short feed path, local network, upper-HF/VHF-Low emphasis, or contingency when a longer system is unavailable.

Documented characteristics

9 ft 4 3/4 in vertical; omnidirectional. Manufacturer describes ground-wave use across 1.8-54 MHz, with lower-band sky-wave performance limited below 10 MHz.

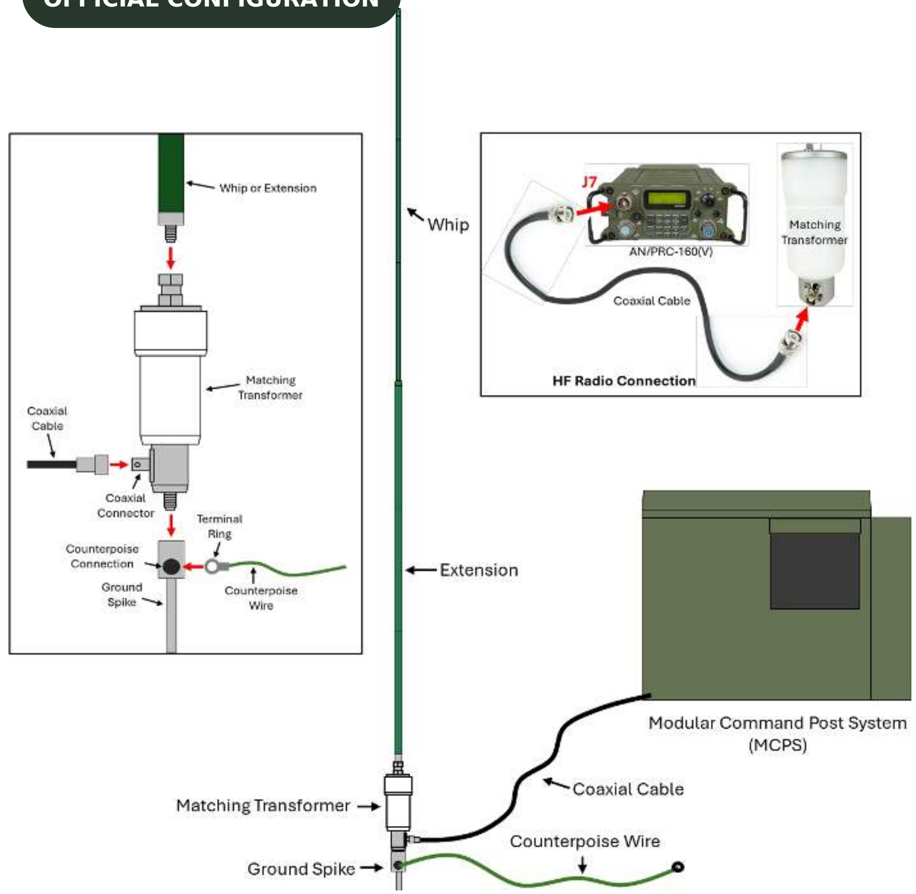
Guardrails

Not suitable for NVIS. Keep the 25 ft counterpoise attached and deployed. Coupler/tuner required below 10 MHz; verify the complete load before transmit.

CONFIGURATION EMPLOYMENT

Vertical Whip - 2 Sections

OFFICIAL CONFIGURATION



Mission fit

Rapid command-post, alternate-site, or dismounted node where a larger vertical footprint and ground spike are acceptable.

Documented characteristics

Whip plus extension: 18 ft 1 3/4 in. Omnidirectional; improved vertical performance, especially at lower frequencies, compared with the one-section whip.

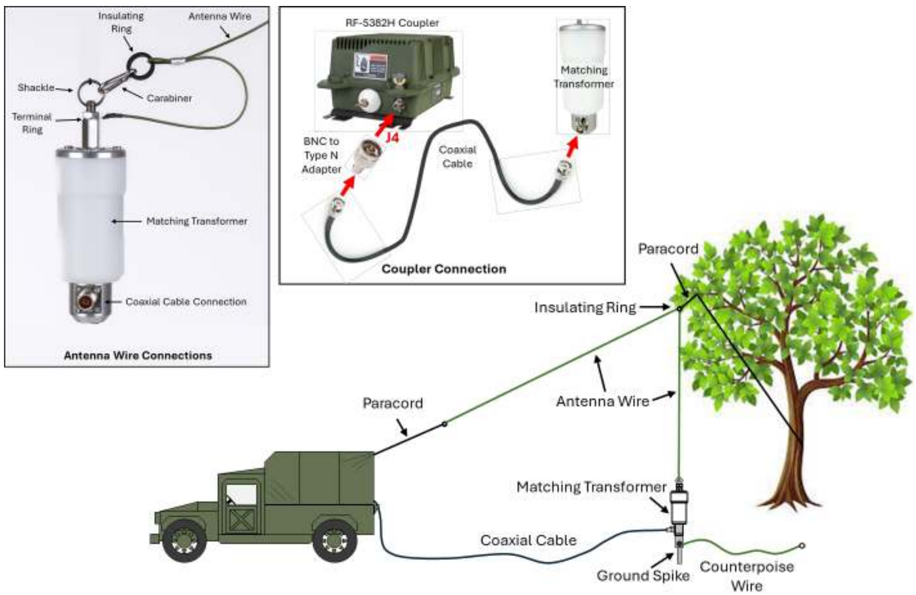
Guardrails

Not suitable for NVIS. Stabilize the tall radiator, control the occupied area, protect the BNC/coax from strain, and never erect near power lines.

CONFIGURATION EMPLOYMENT

Inverted L and Lazy L

OFFICIAL CONFIGURATION



Mission fit

Fixed command post, stationary vehicle support site, NVIS path, or medium-range path when a mast, tree, fence post, or building support is available.

Documented characteristics

73 ft wire with high point near 25 ft for general use; 15-20 ft for NVIS. Broadside tendency on lower frequencies; mostly omnidirectional above 10 MHz.

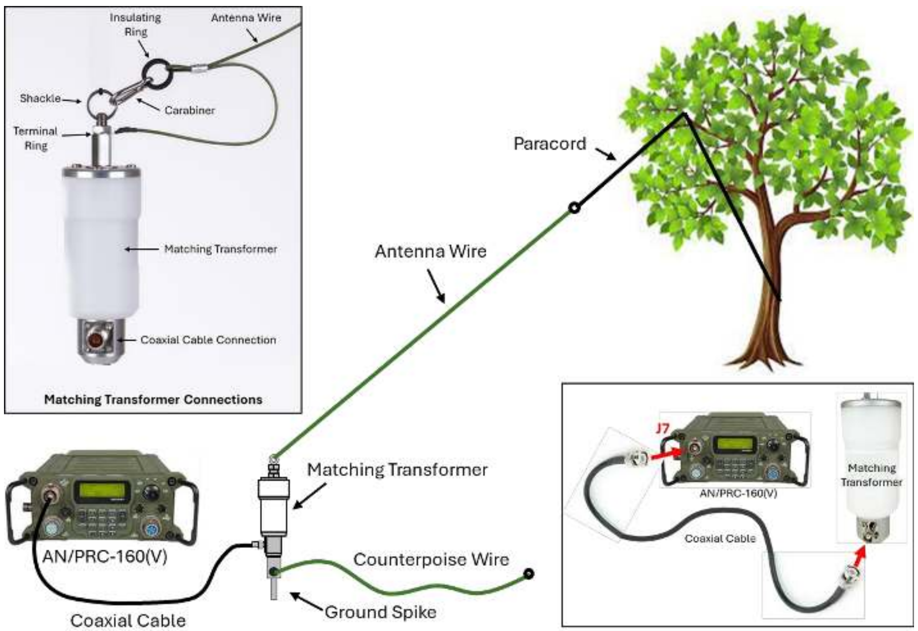
Guardrails

The vehicle or mast is a support, not automatic electrical approval. Maintain clearances, strain relief, approved bonding/grounding, and a controlled antenna hazard area.

CONFIGURATION EMPLOYMENT

Sloping Wire

OFFICIAL CONFIGURATION



Mission fit

Hasty wire configuration when a single elevated support is available; strong alternate to a damaged/ineffective whip; adaptable for NVIS or medium-range work.

Documented characteristics

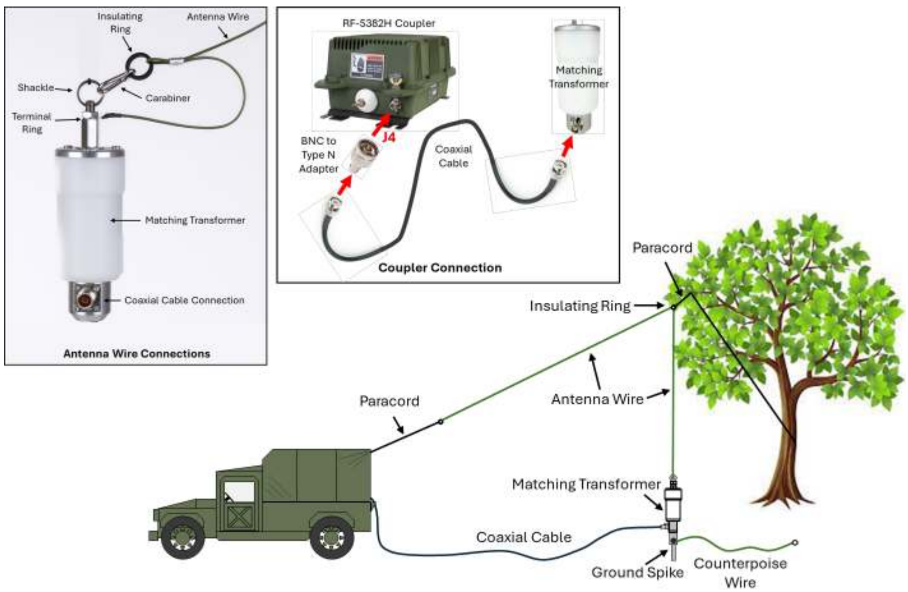
73 ft end-fed sloper; high end near 25 ft for general use or 15-20 ft for NVIS. Mostly omnidirectional low band, becoming slightly directional toward the high end at upper HF.

Guardrails

Use the supplied throw bag and paracord safely. Do not throw toward utilities. Keep people clear of the wire, end, feedpoint, support line, and RF exposure area.

SHORT-RANGE HF

NVIS employment fundamentals



- Use a wire configuration: the one- and two-section vertical whips are not documented as NVIS configurations.
- Lower the high point: the current manual specifies approximately 15-20 ft for Inverted L/Lazy L and sloping-wire NVIS use.
- Choose frequency from current ionospheric conditions: NVIS requires operation below the path critical frequency, within unit frequency authorization.
- Expect high-angle coverage rather than a guaranteed radius: absorption, noise, time, season, and solar conditions control reliability.
- Plan an alternate: a second authorized frequency and/or a different antenna geometry protects the network from changing conditions.

Training standard

Students should explain why lowering the wire changes the elevation pattern and when that trade is preferable to a vertical.

PATH-SPECIFIC TRADE-OFFS

Ground-wave and medium-range employment

Ground-wave emphasis

Initial choice: vertical whip.

Place in a clear area, keep it vertical, deploy the counterpoise, and minimize feed-line/connector loss. Terrain and conductivity can dominate performance; do not promise 50 km.

Medium-range emphasis

Initial choice: two-section whip or wire, based on band and desired elevation pattern.

Use ALE or approved propagation planning to choose the band. Compare link quality rather than assuming the physically largest antenna is best.

Upper-HF observation

The shorter whip becomes more useful as electrical length increases. The manual notes very good performance above 24 MHz for the standard MPAS 2.0 manpack vertical, but conditions and installed system still control the link.

Lower-HF observation

Wire and two-section configurations generally offer more useful radiator length. Below 10 MHz, the military manual requires a coupler/tuner, and efficiency still depends on real load, losses, and return path.

COMPLETE RF SYSTEM

Radio-to-antenna integration

1. **Radio** — Authorized waveform frequency and drive
2. **Amplifier** — Optional; mode and power ceiling
3. **Coupler** — Transforms load; reports status
4. **Feed line** — 50 ft, 50-ohm BNC; integrated RFI choke
5. **MPAS** — Transformer + radiator + counterpoise

Reference configuration in the current manual

The military manual names the AN/PRC-160(V), RF-5833H power amplifier, and RF-5382H coupler in troubleshooting. Treat that as a documented example, not approval for every variant, firmware, cable set, or installation.

- Confirm every connector and cable before energizing.
- Use the lowest frequency, mode, power, voltage/current, and duty-cycle limit in the chain.
- A successful coupler match protects the radio; it does not prove high antenna efficiency or zero transformer/feed-line heating.

PROTECT THE COMPLETE SYSTEM

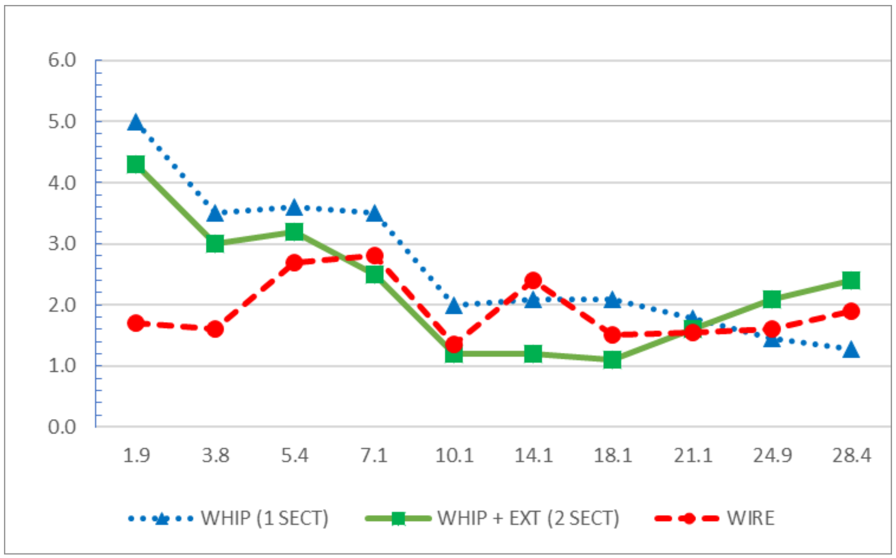
Power handling and duty cycle

500 W	250 W	100 W
SSB MAXIMUM CEILING	CW MAXIMUM CEILING	FM AND DIGITAL CEILING

- Ceilings, not targets: the current manual's mode ratings assume a suitable frequency, load, installation, connectors, coupler, ventilation, and duty cycle.
- High-duty signals: FM and digital waveforms sustain average power and heat faster than ordinary voice SSB. Never substitute the 500 W SSB figure.
- Mismatch: high SWR can increase voltage/current stress and feed-line loss, but reflected power is not automatically converted watt-for-watt into transformer heat.
- Field method: tune at minimum power, increase in controlled steps, keep test transmissions short, and stop for SWR drift, protection, arcing, odor, heat, or intermittent behavior.

MEASUREMENT DISCIPLINE

SWR: what operators must understand



What SWR tells you

Mismatch magnitude at a defined reference plane. The manual's graph is one typical deployment, not a guaranteed curve for every soil, geometry, cable, or support height.

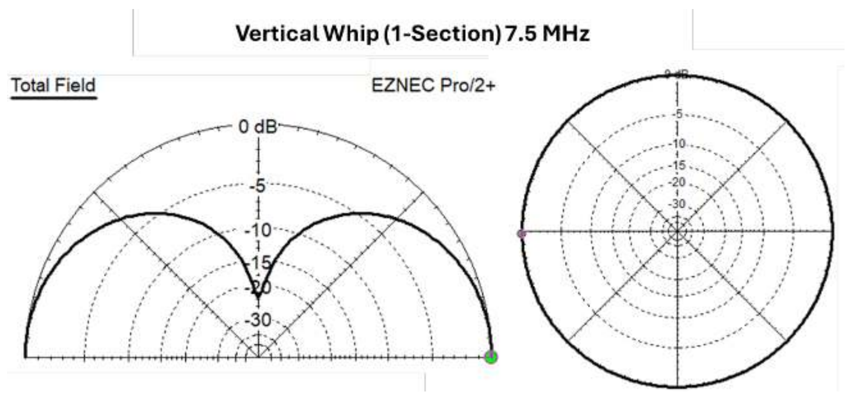
What SWR does not tell you

Radiation efficiency, complex impedance, common-mode current, transformer temperature, cable loss, or whether the antenna is safe at full rated power.

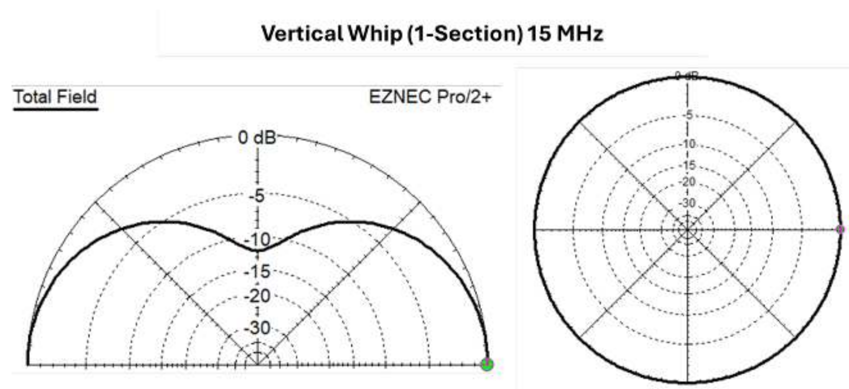
Reference-plane rule

Record where the reading was made, cable included, coupler state, frequency, configuration, ground/counterpoise, weather, and power. Without that context, two SWR readings may not be comparable.

Reading the pattern plots



1-section whip, 7.5 MHz

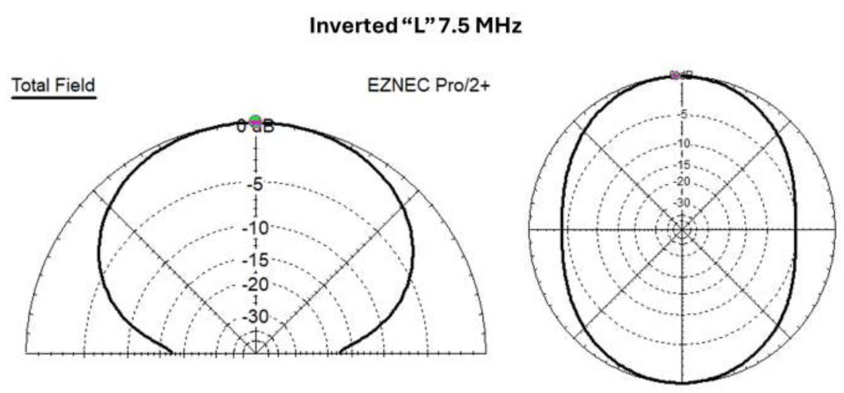


1-section whip, 15 MHz

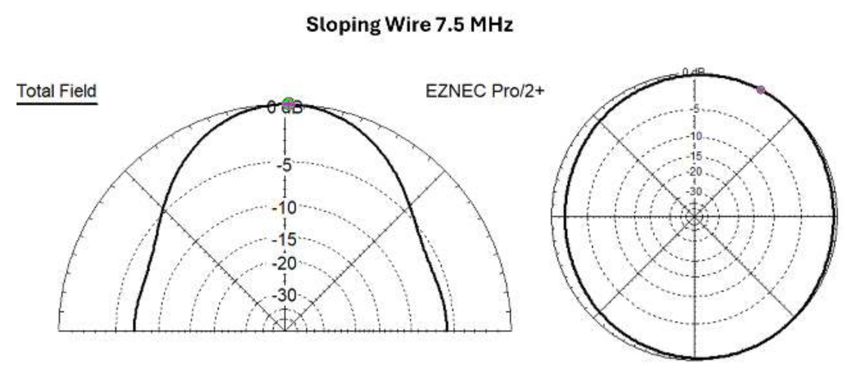
- Elevation plots show how energy divides between low and high angles; azimuth plots show horizontal directionality.
- A vertical that is electrically short at the lower frequency can be inefficient even when a coupler obtains a match.
- Pattern models illustrate tendencies, not measured guarantees. Soil, counterpoise, structures, vehicles, cables, and terrain alter the installed result.
- Use received link-quality data and controlled field comparisons to validate the chosen geometry.

RADIATION GEOMETRY

Wire geometry changes the pattern



Inverted L, 7.5 MHz



Sloping wire, 7.5 MHz

Inverted L

The horizontal portion contributes a broadside tendency at lower frequencies. Lowering the wire supports higher-angle NVIS behavior; raising it favors lower takeoff angles.

Sloping wire

The orientation is useful when only one elevated support exists. At higher frequencies, directionality can increase toward the high end of the wire.

Site selection and hazard control

Hazard	Control before setup
Power lines / utilities	Do not erect, throw, climb, or route any wire, rope, mast, ladder, or feed line near them. Never trust insulation.
RF exposure	Establish controlled distance from people and RF-sensitive medical devices; calculate/evaluate using governing rules and actual power/mode.
Trip / vehicle / rotor hazard	Mark wire, counterpoise, coax, guy lines, spike, and occupied areas; route away from traffic and moving equipment.
Lightning / weather	Follow unit lightning policy; disconnect and secure equipment; do not operate an exposed antenna during unsafe conditions.
Mechanical failure	Inspect supports, knots, wire, spring sections, spike, connectors, and strain relief. Never use RF terminals as lifting points.
Spectrum / COMSEC / OPSEC	Transmit only under authorization using approved equipment, frequency, waveform, identifiers, cryptographic procedures, and emission control.

REPEATABLE TEAM SEQUENCE

Generic deployment battle drill

1

Plan

Path, configuration, supports, frequency plan, coupler, power, hazards, alternate.

2

Inventory

Account for components; inspect cable, BNCs, wire, joints, spike, paracord, and tools.

3

Emplace

Build the selected radiator; attach the 25 ft counterpoise; support and strain-relieve the coax.

4

Integrate

Connect radio chain with power removed; confirm BNC lock and approved coupler path.

5

Measure

Check native load at low level when permitted; couple/tune at minimum transmitter power.

6

Validate

Receive check, controlled low-power transmit, link-quality/ALE result, then staged power increase.

7

Record

Configuration, frequency, time, location class, SWR/coupler result, power/mode, link quality, faults.

8

Recover

De-energize, disconnect radio first, lower, clean, inspect, inventory, and repack.

HANDS-ON LANE A

Vertical-whip setup checklist

- Site: clear overhead and ground hazards; establish controlled area; select firm soil or an approved alternate mount.
- Spike and transformer: install without damaging threads; attach the counterpoise at the intended ground connection; lay it fully out.
- Radiator: choose one or two sections. Seat sections fully. Use anti-oxidant only as documented on extension joints.
- Coax: route and strain-relieve the 50 ft BNC cable; protect the integrated choke; feel the BNC lock into place.
- Radio chain: connect with RF disabled; verify coupler/tuner and amplifier settings; begin at minimum power.
- Operational check: receive, couple/tune, low-power transmit, link-quality check, staged power, and documented result.

Operator must explain

Why the counterpoise is part of the antenna, why the two-section vertical improves lower-band performance, and why neither vertical is the documented NVIS choice.

HANDS-ON LANE B

Wire-antenna setup checklist

- Choose geometry: Inverted L/Lazy L or sloping wire from the required path and available supports.
- Inspect and connect: verify ring terminal, carabiner/insulating ring, transformer connection, wire insulation, winder, and paracord.
- Raise safely: use the supplied throw bag only toward a verified clear support; never toward a utility, roadway, rotor area, or occupied position.
- Set height: approximately 25 ft for general documented use; approximately 15-20 ft for NVIS-oriented geometry.
- Deploy return path: connect and fully extend the 25 ft counterpoise in a practical direction. Use CHA FSR only if equipped and trained.
- Verify: maintain strain relief and clearance, connect the radio chain de-energized, measure/couple at low power, then validate the path.

Operator must explain

How wire height changes the elevation pattern, how orientation affects directionality, and why a successful coupler match does not guarantee antenna efficiency.

QUALITY CONTROL HOLD POINT

Before-transmit release criteria

Physical

Correct configuration; connections seated; counterpoise deployed; no strain, damage, corrosion, water, or exposed conductor.

Safety

Utility, lightning, RF exposure, trip, traffic, support, and access hazards controlled.

Authorization

Approved radio, waveform, frequency, power, identifiers, COMSEC, emissions control, and operator authority.

RF chain

Correct cable path, coupler/tuner state, amplifier state, connector type, component ratings, and grounding/bonding plan.

Measurement

Known reference plane; stable native/coupled indication; no infinite/high-SWR fault; minimum-power tune completed.

Network

Primary and alternate path/frequency defined; called station ready; link-quality or check procedure understood.

PRESERVE READINESS

Recovery and preventive maintenance

Controlled recovery

1. Disconnect coax from the radio first.
2. Lower the antenna before separating RF components.
3. Roll coax without twisting.
4. Wind wire and counterpoise cleanly.
5. Remove the transformer and spike.
6. Account for throw bag, paracord, winders, hardware, and compound.

Critical folding sequence

Antenna extension: begin at the bottom; separate and fold upward section by section.

Vertical whip: begin at the top. Starting elsewhere can prematurely damage the internal braided cord and spring.

After action inspection

Remove dirt and moisture. Check wire insulation, ring terminals, BNCs, coax shield exposure, spring sections, threads, spike, winders, paracord, and the transformer enclosure.

Corrosion control

Inspect bare aluminum extension joints. Apply only a thin coat of the supplied anti-oxidant compound as documented. Record missing/damaged items and quarantine unsafe components.

FAULT ISOLATION

Troubleshooting sequence

1	**Inspect wire and terminals**	Ring terminals secure; no corrosion, breakage, or strain.
2	**Inspect BNC and coax**	Both BNCs click/lock; no cuts, exposed shield, sharp bends, or connector movement.
3	**Check SWR/load**	Use an approved meter/analyzer at a known reference plane and low power.
4	**If SWR is > 8:1**	Treat as open/short or failed signal path; check coupler and every patch cable per its publication.
5	**Substitute coax**	Most antenna-system faults are cable/connector faults; use a known-good cable.
6	**Substitute transformer**	Only after the radiator, return path, coax, coupler, adapters, and connections are controlled.
7	**Escalate with evidence**	Configuration, frequency, power/mode, measurements, reference plane, symptoms, photos, and substitutions.

DIAGNOSTIC THINKING

Common symptoms and likely branches

Symptom	Investigate first	Do not assume
Infinite / >8:1 SWR	Open/short, loose BNC, broken wire, missing return path, bad patch cable, coupler fault	Transformer failed
Tunes but weak link	Band/path choice, noise, loss, counterpoise, radiator length/height, power/mode, remote station	Low SWR means efficient
SWR changes with power/time	Arcing, heating, connector loss, moisture, transformer/coupler nonlinearity	Meter error only
RF in equipment / unstable tuner	Common-mode current, choke placement, bonding, cable routing, return path	More power will fix it
Intermittent while moved	BNC lock, cable center pin/shield, ring terminal, wire break, spring section	Propagation fade

One-variable rule

Change only one component, geometry, cable, or setting at a time. Record the result. Simultaneous changes destroy diagnostic evidence and can hide an unsafe failure.

PERFORMANCE OPTION

Optional Faraday Strip Radial System

Documented boundary

If equipped, CHA FSR is a roughly 3 lb manpackable counterpoise option for both vertical and wire configurations; the current manual describes improved efficiency and durability versus the standard 25 ft wire.

INSTRUCTOR SCENARIO

Practical exercise: establish two paths

Situation

A team must establish an authorized local link quickly and prepare an alternate short-range HF path. Supports include open ground and one safe tree. Students have one MPAS 2.0 - MIL kit and the unit radio chain.

Task 1

Select and deploy the fastest appropriate local configuration. Complete safety, accountability, coupler, low-power verification, and link-quality checks.

Task 2

Reconfigure for a short-range sky-wave/NVIS requirement. Explain height, band-selection logic, directionality, and alternate planning.

Evaluation area	Go standard
Selection	Configuration and propagation explanation match the requirement
Safety	All hold points controlled before raising or transmitting
Assembly	Correct components, counterpoise, connections, support, and strain relief
Integration	Correct radio/coupler path and lowest power/mode rating applied
Verification	Known reference plane, low-power tune/test, stable result, link evidence recorded
Recovery	Correct folding sequence, inspection, accountability, and repack

INSTRUCTOR TIMELINE

Suggested 90-minute lesson plan

Time	Block	Method	Outcome
0-10	Mission and safety frame	Brief + questions	Students state authority and safety boundaries
10-25	Components and specifications	Show-and-tell	Students inventory and identify functions
25-40	Propagation and selection	Brief + mini scenarios	Students select whip, wire, or NVIS geometry
40-55	Radio/coupler/power/SWR	Demonstration	Students explain complete-system limits
55-75	Deployment lanes	Hands-on teams	Students erect one whip and one wire configuration
75-85	Verification and fault injection	Practical	Students isolate a connector/counterpoise/cable fault
85-90	Recovery and AAR	Student-led	Kit is complete, inspected, and lessons recorded

Half-day option

Rotate through all four configurations, require complete analyzer/coupler documentation, add alternate-site selection, and run a controlled network exercise using approved frequencies and procedures.

DISCUSSION AND ASSESSMENT

Instructor knowledge checks

1. Why is the 25 ft counterpoise part of the antenna rather than optional grounding wire?
2. Why can the coupler show a good match while the antenna system remains inefficient or stressed?
3. Which configurations are documented for NVIS, and what height does the current manual recommend?
4. Why does 500 W SSB not authorize 500 W FM or digital operation?
5. What should an operator check first when SWR is greater than 8:1?
6. Why must the vertical whip be collapsed from the top while the extension is collapsed from the bottom?
7. What evidence should be recorded so another team can reproduce a successful deployment?
8. What local publications and authorizations must be added before this package becomes a unit class?

INFORMATION TO REQUEST

Unit tailoring worksheet

Question for the customer	Why it changes the class
Service/organization and operator roles?	Terminology, doctrine references, instructor level, and approval chain
Radio, amplifier, coupler, cable set, and power source?	Exact integration, connectors, tuning workflow, and system limits
Authorized frequency ranges and waveforms?	Exercises, examples, propagation plan, and mode-specific power
Primary path distances and terrain?	Configuration matrix, support height, and primary/alternate geometry
Dismounted, vehicle-supported, command post, or all?	Setup lanes, load plan, signature, and support hardware
Class duration, student count, and available kits?	Pacing, stations, instructor ratio, and evaluation method
Indoor briefing only or controlled outdoor practical?	Safety plan, permits, analyzer/radio use, and weather alternate
Required deliverables?	Slides, student handout, quick card, test, certificate, or train-the-trainer notes

CURRENT DOCUMENTED VALUES

Specifications quick reference

Item	Documented value
Frequency	1.8-54.0 MHz continuous; antenna tuner/coupler required below 10 MHz
Power ceilings	500 W SSB; 250 W CW; 100 W FM and digital waveforms
RF connection	BNC
Antenna wire	73 ft
Vertical whip	9 ft 4 3/4 in extended; 17 in collapsed
Extension	8 ft 9 in extended; 28 3/4 in collapsed
Whip + extension	18 ft 1 3/4 in extended
Weights	Transformer 1 lb; whip 12 oz; whip + extension 1 lb 12 oz; complete kit 8 lb 12 oz
Crew / time	One operator; <5 min whip; <15 min wire
Feed line	50 ft, 50-ohm coax, integrated RFI choke, BNC both ends
Counterpoise	25 ft insulated wire on line winder

SOURCE GOVERNANCE

References and authority hierarchy

- Primary product authority: Chameleon Antenna, HF Modular Portable Antenna System 2.0 - Military (CHA MPAS 2.0 - MIL) Operator's Manual, Rev. 3/10/2026.
- Supporting manufacturer references: MPAS 2.0 - MIL Flysheet, Rev. 3/10/2026; MPAS 2.0 - MIL Quick Start Guide, 3/11/2026; current MPAS Ready Product Guide.
- Engineering background: The ARRL Handbook for Radio Communications; The ARRL Antenna Book for Radio Communications; approved HF propagation and RF-safety references.
- Military reference named by the product manual: ATP 6-02.53, Techniques for Tactical Radio Operations. The receiving organization must verify current applicability and service-specific doctrine.
- Complete-system authority: current government technical publications and unit SOPs for the radio, amplifier, coupler, power source, spectrum, COMSEC, RF exposure, lightning, grounding/bonding, and operational employment.

Freshness rule

Review this package after any change to the MPAS 2.0 - MIL kit, transformer, coax, connectors, power ratings, manuals, supported radios, safety guidance, or receiving unit requirements.

NEXT CONVERSATION

Questions for the receiving unit

This package is immediately usable as a general orientation. A short customer discovery call can turn it into a branch-specific, radio-specific class without guessing.

Organization

Which service/command and what operator qualification level?

Equipment

Which radio, coupler, amplifier, cables, analyzer, and power source?

Mission

What path distances, terrain, mobility, setup time, and primary/alternate use cases?

Training

How many students, kits, instructors, minutes, and outdoor training lanes?

Deliverables

Briefing only, student guide, pocket card, practical test, or train-the-trainer package?

Approval

Who validates doctrine, spectrum, COMSEC, safety, and terminology before delivery?

CONFIGURATION ANNEX

The documented configuration universe

Current MPAS 2.0 - MIL manual

Four primary configurations:
- Vertical Whip - 1 Section
- Vertical Whip - 2 Sections
- Inverted L / Lazy L variations
- Sloping Wire

These use the current BNC-equipped military kit and are the controlling configurations for a military customer receiving that exact kit.

Broader standard MPAS 2.0 manual

Six documented configurations:
- Manpack Vertical
- Portable Vertical
- Horizontal NVIS
- Sloping Wire
- End-Fed Inverted L
- End-Fed Inverted V

Connector and included-hardware details differ by kit version. Verify the exact bill of material before teaching assembly.

How the names map

Manpack Vertical corresponds to the 1-section whip; Portable Vertical corresponds to the 2-section whip. The military manual adds Lazy L vehicle/support variations. Horizontal NVIS and End-Fed Inverted V are documented in the standard MPAS 2.0 manual but are not listed as primary configurations in the current MPAS 2.0 - MIL manual.

Instructor rule

Teach only configurations supported by the receiving unit's exact kit, connectors, mounts, cable set, current manual, and safety approval.

CONFIGURATION ANNEX

All documented configurations compared

Configuration	Initial planning role	Frequency tendency	Planning distance	Setup / support
Manpack / 1-section vertical	Fast local and upper-HF path	1.8-54 MHz; limited <7; strong >24; coupler below 10	Ground 0-50 km; medium possible but weak low band	<5 min; no elevated support
Portable / 2-section vertical	Fast local-to-medium node	1.8-54 MHz; improved low band; sky wave especially >12	Ground 0-50 km; medium 500-2500 km conditionally	<5 min; spike/clamp; stabilize
Horizontal NVIS	Short-range skip-zone coverage	Lower HF for NVIS; medium sky wave documented >10	Short 0-500 km; medium possible >10	<15 min; 2 supports, 73 ft apart, 10-12 ft high
Sloping wire	Hasty general-purpose wire	Broadband; lower HF supports NVIS; direction increases high band	Ground/short; medium conditionally	<15 min; 1 support, normally 25-40 ft
End-Fed Inverted L	Fixed site, NVIS, local-to-medium	1.8-4 MHz ground tendency; below 10 NVIS; 1.8-30 sky wave	Ground 0-50; short 0-500; medium 500-2500 km	<15 min; 2 supports; 25 ft normal, 15-20 ft NVIS
End-Fed Inverted V	Medium-to-long bidirectional path	Lower/upper HF selected from path; broadside pattern	Standard manual: medium-to-long; conditions dominate	<15 min; 1 center support about 25 ft; 27 ft each side

Distance caveat

Manufacturer distance categories are planning aids, not promises. Frequency authorization, ionosphere, terrain, noise, power, waveform, station loss, and the remote antenna control the actual link.

CONFIGURATION ANNEX

Manpack Vertical - pros and cons

Advantages

- Fastest class of deployment: manufacturer target under 5 minutes
- One operator; no tree or mast required
- Small footprint and rapid displacement
- Omnidirectional local coverage
- Very useful at upper HF; manual notes very good performance above 24 MHz
- Shorter coax may improve portability when approved

Limitations

- Limited performance below 7 MHz
- Not the documented NVIS choice
- Short radiator can be inefficient even when a coupler finds a match
- Counterpoise and soil/placement strongly influence the installed result
- Omnidirectional pattern provides little azimuth discrimination
- Requires a coupler/tuner below 10 MHz

Best military communications fit

Rapid local network, contingency manpack antenna, upper-HF path, short halt, or alternate site where time and footprint matter more than lower-band efficiency. Use an authorized primary/alternate frequency plan rather than trying to force the short whip onto an unsuitable band.

Expected distance

Plan ground-wave/local use first (0-50 km category). Medium sky-wave paths may be possible, but lower-frequency performance is explicitly limited and range is not guaranteed.

Portable Vertical - pros and cons

Advantages

- Under-5-minute vertical deployment class
- Extension improves lower-frequency performance
- Omnidirectional local coverage
- Documented sky-wave capability, especially above 12 MHz
- Spike or approved clamp allows flexible fixed-site support
- Optional radials/counterpoise kit, capacity hat, and guying can improve the system

Limitations

- Taller visual/mechanical signature than the 1-section whip
- Requires firm mount and wind/stability control
- Not the documented NVIS choice
- Lower-band operation remains coupler-dependent and can be lossy
- Ground system and nearby vehicles/structures affect pattern and match
- Larger hazard area during erection and operation

Best military communications fit

Dismounted command post, alternate node, base-camp radio, or vehicle-supported halt where rapid setup and omnidirectional coverage are needed but the longer radiator and a controlled ground area are acceptable.

Expected distance

Ground-wave/local 0-50 km planning category plus conditional medium sky wave (500-2500 km), with the manual specifically favoring sky-wave behavior above 12 MHz.

CONFIGURATION ANNEX

Horizontal NVIS - pros and cons

Advantages

- Purpose-built high-angle geometry for short-range HF
- Predominantly omnidirectional NVIS coverage
- Low 10-12 ft height can reduce visual profile and simplify access
- Uses the full 73 ft wire for better lower-band radiation than a short whip
- Can also provide medium-range sky wave above 10 MHz
- Easy to inspect once safely raised

Limitations

- Needs two supports approximately 73 ft apart
- Larger ground footprint, trip/traffic hazard, and more setup time
- NVIS success depends on current critical frequency and absorption
- Low installation can increase ground loss in poor terrain/soil
- Not optimized for low-angle long-distance radiation
- Standard manual configuration; verify military kit support and unit approval

Best military communications fit

Command-area, regional, emergency, or terrain-obstructed network requiring 0-500 km skip-zone coverage without depending on line-of-sight infrastructure. Pair with approved propagation/ALE data and an alternate frequency.

Expected distance

Short/NVIS planning category 0-500 km. The standard manual also documents medium-range sky-wave capability above 10 MHz; actual coverage is conditional.

CONFIGURATION ANNEX

Sloping Wire - pros and cons

Advantages

- One elevated support; simpler than L/V/horizontal layouts
- Manufacturer wire deployment class under 15 minutes
- Full 73 ft radiator improves lower-band usefulness
- Supports ground wave, NVIS when lowered, and medium sky wave
- Good general-purpose alternate when a whip is damaged or ineffective
- Can be adapted to a tree, mast, or approved field support

Limitations

- Pattern changes with frequency and slope
- Upper-HF directionality can favor the high end of the wire
- Throw-bag/support hazards and a long diagonal occupied area
- Feedpoint and low end can carry high RF voltage/current
- One-support failure ends the configuration
- Site geometry can shift impedance and coupler stress

Best military communications fit

Hasty wire alternative, mixed local/short/medium requirement, or a site with one safe elevated support. Lower the high end to roughly 15-20 ft for NVIS; use roughly 25 ft in the current MIL manual or 25-40 ft in the standard manual for general use.

Expected distance

Ground 0-50 km, short/NVIS 0-500 km, and conditional medium 500-2500 km. The chosen frequency and height decide which path dominates.

CONFIGURATION ANNEX

End-Fed Inverted L - pros and cons

Advantages

- Broad mission range: local, NVIS, and medium sky wave
- Full wire improves lower-band performance
- Adapts to command-post masts, trees, fence posts, and stationary vehicle support
- Lazy L variation can exploit one elevated and one lower support
- Height can be changed deliberately between general and NVIS use
- Useful compromise when both vertical and horizontal field components are desired

Limitations

- Two support points and a larger footprint
- Directionality description varies with geometry/frequency across guides; validate orientation
- More setup/recovery and more snag/trip hazards than a whip
- Vehicle/mast physical attachment does not establish RF or safety approval
- Requires careful strain relief at transformer and insulating rings
- A coupler match does not remove feed-line/transformer loss

Best military communications fit

Fixed or stationary command post needing an all-purpose wire, including NVIS below 10 MHz and conditional medium-range service. About 25 ft is the normal high point; use about 15-20 ft when deliberately configuring for NVIS.

Expected distance

Ground 0-50 km, short/NVIS 0-500 km, and medium 500-2500 km planning categories. The standard manual notes daytime ground-wave utility at 1.8-4 MHz.

CONFIGURATION ANNEX

End-Fed Inverted V - pros and cons

Advantages

- Standard manual's medium-to-long-range wire choice
- Bidirectional tendency broadside to the wire
- One central elevated support rather than two high supports
- More symmetric pattern than a sloper or irregular L
- Full 73 ft wire supports lower and upper HF use with a coupler
- Orientation can favor two opposite sectors when planned correctly

Limitations

- Requires center support near 25 ft plus about 27 ft on each side
- Directionality can be a disadvantage for off-broadside stations
- Larger footprint and more anchors/lines than a sloper
- Standard, not primary current MIL-manual configuration
- Long-range path depends completely on propagation and noise
- Incorrect center/end geometry changes impedance and pattern

Best military communications fit

Established site where a broadside medium/long sky-wave path is more important than minimum setup time or omnidirectional coverage. Orient the wire from the required azimuth, then validate both primary and alternate stations.

Expected distance

The standard manual categorizes this as medium-to-long range. Treat paths beyond the current MIL manual's 2500 km planning band as condition-dependent and requiring propagation validation.

Configuration decision table for military training

Operational priority	Preferred starting configuration	Reason	Primary trade-off
Fastest setup / rapid displacement	1-section whip	No elevated support; <5-minute vertical class	Weak lower-band efficiency; no NVIS
Fast omnidirectional node	2-section whip	Longer vertical with <5-minute class	Higher signature/stability needs; no NVIS
Reliable short-range HF / skip zone	Horizontal NVIS or low L/sloper	High-angle lower-HF radiation	Frequency-sensitive; footprint/supports
One safe tree/mast only	Sloping wire	Single elevated support and broad utility	Pattern changes with frequency/slope
Stationary CP with flexible paths	Inverted L / Lazy L	Local, NVIS, and medium options	Two supports / longer setup
Two-sector medium/long path	Inverted V	Bidirectional broadside tendency	Orientation and large footprint
No elevated supports	1- or 2-section whip	Ground-spike/clamp deployment	Path options constrained
Whip damaged / poor lower band	Sloper or Inverted L	Full 73 ft wire restores lower-band options	Support and wire-hazard controls

Procedure expectation

Select, inspect, erect, integrate, measure, validate, record, and recover. A configuration is not operational merely because it is physically standing or the coupler reports a match.

CONFIGURATION ANNEX

What military COMM expectations change

AVAILABILITY	Use primary and alternate configurations/frequencies; rehearse transition rather than treating reconfiguration as improvisation.
SPEED	Use <5-minute vertical and <15-minute wire manufacturer classes as training goals; include safety and verification, not just erection.
RELIABILITY	Record link quality, not only contact/no-contact. Validate under the actual power, waveform, duty cycle, site, and network conditions.
INTEROPERABILITY	Verify the exact radio/coupler/amplifier/cable interfaces and publications. A BNC or impedance match alone is insufficient.
SIGNATURE	Balance visual/physical footprint, occupied area, directionality, setup time, and link requirement under unit policy.
RESILIENCE	Carry fault-isolation evidence and known-good cable/adapter paths; most failures begin in cables, connectors, return paths, or setup.
DISCIPLINE	Frequency authorization, COMSEC, identifiers, emissions control, RF exposure, lightning, and unit SOP remain controlling.