

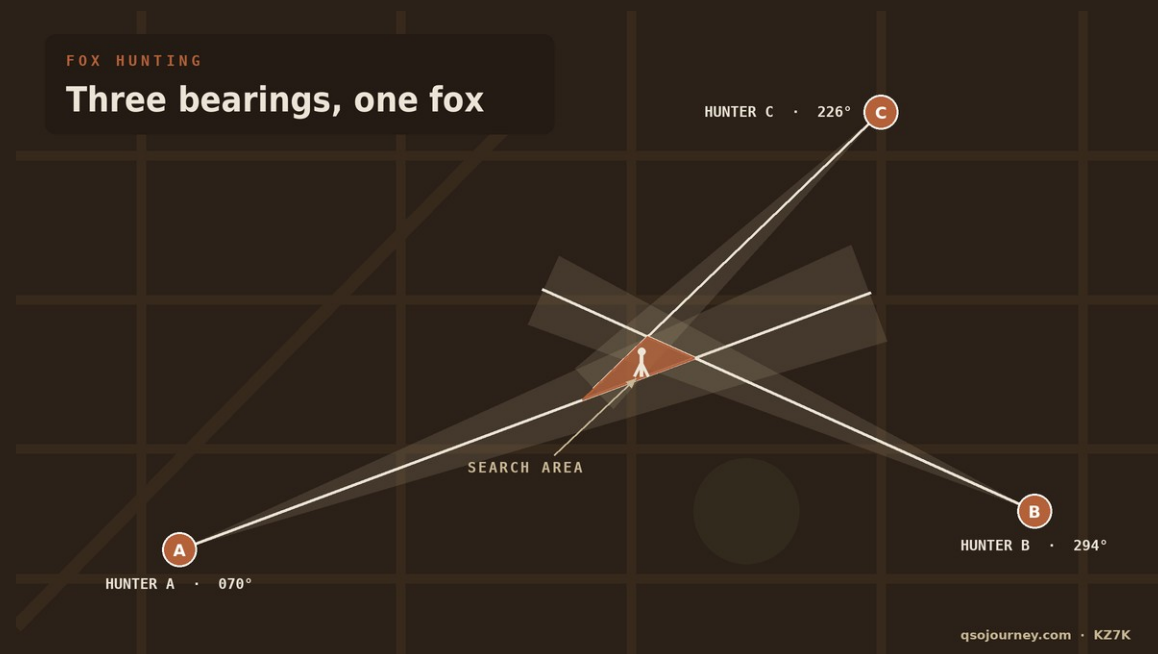
Fox Hunting

How it works, and how to be harder to find



FOX HUNTING

Three bearings, one fox



A NEWCOMER'S LOOK AT FOX HUNTING, HF NVIS, AND EMCON

THE QUESTION

If I can hear you, can somebody figure out where you are?

Yes. And our hobby turned it into a game.



I'm still learning this

Tonight is what I've picked up so far, not a lecture from an expert

What I've done

- Watched club hunts
- Talked with hams who have hunted for years
- Read everything I could find

What I haven't done

- Run a hunt myself... yet
- Taken my own bearings under pressure
- Been the fox

What I'm asking

- If you have hunted, correct me
- Jump in with your own stories
- Help me plan a club hunt



Radio direction finding, turned into a game

One hidden transmitter (the fox) and everyone else hunting it (the hounds)

1

Mobile hunts

The most common club format. Teams take bearings from the road, then finish on foot.

2

On-foot hunts

A park or open space. Often recommended as a first hunt for new hams and kids.

3

ARDF

The formal international sport. Map, compass, timed course, several foxes. Runs on 2 m and 80 m.

Every veteran hunter I have asked says it is one of the best skill builders in the hobby



What fox hunting isn't

Not jamming

Hunters only listen. Nobody transmits on top of anyone.

Not magic

One bearing is a direction, not a location.

Not instant

A fox that talks for five seconds and goes quiet is very hard to find.

Not just a game

The same skills find stuck mics, interference, and unlicensed operators.

Not only VHF

HF can be hunted too, with different tools and much less precision.



What hunters carry

Start simple: a handheld and a tape measure Yagi. Let your club show you the rest

TOOL	WHAT IT DOES	BEST FOR
Handheld with S-meter	Shows relative signal strength	Everything
3-element Yagi	Peaks when pointed at the fox	VHF/UHF bearings on foot
Offset or step attenuator	Knocks down a strong signal	The close-in phase
Sniffer receiver	Low-sensitivity, wideband	The last few yards
Doppler DF unit	Continuous bearing while driving	Mobile hunts
KrakenSDR	Calculates bearings and plots a map	Automated DF
Loop or ferrite rod	Small directional HF antenna	80 m ARDF, close-range HF
KiwiSDR TDoA	Compares arrival times across receivers	Rough HF geolocation

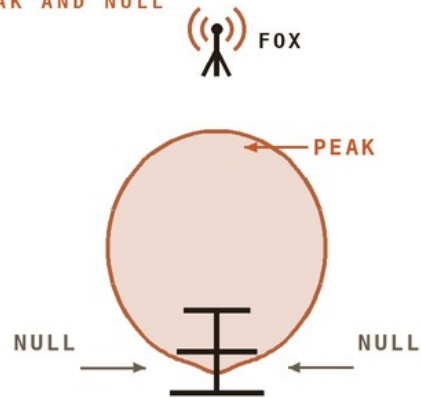


STEP 1

Take a bearing

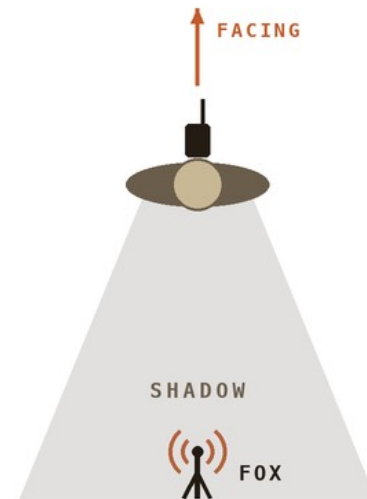
Sweep the beam, watch the S-meter, write down the compass heading

YAGI: PEAK AND NULL



Sweep the beam and watch the S-meter. The peak points at the fox. Many hunters use the null, which is sharper.

BODY FADE



HT flat against your chest, turn slowly. The signal dips when the fox is directly behind you.

Peak or null?

Several veterans I talked to prefer the null. It is sharper than the peak.

No Yagi?

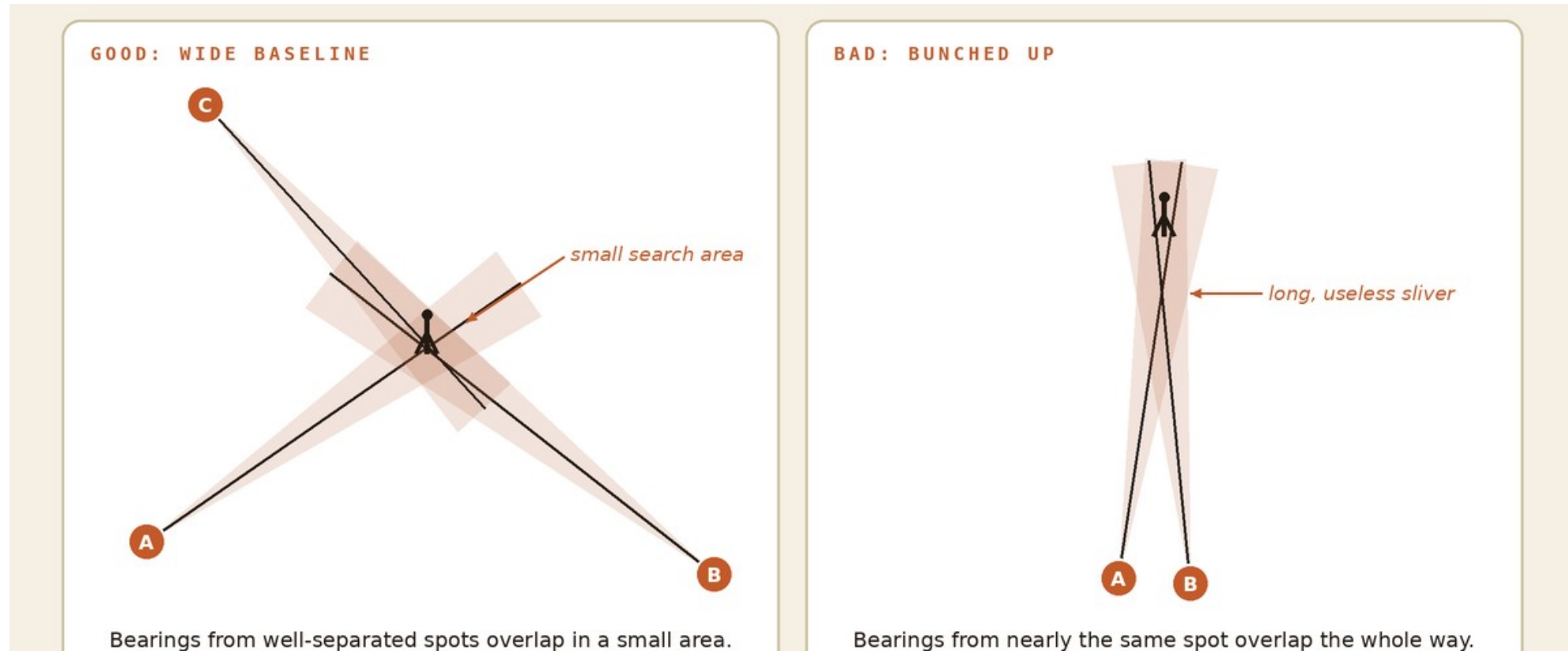
Body fade: HT flat on your chest, turn slowly. The signal dips when the fox is behind you.



STEP 2

Triangulate

Draw each bearing on a map. Where the lines cross is your search area



Spread out. Bearings from nearly the same spot overlap the whole way and tell you very little



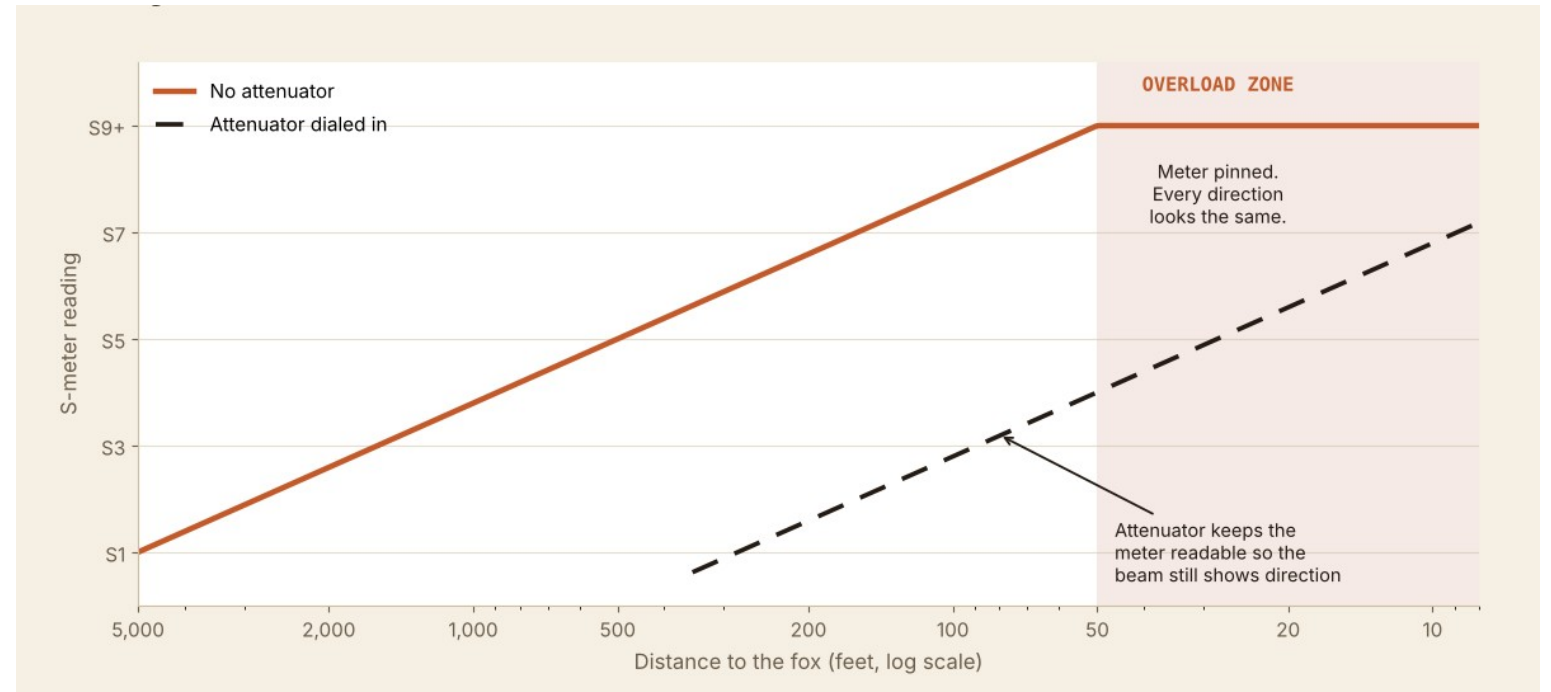
Watch for bad bearings, then close in

Reflections lie, and close to the fox the meter pins

Bad bearings

Buildings, fences, and cliffs reflect VHF. A reflection can give a confident bearing pointing the wrong way.

What hunters do: take bearings from open, high ground and throw out the one that disagrees.



Every experienced hunter told me the same thing: this is where hunts are won or lost



STEP 5

Bring better tools

Automation turns a long hunt into a short one

1

Doppler DF

Roof-mounted array. Continuous bearing while you drive.

2

KrakenSDR

Multi-channel coherent SDR. Calculates bearings and plots them on a map.

3

KiwiSDR TDoA

Public HF receiver network. Compares arrival times to map where a signal probably came from.

On VHF/UHF, a team with decent gear will find a fox that keeps talking. Faster than I expected



Who might be listening

Not every listener is equally capable

LISTENER	TYPICAL TOOLS	WHAT THEY CAN REALISTICALLY DO
Casual scanner listener	Scanner or HT, omni antenna	Hear you, guess your general area
Fox hunter or club team	Yagi, attenuator, Doppler, KrakenSDR	Find a VHF/UHF station that keeps talking, down to the building
Online HF network user	KiwiSDR TDoA	Rough regional fix on an HF signal
Government or military	Fixed arrays, aircraft, coordinated receivers	Locate almost anything that transmits long enough

Most of tonight is about the middle two. Nothing a ham does reliably beats the last one



PART 2

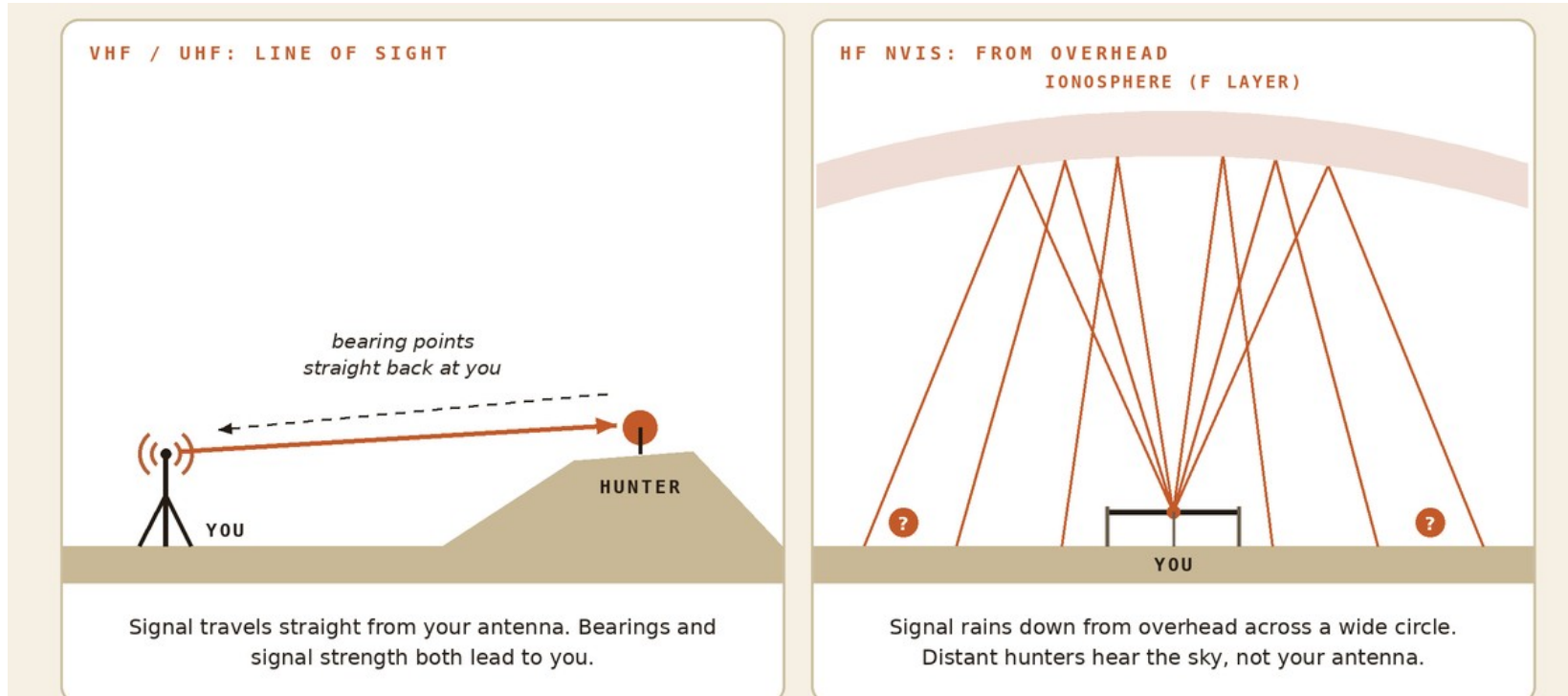
How HF NVIS changes the game

This is where fox hunting overlaps with something I actually do



Straight up, then down over the whole region

Near Vertical Incidence Skywave



0.1 to 0.25 λ

antenna height, about 10 to 20 ft on 40 m

40 m / 80 m

daytime band / nighttime band

~300 mi

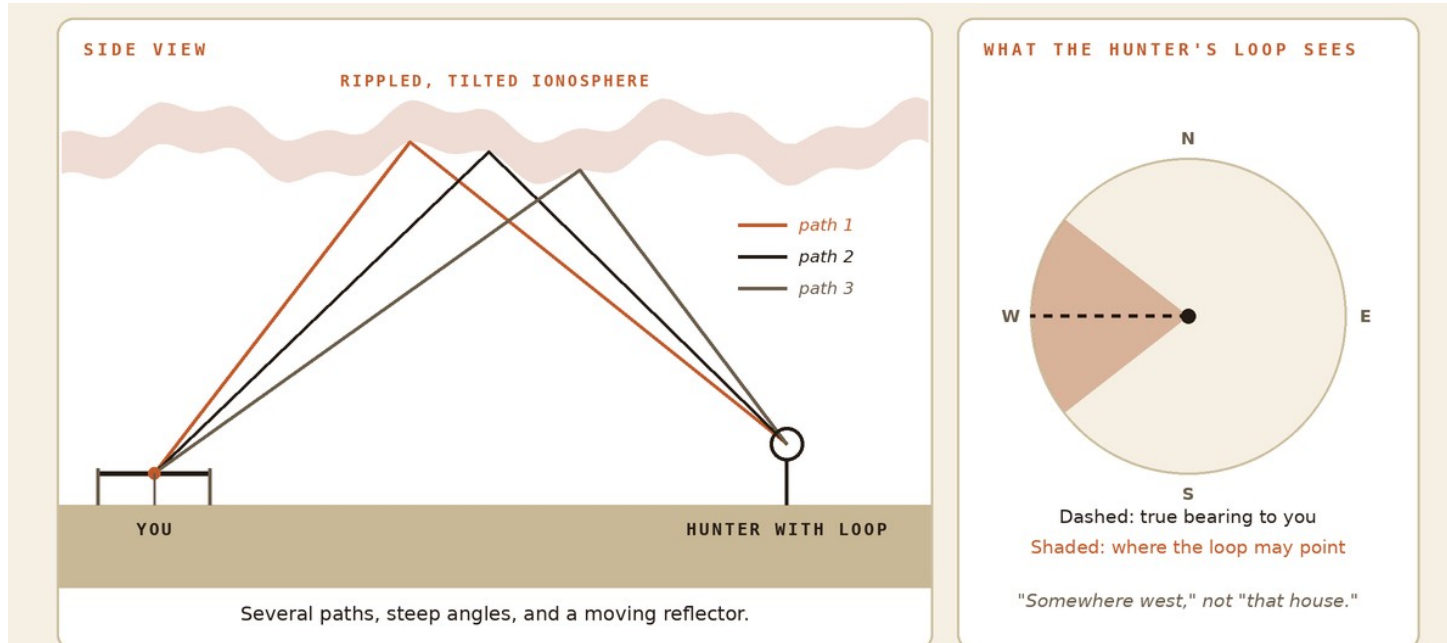
footprint, with no skip zone

It is the backbone of regional emergency nets, and it changes the direction finding problem



NVIS bearings smear

Here's why, as best I understand it from the hunters I've asked



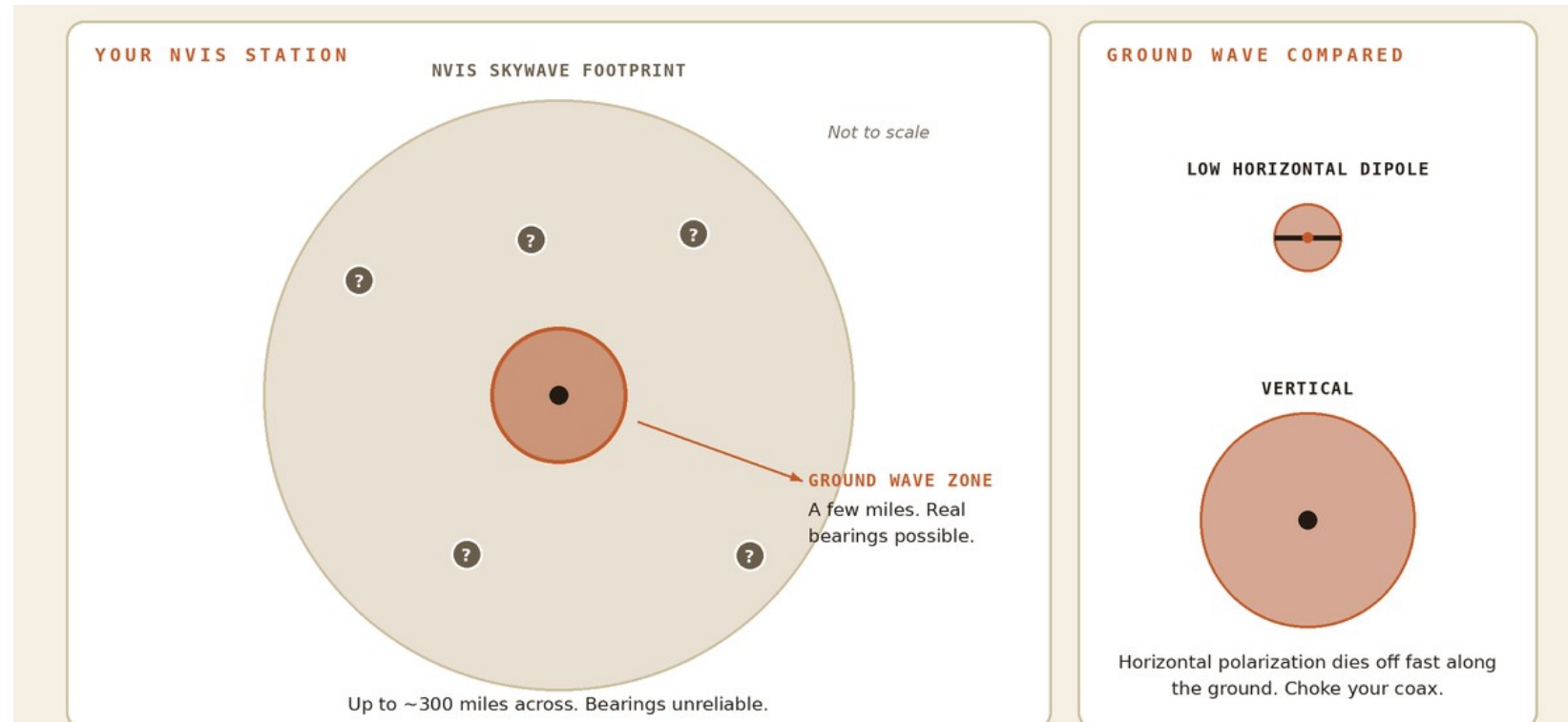
- 1 It comes from overhead**
Distant stations hear the ionosphere, not your antenna
- 2 Night effect**
Skywave has long confused loop and Adcock DF gear
- 3 Huge wavelengths**
No portable Yagi for 40 or 80 m
- 4 No breadcrumb**
You sound about the same 20 or 150 miles out

The result for a hunter far away: "somewhere west," not "that house"



Ground wave is where you can still be found

The hunters I talked to were quick to point this out



Within a few miles, a loop gets an honest bearing. That is exactly how 80 m ARDF works.

Choke your coax

A radiating feedline acts like a vertical and adds ground wave.

NVIS turns "we found the house" into "somewhere in this part of the state." It is not invisibility



VHF line of sight vs. HF NVIS

	VHF/UHF LINE OF SIGHT	HF NVIS
Where the signal comes from	Straight from your antenna	The ionosphere overhead (except ground wave)
Portable DF antenna	Small Yagi, easy	Loop or ferrite rod, limited
Bearing quality at a distance	Good, aside from reflections	Poor, smeared by the ionosphere
Does signal strength lead to you?	Yes	Mostly no
Where you are most exposed	Anywhere with line of sight	Inside the ground wave zone
Realistic result for a skilled hunter	The exact building	A region, unless already close



PART 3

Making your station harder to find

Ground rules: still ID, still no encryption. This is EMCON, emissions control, not breaking rules



Nine ways to shrink your footprint

1

Transmit less

Every bearing needs you on the air

2

Least power that works

Smaller area heard, smaller area hunted

3

Short modes

JS8Call yes. FT8 CQ loops are a beacon

4

NVIS for regional

Far harder to DF than VHF

5

Aim your signal

A beam starves hunters off-axis

6

Use terrain

Reverse slope, ridge in between

7

Don't TX from home

Transmit, then move

8

Break patterns

Same time and place invites an ambush

9

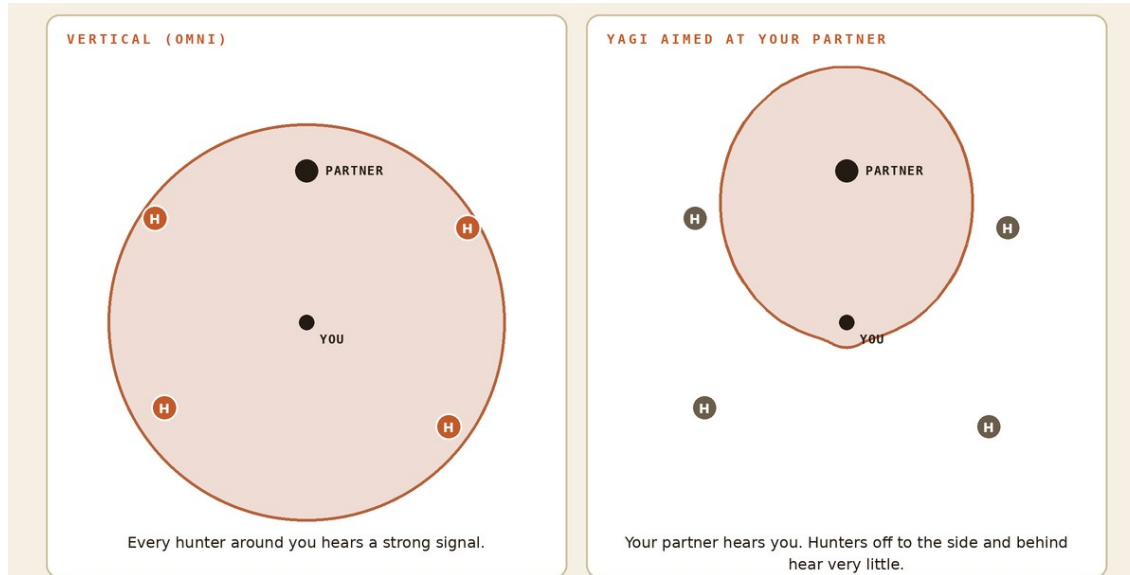
Know what a relay hides

Your input is still on the air

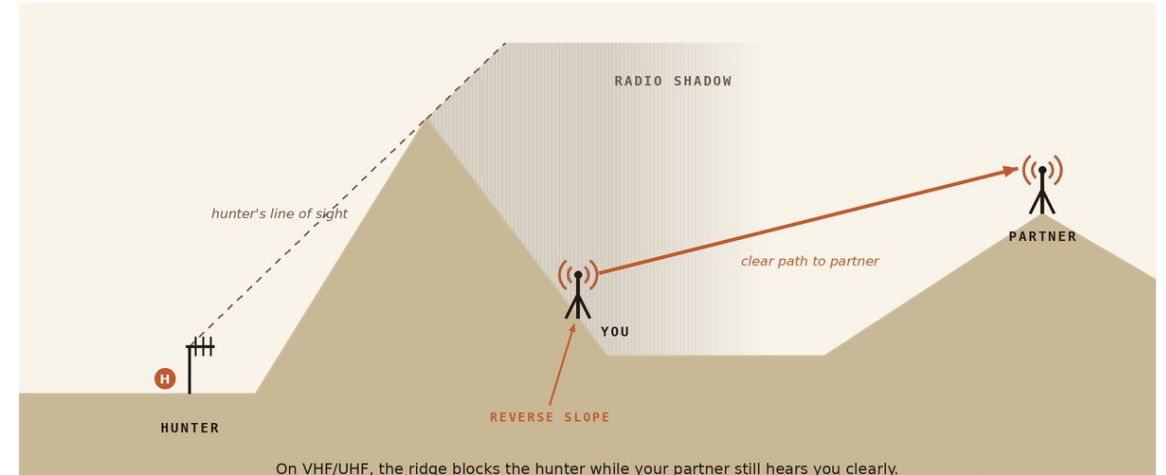


Aim your signal and use terrain

Two of the easiest wins, especially here in Arizona



A vertical gives every hunter around you a strong signal. A Yagi aimed at your partner leaves them out.



Set up on the reverse slope so the ridge sits between you and the listener.



The EMCON checklist

Printable field card on the blog

EMCON Pre-Transmit Checklist

Run this before you key up when your location matters



1

Is my message written and as short as it can be?

☐

2

Am I running the lowest power that will reach my partner?

☐

3

Is HF NVIS a better choice than VHF for this distance?

☐

4

Is my antenna pointed at my partner and away from everyone else?

☐

5

Is there terrain between me and the direction I am worried about?

☐

6

Am I somewhere other than where I live or stage?

☐

7

Have I transmitted from here, or at this time, before?

☐

QSO Journey field card · qsojourney.com · Licensed amateur ops still ID per Part 97. These habits reduce, not eliminate, your chance of being located.



From watching to doing

1

Join a club hunt

2

**Take my own
bearings**

3

**Volunteer to be the
fox**

An experiment I want to run with this club

Same hunt, twice. First the fox on 2 meters. Then the fox on 40 or 80 meter NVIS from a low dipole with a good choke. Compare how long it takes and how close the hunters get. If the theory holds, that contrast is the whole lesson of tonight.



YOUR TURN

Who wants to help me find out?

Let's run the 2 m vs. NVIS hunt as a club



TAKE IT WITH YOU

The full post, every graphic, and the printable field card

qsojourney.com/fox-hunting-ham-radio-how-to-avoid-being-found/?talk=1

