Newcomers and Elmers Net: 6 Meters
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Betwixt and Between

Six meters falls between the upper HF portion of the band and the more common 2-meter VHF band.

-- In the U.S. it is found between 50 and 54 MHz. Originally amateurs were licensed in the 5 meter portion of the band (56 MHz and above).

-- The change to 6 was made in the mid-1940's as the FCC decided 5 meters should be used for TV channels.

-- Unfortunately, because the 5- and 6-meter bands are so close, 6 meters became known as the *TVI* band, or television interference band.

-- Older equipment was (and is) capable of causing interference to TV reception, especially at power levels above QRP power (5 watts or less).

-- Amateurs used a number of tricks and fixes to avoid aggravating their neighbors, including only operating after 11 pm local time after most people were in bed!

-- Most modern rigs have built-in low pass filters which help deal with interference issues now, and of course much of the world has made the jump to digital or cable TV so interference is less of an issue than it used to be.

Six meters has propagation characteristics which resemble both HF and VHF propagation, and this is part of what makes it so interesting and challenging.

-- While most VHF propagation above six meters is "line of sight," HF signals largely rely on atmospheric skip to travel around the world.

-- Because six meters falls right in the middle, sometimes signals bounce along the atmosphere while at other times the signals react like their VHF cousins and travel by skip, scatter, ducting and TEP (transequatorial propagation).

-- Depending on the mode used, 6-meter antennas are either vertically polarized (FM) or horizontally polarized (CW/SSB). There are a number of 6-meter repeaters around the country, and these of course are like their 2-meter cousins—FM modes are virtually always worked on vertical antennas.

-- While FM simplex and repeater work is fun, CW and SSB DX work requires horizontal polarization in most instances to get the kind of distances you want.

-- I will say I have worked Sporadic-E using a vertical antenna to about 1200 miles, but multi-hop work needs horizontal polarization to work regularly. With the right solar conditions and good equipment

and technique, this “local” band has opened up enough for folks to get their DXCC awards (that’s 100+ *countries* in the log books!).

Don’t get too hung up on polarization—give whatever you’ve got a try on six meters; you never know what’s going to happen. As you get more experienced with the band you will no doubt learn how propagation works in your particular area, as well as which antenna(s) work best in which situation.
-- As Fred, K9OHE mentioned during the net, because of scatter and reflections and hops, singles do not remain truly horizontally or vertically polarized. This means a vertical can get great distance just as a horizontally polarized antenna

The Propagation Gods must be Crazy!
As mentioned above there are numerous ways a 6-meter signal can get from one place to another, including Sporadic-E skip, meteor scatter, aurora, backscatter, TEP, ducting, and short/long path F2 layer skip.
-- What makes things even more interesting is that several of these propagation modes may combine on any given day to increase the effect on an RF signal and greatly boost the distance it can be heard.
-- Common combinations include F2 opening into a Sporadic-E, or in America, TEP and Sporadic-E often combine to communicate between North and South America.
-- While Sporadic-E and TEP can occur almost any time, F2 propagation (that is, reflections off the F2 layer of the atmosphere) occur primarily near peak sunspot activity, 1-2 years prior and following the solar peak.
-- Of course the year of the solar peak things are hopping all the time!
-- As an aside, ground wave propagation is quite interesting with 6 meters as distances of 20+ miles can be easily achieved with far less interference from busy HF or 2-meter bands.
-- Here matching polarization becomes important since cross polarization between amateurs can cause some significant signal loss.
-- Antenna height and ground conditions can make up for a lot however, and even low power stations can see significant distances over ground when located in higher elevations.

Sporadic-Es
Sporadic-Es (or E) is by far the most common propagation mode used for DX on this band.
-- As you may recall, Sporadic-E conditions exist when charged ion particles form a cloud in the “E” layer of the atmosphere. These

“clouds” can vary greatly in size, sometimes long and thin while at other times narrow and tall.
-- The “E” layer is located about 60-70 miles up in the atmosphere, and the clouds form most commonly in the months of May-July.
-- Less active clouds can show up in Nov-Jan, and activity is most common between 20 and 50 degrees latitude north and south.
-- On occasion, two such clouds may be present in just the right places to allow double hop propagation of over 2000 miles.
- It is not uncommon during particularly strong E-Skip conditions for folks on the East Coast of the States to work stations in Europe, or for East Coast stations to reach the West Coast.
-- While you may luck into such situations, more likely you will find such openings through regular checking of the 6-meter band and DX-spotting sites on the Internet.
-- Another way to check for propagation conditions is to listen for 6-meter beacons down in the CW portion of the band, between 50.0 and 50.1 MHz.
-- The more beacons you hear the better conditions are for good DX. If you aren’t able to copy the beacons to locate them, just listening for a lot of activity in the code portion of the band (50.1-50.3 MHz) can be a good indicator of favorable DX conditions.
-- When E-skip opens up the CW portion of the band things are really hopping!
-- Sporadic-E does not require a lot of power to work—10 watts can go a long way. Many modern rigs allow for up to 100 watts on 6 meters, but why use 100 watts if 50 or 25 will do?
-- Keep in mind your station might cause interference for others in the neighborhood even though most folks are using cable or digital TV these days.
-- Cable lines can leak allowing in spurious signals, and the stronger your wattage the more likely your signal is to cause unwanted interference.
-- Other appliances and/or devices might be affected due to poor shielding, such as radios and TVs. Just because you are running a “clean” station and are clearly within your rights to transmit, you don’t want to cause unnecessary problems for others.
-- Be especially careful if you are using older equipment as even the power supplies for these old radios can be a source of interference

TEP and F2 Propagation
Trans-equatorial Propagation is somewhat common, and definitely is something to look for on six meters.

-- When conditions are right for TEP signals from northern or southern latitudes jump across the equator about equally (that is the *geomagnetic* equator!) allowing for great DX signals.
-- While TEP can occur in other parts of the world, the most common place is in the Americas simply due to the placement of the geomagnetic equator and the land masses present.
-- TEP occurs most commonly during the mid afternoon hours until early evening, and it is strongest during peak years of solar activity, just like F2 propagation.
-- What is rather amazing about TEP is the distances involved; 6000 miles is not uncommon, with stations being about 3000 miles each away from the magnetic equator.
-- Both ten meters and two meters can be affected by TEP, but it is far more common on six. This is just another reason to get active on six meters and join in the fun!
-- TEP and F2 propagation can combine to greatly change the direction of a signal, allowing for contacts between America and Australia, for example.
-- While TEP is pretty predictable, if F2 propagation gets involved the signal can do some interesting things.
-- However, whenever great distances are involved there has certainly been TEP, F2, or a combination of the two acting on the signal.
-- These events are going to be during periods of high solar activity.

Antennas
Six meters allows for a lot of different antennas, from simple verticals to rather elaborate directional antennas.
-- I mentioned earlier that I have used a vertical antenna to work both local FM repeaters, simplex, and Sporadic-E, and it worked well.
-- Even with vertical polarization I was able to make good quality DX contacts during skip openings partial because by making at least one hop the reflected signal is not exactly vertically polarized anymore—the reflection adds some variation which helps a cross polarized station to receive it.
-- I must confess I do not always remember to ask the operator on the other end about their antenna, but it is always good to do so.
-- The more information you have about the location, power, and antenna setup the other person is using, the better you will understand your own abilities.
-- Of course, often folks making E-skip contacts are anxious to make as many loggings as possible so they are moving fast to confirm the contact and little else.

-- For DX CW and SSB work more often than not the preferred antenna is horizontally polarized, and very often a directional antenna to boot.
-- Unless you have the money and time to set up a directional base station, you may want to use a small portable Yagi which you can rotate by hand if a directional antenna is the way you want to go.
-- When starting out I recommend an omni-directional antenna to give you the best shot at hearing other stations.
-- Until you gain some experience you will not really know where to point your beam and many potential contacts may be lost.

Keep in mind also that a directional antenna has as part of its design a fairly significant front-to-back ratio which means there's a decent gain in the direction you are aiming for, but a significant drop opposite (and to the sides) of the rest of the antenna. This means a low power station is not likely to be heard unless you are pointed right at them.

Final Thoughts

I hope you give six meters a try this year and really learn a lot about the band and about operating under varying propagation conditions. Watch for interesting weather patterns which can introduce DX possibilities through temperature inversions and the like, and just have some fun tossing your signals out into the ether.

I guarantee you will learn a lot and have a lot of fun a long the way. Not only that, you'll no doubt have some great stories to tell your radio buddies at the end of the summer as the band quiets down and you turn your attention to the next great "season of opportunity!"