How to Work NVIS into Tactical Emergency Communications, Provided by Steve Peterson Ki7L

NVIS is not just an antenna type or a propagation mode -- it is a tactical communications system that was designed by military radio operators in the field. The NVIS antenna is only part of that system. The other part is the knowledge and cooperation of the operators, which must be accurately applied to achieve the best results -- particularly when results are a life-and-death matter. Emergency communications should be driven by clearly written procedures that have been well-designed and tested. The procedures should be drilled on a regular schedule, and the drills should be followed by debriefings attended by everyone, so that all can learn to avoid mistakes. Suitable procedures are available in books, Field Manuals, and on the web. Look for ARES and RACES web sites and capture their procedural documents. Other excellent sources are FEMA and MARS sites.

Groups of operators using NVIS must understand and cooperate on the basics. (1) All must be using NVIS antennas (defined as any horizontal antenna well under a quarter-wave high), as well as the radio hardware and propagation theory. (2) All must understand that the frequencies used must stay between the total absorption and vertical MUF ranges. (3) The group must decide whether it will equip itself to use 160. (4) Calling frequencies and other procedures should be established, in writing, with contingencies clearly stated.

For example:
1. Meet at 7228 before 8 PM summer, 6 PM winter.
2. Meet at 3853 after 8 PM summer, 6 PM winter.
3. If the frequency is occupied: Move UP 2 kc and listen or call, for two minutes.
4. If occupied, move UP 2 kc MORE and listen or call two minutes, etc.
5. When QSYing to another band, if no contact made in 6 minutes, return to previous frequency.

This procedure helps to keep people from getting lost and scattered on the dial. It's a good idea to keep assigned frequencies in VFO A and B, or use radio memories.

In the evening, 40 will spread out and suffer interference from foreign broadcast stations, and later, show signs of fading as the vertical signal starts breaking through the diminishing F layer. Before the operator is lost in the noise, QSY to 75 meters. In the mid-morning, as the absorption rises and kills off 75, QSY to 40. The 60-meter band should provide a much-needed transition frequency -- but, alas, the government has limited it to 50 watts EIRP and five discreet channels...

The signals for every NVIS operator within 200-300 miles, running 100 watts, should be well over S9. If you hear a very faint station and want to work it, switch to a higher dipole or a higher frequency.

Running high power is usually not needed. QRO will greatly increase your groundwave radius, and thus, the number of possible stations which will receive multipath distortion. High power may be needed to overcome QRM or QRN. Otherwise, keep the power down, keep the groundwave close in, and let F2 do the work. If already getting out an S9+10, why QRO and make it a +20? It you can't get above the static, lower your antenna and tell your field contacts to do the same. If you can't get the distance you need, switch to a much higher antenna with a lower angle of radiation, or QSY to a higher band.
Interesting "Rules of Thumb" based on tests on the 40 meter band (from WA6UBE):

Returning briefly to the "What's the best NVIS height?" question, observe the excellent research of Patricia Gibbons:

“Assume a half-wave dipole at ¼ wavelength above ground as a reference for comparison: A half-wave dipole at 6 to 7 feet off the ground will have an attenuation of approximately -4 dB. A half-wave dipole 10-½ inches over lossy ground will have a worst-case attenuation of approximately 20 dB.”

“Assuming correct choice of frequency and a 10.7 cm solar flux value in the 200 range, a half-wave dipole at ¼ wavelength above the ground would provide a 20 dB over S9 signal reading at the distant station when the transmitter has a power output of 100 Watts. If the transmitting station uses an antenna at 6-feet above ground-level, the resultant signal strength would be: 16 dB over S9. If the transmitting station uses an antenna at 10-½ inches above the ground, the resultant signal strength would still be S9!”