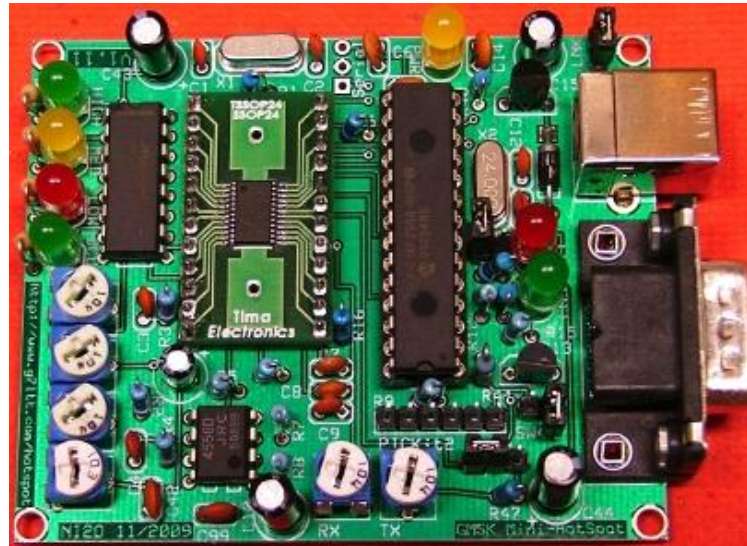
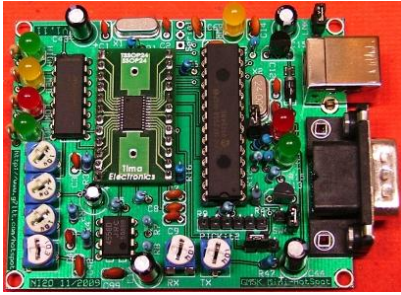


Building D-Star HotSpots



Jim Moen – K6JM
October 17, 2010
Pacificon 2010

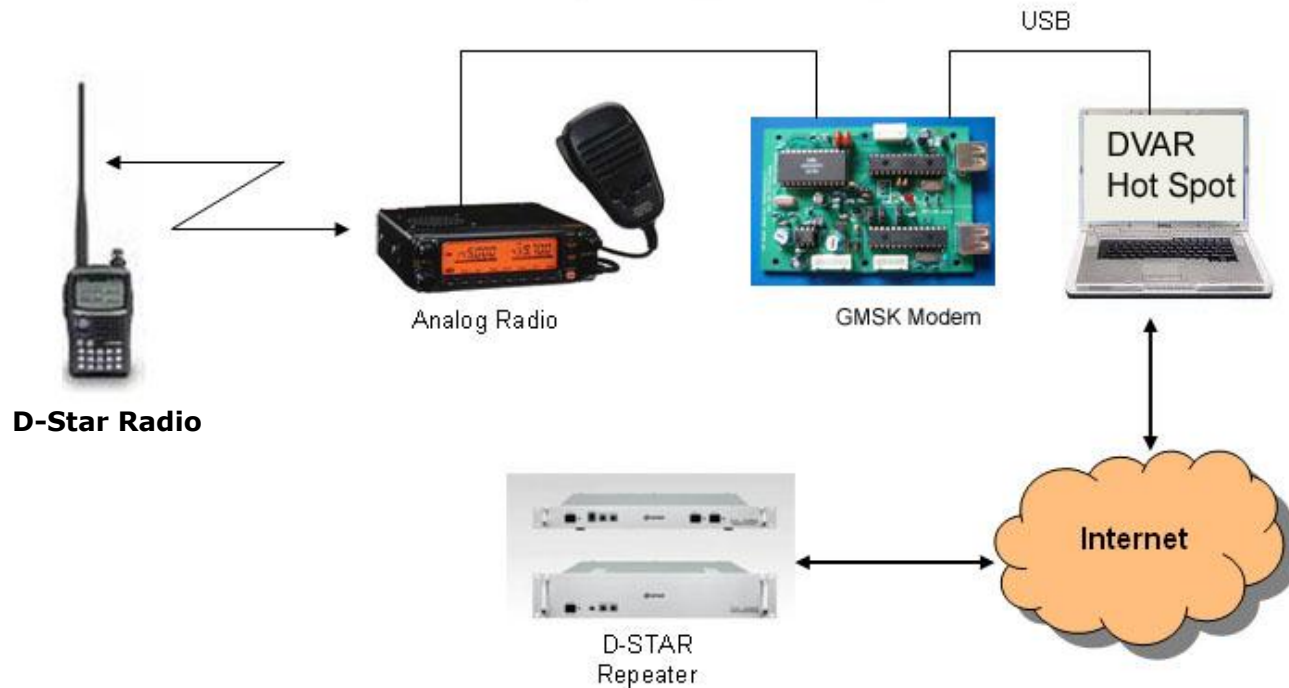


HotSpots

Extending the reach of the D-Star Network:

- Ideal for locations without good RF access to D-Star repeaters
- Inexpensive hardware, free software
- Supports DPlus, but is not full D-Star (no callsign routing)
- This technology is stable and easy to put on the air

HotSpot Block Diagram



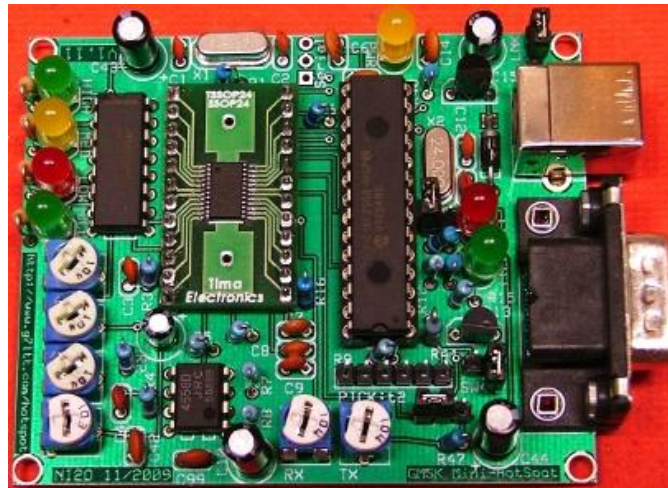
- Extends access to DPlus-linked DStar Repeaters and Reflectors
- RF handled by analog FM radio
- D-Star radio is needed to communicate
- GMSK Modem does not decode or encode the DV payload, it just passes it from and to the internet

Why HotSpots?



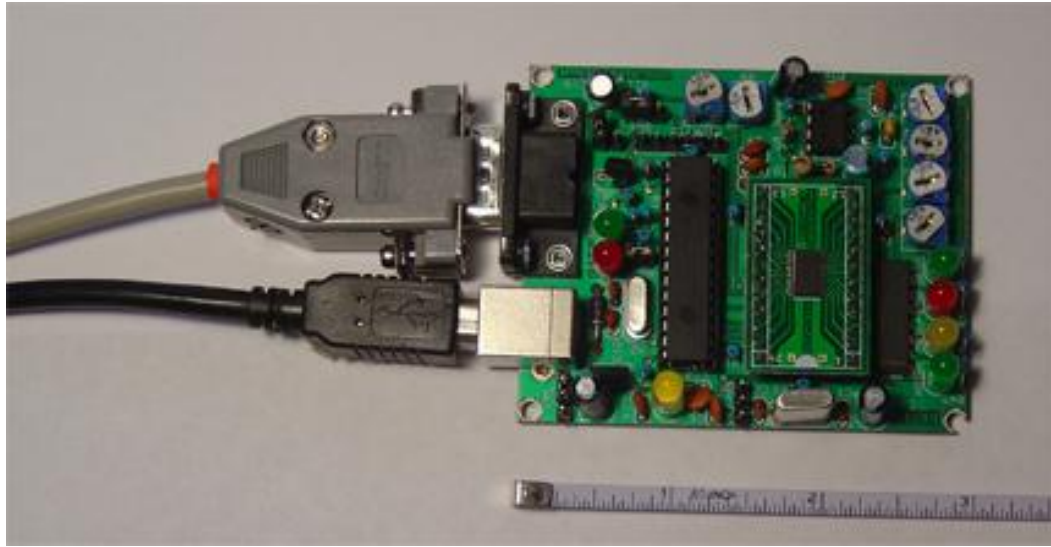
- If your QTH has no RF access to a D-Star repeater
- Or (like my QTH) is in a multipath shadow
- Your D-Star radio can link to DPlus Repeaters and Reflectors
- Analog Radio must provide access to discriminator and to direct FM modulator (9600 Data Port normally works)
- PC runs DVAR Hot Spot software (Mark McGregor, KB9KHM)
- GSM Modem interfaces the PC and the radio
- Architecturally like DVAP, but somewhat greater power/range
- HotSpot can be configured as DPlus Repeater (Rich KC6OBJ will show how he did this)

GMSK Modem



- Also called Mini Hot Spot (MHS) or Node Adapter
- TX, generates gmsk audio for analog FM transmitter
- RX, demodulates audio for processing by PC
- Decodes the gmsk protocol (headers, routing info)
- Does NOT decode or generate Digital Voice stream
- So you need a D-Star radio to use it
- Inexpensive (kits approx. \$80, built \$130)

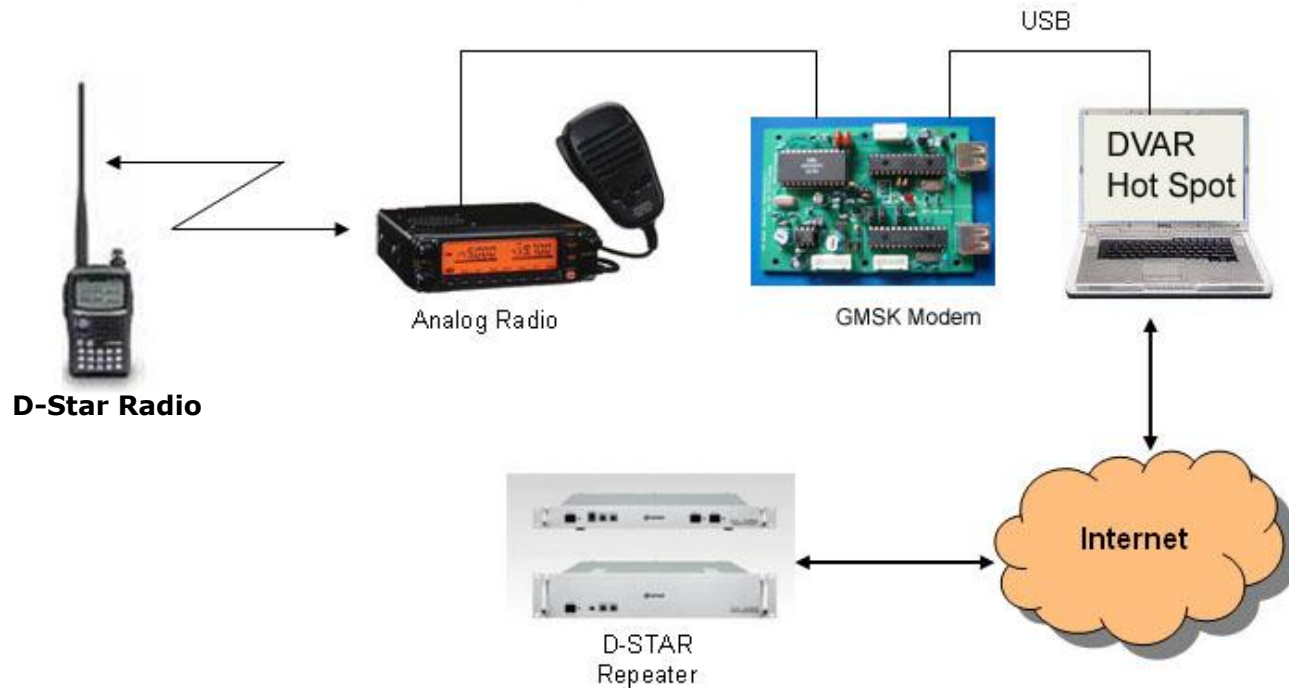
GMSK Modem Sources



My NQSMHS
from G7LTT

- **Satoshi Yasuda 7M3TJZ/AD6GZ**
 - <http://d-star.dyndns.org/>. Designed the first Node Adapter. Also produces firmware.
- **Fred van Kempen PA4YBR**
 - <http://www.dutch-star.eu>. Provides “mini hotspot” boards, related hardware and firmware.
- **Mark Phillips G7LTT/NI2O**
 - <http://www.gmskhotspot.com>. Provides similar hotspot boards. Located in New Jersey.

HotSpot Software



- Software: DVAR Hot Spot by Mark McGregor KB9KHM is frequently used for HotSpots
- Available in Files section of gmsk_dv_node Yahoo Group
- Also can download from www.dutch-star.eu/software/

5 Simple Steps to Setup HotSpot



1. Register on the D-Star network
2. Install software tools to configure & test
3. Load firmware on Mini Hot Spot board
4. Configure and test board
5. Install & Configure DVAR Hot Spot s/w

1 - Register on the D-Star network



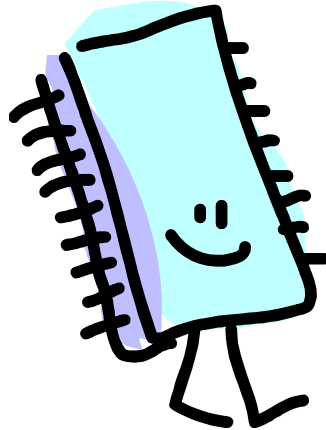
- Gateways require you to be registered
- For HotSpots, it's best to set up an additional “terminal” for authentication
- No standards (yet), but typically for HotSpots people use node N
- Example: K6JM N
- Many repeaters allow self-registration
- This “terminal” is used by DVAR software

2 - Install software tools



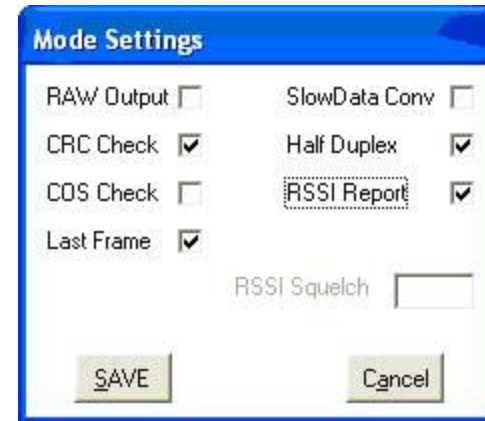
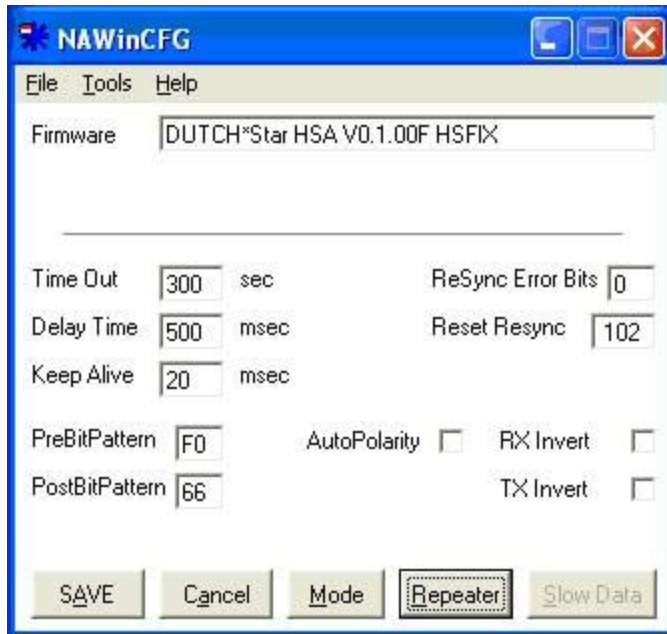
- Software tools depend on the MHS board
- Example: G7LTT and PA4YBR boards use WinNATools from <http://www.dutch-star.eu>
- Typically get Config and Test tools for PC

3 - Load firmware on MHS board



- If you buy a MHS board without firmware installed, you need to purchase firmware
- Example: <http://www.dutch-star.eu/software>
- Connect MHS board to PC with USB cable
- Use the Config tool to load the firmware

4 - Configure and test board



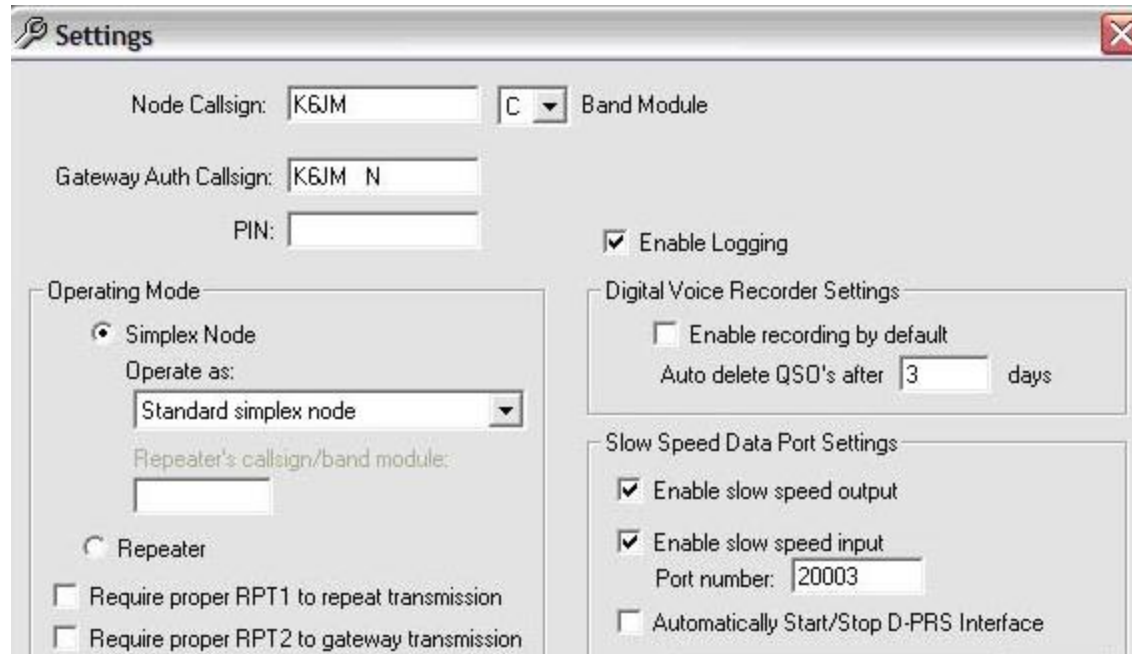
- Example: NAWinCFG (DUTCH*Star)
- Note RX Invert, TX Invert – depends on radio and you may have to experiment
- HotSpots have 1 radio and use Half Duplex

4 (continued) – Testing Board



- Test example: NAWinTEST
- RF Read proves MHS board and radio can understand D-Star signal
- EchoTest proves MHS board can transmit D-Star signal through the analog radio

5 - Install & Configure DVAR Hot Spot



The screenshot shows the 'Settings' window for DVAR Hot Spot software. The window title is 'Settings' with a close button in the top right corner. The settings are organized into several sections:

- Node Callsign:** A text field containing 'K6JM' and a dropdown menu set to 'C' with the label 'Band Module'.
- Gateway Auth Callsign:** A text field containing 'K6JM N'.
- PIN:** An empty text field.
- Operating Mode:** A section with two radio buttons: 'Simplex Node' (selected) and 'Repeater'. Below 'Simplex Node' is a dropdown menu for 'Operate as:' set to 'Standard simplex node' and a text field for 'Repeater's callsign/band module:'.
- Digital Voice Recorder Settings:** A section with a checkbox for 'Enable Logging' (checked), a checkbox for 'Enable recording by default' (unchecked), and a text field for 'Auto delete QSO's after' set to '3' with the label 'days'.
- Slow Speed Data Port Settings:** A section with a checkbox for 'Enable slow speed output' (checked), a checkbox for 'Enable slow speed input' (checked), a text field for 'Port number:' set to '20003', and a checkbox for 'Automatically Start/Stop D-PRS Interface' (unchecked).
- Other options:** Two checkboxes at the bottom left: 'Require proper RPT1 to repeat transmission' (unchecked) and 'Require proper RPT2 to gateway transmission' (unchecked).

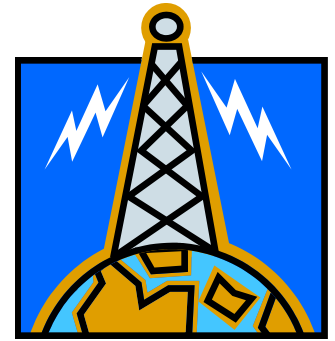
- Get DVAR Hot Spot software from gmsk_dv_node Yahoo Group
- Node Callsign: use A, B or C
- Gateway Auth Callsign: use terminal you setup in Step 1 (e.g. K6JM N)

Successful HotSpot Builder



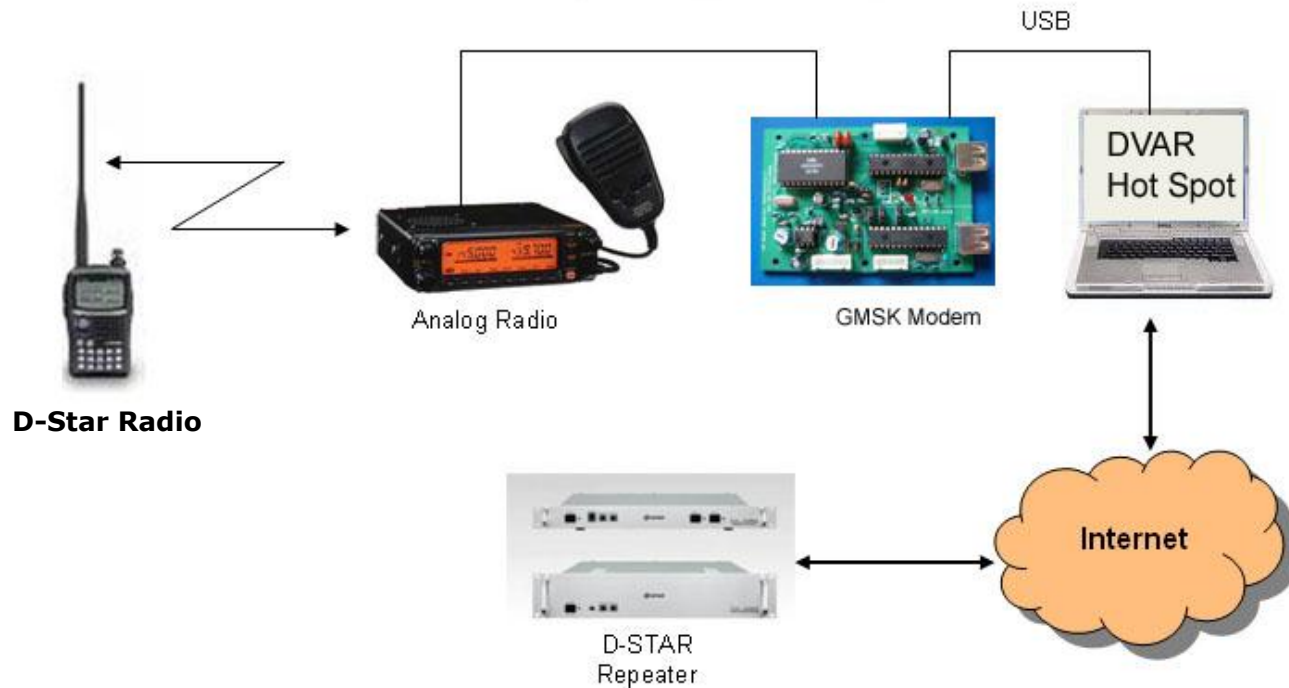
Mason City, Iowa
Warren is 82 years young

Going Further



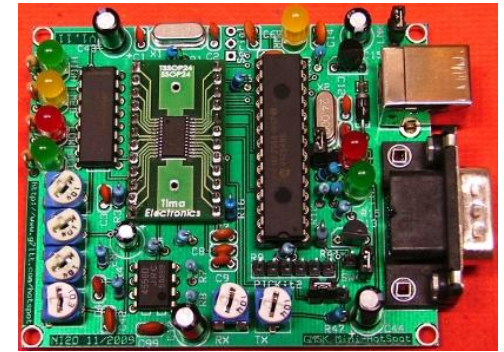
- HotSpots can link to other HotSpots
 - Router (allow incoming UDP on port 20001 and port forward 20001)
 - Configure DVAR to accept incoming
- Check out www.k6jm.com/dstar for details

Summary



- HotSpots extend the D-Star network
- RF handled by analog FM radio
- D-Star radio is needed to communicate
- Can be upgraded to D-Star compatible repeater
- Development continues on related products

More Info



- See my website at www.k6jm.com/dstar
- Yahoo Group: gmsk_dv_node
- Vendors' sites:
 - GMSK modem: Fred van Kempen PA4YBR
www.dutch-star.eu
 - GMSK modem: Mark Phillips G7LTT/NI2O
www.gmskhotspot.com
 - GMSK modem: Satoshi Yasuda 7M3TJZ/AD6GZ
d-star.dyndns.org/
 - DVAR Hot Spot: www.w9arp.com/hotspot/