



D-STAR InfoCon 2014

at Dayton Hamvention

Part 1 – Intro to D-STAR

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What is D-STAR?

- D-STAR is an open standard for digital voice and data on Amateur Radio
- One of several digital modes in Amateur Radio
- Developed by Japan Amateur Radio League (JARL)
- Uses AMBE vocoder chip from DVSI
- Icom is first manufacturer with base, mobile, handhelds and repeater equipment
- Connect Systems planning D-STAR handheld for 2014
- Other vendors offering other products





How does D-STAR work?

- Voice is converted to digital modulation and transmitted at 4800 bps
 - 2400 bits for voice
 - 1200 bits for Forward Error Correction on voice
 - 1200 bits for data (error correction usually in applications)
- True narrowband digital signal
 - Voice and data occupy one 6.25 KHz signal (versus 12.5 KHz FM voice, P25 and MotoTRBO)
- Can operate simplex, repeater or linked to other repeater(s)





What can D-STAR Do?

- Transmit or receive voice and 1200 baud data simultaneously on 2m, 440 and 1.2 GHz (no TNC required)
- 128 Kb data transmission on 1.2 GHz with Internet connectivity (Ethernet bridge to Internet with IP address)
- D-PRS (digital APRS) automatic position reporting simultaneous with voice with GPS
- Flexible repeater linking with Gateway and Internet connection
- Reflectors act as conference bridge for linking multiple repeaters (60+ DPLUS Reflectors now in operation worldwide)
- DV Dongle, DV Access Point (DVAP) and DV Node Adapters allow voice and data access to D-STAR via Internet connection (similar to EchoLink)

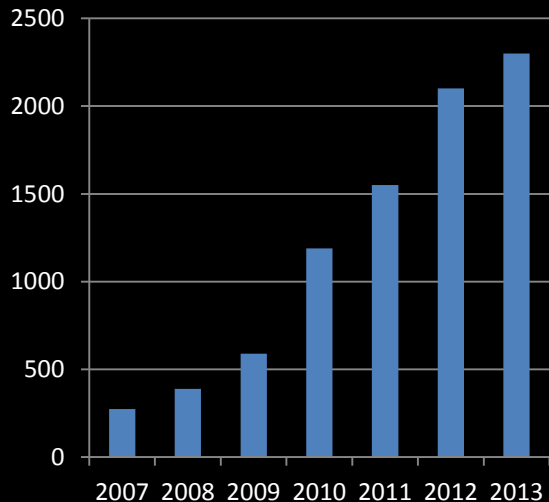




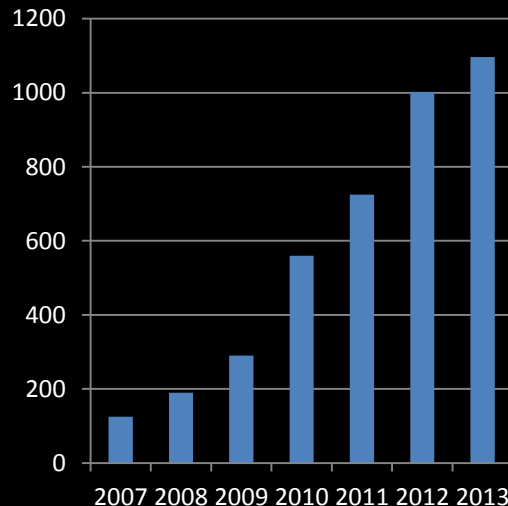
D-STAR Growth Continues

- As of May 1, 2014 – 1,111 DPLUS Gateways, over 2,575 Voice Repeaters, 218 Data Modules and 34,298 registered users on US Trust Server and 62+ DPLUS reflectors in operation
- Other users, repeaters and reflectors on DCS and XREF systems

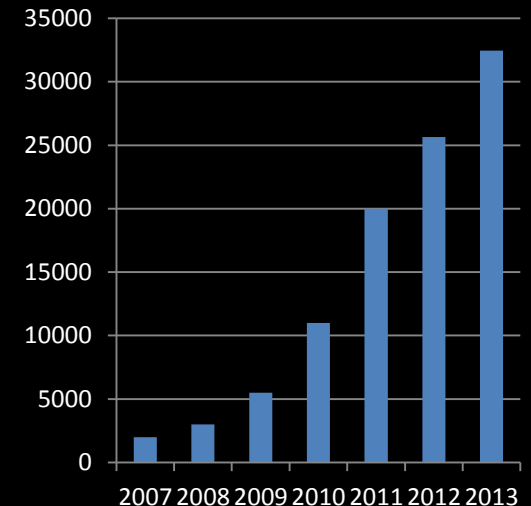
Repeaters



Gateways



Users



- D-STAR has largest base of users and repeaters of all digital modes





D-STAR Equipment

- D-STAR radios (mobiles, handhelds, repeaters) commercially produced by ICOM
- D-STAR handheld by Connect Systems available in late 2014
- DV Dongle is non-radio device allowing access to repeaters and reflectors via Internet (similar to EchoLink)
- DV Access Point (DVAP) creates low power hotspot via Internet
- Node Adapters converts FM transceiver to D-STAR hotspot via Internet





Icom Radios

- Offers line of mobiles, handhelds and repeaters
- Most radios are dual band (2m, 70cm)
 - ID-31A is 70cm only
 - ID-1 is 23cm only, allows high speed data
- All radios operate standard FM and D-STAR digital modes
- All Icom radios have built-in serial port for data transmission
- All offer GPS as built-in, a part of speaker/mic or connection via serial or USB port



Icom Mobiles

- IC-2200 and ID-800 were initial mobiles
 - D-STAR board can be added to IC-2200
- ID-880 updated ID-800 with improved user functions
 - Dual-band, single receive mobile
- IC-2820 is full featured mobile
 - Dual-band, dual receive
 - Built-in GPS with external antenna
- New ID-5100 mobile offers new features
 - Dual-Band, dual receive
 - GPS built into head unit
 - Touchscreen display
 - Optional Bluetooth interface
 - DR Mode with 1200 included memories





Icom Handhelds

- IC-91AD was initial D-STAR handheld
 - Dual-band, dual receive
- IC-92AD dual-band, dual receive
 - Slightly larger frame with more heat sink
 - Waterproof
 - GPS spkr/mic optional accessory
- IC-80 introduced as lower cost handheld
 - Dual-band, single receive
 - GPS spkr/mic accessory available
- ID-31A is 70cm handheld
 - Waterproof
 - SD card for memory storage, update memory from download
 - Built-in GPS
 - User friendly DR Mode, locate closest repeater
- ID-51A is latest dual band handheld
 - All features of ID-31A, but dual band, dual receive



ID-1 for 1.2 GHz Voice and Data

- Operates FM, Digital Voice (DV), low speed data and high speed data (DV)
- High speed data connection is Ethernet compatible
- Acts as Ethernet bridge



DV Dongle

- Produced by Internet Labs, available at major ham dealers
- Provides access to D-STAR repeaters via PC without radio
- Small module connects to PC via USB
- Uses PC sound card for mic/speaker audio
- Windows software runs efficiently on PCs, Netbooks, Windows tablet
- Coming to Android tablets, smartphones
- Java-based software for Mac, Linux
- Connect to repeaters, reflectors, send data, view history.



DV Access Point

- Produced by Internet Labs, available at major ham dealers
- Creates instant local access point for limited area without D-STAR repeater
- Connects to PC via USB
- Includes 10mw 2m transceiver and stubby antenna
- Use HT, other D-STAR radio nearby for full network access without local repeater
- Windows software module for configuration and operation



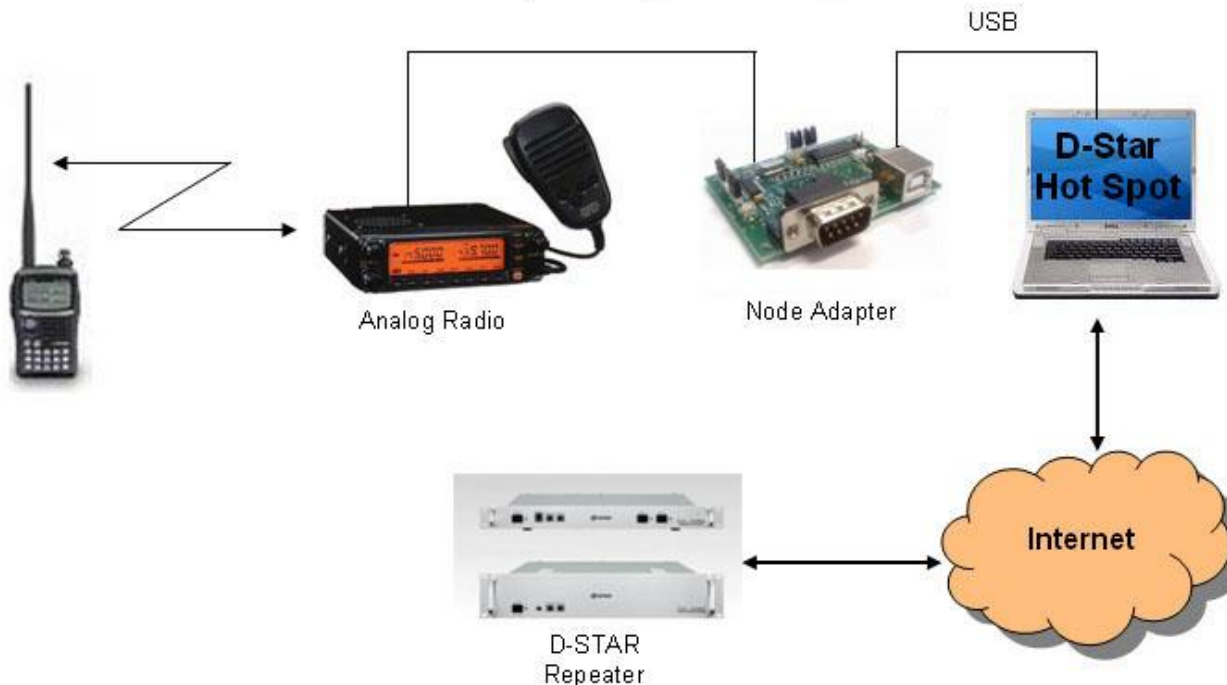
DV Node Adapters/GMSK Modems



- Provides D-STAR interface to FM radio
- Can be used to create hotspot or repeater
- Can create D-STAR compatible radio with Dongle



D-STAR Hot Spot - System Diagram



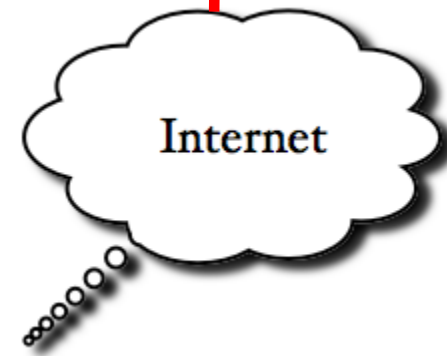
D-STAR Repeater Architecture



Linux Gateway PC
Running G2 Gateway
software



Runs third-party
apps, Dongle,
DVAP





The Registration Process

- Why register?
- Registering your callsign allows access to more functions (callsign routing, linking)
- Register on your local or the closest system
- Register on **one and only one** system (local registration syncs with all systems throughout world)
- Registration is a three-step process (*all three steps must be completed*)



Starting Registration



- Step 1 – Browse to desired system and register as new user (<https://callsign.dstargateway.org/Dstar.do>)

The screenshot shows a web browser window with the address bar displaying <https://wd4str.dstargateway.org/Dstar.do>. The page title is "D-STAR Gateway System (WD4STR) Sponsored by Gwinnett D-STAR". The page content includes a login section for "Already registered?" and a registration section for "New user?".

D-STAR Gateway System (WD4STR)
Sponsored by Gwinnett D-STAR

REVISION 1.0

Already registered?
Login with Callsign and Password.
Please note that Callsign and Password are case sensitive!
Callsign must be in Upper Case!

Callsign:

Password:

Login

New user?
Register here for D-STAR access.
Registering takes just a few seconds, and
you won't have to enter your personal information
again the next time you visit here.

Register





Fill Out Your Info

- Fill out the info (callsign, name, email address and desired password)

A screenshot of a web browser displaying the D-STAR Gateway System (WD4STR) registration form. The browser's address bar shows the URL "https://wd4str.dstargateway.org/TopMenu.do?sessionid=...". The page title is "D-STAR Gateway System (WD4STR) Sponsored by Gwinnett D-STAR". The page includes a "The agreement document" section with a text area containing the following text: "I certify that I hold a valid Amateur Radio license. I also agree to abide by all rules and regulations of Gwinnett D-STAR and Part 97 of the FCC Rules and Regulations. I understand that non-compliance may result in removal from the D-STAR gateway network without warning. When filling in the form below, enter both your first and last name in the Name field. Upon submitting the form, please send an email info@dstarinfo.com to provide notification of your request and prompt approval. After approval, you will need to return and login to complete the registration process." Below the agreement is a "Do you agree?" section with radio buttons for "YES" and "NO". The "NO" button is selected. Below this is a section titled "Enter your personal information!" with five input fields: "CallSign", "Name", "E-mail", "Password", and "Password confirm". Each field has a corresponding instruction: "Equal to or less than 7 characters.", "Make sure you use a valid e-mail address.", and "8 to 16 characters." for the Password field. The "OK" and "Cancel" buttons are at the bottom of the form.

- **Step 2** – System administrator must approve your initial registration. *You may need to send email to admin.*





Add a Terminal

- **Step 3** – Add at least one terminal with a space in first row under Initial, then type a pc-name (lower case, e.g. wb4qdx-dstar)

https://wd4str.dstargateway.org/PersonalInfoInit.do D-STAR Gateway System

File Edit View Favorites Tools Help

D-STAR Gateway System (WD4STR)

Revision 1.0

Login : WB4QDX Logout

[User Information](#) [GW Information](#) [Terminal Information](#) [Personal Information](#)

Please, edit after making a left check box on.

☐ Name : John Davis

☐ E-mail : jdavis@gtworks.com

☐ Password :

Password Confirm :

If the station has multiple radios, Target CS are distinguished by initial(last character) of a space or a capital english letter.
Definition character as follows..... (G)is a gateway. (S)is a local server.
Usually RPT(Repeater) isn't checked, initial AreaRPT CS is the port A of ZoneRPT CS.
If RPT is checked, AreaRPT CS is the same as Target CS.

	Initial	RPT	Local IP	pcname	Del
<input type="checkbox"/> 1:	WB4QDX	<input type="checkbox"/>	10.210.206.240	wb4qdx	<input type="checkbox"/>
<input type="checkbox"/> 2:	WB4QDX N	<input type="checkbox"/>	10.210.206.241	wb4qdx-node	<input type="checkbox"/>
<input type="checkbox"/> 3:	WB4QDX	<input type="checkbox"/>	10.210.206.242		
<input type="checkbox"/> 4:	WB4QDX	<input type="checkbox"/>	10.210.206.243		
<input type="checkbox"/> 5:	WB4QDX	<input type="checkbox"/>	10.210.206.244		
<input type="checkbox"/> 6:	WB4QDX	<input type="checkbox"/>	10.210.206.245		
<input type="checkbox"/> 7:	WB4QDX	<input type="checkbox"/>	10.210.206.246		
<input type="checkbox"/> 8:	WB4QDX	<input type="checkbox"/>	10.210.206.247		

Check item and change a set value.
Click the Update button.

Update

Note: You only need one terminal, a "space" for use. Adding more terminals can add confusion

Add Your Callsign to Radio



- For a radio, program your callsign (caps, no spaces) in MYCALL or MY field
 - Found in Menu under MY STATION in newer radios
- For a DVAP, DV Dongle or Hotspot, program call in callsign field exactly as entered in registration terminal
- Get on and talk!

