
# D-STAR InfoCon 2014

## at Dayton Hamvention

*Part 1 – Intro to D-STAR*

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Georgia D-STAR

# 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?

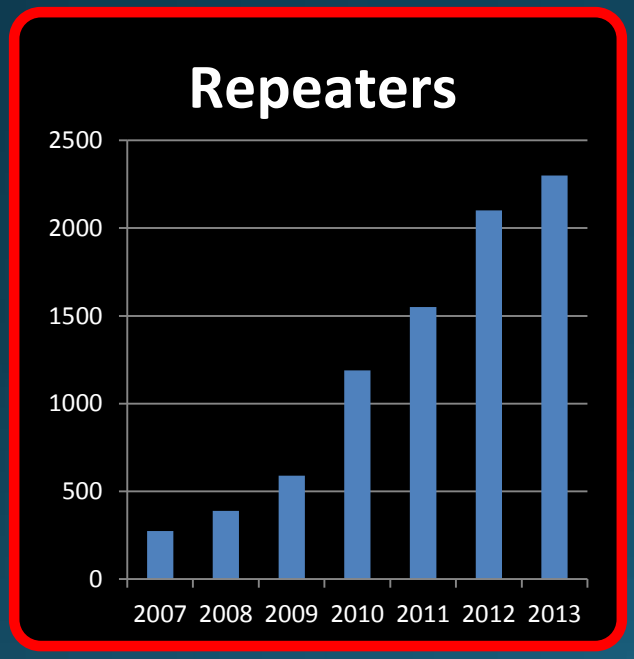
- Voice is converted to digital modulation and transmitted at 4800 bps
  - 2400 bits for voice
  - 1200 bits for Forward Error Correction on voice
  - 1200 bits for data (error correction usually in applications
- True narrowband digital signal
  - Voice and data occupy one 6.25 KHz signal (versus 12.5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

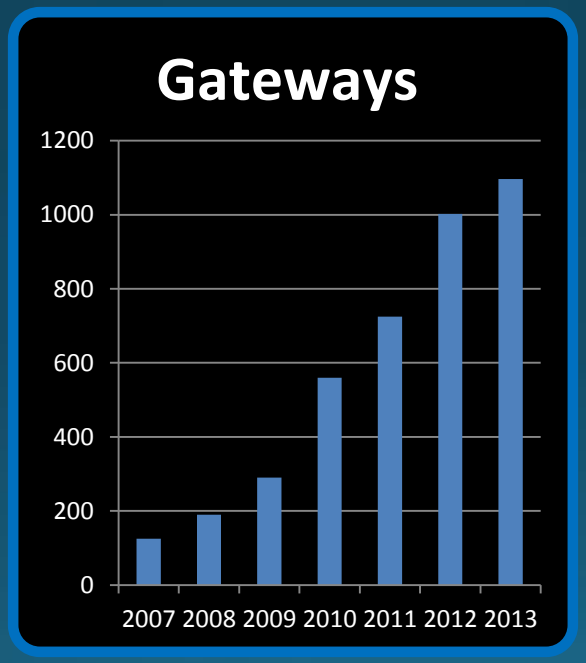
# What can D-STAR Do?

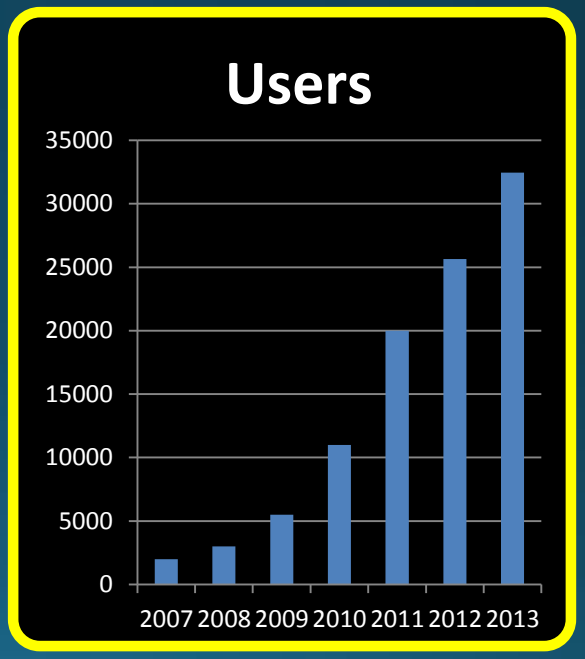
- Transmit or receive voice and 1200 baud data simultaneously on 2m, 440 and 1.2 GHz (no TNC required)
- 128 Kb data transmission on 1.2 GHz with Internet connectivity (Ethernet bridge to Internet with IP address)
- D-PRS (digital APRS) automatic position reporting simultaneous with voice with GPS
- 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*




- *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





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# 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 handh
  - Dual-band, single receive
  - GPS spkr/mic accessory available
- ID-31A is 70cm handheld
  - Waterproof
  - SD card for memory storage, update memory from dow
  - 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

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# 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

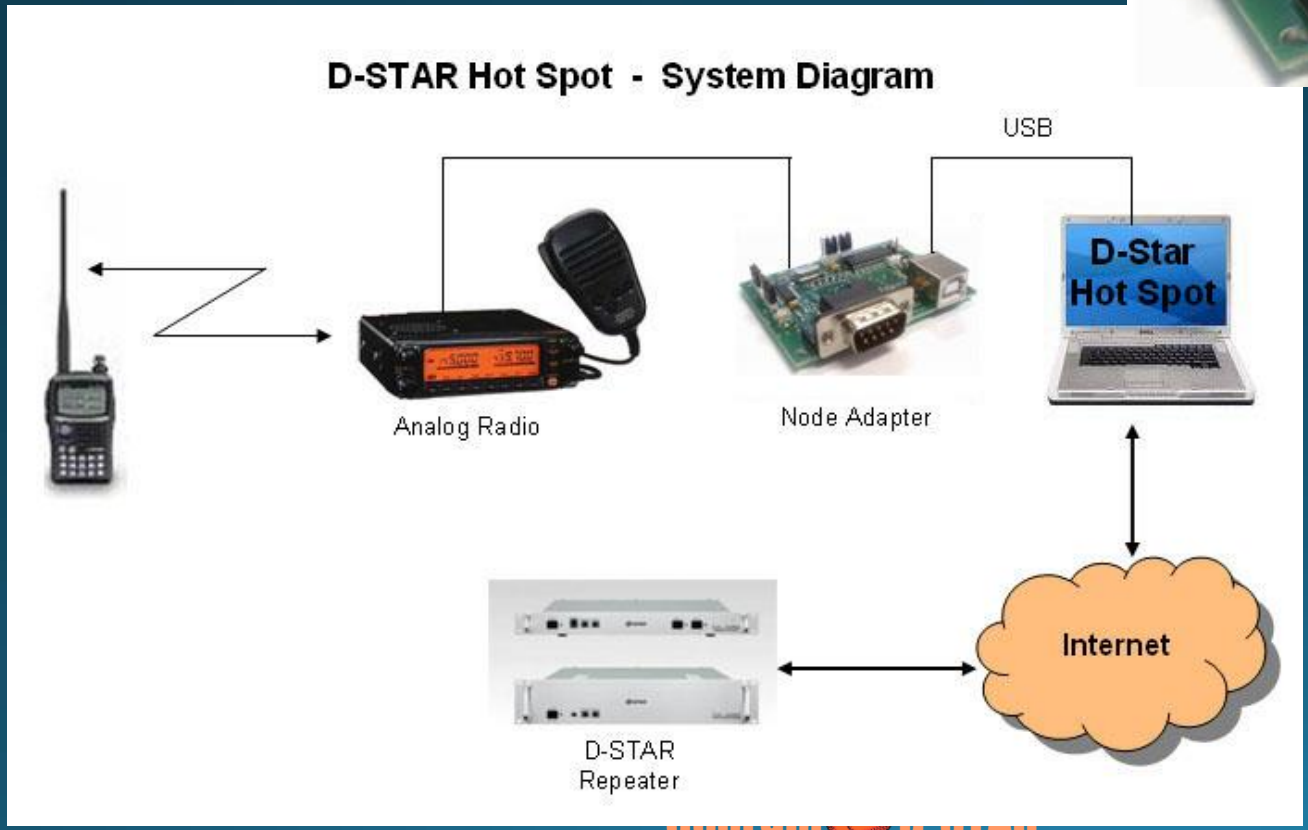
- Produced by Internet Labs, available at major ham dealers
- Provides access to D-STAR repeaters via PC without radio
- Small module connects to PC via USB
- Uses PC sound card for mic/speaker audio
- Windows software runs efficiently on PCs, Netbooks, Windows tablet
- Coming to Android tablets, smartphones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

# DV Access Point

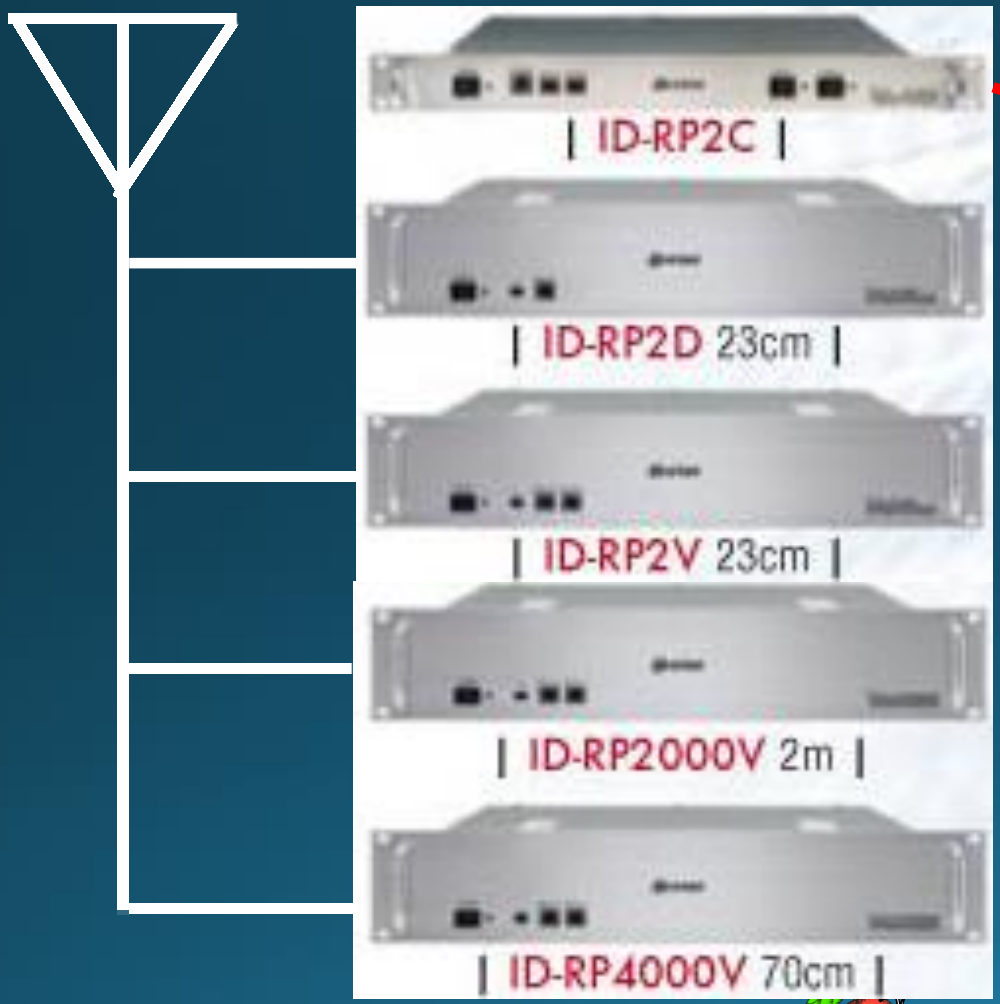
- Produced by Internet Labs, available at major ham dealers
- Creates instant local access point for limited area without D-STAR repeater
- Connects to PC via USB
- Includes 10mw 2m transceiver and stubby antenna
- Use HT, other D-STAR radio nearby for full network access without local repeater
- Windows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

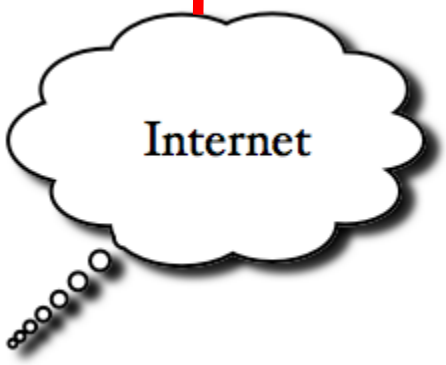


# D-STAR Repeater Architecture




Linux Gateway PC
Running G2 Gateway
software

Runs third-party
apps, Dongle,
DVAP

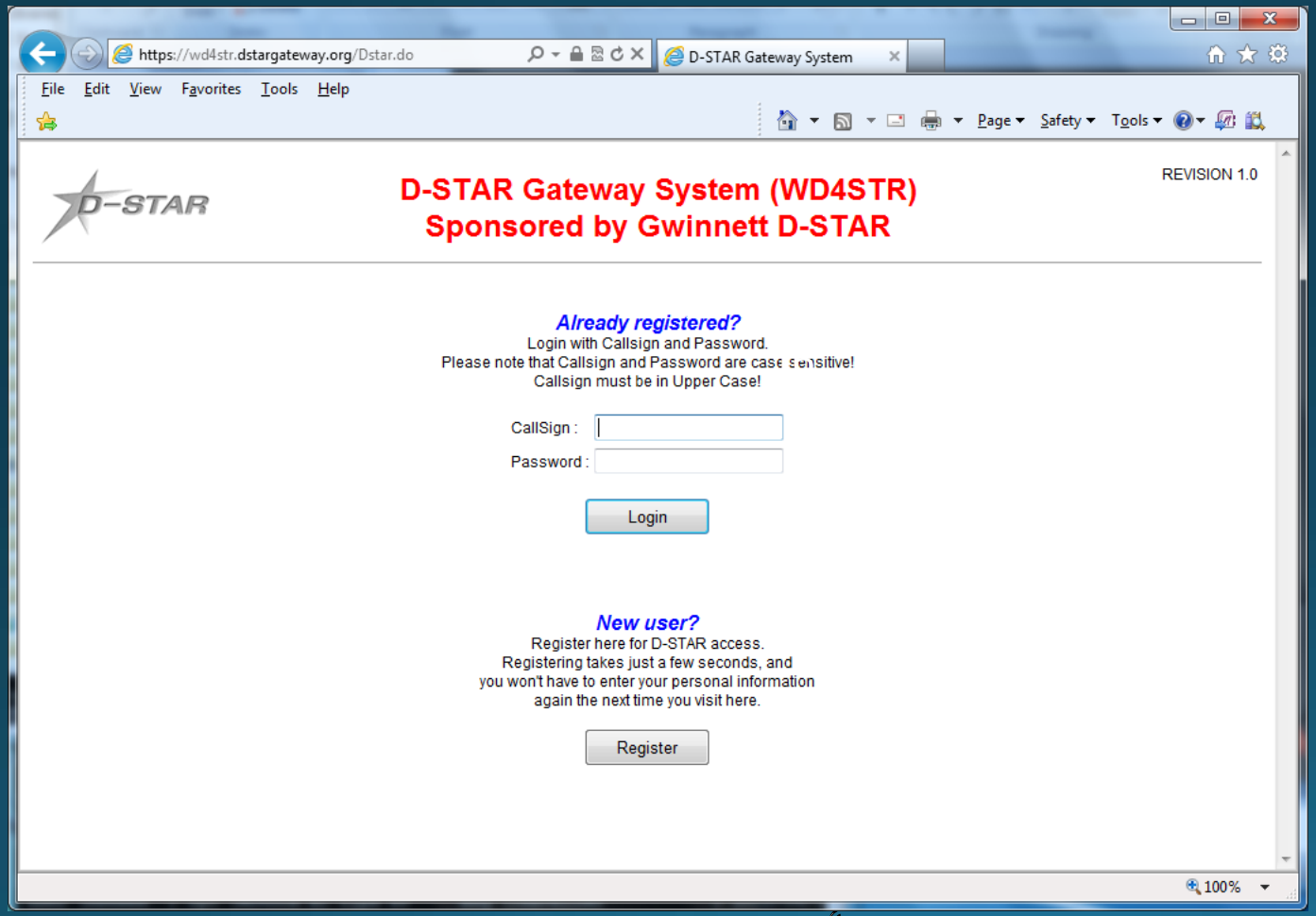


# The Registration Process

- 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*)

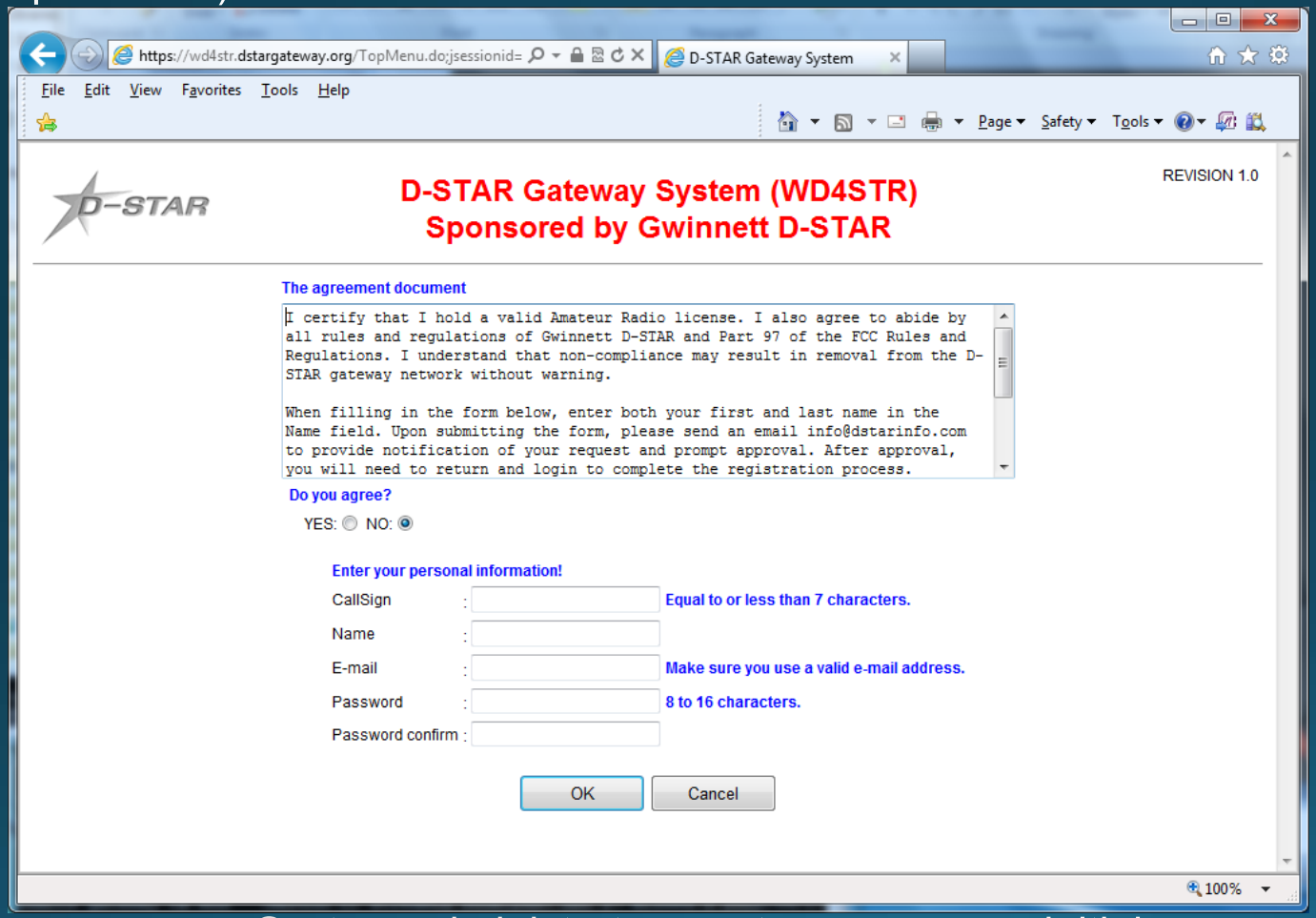
# Starting Registration

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



# Fill Out Your Info

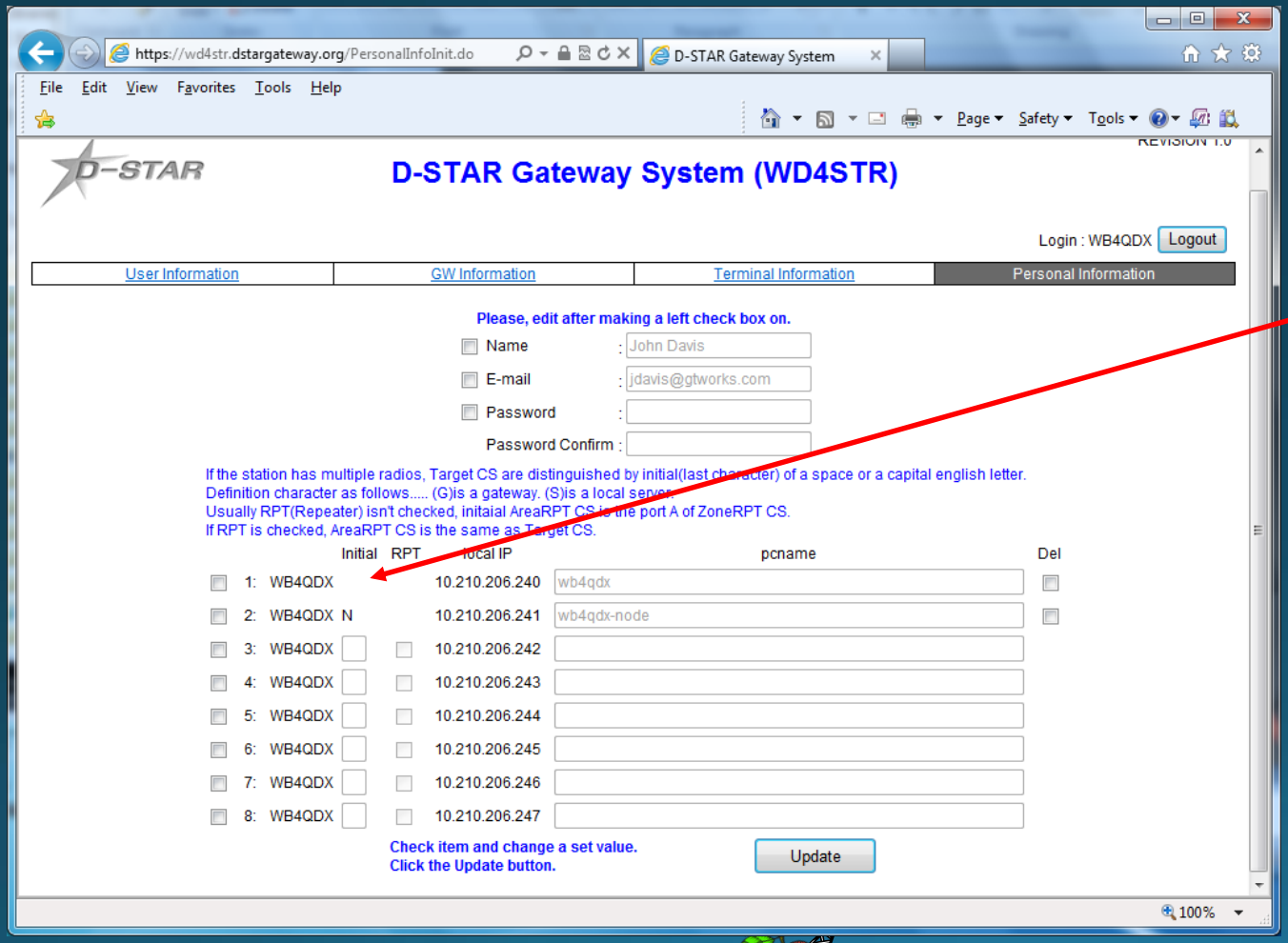
- Fill out the info (callsign, name, email address and desired password)




- 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)




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!