# INTRO TO D-STAR

## Katy Amateur Radio Society

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# DIGITAL (VOICE) RADIO (GENERALLY)

- **D-Star –**
  - Developed for amateur radio
  - Open standard
- **DMR** – developed for commercial communications
  - DMR presentation March 13
  - Inexpensive radios
- **C4FM** – Yaesu proprietary
  - Installed base?

# D-STAR IS…

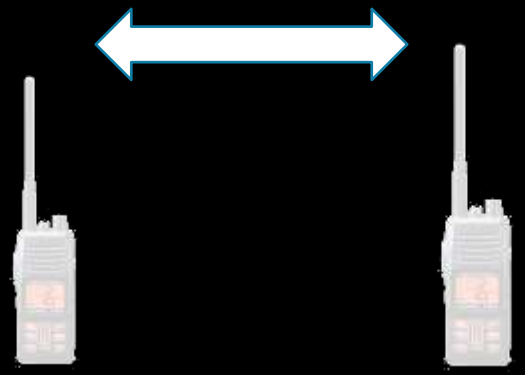
- **D**igital **S**mart **T**echnologies for **A**mateur **R**adio
- Digital voice – encoder is in the radio
- D-Star is an open standard developed by the JARL
- Any manufacturer can build a D-Star radio
- Allows data transmission
- Allows position transmission compatible with APRS

# Much of what you already know about repeater use applies to D-Star

…but there are some things you need to learn to use D-Star

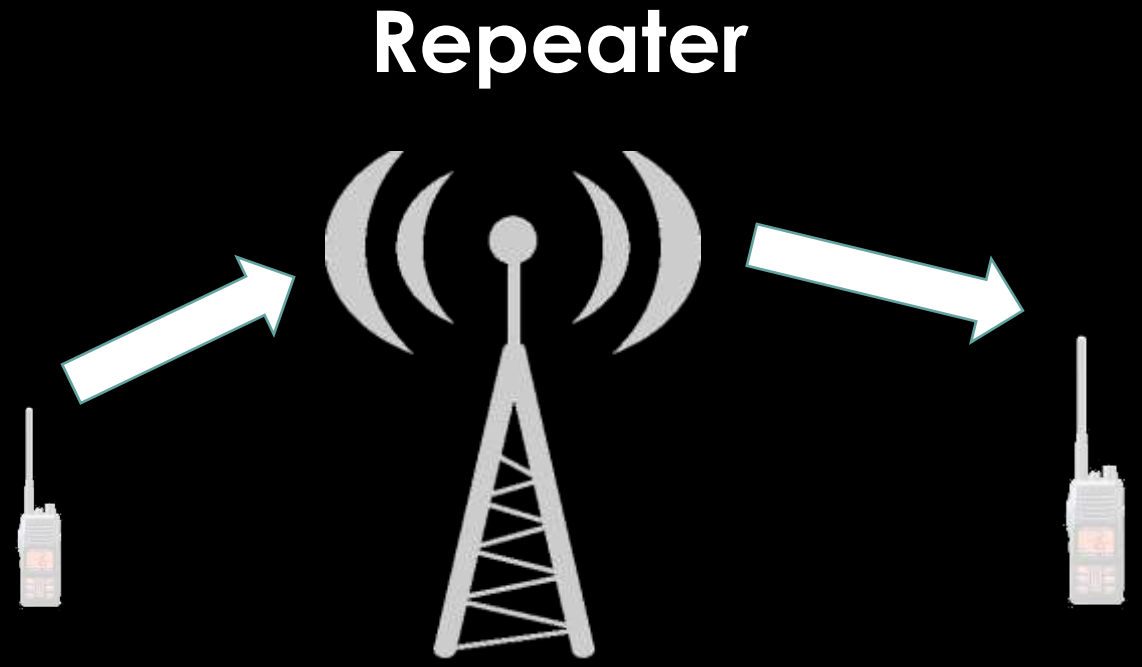
# WHAT YOU ALREADY KNOW

Two operators can communicate with each other directly radio-to-radio. Simplex.

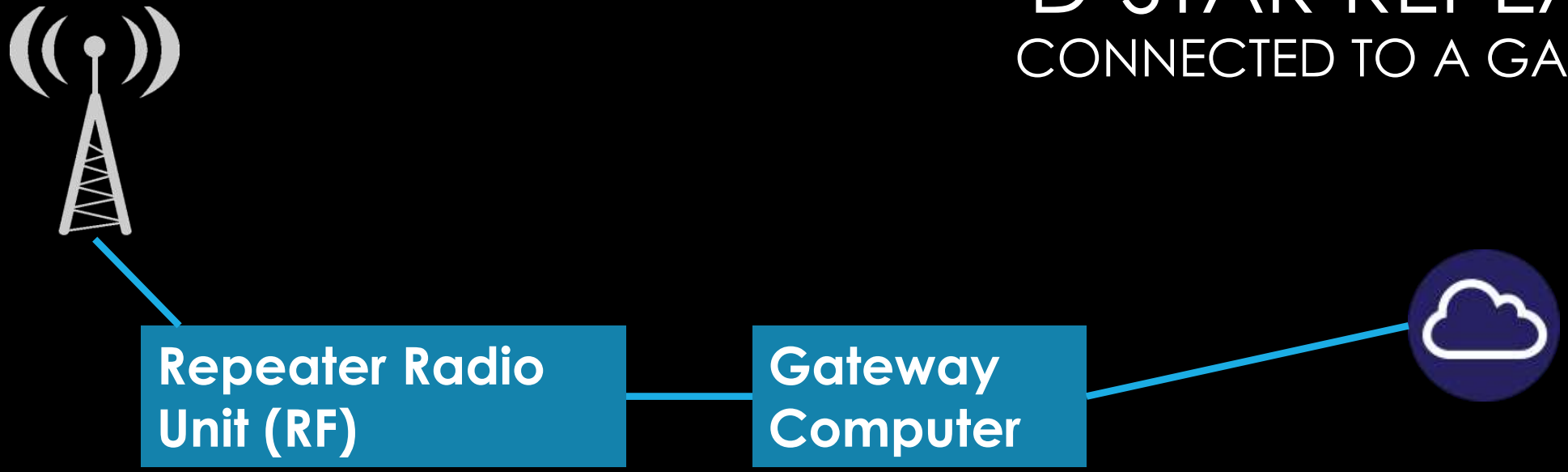


# WHAT YOU ALREADY KNOW

Two operators can communicate with each other through a digital repeater.

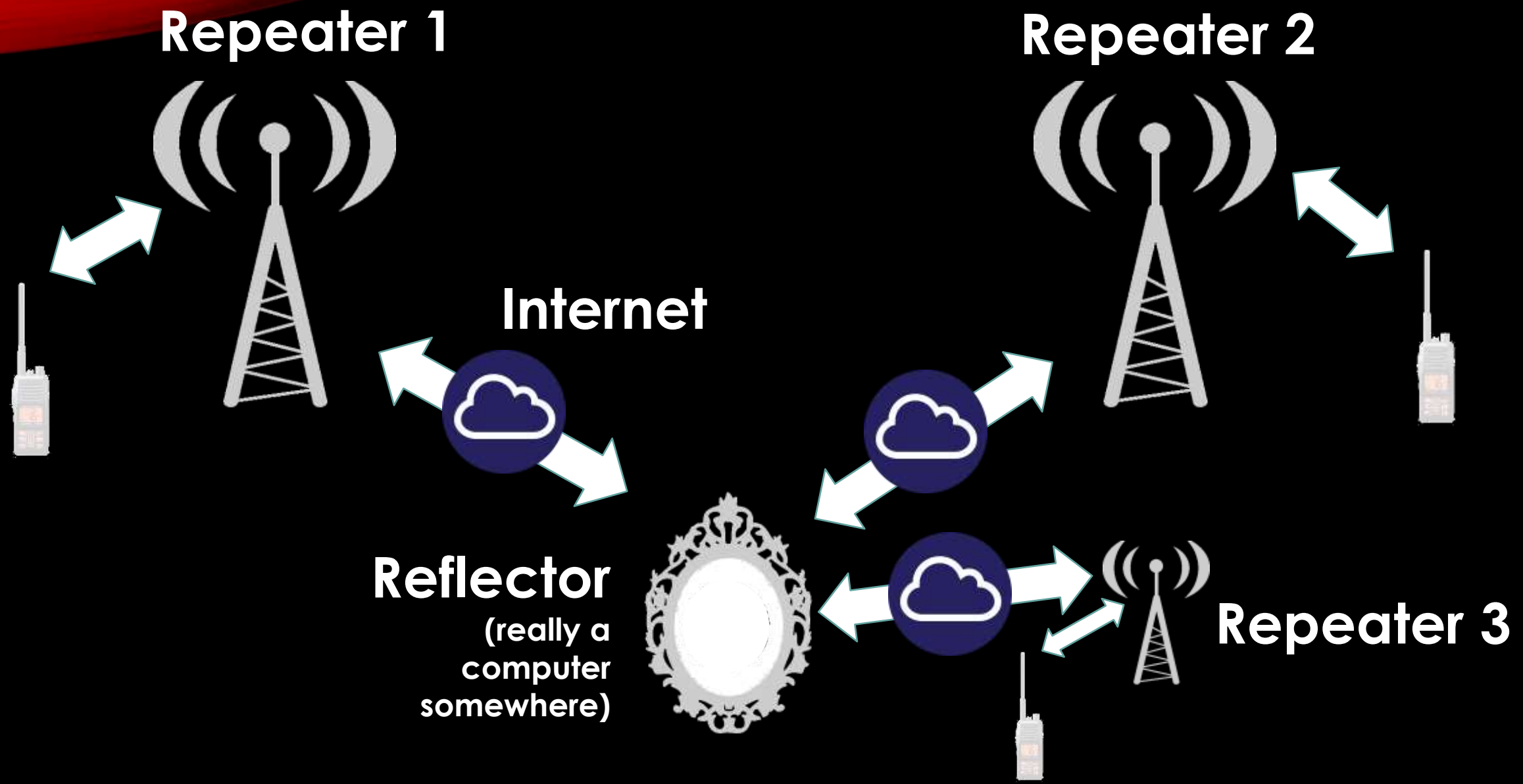


# D-STAR REPEATER
## CONNECTED TO A GATEWAY




- All Signals are digital
- Gateway computer connects repeater radio to internet
- …which opens up lots of new possibilities!

# REFLECTOR CONNECTS MULTIPLE REPEATERS



# REFLECTOR OPERATIONS

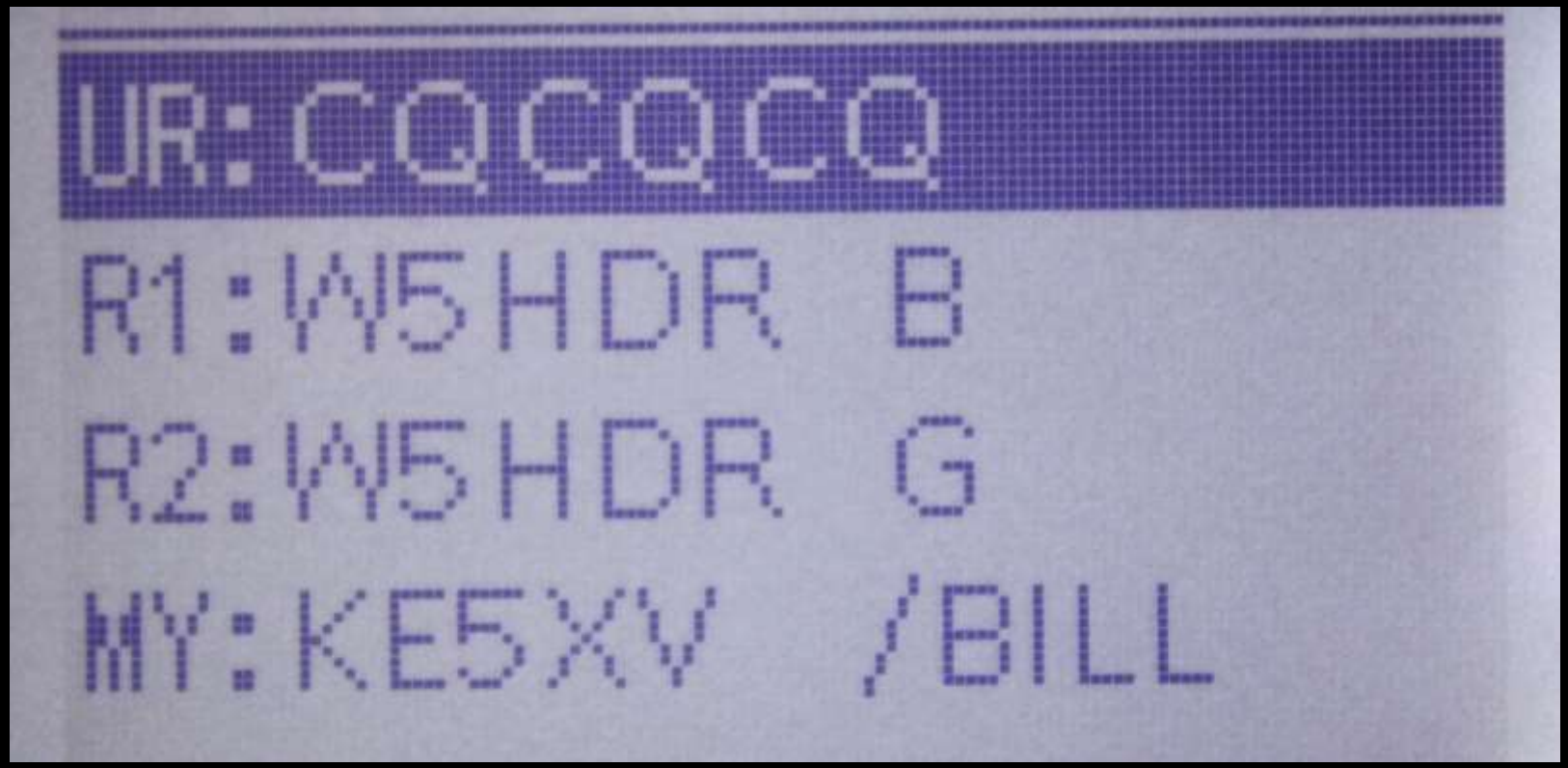
- It's the repeater that's connected to the reflector, not your radio
- Any repeater can connect to any reflector anywhere in the world
- Repeater operators allow users to link repeaters to any reflector (although they sometimes have a 'default' reflector)

# ID-51A PLUS SCREEN DISPLAY, OTHER RADIOS HAVE SIMILAR DISPLAYS


- Your signal is forwarded to the reflector to which the repeater is connected
- If the repeater isn't connected to a reflector, your transmission remains 'local'

# THE FOUR INFORMATION FIELDS

## UNDER THE COVERS



# THE UR/'TO' FIELD

- Think of this as a command line field
  - (Out of the box setting)
  - CQCQCQ – means 'do nothing'; forward my transmission
  - I (letter I, 8th position) – means 'tell me the status of the repeater I'm using – is this repeater linked? Where?'
  - E – Echo test PTT, talk, listen
  - U – Unlink the repeater from a reflector
  - REF004BL – link the repeater to reflector 004B
  - (Almost) <u>never</u> have a call sign in the UR field
    - Specifies 'call sign routing' or 'repeater node routing' – usually BAD

# THE R1 (REPEATER 1) / 'FROM' FIELD

- (Out of the box setting)
- The call sign and module of the repeater you're using
- W5HDR – this is the repeater at TranStar
- B – the B module (440 MHz)
  - The A module is 1.2 GHz
  - The C module is 144 MHz

# THE R2 /'FROM' FIELD

- (Out of the box setting)
- Specifies what happens with your transmission
  - Blank – the repeater repeats your transmission (RF), but it's not sent to the Internet and to any reflector that might be connected to this repeater.
  - W5HDR  G – your transmission is forwarded to the repeater's gateway (i.e. to the Internet). This means it's going to the reflector to which the repeater is connected.

# IF YOU BUY A ID-51A+ OR +2 TODAY

- It has local D-Star and analog repeaters programmed into the radio out-of-the-box
- It has a GPS receiver so it can determine which repeaters are near you!!
- You only need to know ONE thing

# YOUR CALL

(AND, OPTIONALLY, YOUR NAME)

# YOU DON'T NEED TO KNOW

- CTCSS tones – not used for digital
- Repeater names, frequencies, offsets (they're pre-programmed into the radio)
- Which repeaters are closest to you (the radio will tell you; also for analog)

# YOU MUST ENTER…

- Owner's call sign and a 4 letter message (message is optional) – usually your name or your radio type.

# HOW TO GET ON THE AIR

- Register your call – allows your transmissions to be forwarded on the Internet – easy and free.
- Houston area: kb2wf.tx@gmail.com
- Only needs to be done ONE time ever

# RADIOS FOR D-STAR

# ID-51A, PLUS/ANNIVERSARY, PLUS 2

- 2 meter and 440
- Analog and D-Star
- 5 watts max
- Repeater list pre-installed
- GPS receiver allows ‘near me’ repeater selection
- Price:  $339 for Plus
- Price:  $469 for Plus 2

# OTHER RADIOS

- IC-7100 – HF + VHF/UHF + D-Star $919 ($100 rebate)
- IC-5100 – VHF/UHF mobile $519
- ID-4100 – Brand New – $460
- IC-9100 – HF + VHF/UHF (D-Star option) $2340

# ID-4100 – ANNOUNCED, JUST NOW AVAILABLE

- $460 – bracket extra
- Similar interface to ID-51, 5100, 7100
- Feature set similar to ID-51A Plus2 Handheld
- 50 Watts
- GPS option
- Bluetooth option

# KENWOOD THD-74A

- Triband (2m, 220 MHz, 440MHz)
- Color display
- D-Star and APRS support
- HF SSB/CW/AM receive
- Excellent audio
- $609

# NO RADIO NEEDED!!!

You can get on D-Star without a radio. (Great for travelers.)

# EXTERNAL DIGITAL ENCODER

USB Headset (Logitech et al)

USB

- DVDongle
- DV3k
- DV4Mini (AMBE)

# DV-DONGLE / DV3K-DONGLE / DV4MINI AMBE

- Free software
- Access to any reflector in the world
- Less than $150 (DV3k)



# RADIO W/PERSONAL HOTSPOT

# HOT SPOTS

- Radio required
- Hotspot is a low power transceiver (personal repeater)
- Connects to a computer
- Provides access to the internet

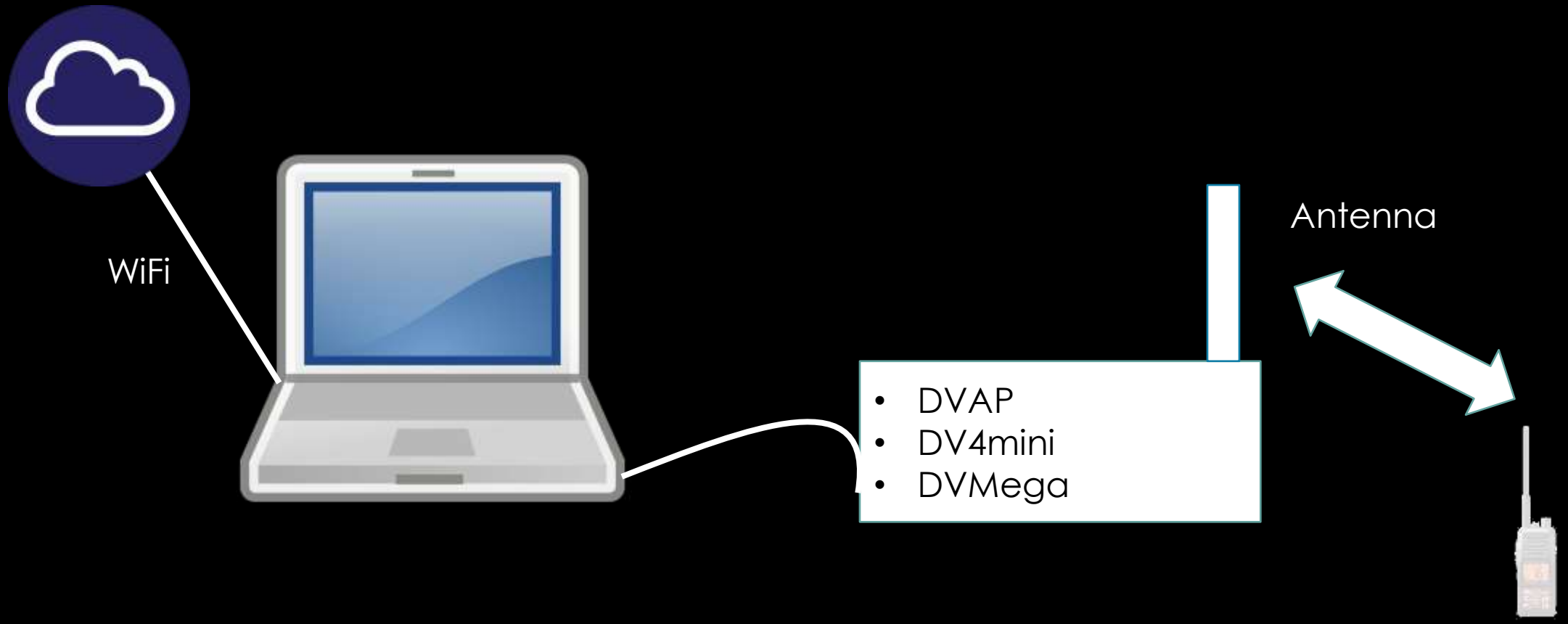
# DVAP/DV4MINI – DIGITAL VOICE ACCESS POINT


- Free software
- 2M or 440 Mhz
- DVAP Price $250
- DV4mini Price $129 (UHF) (no antenna)

# DVMEGA (TRANSCEIVER)

- Add-on boards for Arduino, Raspberry Pi, Bluestack
- Not for a Windows/Mac comp
  - ..except with a Bluestack
- Act like a DVAP
- Support D-Star and DMR, C4FM

# DVAP/DV4MINI/DVMEGA



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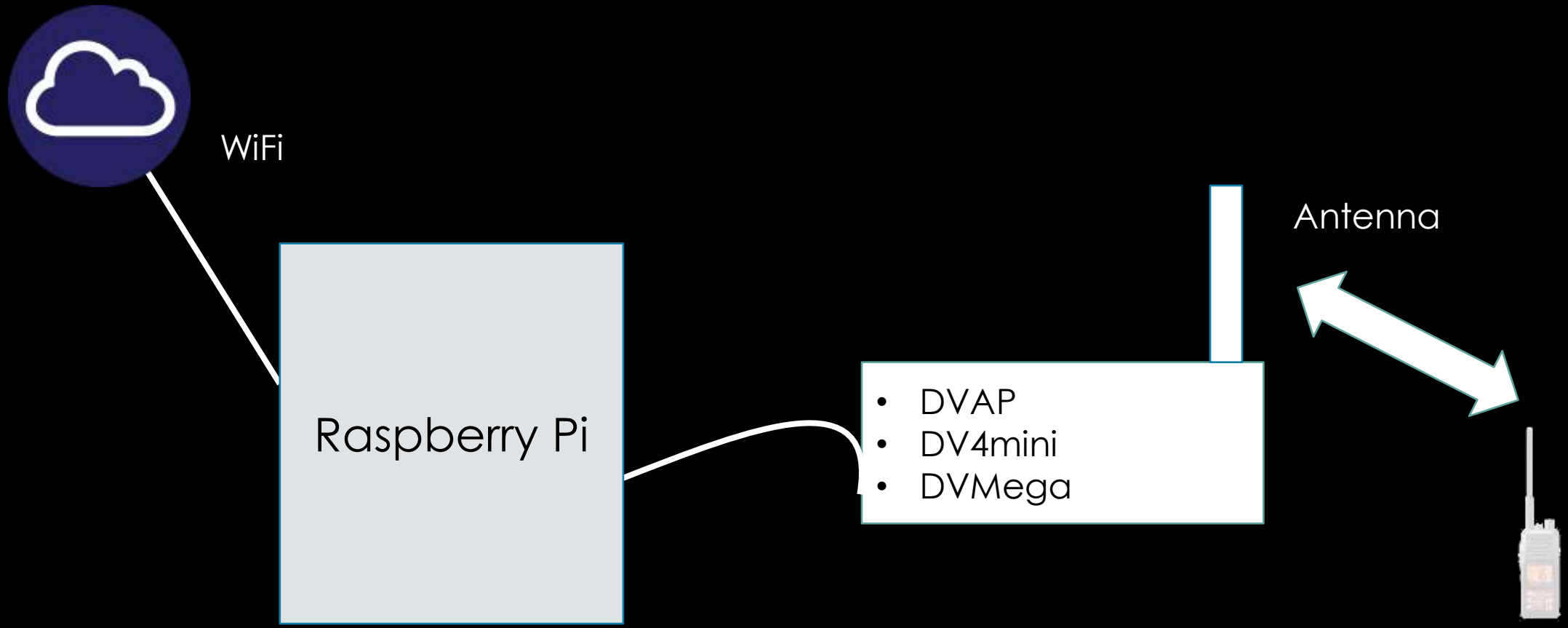

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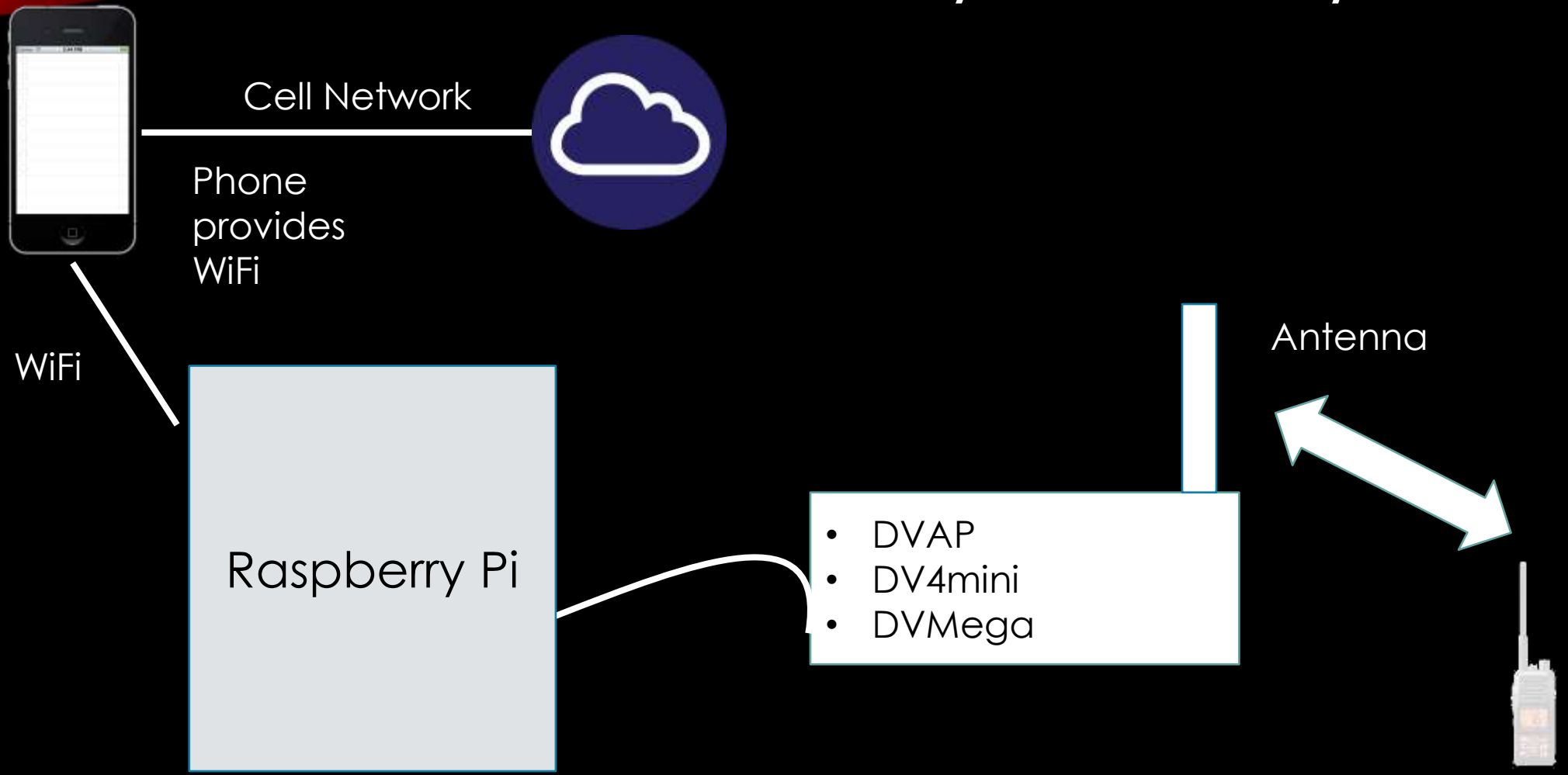
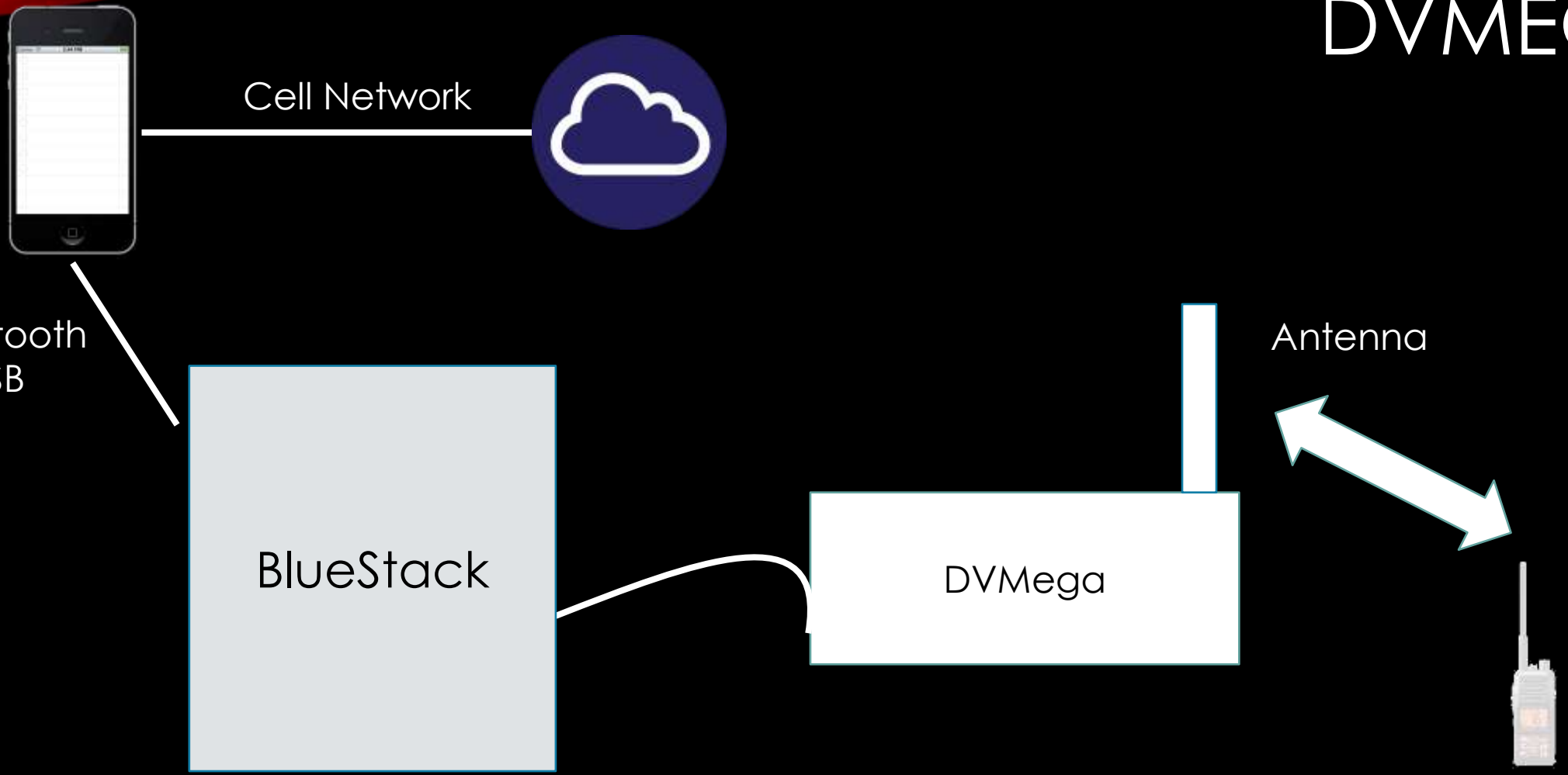
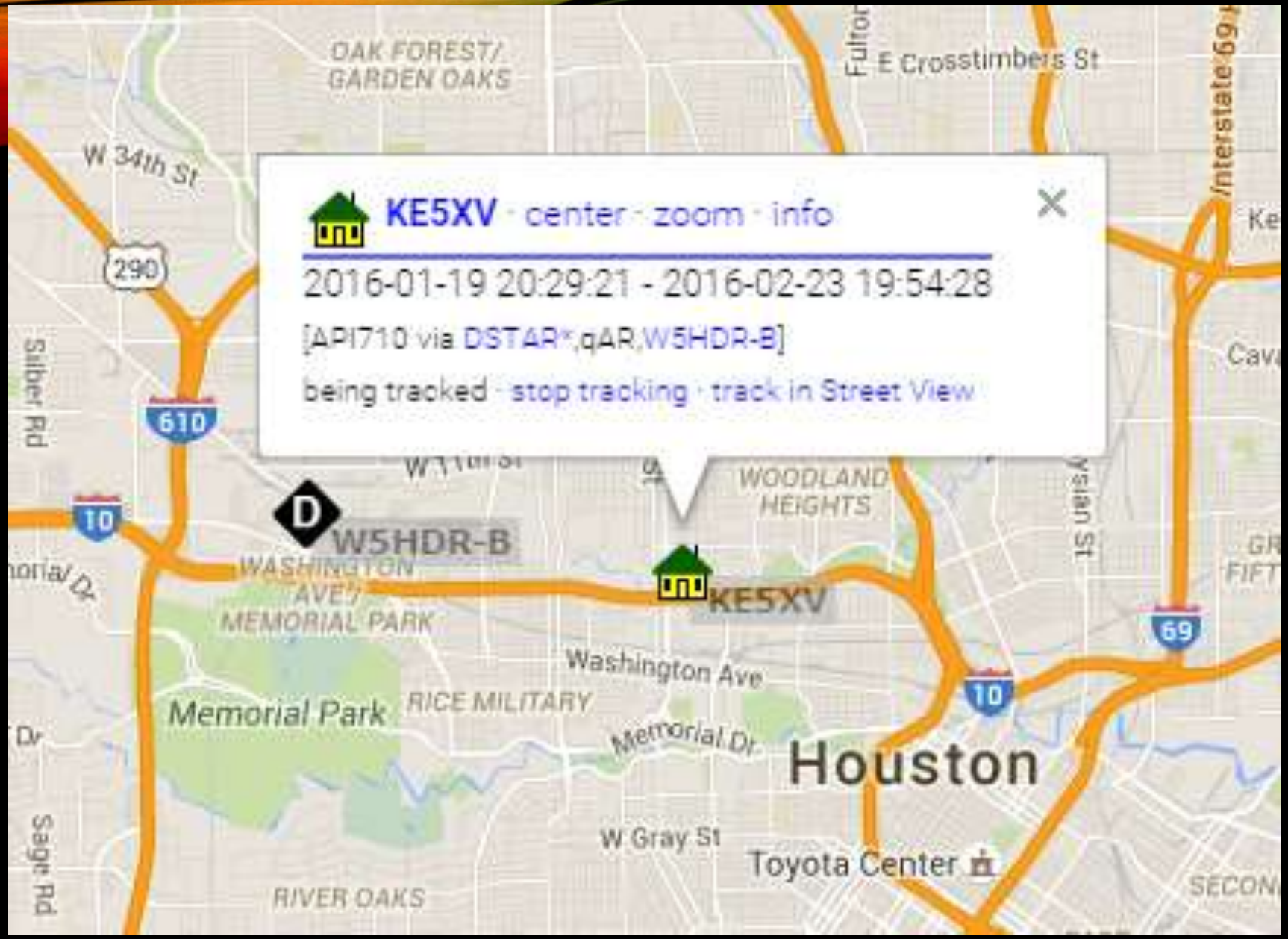


# DVMEGA



# BLUEDV SOFTWARE (IOS)

# APRS.FI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[API710 via DSTAR*,qAR,W5HDR-B]
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OAK FOREST/
GARDEN OAKS
E Crosstimbers St
W 34th St
290
610
10
Silber Rd
W5HDR-B
KE5XV
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HEIGHTS
WASHINGTON
AVE/
MEMORIAL PARK
Washington Ave
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RICE MILITARY
Memorial Dr
Houston
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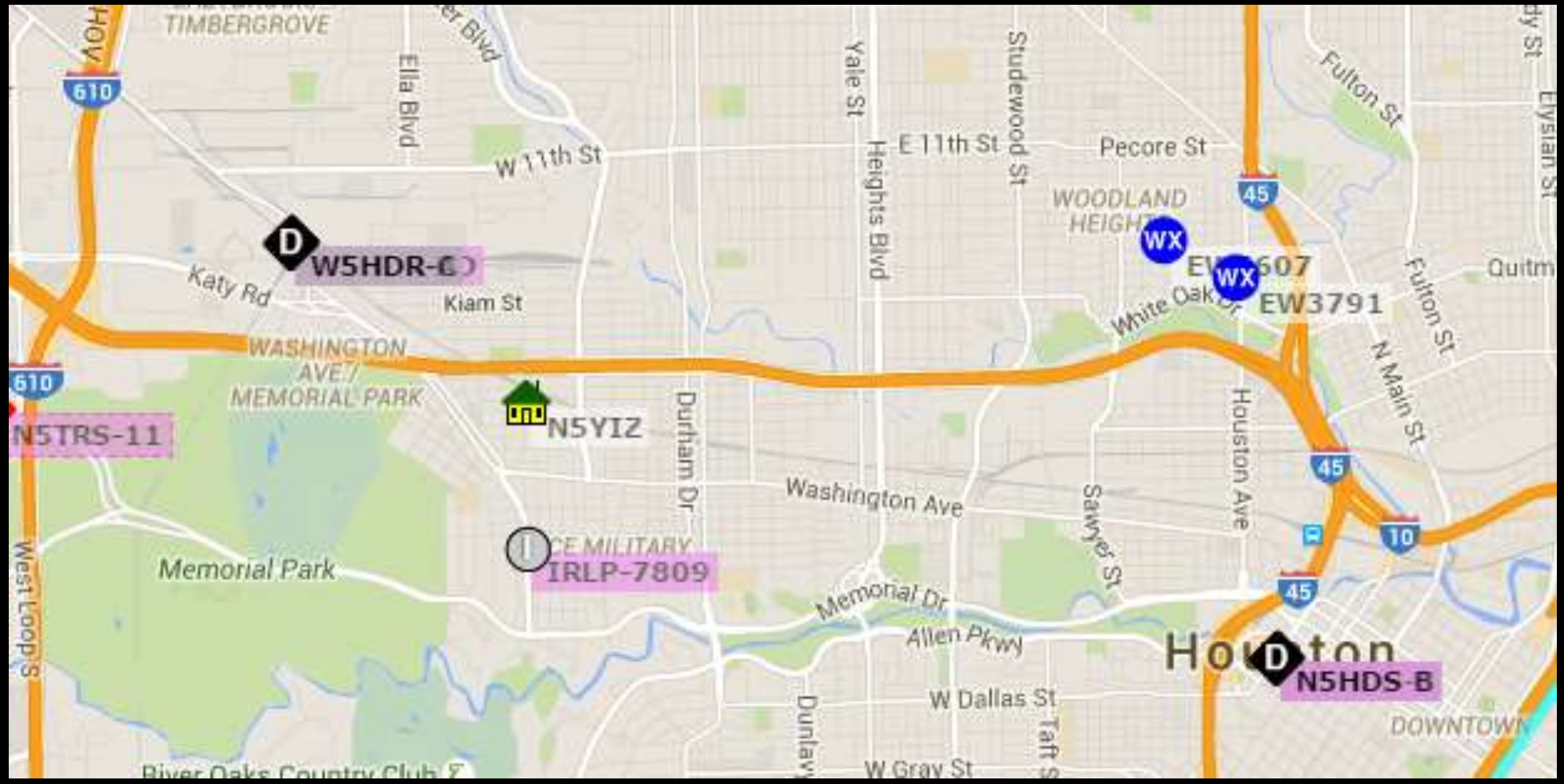
W Gray St
Toyota Center
RIVER OAKS
Sage Rd

# CENTRAL HOUSTON REPEATERS



# OTHER FUN THINGS TO DO…

- You can send photos from your Android device via D-Star
- You can send text messages via your Android device
- Slow speed access to the Internet

# RESOURCES

- "Houston Digital Radio" – Facebook group
  - Documents – how to set up radios, links to web sites
  - Meeting announcements –
  - Conversations
  - Programming files
- Digital Radio monthly meeting at **Transtar** (on Old Katy Road), 4th Monday, 7:00 p.m.

# RESOURCES

- DSTARINFO.com
  - Conferences – videos from D-Star class at Dayton Hamvention
  - Closest repeaters – zip code or city name
  - Nets schedule – Texas D-Star Net Tuesday night, 8:00 p.m. (local) Reflector 4B
  - Reflectors list – 235 reflectors world wide
  - Downloads – programming files
  - Much more
- DSTARUSERS.org
- REPEATERBOOK.com – filter by D-Star repeaters
- Yahoo Groups – DStar_Digital, DVAP Dongle, DV Dongle

# RESOURCES

- Software for programming your radio
  - ICOM – free software (you need to buy or build a cable)
  - Kenwood – free software provided by manufacturer
  - RT-Systems – Purchase with cable, updates D-Star repeater lists

# QUESTIONS?

# DEMO – HAL – N5BXP