# Katy Amateur Radio Society

Introduction

to

# Automatic Packet Reporting System (APRS)

Michael Deaver KG5JBJ-9

**KARS** 

APRS

### • History

- In 1982, Bob Bruninga (WB4APR), a senior research engineer at the United States Naval Academy, implemented the earliest ancestor of APRS on an Apple II computer
- Bob Bruninga describes APRS in this way: "APRS provides situational awareness to all operators of everything that is going on in his or her local area, whether it be weather reporting, traveler info, direction finding, objects pointing to ECHOlink and IRLP, or traffic reporting and emergency response."

APRS

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### APRS is

- a two-way tactical real-time digital communications system
- > digital communications information channel for Ham radio.
- > a single national channel
   (United States & Canada: 144.390 MHz)
- announcements, bulletins, messages, alerts, weather

**APRS** 

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### APRS is

- a frequency to monitor at any time to capture what is happening in ham radio in the local surrounding area
- a map of all this activity including objects, frequencies, satellites, nets, meetings, Hamfests, etc.
- real time positioning can be monitored on the <u>http://aprs.fi/</u> website by call sign, location, etc.

## APRS Technology

- uses Global Positioning System (GPS)
- > operates entirely in an unconnected broadcast fashion, using unnumbered AX.25 protocol at 1200 bit/s
- > packet repeaters, called digipeaters, form the backbone of the APRS system
- Internet gateway stations (IGates) connect the on-air APRS network to the APRS Internet System (APRS-IS)

APRS Hardware & Software

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- Equipment
  - Radio (2m)
  - > Terminal Node Controller (TNC)
  - GPS receiver
  - Cell phone
- APRS Software
  - > APRSDroid
  - > APRSPoint
  - > APRSPro
  - > APRS-TW (Telemetry Watcher)

#### EQUIPMENT

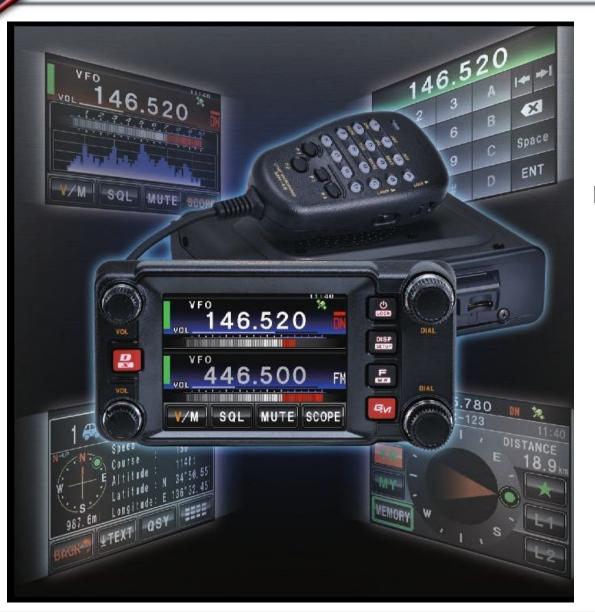
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Yaesu FT-8800 with Bluetooth TNC-X GPS from cell phone running APRSDroid

#### EQUIPMENT





#### Yaesu FTM-400XDR built in GPS & APRS TNC

#### FTM-400XDR Displays

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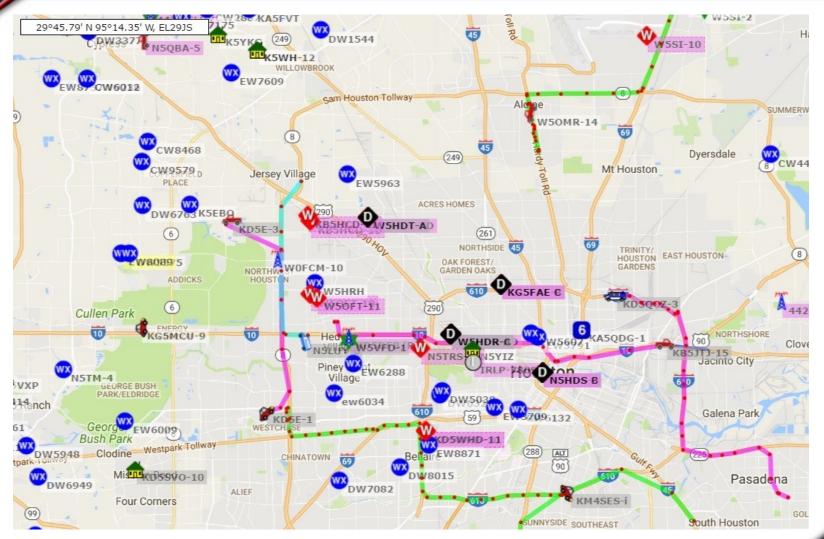


Moving Vehicle

Weather Station

#### APRS INTERNET SERVICE

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APRS-IS via APRS.fi website

#### **APRS-IS SSID SYMBOLS**



- -0 Dot
- -2 Bus
- -4 Bike
- -6 HELO
- -8 Ships (power)
- -10 Motorcycle
- -12 Jeep
- -14 Truck

## Example - KG5JBJ-9

- -1 Ambulance
- -3 Fire Truck
- -5 Yacht (sail)
- -7 Aircraft
- -9 Car
- -11 Balloons
- -13 Rv
- -15 Van

**APRS-IS ICONS** 



# = STAR (digipeaters)

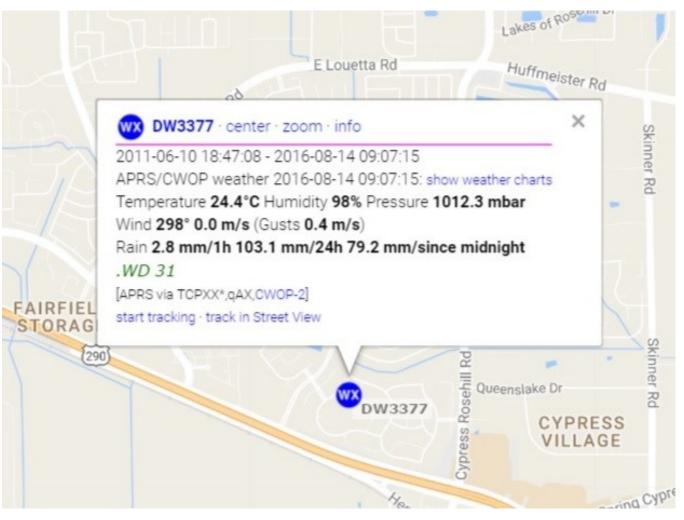
& = DIAMOND (gates)

= WEATHER Station (blue),WX and W-R DIGI (green)

Z = W in Red Diamond (APRSlink, part of Winlink)

#### **APRS-IS** Weather Station Info

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**APRS Weather Station** 

#### **APRS-IS APRSlink / Winlink Station Info**

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**APRS Winlink Station** 

#### APRS-fi Search

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Track ca	Illsign: Cle		Search ?	*
Address	, city or L		Clear Search ?	) A
Show la	1		-	
3 hours	s ~ :	Show al	1	
Track ta	il length:			
3 hours	5 V			
KG5JB	-9 🚓			×≡
D	. DOOFE 7	E'NOT	:35:41 (2	
Position	: 29°55.2	2019	°41.99' ₩	
2017		2019		
2017 Other S	2018	2019 G5JBJ	°41.99' Ŵ	
2017 Other S	<b>2018</b> SSIDs: K	2019 G5JBJ	°41.99' Ŵ	
<b>2017</b> <b>Other S</b> Wx: 96°F	2018 SIDs: K 56% 1012 m	2019 G5JBJ	°41.99' Ŵ	
2017 Other S Wx: 96°F Other v • Statio	2018 SIDs: K 56% 1012 m	2019 G5JBJ	°41.99' Ŵ	
2017 Other S Wx: 96°F Other V • Station • Raw	2018 SIDs: K 56% 1012 m riews: on info packets	2019 G5JBJ bar 2.2 MP	°41.99' Ŵ	
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2017 Other S Wx: 96°F Other V • Statio • Raw • Statu • APRS • Mess • Prefix • Goog	2018 SIDs: K 56% 1012 m riews: on info packets is packets s packets s cwop w ages - Bu	2019 G5JBJ bar 2.2 MP s - Beaco reather - lletin boa g (ML ?	P41.99' W → → → → + s → on packets Telemetry	

Preferences - My account

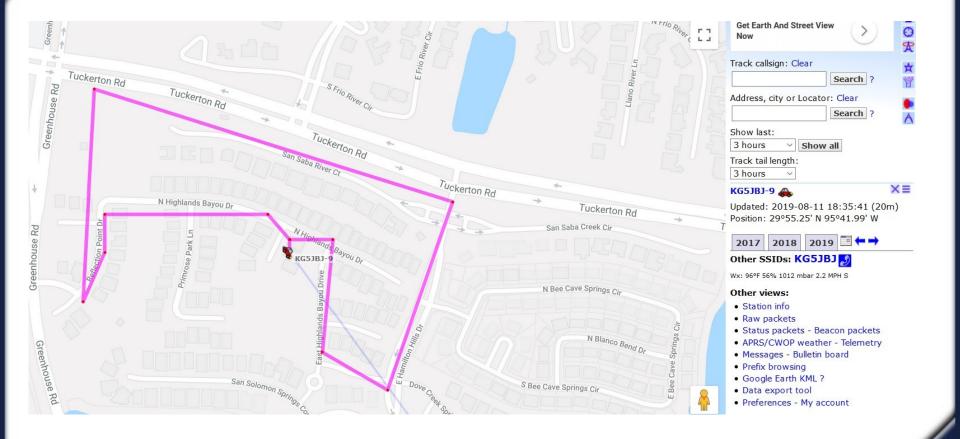
#### APRS-IS Vehicle Info Map

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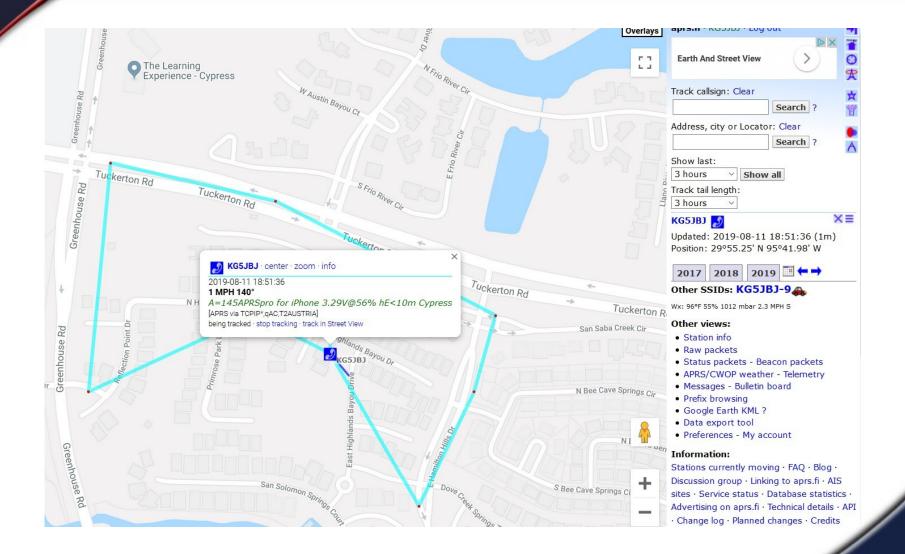
× KG5JBJ-9 · center · zoom · info 2016-08-14 08:48:36 TAIS 61 km/h 225° alt 40 m 147.200MHz T141 +060 kg5jbj@arrl.net [R9UU9W via WIDE1-1, WIDE2-1, qAR, KC5DAQ-1] start tracking · track in Street View ndy Groke Vehicle Information at that point Tuckerton Rd 5JBJ-9 West Rd est P

YAESU FTM-400XDR sends main band freq. information

#### APRS Track from FTM-400XDR

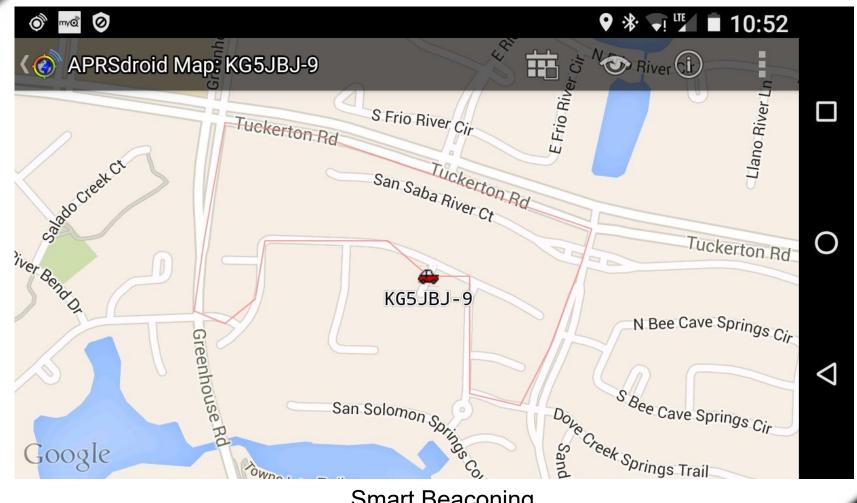


#### APRS Track from APRSPro for iPhone



#### **APRSDroid Map**

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Smart Beaconing APRSDroid map display

### APRSDroid



M (* ()	♥ 券 心 ♥◢ ■ 11:17				
APRSdroid Hub					
👹 KG5JBJ	0.0 km N 11:14 AM				
/A=000052 kg5jbj@ar	rl.net				
🎂 KD5QCZ-3	3.3 km SE 11:16 AM				
281/029/A=000183!wI	11				
📣 KC5DAQ-8	6.3 km W 11:16 AM				
4F}					
👆 KF6KYD	6.9 km E 11:15 AM				
APRS-IS for Win32					
💀 KF6KYD-2	7.0 km E 11:16 AM				
000/000g000t078r000					
♣KD5E-3	12.0 km SE 11:05 AM				
%P%C'r !w`;! 3					
👆 K5₩H-12	12.5 km NE 11:16 AM				
PHG5170/AllStar 282					
💀 KA5FVT	13.5 km NE 11:14 AM				
346/001g004t077r002p237h96b10159.wvi					
SINGLE SHOT	STOP TRACKING				

APRSDroid Station List

### APRSDroid Station Info

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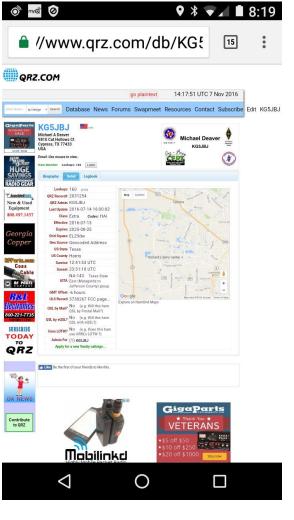
<ul> <li>Image: Image: Im</li></ul>					
← Station Info KG5JBJ-9 ► 🗺 :					
Station SSIDs					
KG5JBJ-9     0.0 km N       /A=000019     KG5JBJ@ARRL.NET					
Station History K65JBJ-9≫APDR13,WIDE1-1:=2955.26N/ 09542.00W≥201/011/A=0000013 K65JBJQARRL.NET					
2016-03-15 10:52:02 Bluetooth OK (±4m) KG5JBJ-9≫APDR13,WIDE1-1:=2955.26N/ 09541.96W≥316/011/A=000006 KG5JBJ@ARRL.NET					
2016-03-15 10:51:55 received KG5JBJ-9>APDR13,N5LUY-2*:=2955.23N/ 09541.96W>001/023/A=-00013					
MAP APRS.FI QRZ.COM					

### MAP - APRS.FI - QRZ.COM

### APRSDroid - aprs.fi & qrz.com

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apre	s.fi				
	· info · static map · telemetry · weather · raw · status ·				
	messages · bulletins · browse · moving				
Calleign e	hip name or locator:				
KG5JBJ-9					
KG00D0-	Search [clear]				
APRS statio	on KG5JBJ-9 🚓 - show graphs				
	KG5JBJ@ARRL.NET				
Location:	29°55.26' N 95°42.00' W - locator EL29DW61AA - show ma				
	- static map				
	5.4 km South bearing 183° from Cypress, Harris County,				
	Texas, United States [?]				
	7.1 km West bearing 265° from Oak Cliff Place, Harris				
	County, Texas, United States				
	36.9 km Northwest bearing 298° from Houston, Harris				
	County, Texas, United States				
	53.8 km Northwest bearing 298° from Pasadena, Harris				
Last	County, Texas, United States 2016-03-15 15:53:20 UTC (3s ago)				
position:	2016-03-15 10:53:20 CDT local time at Cypress, United				
position.	States [?]				
Altitude:	6 m				
Device:	Open Source: APRSdroid (app, Android)				
Last path:					
	Good path!				
Positions	22				
stored:					
Packet rate	:187 seconds between packets on average during 3554				
	seconds.				
Other SSIDs:	KG5JBJ 🚓 KG5JBJ-10 🔊 KG5JBJ-5 💋 KG5JBJ-7 💋				
Stations ne	ar current position of KG5JBJ-9 - show more				
callsign	distance last heard - UTC				



APRSDroid screen capture

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### APRSlink is a part of Winlink System which allows you to send messages, text, and emails

### <u>Commands:</u>

- <u>WLNK-1</u> start login process LOGIN [123] response 123xxx
- <u>H</u> or ? Return brief Help
- <u>L</u> List of messages
- <u>**R#</u>** Read message number #</u>
- <u>Y#</u> replY to message #
- <u>SP</u> <email address or- call sign –or- alias> <subject> SP sam@iam.com Header Test Message /EX Complete and send the composed

#### **APRSlink Commands**

- **P** Playback message
- <u>SMS</u> Send short message
   Syntax: SMS <email address, call sign, or alias> <message>

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- <u>A</u> Create an alias for an e-mail address
   Example: A sam=sammy.miller@somelongdomainname.net
- <u>F#</u> Forward message number # to address or call sign following
- <u>K#</u> Kill (mark as deleted) message number
- <u>G#</u> Return information about closest active RMS Packet Gateway
- I Return Information about APRSlink

### APRSlink Messages

# KARS

← Messages       F       ●       +       Messages WLNK-1       ●       I         There are no stored conversations.       2016-08-15 12:33:39 KBSUBJ       List         2016-08-15 12:33:40 WLNK-1       1       2016-08-15 12:33:43 APRS MSG TEST       1         Send message to       WLNK-1       1) 08/15/2016 17:33:43 APRS MSG TEST       1         WLNK-1       1) 08/15/2016 17:33:43 //WL2K Packet       2         00       08/15/2016 17:33:43 //WL2K Packet       2         2016-08-15 12:34:19 KBSUBJ       1         2016-08-15 12:34:20 WLNK-1       2         1       2       2016-08-15 12:34:49 KBSUBJ       2         1       1       1       1       1         1       1       1       1       1         2       08/15/2016 17:33:43       1       2         2016-08-15 12:34:19 KBSUBJ       1       1       1         1       0       1       1       1       1         1       0       1       1       1       1         1       1       1       1       1       1       1         1       1       1       1       1       1       1       1       1	ð Ø	♥ * ▼⊿ ■ 1:27	i 🔊 💿 🗖	♥ 🕸 🐨 🖌 🛢 12:34
LListconversations.2016-08-15 12:33:40 WLNK-111) 08/15/2016 17:33:43 APRS MSG TEST12016-08-15 12:33:43 WLNK-12) 08/15/2016 17:33:43 //WL2K Packet2WLNK-12) 08/15/2016 17:33:43 //WL2K Packet2WLNK-112016-08-15 12:34:19 KGGJBJ112016-08-15 12:34:22 WLNK-1R12016-08-15 12:34:24 WLNK-1R12016-08-15 12:34:24 WLNK-1R12016-08-15 12:34:45 KGGJBJ1732016-08-15 12:34:45 KGGJBJ713-201-44952016-08-15 12:34:45 KGGJBJ6555518518619969919 </th <th>← Messages</th> <th><b>=</b> () <b>:</b></th> <th></th> <th>(i) 🛐 :</th>	← Messages	<b>=</b> () <b>:</b>		(i) 🛐 :
2016-08-15 12:33:40 WLNK-1       1         1) 08/15/2016 17:33:43 APRS MSG TEST       1         2016-08-15 12:33:43 WLNK-1       2         1       08/15/2016 17:33:43 //WL2K Packet       2         WLNK-1       1         1       08/15/2016 17:33:43 WLNK-1       2         2016-08-15 12:34:40 WLNK-1       R1         APRS MSG TEST Fm:SMTP:kg5jbj@g.mail.com Msg:This is a msg test.       73         2016-08-15 12:34:44 WLNK-1       1         Michael Deaver KG5JBJ       713-201-4495         2016-08-15 12:34:45 K@GJBJ       0ff         WIENK-1       06K		d	L	List
Send message to       2) 08/15/2016 17:33:43 //WL2K Packet       2         WLNK-1       Est via Telnet 969 bytes       2         U       2016-08-15 12:34:19 K065JBJ       R1         CANCEL OK       OK       2016-08-15 12:34:24 WLNK-1       R1         SEND MESSAGE TO       MESSAGE TO       OK       0K	conversations.		1) 08/15/2016 17:33	
WLNK-1       2016-08-15 12:34:19 K@GJBJ       R1         U       2016-08-15 12:34:22 WLNK-1       APRS MSG TEST Fm: SMTP: kg5jbj@g-mail.com Msg: This is a msg test.       R1         CANCEL OK       2016-08-15 12:34:24 WLNK-1       Michael Deaver KG5JBJ       File         SEND MESSAGE TO       OK       OK       OK	Send messag	ge to	2) 08/15/2016 17:33	:43 //WL2K Packet
L2016-08-15 12:34:22 WLNK-1APRS MSG TEST Fm: SMTP: kg5jbj@g- mail.com Msg: This is a msg test. 73CANCEL OKCANCEL OK2016-08-15 12:34:24 WLNK-1 Michael Deaver KG5JBJ 713-201-4495 2016-08-15 12:34:45 KG5JBJ Digg 	WLNK-1		2016-08-15 12:34:19 🕅 🗟 🕅	BJ P1
CANCEL OK2016-08-15 12:34:24 WLNK-1 Michael Deaver KG5JBJ 713-201-4495Iog off2016-08-15 12:34:45 KG65JBJ 	<u>ц</u>		APRS MSG TEST Fm:SM mail.com Msg:This i	K-1 ITP:kg5jbj@g-
2016-08-15 12:34:45 K@SJBJ       log         by@       2016-08-15 12:34:46 WLNK-1         Log off successful       OK	C/	ANCEL OK	2016-08-15 12:34:24 WLN Michael Deaver	
2016-08-15 12:34:46 WLNK-1 Log off successful OK			2016-08-15 12:34:45 🕅 🕄	10g
			2016-08-15 12:34:46 WLN	K-1 Off
	SEND MESS	AGE TO	<u> </u>	ок
	0			

Email via APRSlink

After WNLK-1 login

SP sam@iam.com Test Message (Msg Tx) Some text for the body of the message (Msg Tx) Some more text for the message (Msg Tx) /EX (Msg Tx)

Each line is a separate APRS message, but the need for entering specific commands for each line/message has been removed. You type and send as much text as necessary and then send /EX as a separate APRS message to complete your email and send the composed message. You should receive a confirmation message.

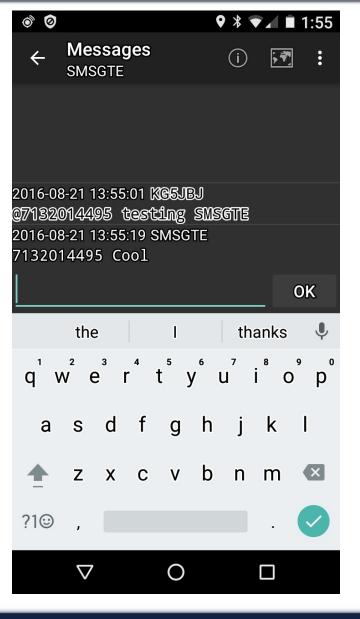
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SMS 7135551234 call me asap

#### SMSGTE SMS texting

### **KARS**

#### SMSGTE @5551234567 <Your short message here>



## **KARS**

- Sources and Links
  - https://en.wikipedia.org/wiki/Automatic\_Packet\_Reporting\_System
  - http://aprs.fi/
  - http://www.aprs.org/
  - http://www.openaprs.net/
  - https://aprsdroid.org/ Android app
  - http://aprspro.com/v1/ iPhone app
  - http://www.aprs-is.net/
  - http://www.winlink.org/APRSLink
  - Emails and Texts with APRS by K7DCC (PPT)
  - http://smsgte.wixsite.com/smsgte

## **KARS**

### Sources and Links

- http://www.dxzone.com/catalog/Software/APRS/
- http://aprsisce.wikidot.com/start
- http://www.aprs.net/
- https://en.wikipedia.org/wiki/AX.25
- http://www.dxzone.com/catalog/Software/APRS/
- YouTube "APRS tutorial SMS messaging APRSDroid"
- http://harriscountyares.org/training/DIG/DIG-105.pdf
- http://aprstw.blandranch.net/
- http://www.aprs.net/vm/DOS/SYMBOLS.HTM
- https://groups.yahoo.com/neo/groups/APRS/info



# Thank You!

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