

Introduction to APRS  
by  
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- ⌘ Automatic Packet Reporting System
- ⌘ Packet communications protocol for disseminating live data to everyone on a network in real time
- ⌘ Gives tactical situational awareness of everything on the net
- ⌘ Fully integrated with the Internet
- ⌘ Can send email and text messages

# What is APRS?

- ⌘ First researched on amateur bands in 1978 in Montreal, Canada
- ⌘ First TNC was developed in 1982 by TAPR
- ⌘ Outgrowth of BBS and packet networks in 1990s
- ⌘ ARES, NTS and EOCs are using packet to deliver messages

## History of packet

- ⌘ First used in mid-1980s
- ⌘ Integrates amateur radio, GPS, and maps
- ⌘ APRS is a registered trademark of the late Bob Bruninga WB4APR

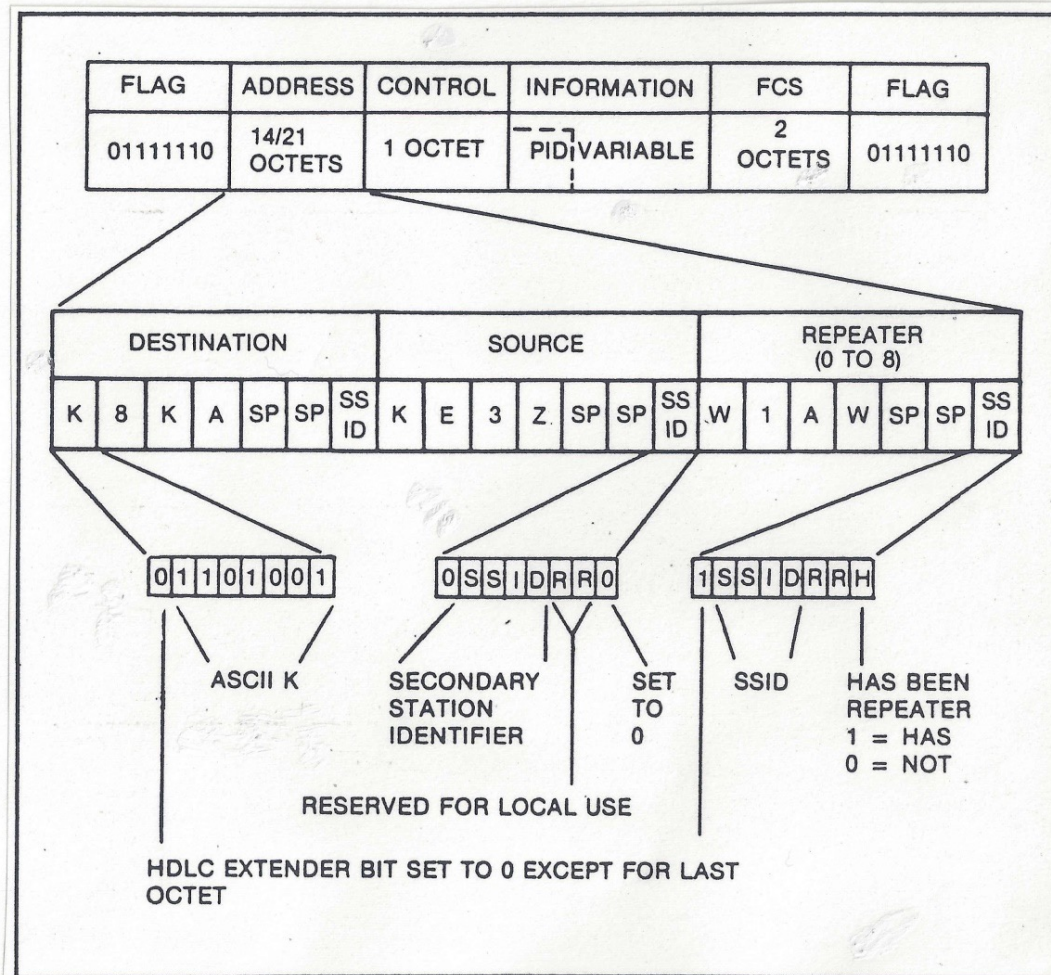
# History of APRS

- & AX.25 Protocol
- & Location, date, and time
- & May contain other telemetry data (elevation)
- & One-to-many protocol
- & Digipeating
- & Supports two-way messaging
- & Supports email
- & Supports texting to cell phones

# What is an APRS packet?

- & The packet frames a sequential group of data
- & Destination and source address
- & Repeat counter
- & Number of bytes
- & Sequence number for multi-frame packets
- & Error check sum

What is an AX.25 packet?



# Packet Address Field

& HF – 300

& VHF - 1200

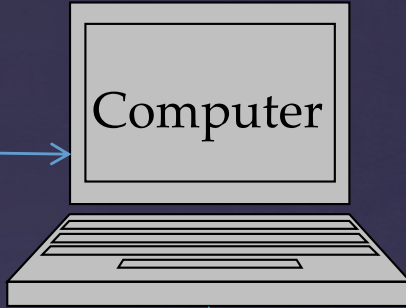
# APRS Baud Rate



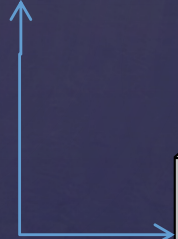
GPS



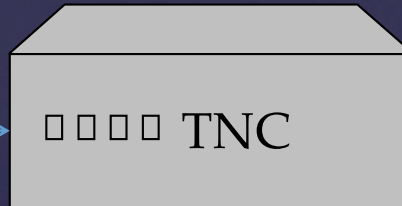
Computer



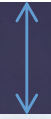
Serial Cable



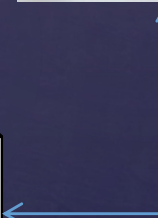
TNC



Radio



Radio Cable

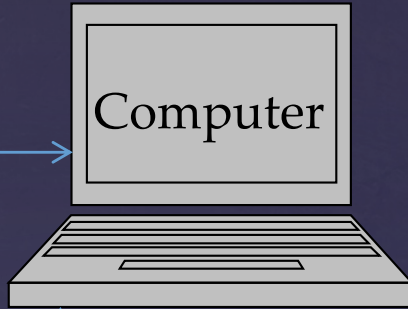


# Hardware

GPS



Computer



Radio



PTT

Data In  
Mic

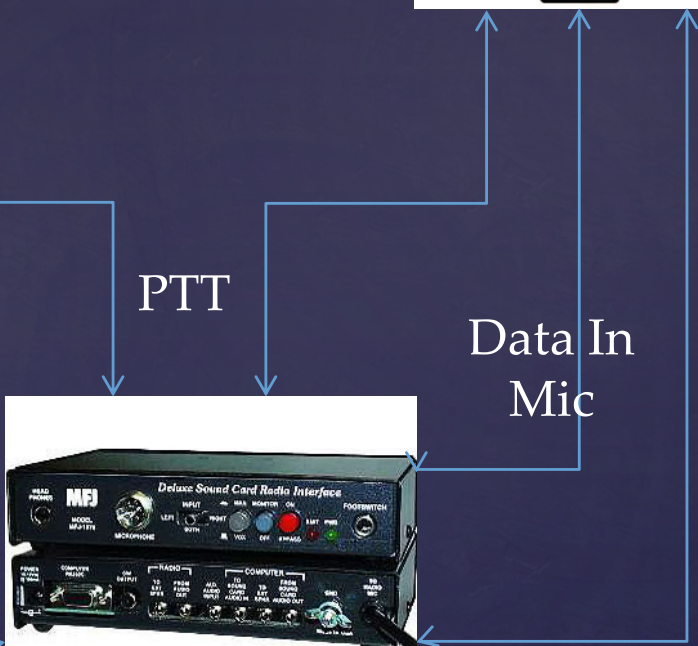
Data In  
Mic

Data Out  
Speaker

Data Out  
Speaker



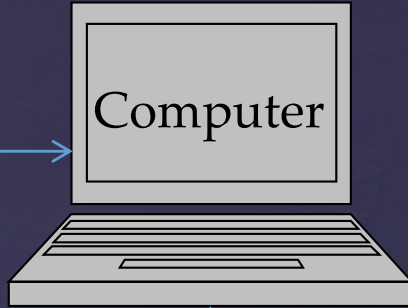
# Sound Card



GPS



Computer



Radio



USB Cable



Radio Data Cable



# Tigertronics SignalLink

- & You can buy them everywhere
- & They are in tablets
- & They are in smart phones
- & They are in amateur radios
- & They are in navigation devices

## GPS Receivers

- & Kantronics-3+
- & Timewave PK-96/100
- & MFJ-1270X
- & TNC-Pi & TNC-Black
- & Farallon PTC-II
- & Radios with built-in TNCs
- & Byonics TinyTrak4

# Terminal Node Controller



MFJ's TNC-X



Timewave PK-96/100



Kantronics-3+





# Raspberry Pi & TNC-Pi



Kenwood TM-D710G



# Kenwood TH-D74A



Yaesu FTM-500DR



# Byonics TinyTrak4

- & MFJ-1279 & 1275
- & Tigertronics Signalink
- & West Mountain
- & Timewave

## Sound Card Interfaces

& Direwolf

& Sound Modem – UZ7HO

& AGWPE Pro

Sound Modem Software



What frequencies?

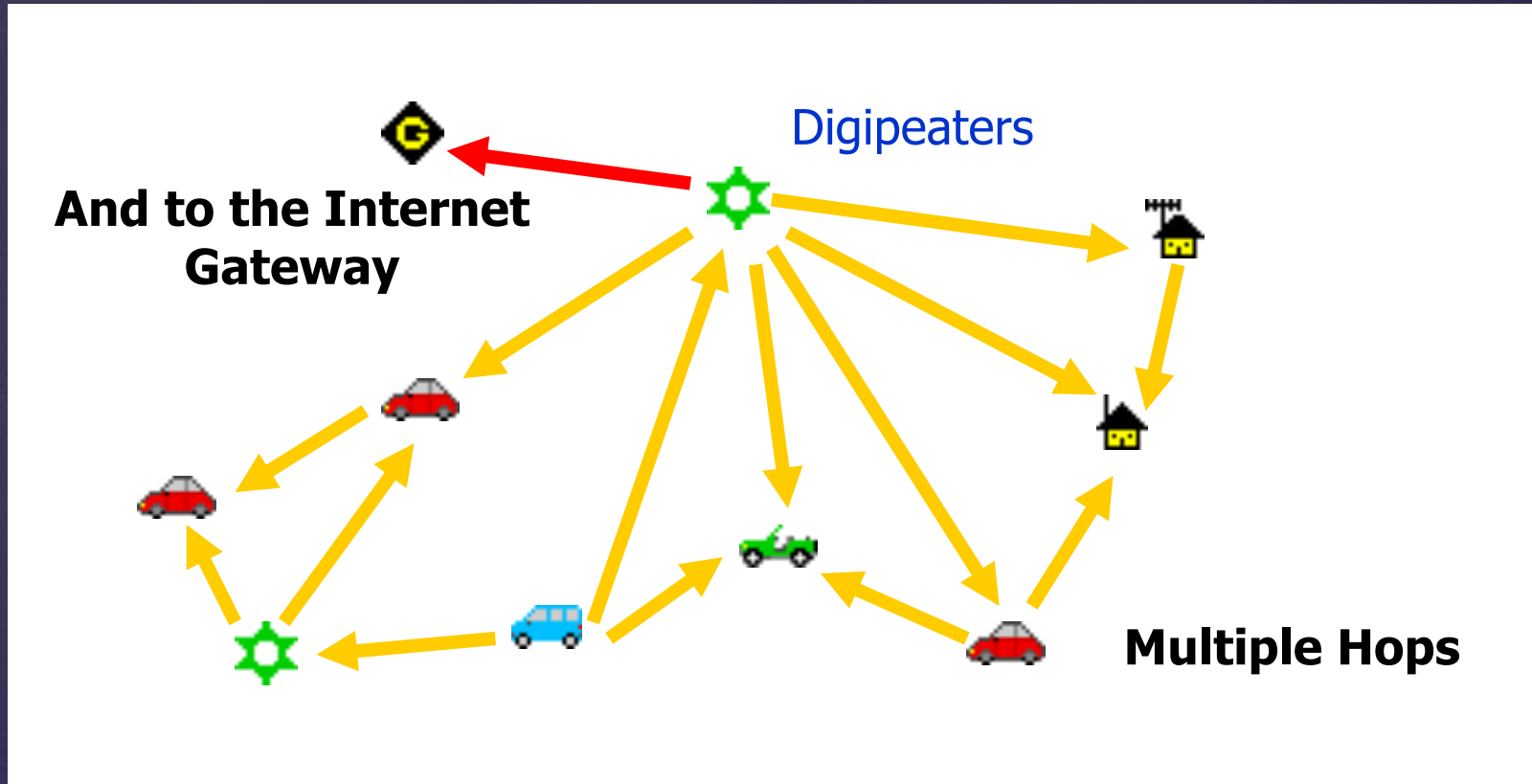


& Digipeaters

& iGates

& Need a passcode to be an  
IGate

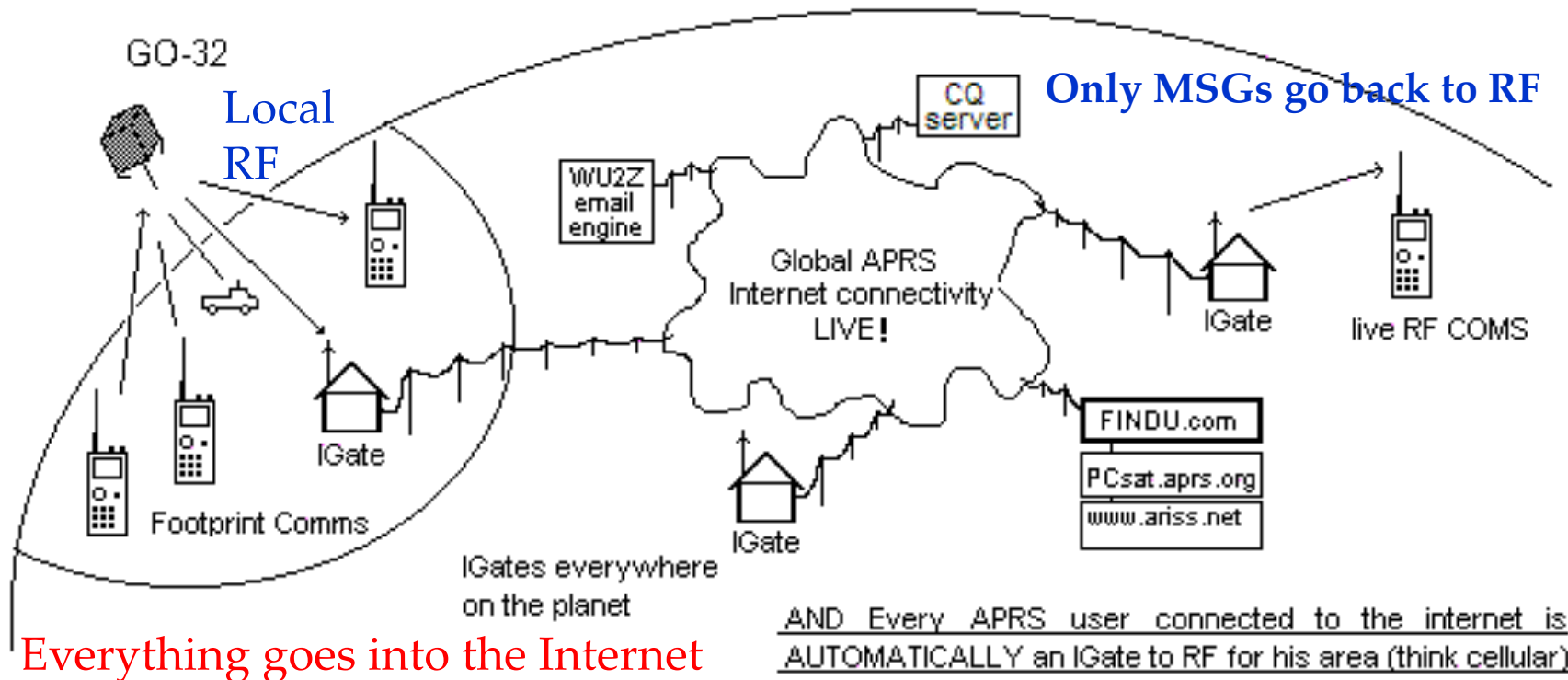
How do APRS packets  
propagate?



# The APRS Network

# APRS Global Network

( End-to-End Everywhere )



# Internet Connectivity

- & UI-View
- & WinAPRS
- & [APRSISCE/32](#)
- & PinPointAPRS
- & Xastir
- & YAAC
- & APRSdroid (iPhone version?)
- & Requires a passcode to connect to APRS server

# APRS Software



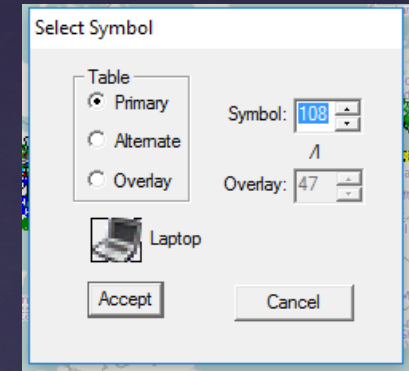
# APRS Operation



# Android Tablet and HT

- & K0LAI-0 Fixed
- & K0LAI-1 to 4 mobile
- & K0LAI-5 Dstar, iPhone, Android
- & K0LAI-7 HT
- & K0LAI-8 Boat, RV
- & K0LAI-9 Primary mobile with messaging capability
- & K0LAI-10 - iGate

SSID



- ⌘ Selection from a standard set of symbols
- ⌘ NOT a bitmap transmitted over the air!



# APRS symbols



File Edit View History Bookmarks Tools Help

Google Maps APRS

aprs.fi/#lat=39.67383&lng=-105.15000

39°55.47' N 104°25.87' W  
DM79SW

Map

aprs.fi · KOLAI · Log out

Track callsign: Clear

Address, city or Locator: Clear

Show last: 1 hour Show all

Track tail length: 1 hour

Wx: 85°F 25% 1013 mbar 3.9 MPH NW

**Other views:**

- Station info
- Raw packets
- Status packets - Beacon packets
- APRS/CWOP weather - Telemetry
- Messages - Bulletin board
- Prefix browsing
- Google Earth KML ?
- Data export tool
- Preferences - My account

**Information:**

Stations currently moving · FAQ · Blog · Discussion group · Linking to aprs.fi · AIS sites · Service status · Database statistics · Advertising on aprs.fi · Technical details · API · Change log · Planned changes · Credits and thanks · Terms Of Service · iPhone/iPad APRS

Idle: points updated 1, deleted 0

Map data ©2016 Google 2 km Terms of Use Report a map error

1:58 PM 8/10/2016

aprs.fi

Google Maps APRS

aprs.fi/#fnt=roadmap&z=12&call=a%2FKOLAI-9&timerange=10800&tail=10800

39°45.70' N 105°0.84' W, DM79LS

Map

Search

aprs.fi · KOLAI - Log out

Track callsign: Clear

Address, city or Locator: Clear

Show last: 3 hours Show all

Track tail length: 3 hours

KOLAI-9

Updated: 2016-08-09 16:25:49 (21h39m)

Position: 39°40.40' N 105°8.98' W

2014 2015 2016

Other SSIDs: KOLAI KOLAI-10

KOLAI-5

Wx: 85°F 27% 1014 mbar 4.2 MPH NW

Other views:

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idle

2:04 PM 8/10/2016

File Edit View History Bookmarks Tools Help

2016-08-09 16:25:49

11 MPH 328' alt 5833 ft

449.350MHz

Mic-E: En route

[SYAPT via WIDE1-1,WIDE2-1,qAR,K0KK-S] being tracked stop tracking track in Street View

KOLAI-9

KOLAI-9

KOLAI-10

Map data ©2016 Google 1 km Terms of Use Report a map error

# Where's KOLAI-9?

& To: KØGRC

& Hi, Mike, 73!

Send RF Text

& <http://www.findu.com/cgi-bin/entermsg.cgi>

& To: KØGRC

& Hi, Mike, 73!

Send RF Text using  
Findu.com

& To: EMAIL or EMAIL2

& [k0lai@arrl.net](mailto:k0lai@arrl.net) Hi, Larry!

Send RF to Email

& To: EMAIL

& [3038832146@vtext.com](mailto:3038832146@vtext.com) Hi,  
Larry, 73!

& Cannot reply directly

Send RF Text to Verizon Cell Phone

& <https://smsgte.org>

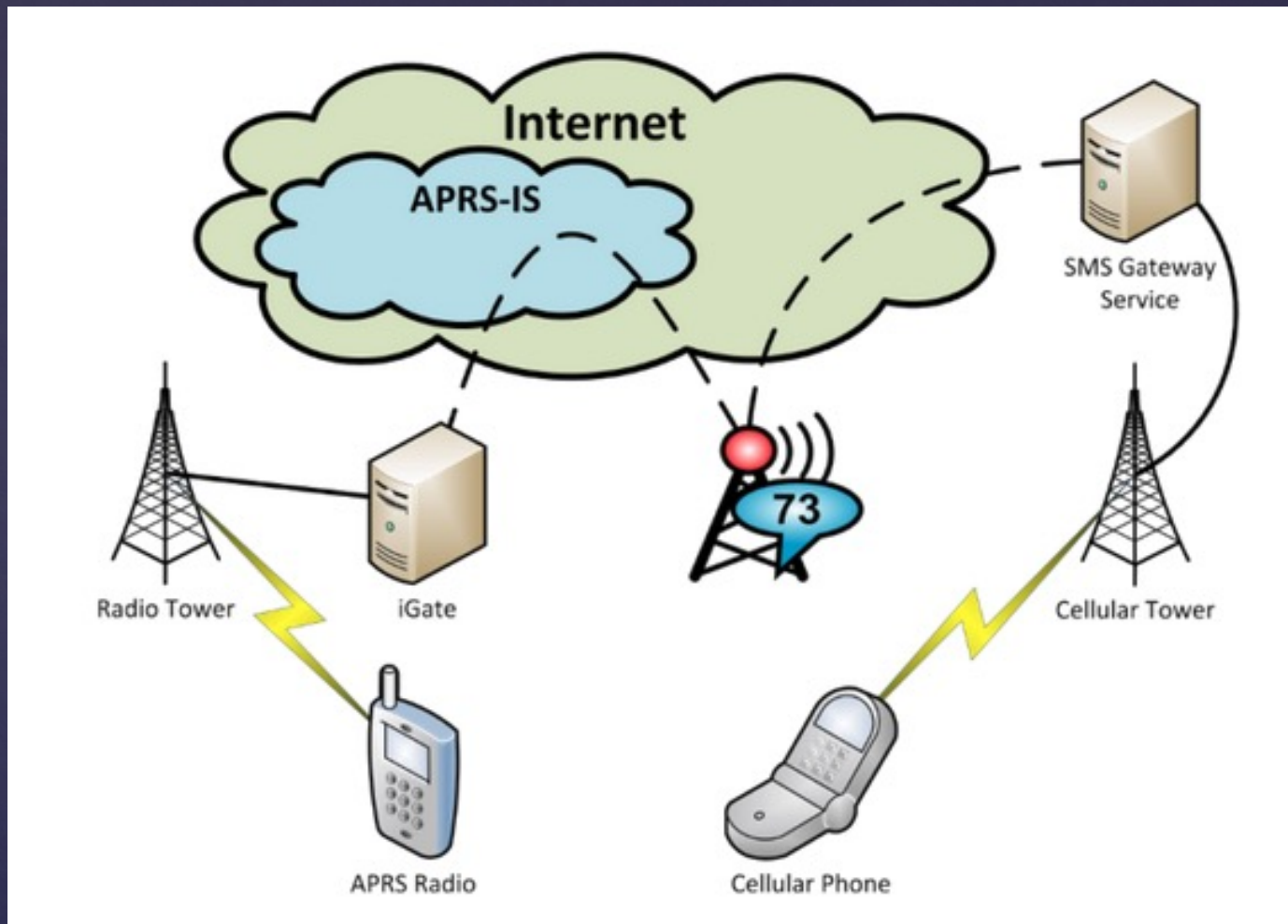
& To: SMSGTE

& @3038832146 Hi, Larry, 73!

& Interactive texting is allowed

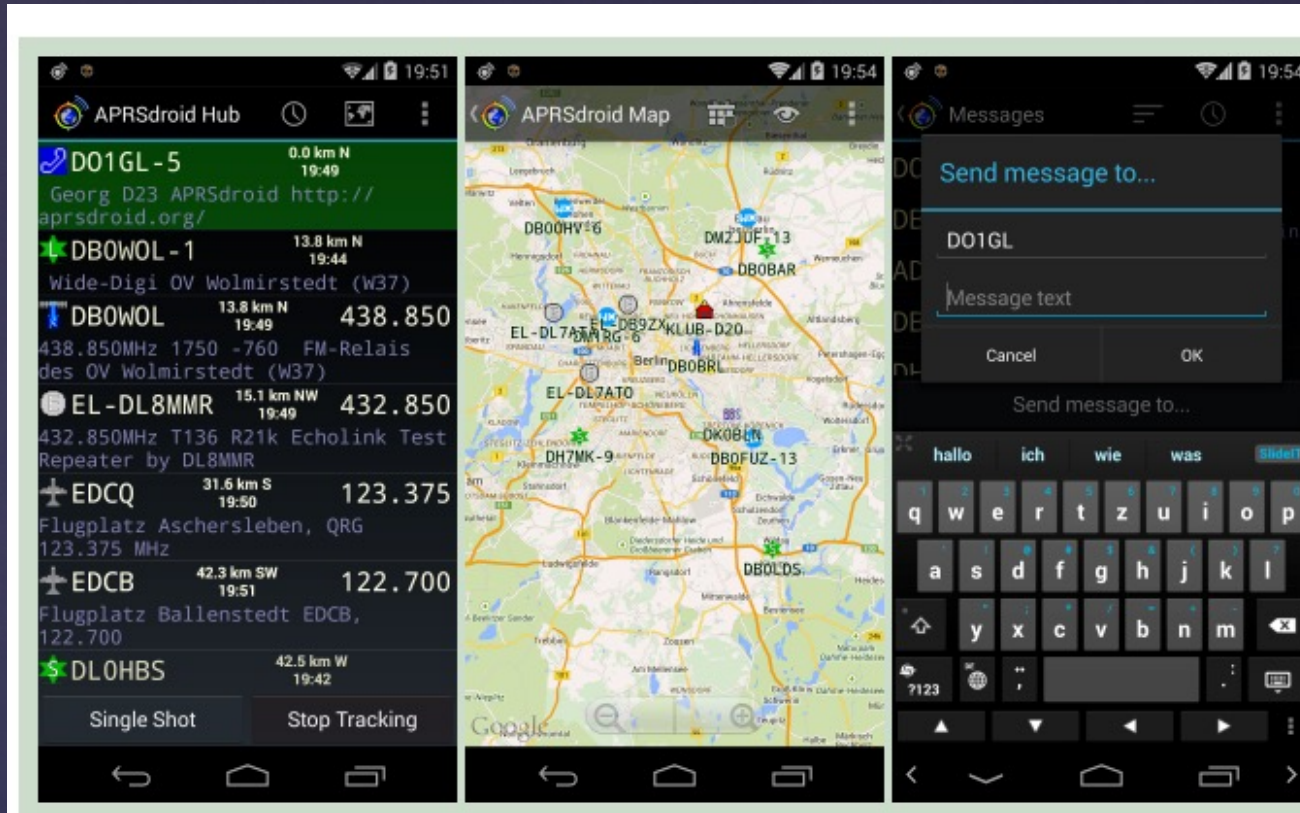
& Unfortunately, this is down

# Send SMS to Cell Phone



# Text APRS to Cell





# APRSdroid

& To: KØLAI-9

& Hi, Larry, 73!

& Interactive texting allowed

& <http://aprsdroid.org>

Send APRSdroid Text  
Message

& email functionality using the Winlink system

& <https://winlink.org/APRSLink>

& supports Kenwood TH-D7, TM-D700 and TM-D710 radios

# APRSLink

& [aprs.org](http://aprs.org)

& [Ham Radio Outlet](#)

& [Tucson Amateur Packet Radio](#)  
(TAPR)

& [DXZone](#)

## Technical Resources

& [winaprs.com](http://winaprs.com)

& [aprs-is.net](http://aprs-is.net)

& [aprsisce.wikidot.com](http://aprsisce.wikidot.com)

& [pinpointaprs.com](http://pinpointaprs.com)

& [xastir.org](http://xastir.org)

& [sourceforge.net/projects/yetanotheraprsc/](http://sourceforge.net/projects/yetanotheraprsc/)

## Software Resources

- & [https://www.youtube.com/watch?v=HEq-p8v6HPY&feature=emb\\_logo](https://www.youtube.com/watch?v=HEq-p8v6HPY&feature=emb_logo)
- & [https://www.youtube.com/watch?v=o0A\\_ZyMkY9M&feature=emb\\_logo](https://www.youtube.com/watch?v=o0A_ZyMkY9M&feature=emb_logo)

APRSISCE/32 YouTube Resources

& APRS

& APRSISCE

& Kenwood-radios, mobile and HTs

& FTM-300, FTM-500 & other Yaesu radios

Google Groups Resources

& [aprs.fi](http://aprs.fi)

& [www.findu.com](http://www.findu.com)

APRS real-time maps



- & APRS is a useful real-time communication protocol
- & Reasonable cost to implement
- & Can send messages and email
- & APRS is a functioning part of emergency operations with situational awareness

## Summary