YOUR SMART CELL PHONE: AN OVERVIEW

by Francis Chao
fchao2@yahoo.com

TuCSon COMPUTER SOCIETY

WINNERS WINdows usERS

apcug An International Association of Technology & Computer User Groups

Web location for this presentation:

http://aztcs.org

Click on “Meeting Notes”

SUMMARY

Your smart Android or iPhone cell phone is actually 6 separate radio transmitter-receivers in a very compact device. If you get a working understanding the petty details of these 6 transmitter-receivers, you can make better use of your smart cell phone and save money.

TOPICS

- 6 Transmitter-receivers In A Smart Cell Phone
- Not Having a Data Plan
- Having a Data Plan But Using It Wisely

6 TRANSMITTER-RECEIVERS IN A SMART CELL PHONE

- Cellular transceiver
- Wi-Fi transceiver
- Global Navigation Satellite System (GNSS) = (GPS, etc.)
- Bluetooth transceiver
- Near-field Communication (NFC)
- FM radio receiver

6 TRANSMITTER-RECEIVERS IN A SMART CELL PHONE

- Any smart phone app that does not require an Internet connection for operation (i.e. that does not require a Wi-Fi connection or a data plan) still will require an Internet connection when you are installing the smart phone app (for the first time) or when you are upgrading the app

Wi-Fi TRANSCEIVER

- 2.4 Gigahertz or 5 Gigahertz radio waves
- All signals emanate from a Wi-Fi router, a Wi-Fi repeater, a Wi-Fi extender, or a Wi-Fi adapter
- All smart phones have a Wi-Fi adapter
- Most smart phones send outgoing phone calls through a Wi-Fi connection through the Internet when one is available.

- GLOBAL NAVIGATION SATELLITE SYSTEMs (GNSS)
- All 5 GNSS systems use "Low Earth Orbit" (LEO) satellites:
- GPS = Global Positioning System (US)
- GLONASS = Global Navigation Satellite System (Soviet Union)
- Galileo (European Union)
- BeiDou Navigation Satellite System (Peoples Republic of China)

GLOBAL NAVIGATION SATELLITE SYSTEMs (GNSS) (continued)

- GPS = Global Positioning System (US)
- GLONASS = Global Navigation Satellite System (Soviet Union)
- Galileo (European Union)
- QZSS = Quasi-Zenith Satellite System (Japan only)

- GLOBAL NAVIGATION SATELLITE SYSTEMs (GNSS) (continued)
- Iphones 6, 7, 8, and 10 use the 4 previous GNSS simultaneously and automatically

- GLOBAL NAVIGATION SATELLITE SYSTEMs (GNSS) (continued)
- BeiDou Navigation Satellite System (Peoples Republic of China)

- GLOBAL NAVIGATION SATELLITE SYSTEMs (GNSS) (continued)
- Most map apps for smart phones use the GNSS receiver IF a data plan or a Wi-Fi connection is available.
  See
  https://www.quora.com/Does-Google-Maps-use-GPS-as-well-as-GLONASS-in-Android-smartphones

- GLOBAL NAVIGATION SATELLITE SYSTEMs (GNSS) (continued)
- Specialized smart phone apps can use the GSP transmitter-receiver even if no data plan or Wi-Fi connection is available:

- GLOBAL NAVIGATION SATELLITE SYSTEMs (GNSS) (continued)
- "MyGPSCoordinates" app at https://itunes.apple.com/us/app/my-gps-coordinates/id945482414?mt=8

- GLOBAL NAVIGATION SATELLITE SYSTEMs (GNSS) (continued)

- "GPS Status" app at https://itunes.apple.com/us/app/gps-status/id1254805862?mt=8

- GLOBAL NAVIGATION SATELLITE SYSTEMs (GNSS) (continued)

- To test a GPS-only app:
  Make sure that the data plan and the Wi-Fi connection is turned on in "Settings".
  Use the "..Store" to install the app.
  Turn off the data plan or Wi-Fi connection in "Settings".
  Run the GPS-only app and see if it gets a GNSS fix on your location.

- GLOBAL NAVIGATION SATELLITE SYSTEMs (GNSS) (continued)

- "Sygic GPS Navigation & Maps" for iPhones, iPADs, Android phones, and Android tablets is a great, free, GPS-only mapping application with turn-by-turn navigation capability. See https://play.google.com/store/apps/details?id=com.sygic.aura

BLUETOOTH TRANSCEIVER

- According to https://en.wikipedia.org/wiki/Bluetooth **Bluetooth** is a wireless technology standard for exchanging data between fixed and mobile devices over short distances using short-wavelength UHFradio waves in the industrial, scientific and medical radio bands, from 2.400 to 2.485 GHz..

BLUETOOTH TRANSCEIVER

- Note that Bluetooth runs at the same radio frequencies as microwave ovens, cordless phones, and legacy Wi-Fi systems.

BLUETOOTH TRANSCEIVER

- Uses of Bluetooth transceiver inside smart cell phones:
  Hands-free cell phone use in cars,
  "Personal Area Network" with computers, tablets, and printers, and
  Micro-Location iBeacons
- Most Bluetooth apps in cell phones do not require a data plan or a Wi-Fi connection

NEAR-FIELD COMMUNICATION (NFC)

- According to https://en.wikipedia.org/wiki/Near-field_communication
  NFC is a set of short-range wireless technologies, typically requiring a separation of 10 cm or less. NFC operates at 13.56 MHz on ISO/IEC 18000-3 air interface and at rates ranging from 106 kbit/s to 424 kbit/s.

NEAR-FIELD COMMUNICATION (NFC) (continued)

- To use NFC with "Android Pay" or "Apple Pay"
  Start "Android Pay" in an Android phone or "Wallet" in an iPhone or the store-specific app.
  Place the top of the smart cell phone within 1 1/2-inches of the point-of-sale terminal device.
  Follow the instructions in the wallet app or the store-specific app to complete the transaction.

NEAR-FIELD COMMUNICATION (NFC) (continued)

- Most wallet apps or store-specific apps do not require a data plan or a Wi-Fi connection. They only require a NFC radio-transmitter chip. Many cheap Android phones do not have an NFC radio-transmitter chip.

NEAR-FIELD COMMUNICATION (NFC) (continued)

- iPhones prior to "iPhone 6" do not support "Apple Pay".
  See https://www.macrumors.com/roundup/apple-pay/

FM RADIO RECEIVER

- Even though most models of iPhones have an FM radio receiver chip inside of them, the Apple company has disabled all of them, despites appeals from the FCC and consumer advocacy groups.
  There are many conspiracy theories about why Apple is refusing to activate the FM radio receiver chips inside their iPhones.

FM RADIO RECEIVER (continued)

- Most apps that purport to be FM and/or AM radios inside smart phones are actually streaming the station from the station's Web site, requiring a data plan or a Wi-Fi connection

FM RADIO RECEIVER (continued)

- Some Android phones have FM receiver chips inside of them and some do not.
  See https://nextradioapp.com/supported-devices/
- Most Android phones made by "Blu" have a FM receiver chip inside them
- "Blu" brand phones are available at Walmart

FM RADIO RECEIVER (continued)

- The "NextRadio Free Live FM Radio" app is available at the "Play Store" of a Android phone but this app only works to turn your Android phone into an off-the-air FM radio if two conditions are met:
  Condition 1:
  You phone has a FM radio chip inside it
  and
  Condition 2:
  You have a wired headset plugged into the USB jack at the bottom of the phone since the headset servers as the required FM antenna

"GOOGLE MAPS" AND Apple "MAPS"

- "Google Maps" (for both Android and iOS) and Apple "Maps" (for iOS) both utilize Internet access via a data plan or via a WiFi connection.
- Both of these apps also use the GPS transmitter inside a Android phone/tablet or inside a iOS phone or iPAD.
- To continue using these two apps, when your device lacks an Internet connection, you have "save" a map of an area before you lose the Internet connection.

"GOOGLE MAPS" AND Apple "MAPS"

- "Google Maps" (for both Android and iOS) and Apple "Maps" (for iOS) both utilize Internet access via a data plan or via a WiFi connection.
- Both of these apps also use the GPS transmitter inside a Android phone/tablet or inside a iOS phone or iPAD.
- To continue using these two apps, when your device lacks an Internet connection, you have "save" a map of an area before you lose the Internet connection.

"GOOGLE MAPS" AND Apple "MAPS"

- To use "Google Maps" offline, see https://support.google.com/maps/answer/6291838?co=GENIE.Platform%3DiOS&hl=en
- To use Apple "Maps" offline, see https://ios.gadgethacks.com/how-to/download-maps-navigation-routes-for-offline-use-apple-maps-0184439/

USE "SPEEDTEST.." TO DETERMINE IF YOU PHONE IS USING IT'S DATA PLAN OR YOUR HOME Wi-Fi

- When you are at home, your iPhone or Android phone will default to using your home Wi-Fi when it is fast and reliable enough. However, your iPhone or Android phone will use your cellular data plan instead if it detects that your home Wi-Fi is too slow or unstable.

USE "SPEEDTEST.." TO DETERMINE IF YOU PHONE IS USING IT'S DATA PLAN OR YOUR HOME Wi-Fi (continued)

- If you have a cellular data plan, make sure that it it turned off in "Settings". Then make sure that Wi-Fi is turned on in "Settings". Then use "Speedtest by Ookla" to determine your upload and download speeds.

USE "SPEEDTEST.." TO DETERMINE IF YOU PHONE IS USING IT'S DATA PLAN OR YOUR HOME Wi-Fi (continued)

- If you have a cellular data plan, make sure that it it turned on in "Settings". Then make sure that Wi-Fi is turned off in "Settings". Then use "Speedtest by Ookla" to determine your upload and download speeds.

USE "SPEEDTEST.." TO DETERMINE IF YOU PHONE IS USING IT'S DATA PLAN OR YOUR HOME Wi-Fi (continued)

- If you have a cellular data plan, make sure that both Wi-Fi and "Cellular Data" are turned on in settings. Then use "Speedtest by Ookla" to determine your upload and download speeds. If your upload and download speeds indicate that you are using your cellular data plan, even when your home Wi-Fi is available, fix your home Wi-Fi.