Radio Mobile for Windows

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What is Radio Mobile?

- VHF/UHF propagation mapping software
- Free for personal use
- Downloads terrain data from Internet
- Manages database of Units and Networks
- Models radio wave propagation, including obstacles, fresnel zones, and ground cover
- Visualizes resulting signal strength on maps

Questions

- Why is it hard for Allan down in the valley to talk to Highland Butte but easy for James?
- If Mike, James, and John David had the only stations on the air, what parts of the county could they reach?
- Where could we place a relay so Bagby Hot Springs could pass messages to Glen Avon bridge?

Questions 2

- Where do I physically need to be in reach of Sunday night Nets?
- How come my packet station can hear Lincoln City and Kalama but I can't get TV signals?
- Should I use the UHF intertie low on this side of the butte or the VHF higher up on the other to best hit the repeater?

What is Radio Mobile? 2

- A tool for planning, for siting
- Identify costs to benefits to different
  - Frequencies
  - Antenna heights
  - Locations
- Makes really pretty maps (to a radio geek)

Hardware Needed

- X86 PC (real hardware or emulated)
- Moderate performance
- Nice graphics for looking at maps
- Broadband Internet connection (map data)
- Color Printer (nice to have)
- Netbooks not recommended
  - tiny display and slow processor

Software Needed

- Windows OS
  - Or WINE on Fedora Linux

    `yum install wine wine-openal`
- Download and install Zip utility
  - ex. *http://www.7-zip.org/*

Radio Mobile Website

Go to the website

http://www.cplus.org/rmw/english1.html

- See "*About...*" link for overview
- Read at "*Download...*" link to familiarize yourself with the next steps

Note this helpful tutorial:

http://www.pizon.org/radio-mobile-tutorial/index.html

Install Visual Basic

At *http://www.cplus.org/rmw/download/download.php?S=1*

- **Step 1**: Click to download *vbrun60sp6.exe*
  - It downloads *VB6.0-KB290887-X86.exe*
- Run that
  - It will ask where to put the results
  - Desktop is fine, it extracts *vbrun60sp6.exe*
- Run *vbrun60sp6.exe*
  - May see some complaints, but it's installed

Download Radio Mobile

At *http://www.cplus.org/rmw/download/download.php?S=1*

Download linked files from steps:

- **Step 3**: *rmwcore.zip*
- **Step 4**: *rmw1079eng.zip* (English language)
- **Step 8**: *wmap.zip*

Create directory, extract files

- From Windows Explorer/File Manager
  - create folder *c:\rmw*
- Use 7-zip to open each *.zip* file
  - extract to *c:\rmw*

Create Map Storage Directories

- Create folder *c:\geodata*
- Inside *c:\geodata*, create folders:

expedia, google, gtopo30, landcover, landsat, mapquest, openstreetmap, srtm1, srtm3, terraserver, toporama, virtualearth, yimg

Configure Elevation Data

- Run *c:\rmw\rmweng.exe*
- Open menu *Options -> Internet*
- Click *SRTM*
- Check "*Download from Internet if a file is not found on local path and keep a local copy*"
- Set Local files path to *c:\geodata\srtm1*

Configure Elevation Data

Select Internet ftp directory:

- *SRTM - 1 arcsecond - Site 3*

1 arcsecond represents medium grain detail

- For large-scale maps, use 3 arcsecond
- For small-scale maps, use 1/3 arcsecond

Configure Other Map Storage

- Set up other maps like SRTM:

Land cover (*landcover*)

Landsat (*landsat*)

OpenStreetMap (*openstreetmap*)

Terraserver (*terraserver*)

Toporama (*toporama*)

Virtual Earth (*virtualearth*)

Google Map (*google*)

Yahoo Map (*yimg*)

Networks, Systems, and Units

Somewhat independent things:

- **Networks** - organize Units and Systems together
- **Systems** - common antenna, transceiver configurations
- **Units** - specific radio station data

Networks

Networks define the following:

- **Band**/Frequency (e.g. VHF or UHF)
- **Terrain** model (ex. Contintental temperate)
- **Topology** (Voice vs. Data network)
- **Membership** (which Units are in Network)
- **Systems** (default transmit power, antenna)
- **Style** (what to color ok/fair/bad)

Using Networks

Go to *File -> Networks Properties...*

- Go through each tab
- Don't worry about Units yet
- Notice at the top:
  - Networks are easy to copy and modify
- Set up a VHF net

Units

In short, a station: **location** and **height**

- Units belong to one *or more* Networks
- **Name** (e.g. KN1X, W7ODY, KD7ZDO-10)
- **Elevation** (don't worry, initialize later)
- **Location** (Lat/Lon (best) or place using map cursor)
- **Style** icon for unit (graphic, color)

Finding Latitude/Longitudes

- Find addresses for callsigns:

  http://www.qrz.com

- Convert street address to Lat/Long coordinates:

  http://stevemorse.org/jcal/latlon.php

- Find repeaters near location (plotted on a map, gives Lat/Long):

  http://k5ehx.net/repeaters/qrepeater.php

Using Units

Go to *File -> Unit Properties...*

- Go through each tab
- Create a few

Maps

- Rectangular area of Earth's surface
- Pulls in data from the Internet
  - At each point, height and terrain cover
- Variety of styles to display data
- Can overlay Units in a Network
- Can overlay propagation patterns

Using Maps

Go to *File -> Map Properties...*

- Set a center location Lat/Lon or via world map
- Click [x] *Adust units elevation*
  - initializes units altitude data for you
  - Remember units have an antenna height above average terrain too
- Set *picture size* in pixel width x height
- Set *height* (in km) to scale area covered

Using Maps 2

- Configure *elevation data*
  - Change *None* to *SRTM*
  - *C:\geodata\srtm1*
- Click *Extract*, it will download and go
- Subsequent maps will offer to overwrite or to merge data with previous map data, or throw it away

Show Network of Units on Map

Putting it all together:

- Create a Network
- Create some Units in the Network
- Create a map where the Units are

Show the units on the map

- *View -> Show Networks*

Visualize Link Propagation

... between Two Stations

Go to *Tools -> Radio Link*

- Select the Tx and Rx units
- Adjust antenna height and power or use system defaults
- Swap Tx and Rx stations

Visualize Station Coverage

Go to *Tools -> Radio Coverage -> Single Polar*

- Select *center station Unit*
- Select typical *mobile Unit*
- Select *Network* (freq and system info)
- Adjust *display parameters*
- Adjust *iteration parameters*
- *Draw* it on your map
  - Merge it into your map or discard it

Visualize Network Coverage

- Where on the map can cooperating stations pass a message to/from?

Said another way:

- Sum of all Single Polar plots for each cooperating station in the list

Visualize Network Coverage 2

Go to *Tools -> Radio Coverage -> Combined Cartesian*

- Select typical *mobile Unit*
- Select *Network* (freq and system info)
- Select each Unit that is cooperating
- Click *Draw*, ***get coffee***

Pictures

...the result of generating Maps

You may turn on:

- Topographical altitude lines
- City names
- Merge pictures with other pictures
  - e.g. maps for altitude, propagation, roads
  - *Edit -> Merge Pictures*

Other Fun Stuff

The Bretz Flood...

- Create map centered on Portland
- *Edit -> Flood*, set 100 meters, and go

Conclusion

- What you need to start
- Download, Installation, Configuration
- Explanation of major features
- Key Uses of Radio Mobile

Download these slides from:

http://www.loowit.net/~james/hamradio/radiomobile