Low cost, open source spectrum monitoring

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- Open source software developer
  - Ubertooth
  - GreatFET
  - HackRF
  - fcc.io
Great Scott Gadgets

- HackRF One
- Ubertooth
- YARDStick One
- GreatFET
What is spectrum monitoring?

- Looking at the radio spectrum around us
- Finding and analyzing signals
- Identifying unknown transmitting devices
Who wants spectrum monitoring?

- Organisations
  - Protecting infrastructure
  - Knowing and controlling their environment
- Reverse engineers
  - Enumerating a device
- Hackers
  - Targets
- Radio Operators
  - Tracking down interference
How are we going to do it?

- Software Defined Radio
  - Rapidly tune radio
- FFT (Fast Fourier Transform)
  - Frequency to power map
- Plot frequency vs power
- Profit???
Plotting power vs frequency isn’t new

- Rtl-power + heatmap
  - kmkeen.com/rtl-power
- satmap
  - www.alcrypto.co.uk/satmap
rtl_power + heatmap.py
hackrf_sweep + heatmap.py
hackrf_sweep + heatmap.py
Realtime visualization

- QspectrumAnalyzer
  - github.com/xmikos/qspectrumanalyzer
Inverse FFT

- Frequency: power map $\rightarrow$ samples
- Now we can use our favourite tools to view data
What’s next?

- **Putting it all together**
  - One tool to rule them all
  - nmap for RF

- **Automation**
  - Signal analysis
  - Signal Identification

- **Direction finding**
  - Pseudo Doppler
Thanks

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  - Taylor
  - Elizabeth

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  - @assortedhackery
Questions?

github.com/mossmann/HackRF

github.com/xmikos/qspectrumanalyzer

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