MARC Wireless Network Project Plan

Montgomery Amateur Radio Club

Rockville, Maryland

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Executive Summary

The workgroup recommends that MARC proceed with Phase 1 of this project: the installation of a high-speed, microwave network link between the MARC-North site and the Damascus Emergency Communication Team (DECT) site. This link will benefit both MARC and other stakeholders to provide backup Internet access for D-STAR and Winlink, to gain experience and to experiment with this technology. Equipment purchases will be funded by private donations. Interested MARC members are invited to bring their experience and expertise and to contribute their “sweat equity” to this project.

Rationale for recommendation

- selected a link that provides easy access at both:
  - MARC-North site – easiest to gain access to and is probably the most flexible
    - is “interface site” between the Part 15 and Part 97 wireless networks
  - DECT site – we have relationship and access
    - provide mutual backup Internet access
- opportunity to learn and gain experience
- build relationships with neighboring radio clubs
- recruit new members interested in networking
- opportunity to provide backup Internet access to MCEOC

Benefits

Gain experience:

- opportunity to learn Ubiquiti networking equipment
  - installation and initial configuration
  - ongoing operations – remote equipment management
  - monitoring link usage and statistics
- jointly working with DECT to establish network link
- TCP/IP IP address space management
- Lay groundwork for Phase 2 – extend MARCNet from MARC-North other MARC sites

Benefits

Learn from tests and experiments:

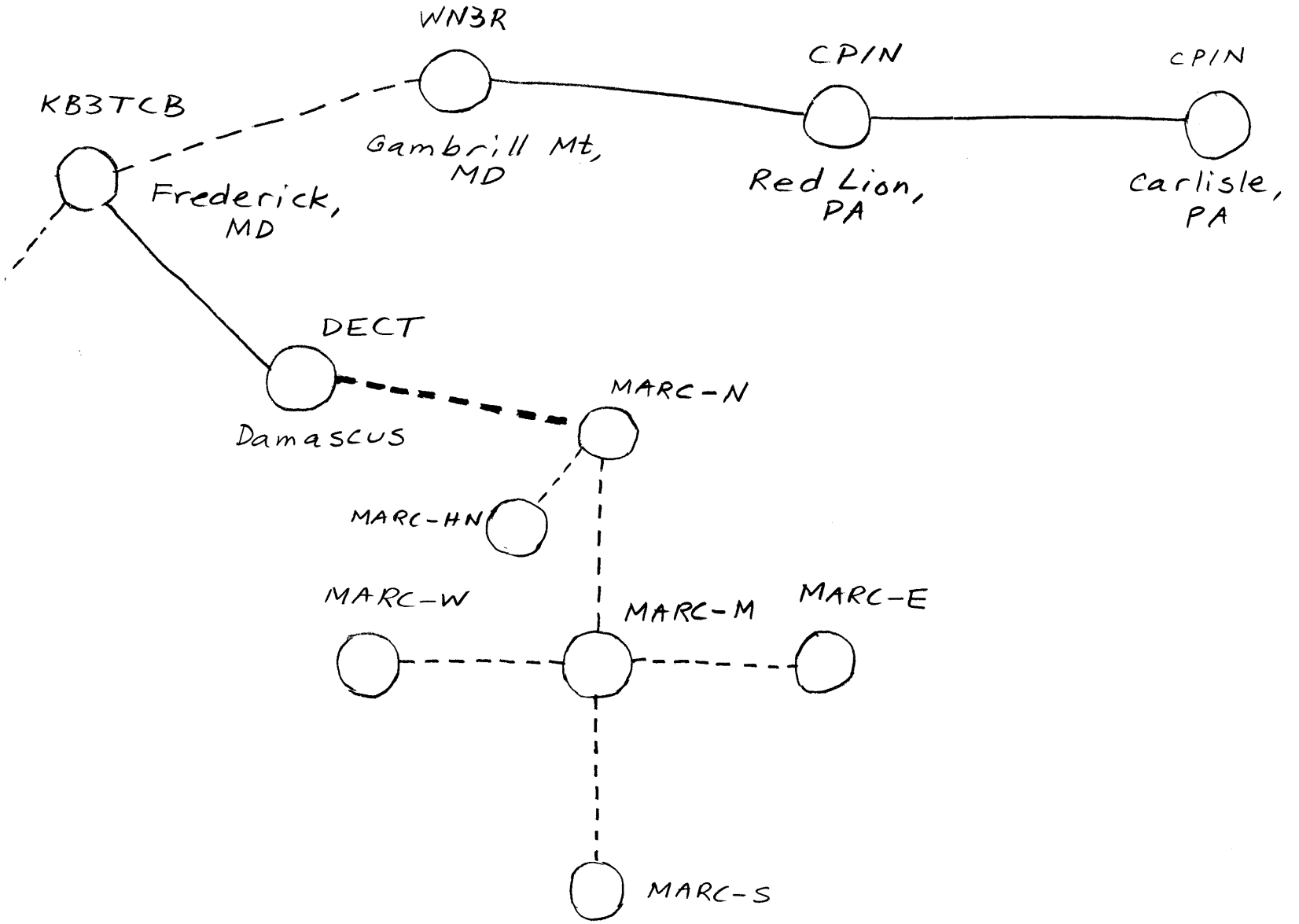
- test backup Internet access for D-STAR repeater at MARC-North
- test backup Internet access for Winlink packet gateway
- test various “on ramps” to MARCnet network:
  - VHF/UHF radios with 9600 bps data ports
    - 1200/9600 bps TNCs
  - 100 kpbs data radio
    - NW Digital Radio UDRX-440 data radio – soon to ship

Phase 1 project goals

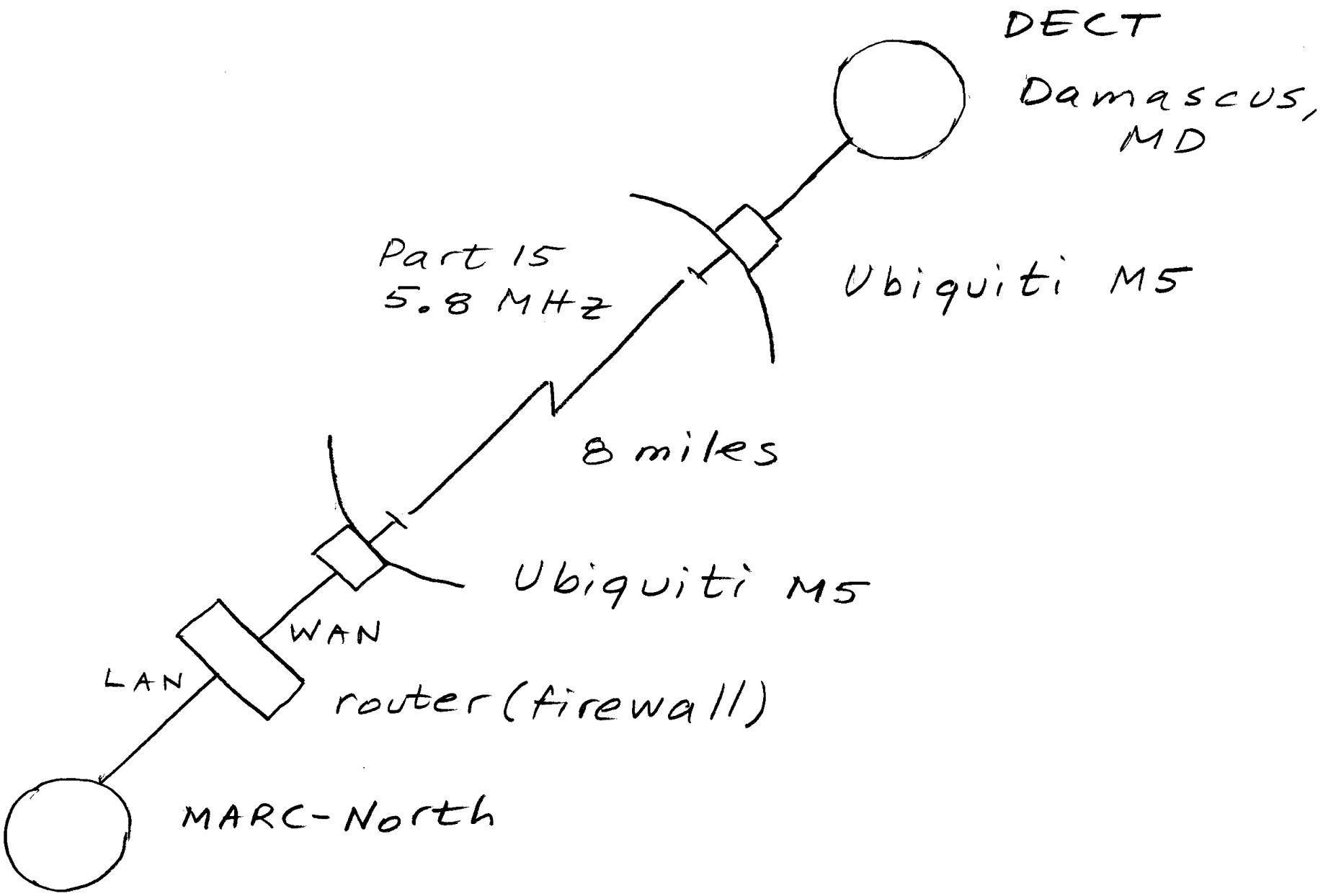
Provide reliable Winlink packet gateway – needed in Montgomery County:

- provide redundant Internet access
  - primary Internet access at MARC-North
  - secondary Internet access at DECT
    - install a high-speed wireless link from MARC-North to DECT in Damascus, MD
- add emergency backup power at MARC-North site
- provide user access to Winlink packet gateway using
  - 1200 bps on VHF packet radio
  - 9600 bps on UHF packet radio

Phase 1 network



Phase 1 network



Phase 1 project

User services:

- Winlink packet gateway – new in Montgomery County
- enhanced D-STAR Internet access

Equipment:

- Ubiquiti Part 15 airMAX wireless networking equipment
- NanoBeam M5 or Rocket M5+RocketDish
- enterprise dual WAN router with firewall
- 1200/9600 bps data radio
  - VHF/UHF radio with 9600 bps data port
  - Kantronics KPC-9612 PLUS dual 1200/9600 bps TNC
  - Timewave/AEA PK-96 1200/9600 bps TNC

Issues

Regulatory – licensed Part 97 vs unlicensed Part 15:

- MARCnet – amateur radio Part 97 3.4 GHz
  - equipment is not easily available to non-hams
  - Internet access is through dual WAN router:
    - wired Ethernet – from MARC-N site
    - wireless Internet – from CPIN-Carlisle, PA
    - router firewall:
      - prevents in-coming connection from Internet
      - allows only out-going connection to Internet

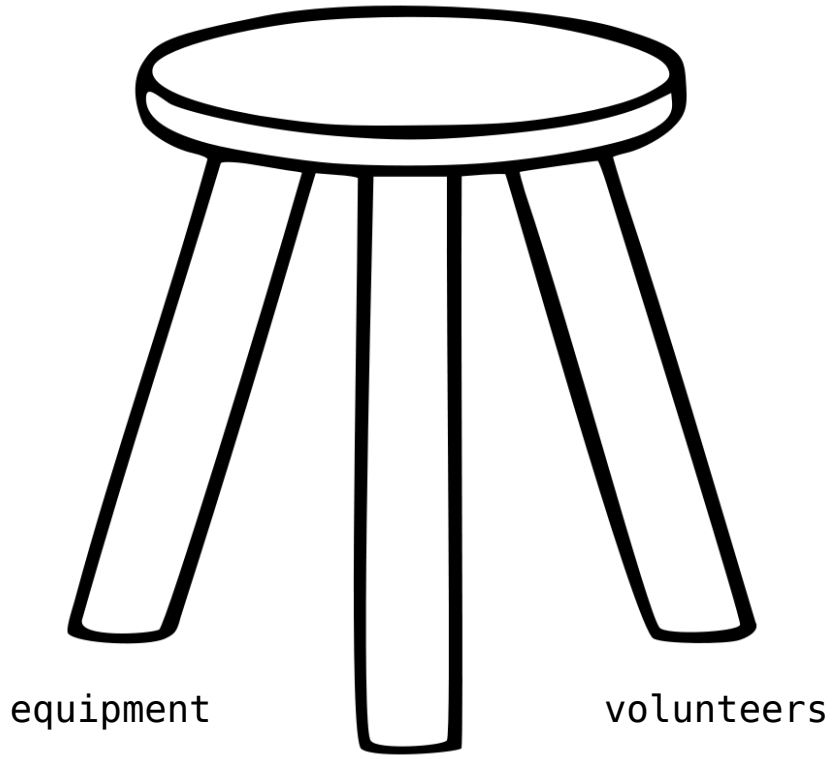
Good tenancy:

- continue and enhance public service to Montgomery County

Project resources

MARC project model:

- equipment – members contribute – least expensive
- location – MARC provides sites – very valuable
- volunteers – members share expertise and time – most valuable



Project resources

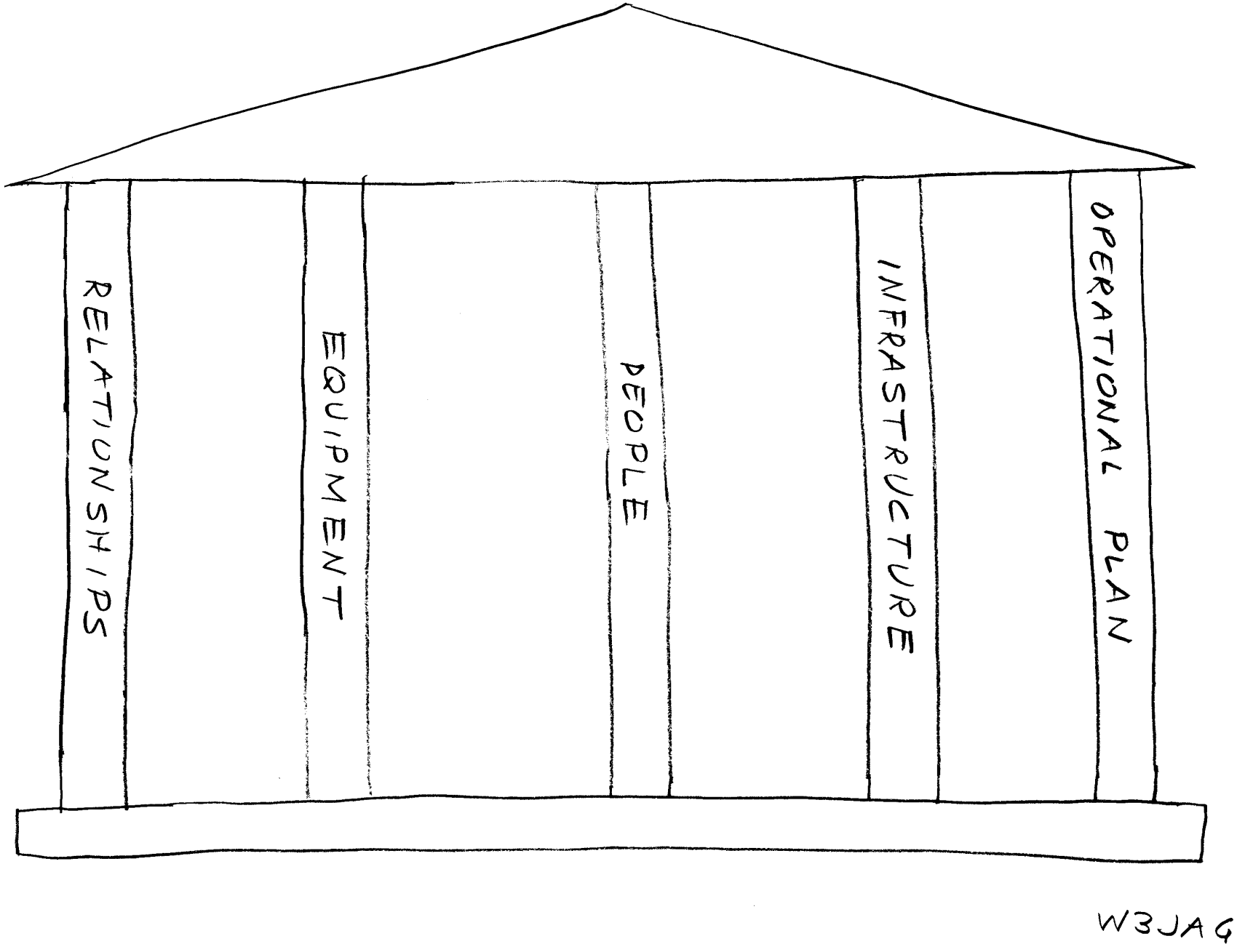


Table top demonstration network

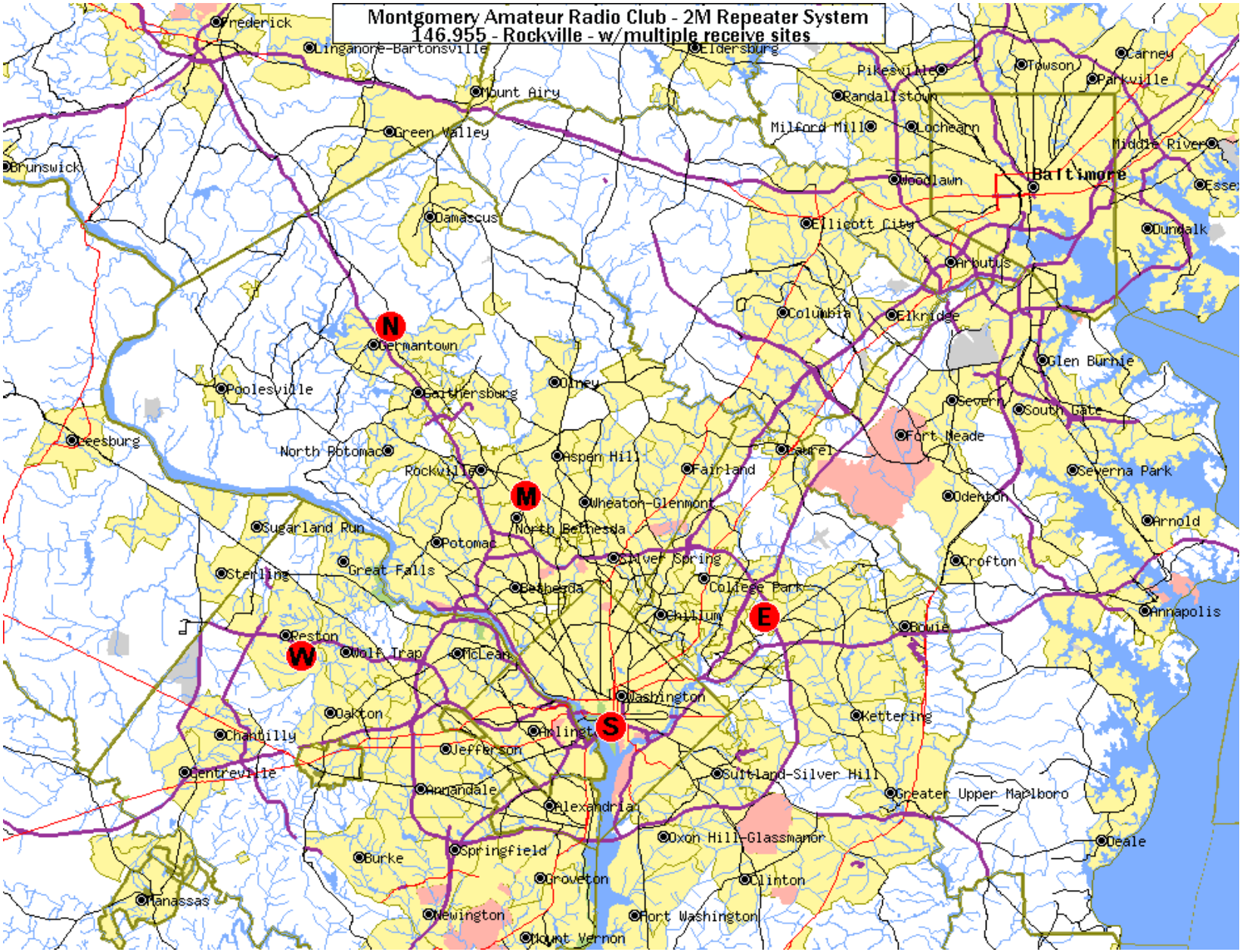
- ☞ show able top network diagrams
- ☞ demonstrate Winlink
- ☞ demonstrate D-STAR

Phase 2 project goals

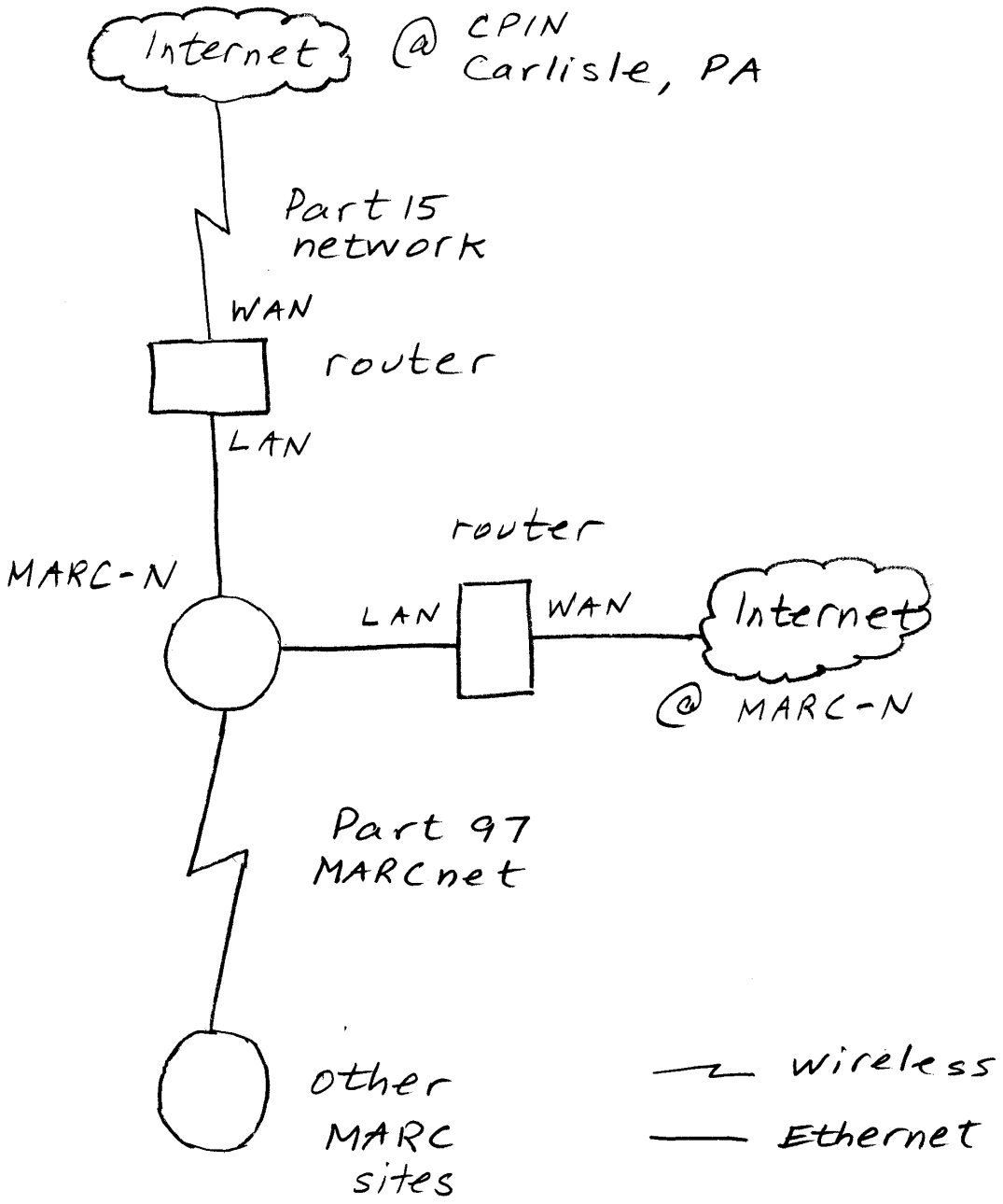
Deploy Part 97 MARC high-speed wireless network between MARC sites:

- MARCnet is behind firewall router
  - WAN port – wired Ethernet connection from MARC-N
  - WAN port – Part 15 wireless network from CPIN
  - LAN port – Part 97 MARCnet wireless network
- help extend Part 15 network to CPIN-Carlisle, PA
- provide user access at 9600 bps or 100 kbps
  - learn 1200/9600 bps TCP/IP techniques
- develop authentication mechanism to allow hams coming from Internet onto MARCnet

Phase 2 network



Phase 2 network

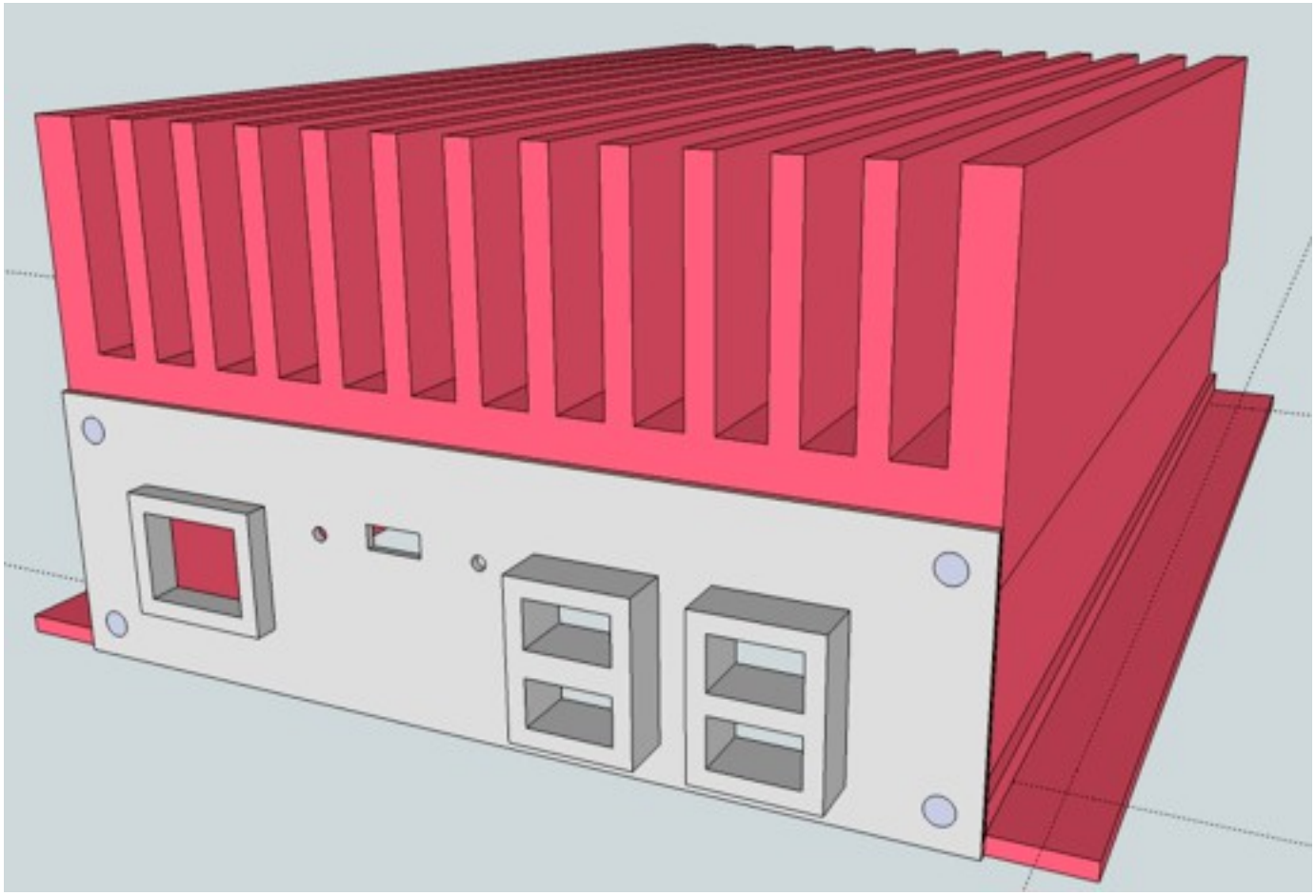


Phase 2 project

Equipment:

- Ubiquiti airMAX Part 97 wireless networking equipment
- enterprise dual WAN with firewall – same as Phase 1
- 1200/9600 bps ham data radio
  - 1200/9600 bps TNCs
  - radios with 9600 bps data port on the back
- UDRX-440 9600 bps/100 kbps ham data radio

User equipment:



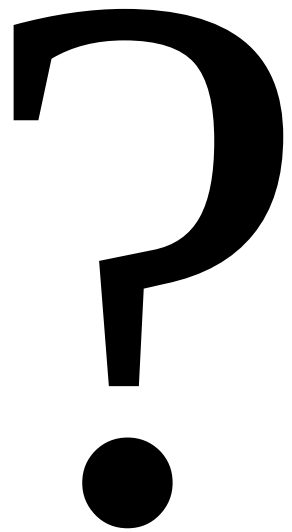
UDRX-440 9600 bps/100 kbps data radio

http://nwdigitalradio.com/

Conclusions

This is...

Questions



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