540545

Simon Fraser University and Ames Research Center
Collaboration in Data Communications

Intelligent Mobile Technologies

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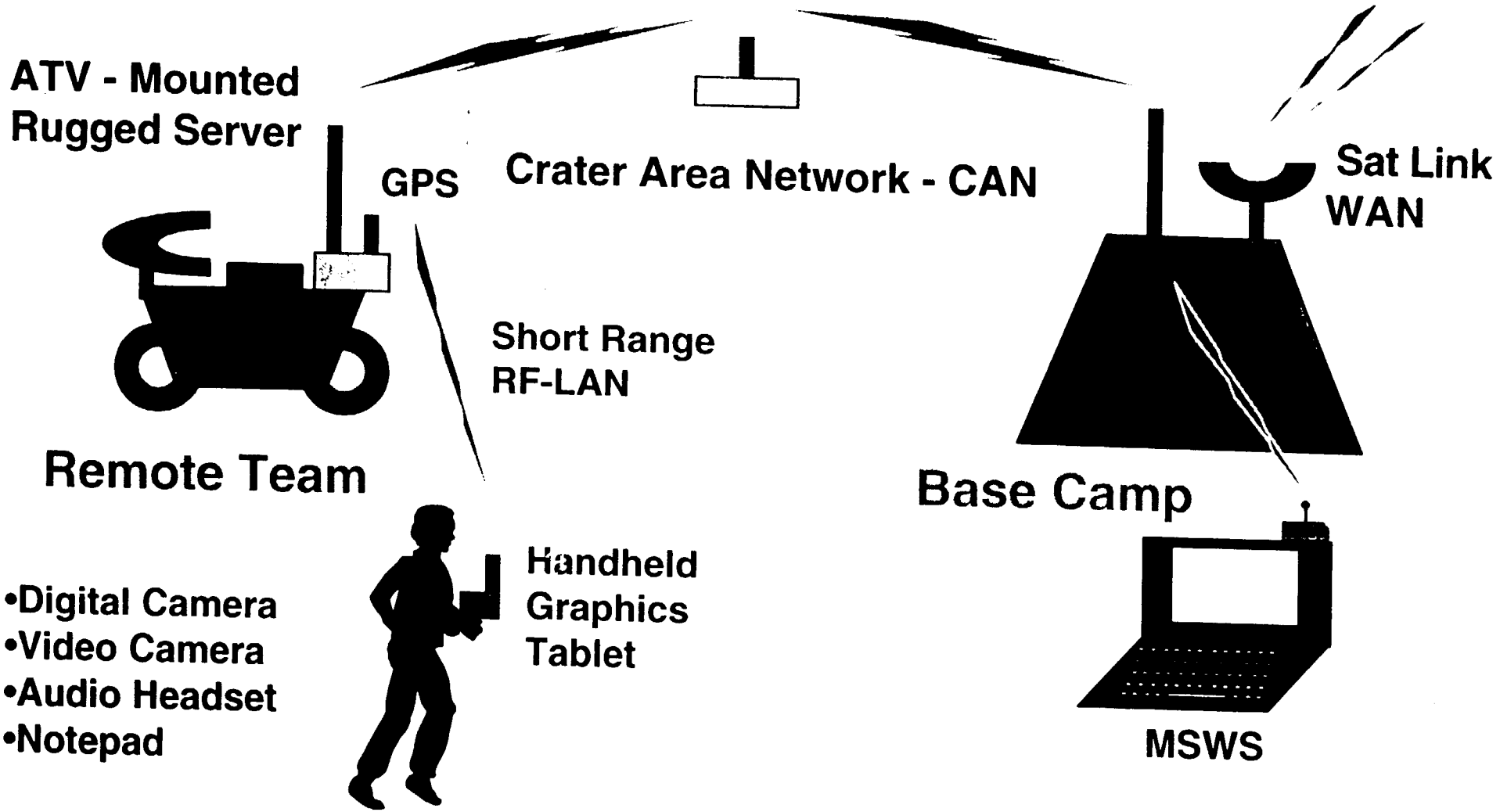
Project Summary

- Testing involves commercial radio equipment approved for export and use in Canada
- Testing conducted in Canadian High Arctic
  - Hilly terrain provides worst-case testing
  - Part of NASA Haughton Mars Project field activities
- Significant technical contributions by SFU and Canadian government agencies
- Only technical data related to radio testing is exchanged with SFU
  - Test protocols are standard radio tests performed by communication technicians worldwide

Joint Field Operations Objectives

- To provide Internet communications services for field science work and mobile exploration system: High-bandwidth satellite communications, Internet access, TCP/IP network.
- To evaluate range and throughput of three different medium-range radio link technologies for providing coverage of the crater area
- To demonstrate collaborative software such as NetMeeting with multi-point video for exchange of scientific information between remote node and base base camp and science centers as part of communications testing

Mobile Exploration System (MEX00)



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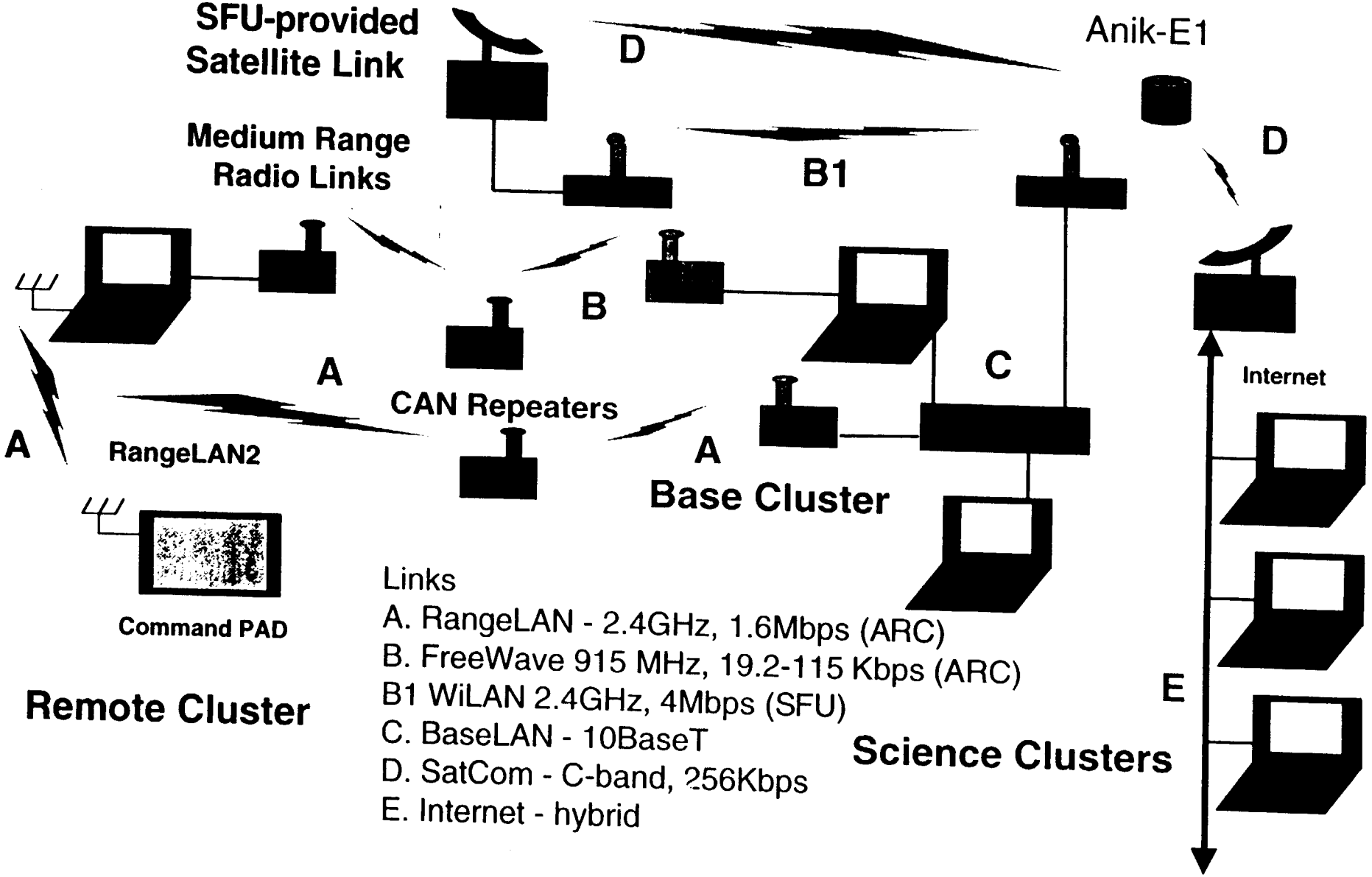
Mobile Exploration System Network



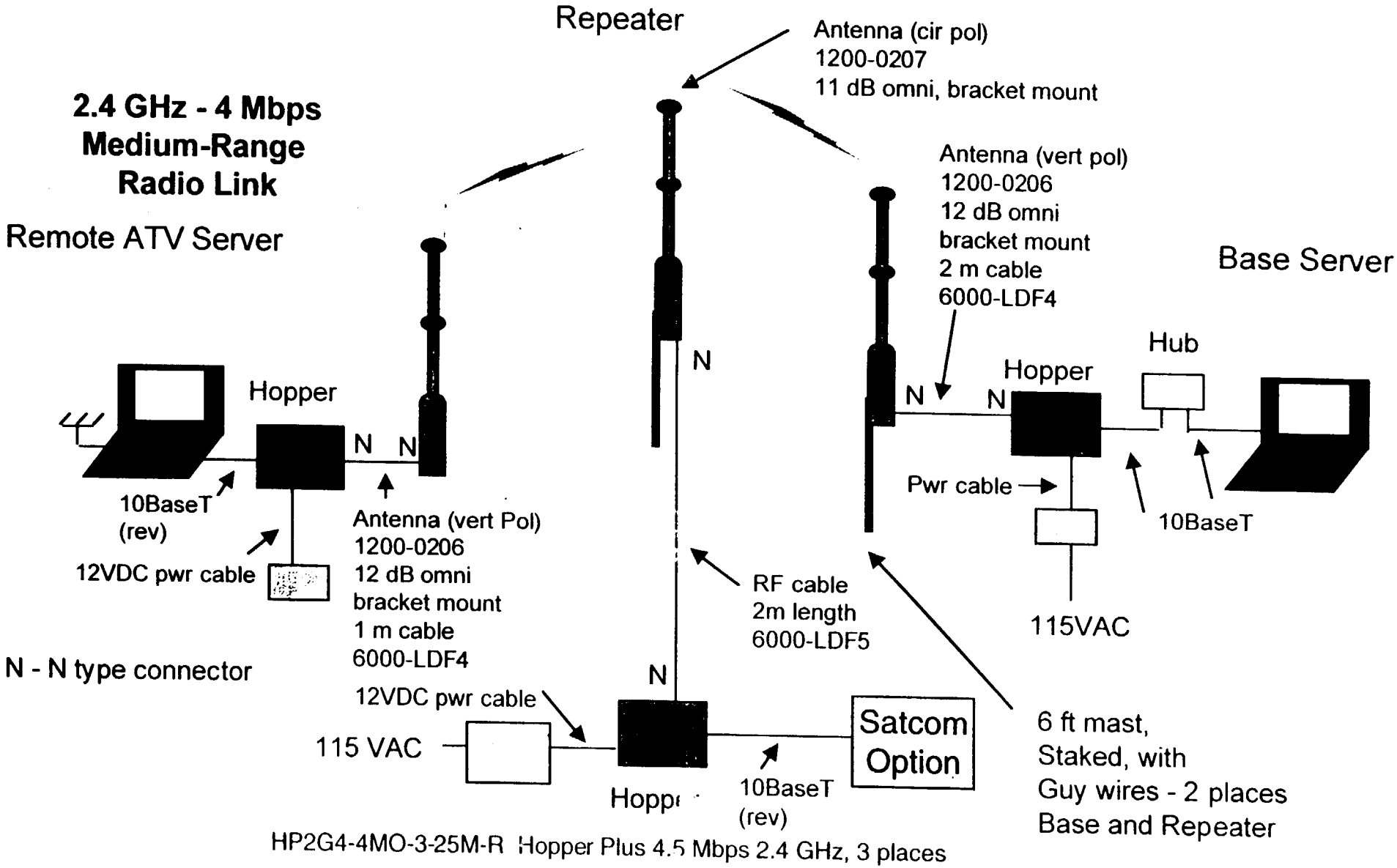
ISM Radio System Definition

Unlicensed Instrumentation, Scientific, Measurement

SFU - provided commercial equipment

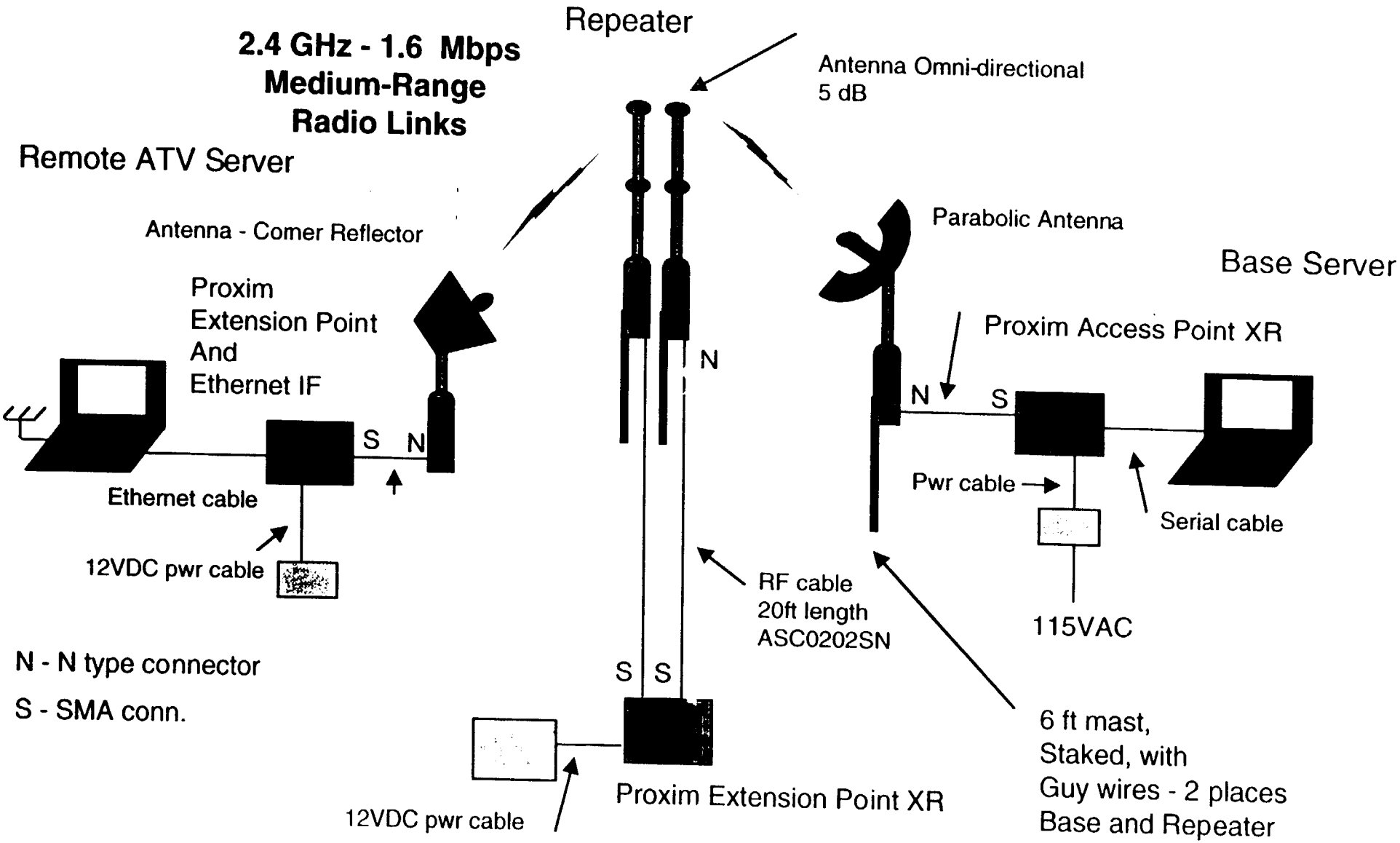
- WiLAN Hopper Plus:
  - 2.4 GHz frequency hopping, ISM-compliant Ethernet radio – 200 mW.
  - US Part 15 Compliant: FCC K4BBP02
  - Industry Canada DOC 2350 391 103A

SFU00 Wi-LAN Configuration

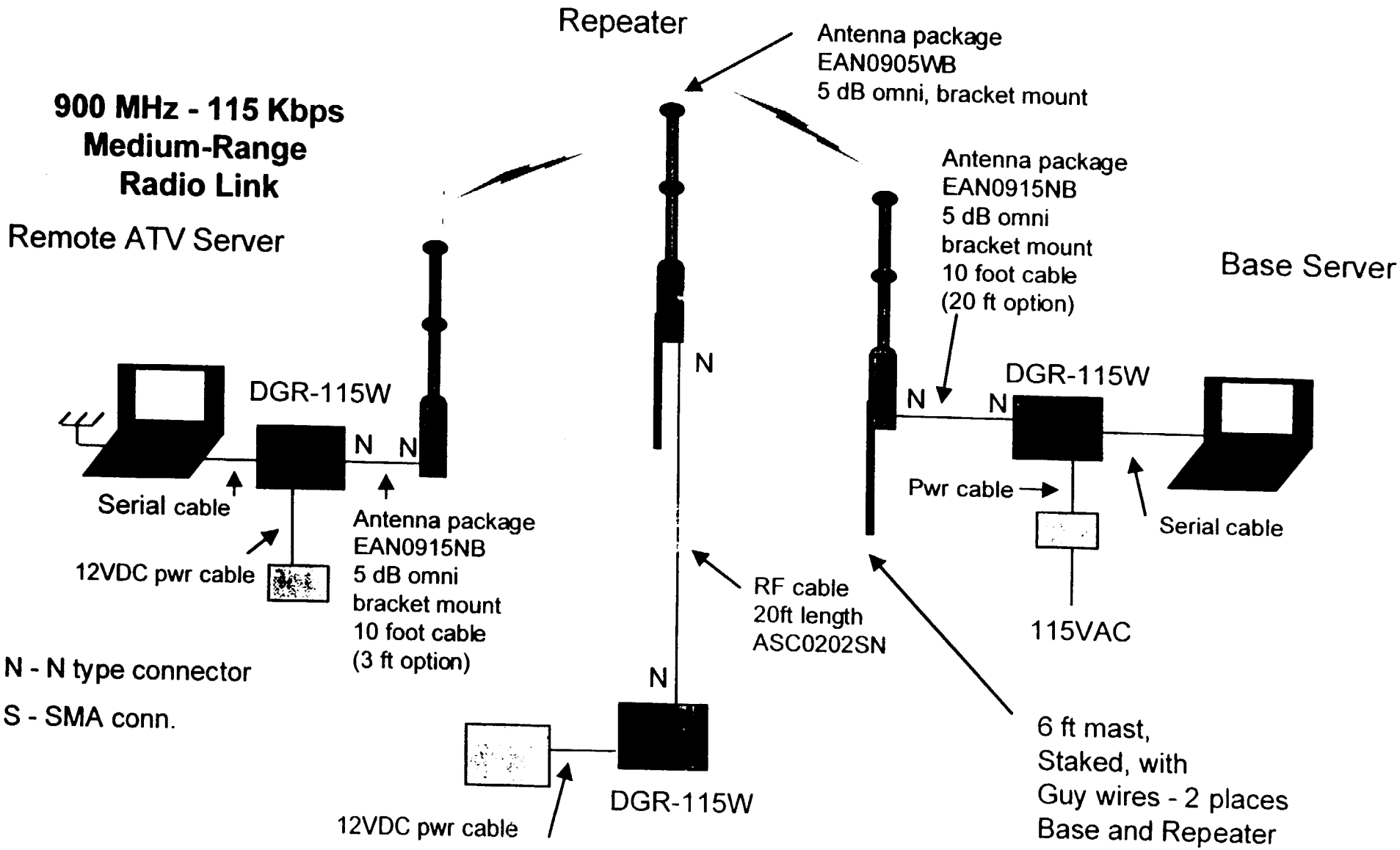


HP2G4-4MO-3-25M-R Hopper Plus 4.5 Mbps 2.4 GHz, 3 places

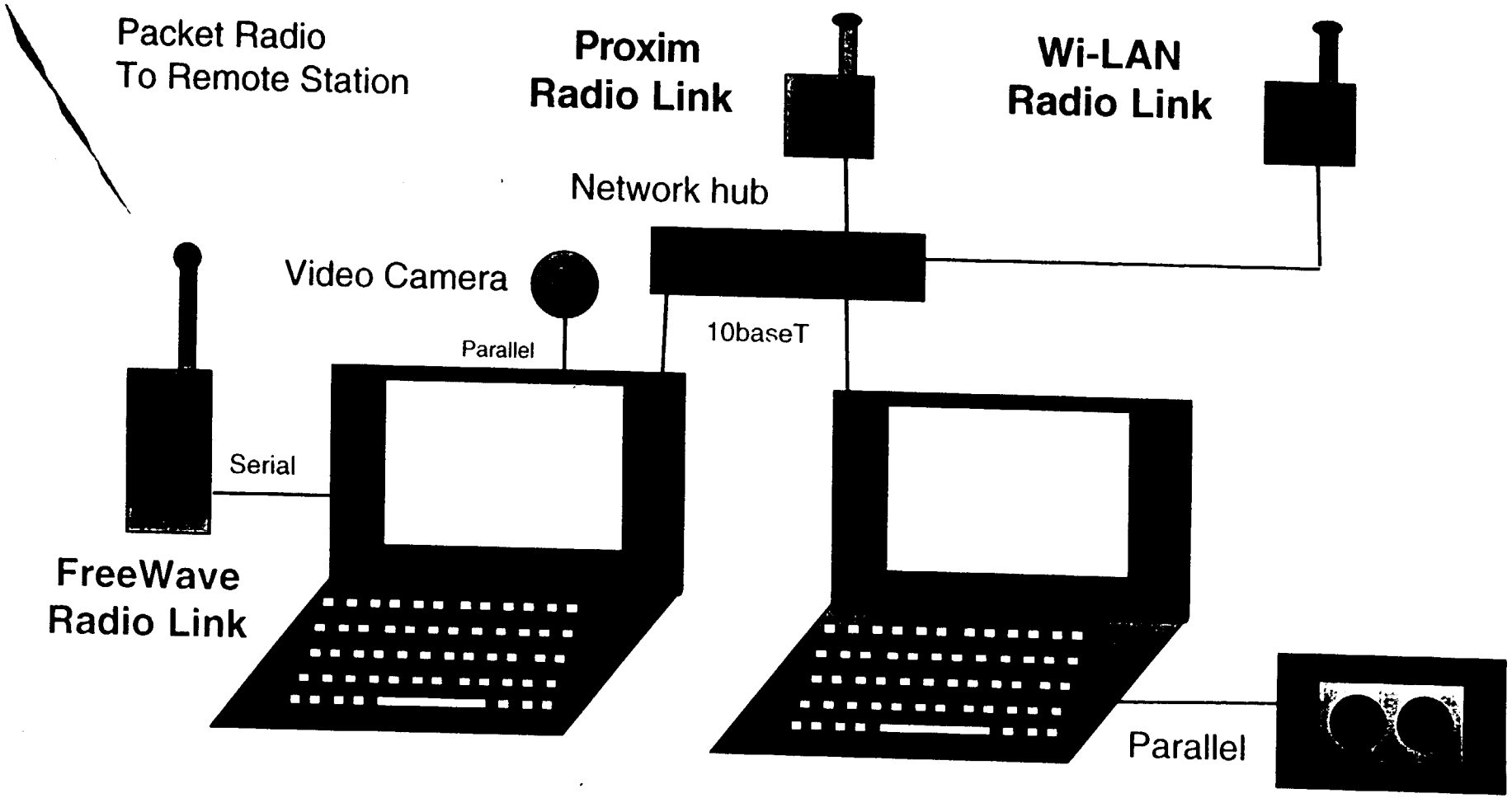
MEX00 Proxim Configuration



MEX00 FreeWave Configuration



MEX00 Base Station



Radio Test Protocols

- Determine relative signal strength vs distance
  - Use radio internal measurement capability
  - Calibrate to decibels
- Determine relative gain and beam-width of commercial antennas
- Compare test results to specifications and radio propagation theory
- Perform network throughput tests
- Use for radio system architecture design study