

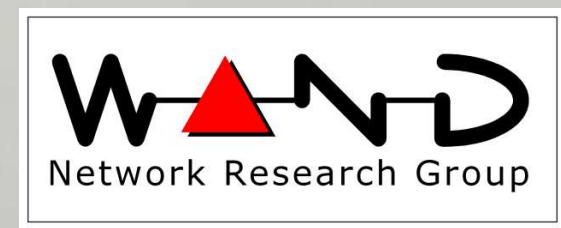
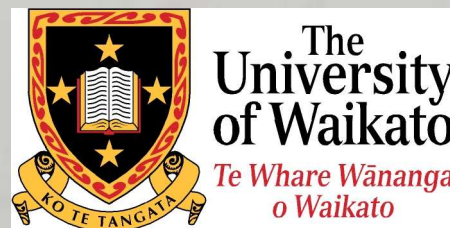


Connecting Rural Communities

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WAND Network Research Group

University of Waikato





CRCnet Overview

- Introduction
- Current Networks
 - CRCnet
 - Rotorua Network
 - Huiarau Network
- Configuration/Management
- Next Generation Node





Introduction

- Project started 2.5 years ago
- Rural communities were frustrated by low speed unreliable Internet access
- Develop a new platform suitable to deploy future generation ($>>10\text{Mbps}$) wireless networks in rural and remote areas
 - Based around a tree/mesh architecture
- Funded by Foundation for Research Science and Technology



Stage 1 – Build Trial Network

- Range of equipment
 - 2.4Ghz (802.11b and g)
 - Orinoco radio cards and APs
 - Advantech and Soekris Biscuit PC
 - Linksys wireless Ethernet bridges
 - 5.8 GHz
 - Proxim Quick bridge20
 - Trango

Stage 1
Build Trial Network

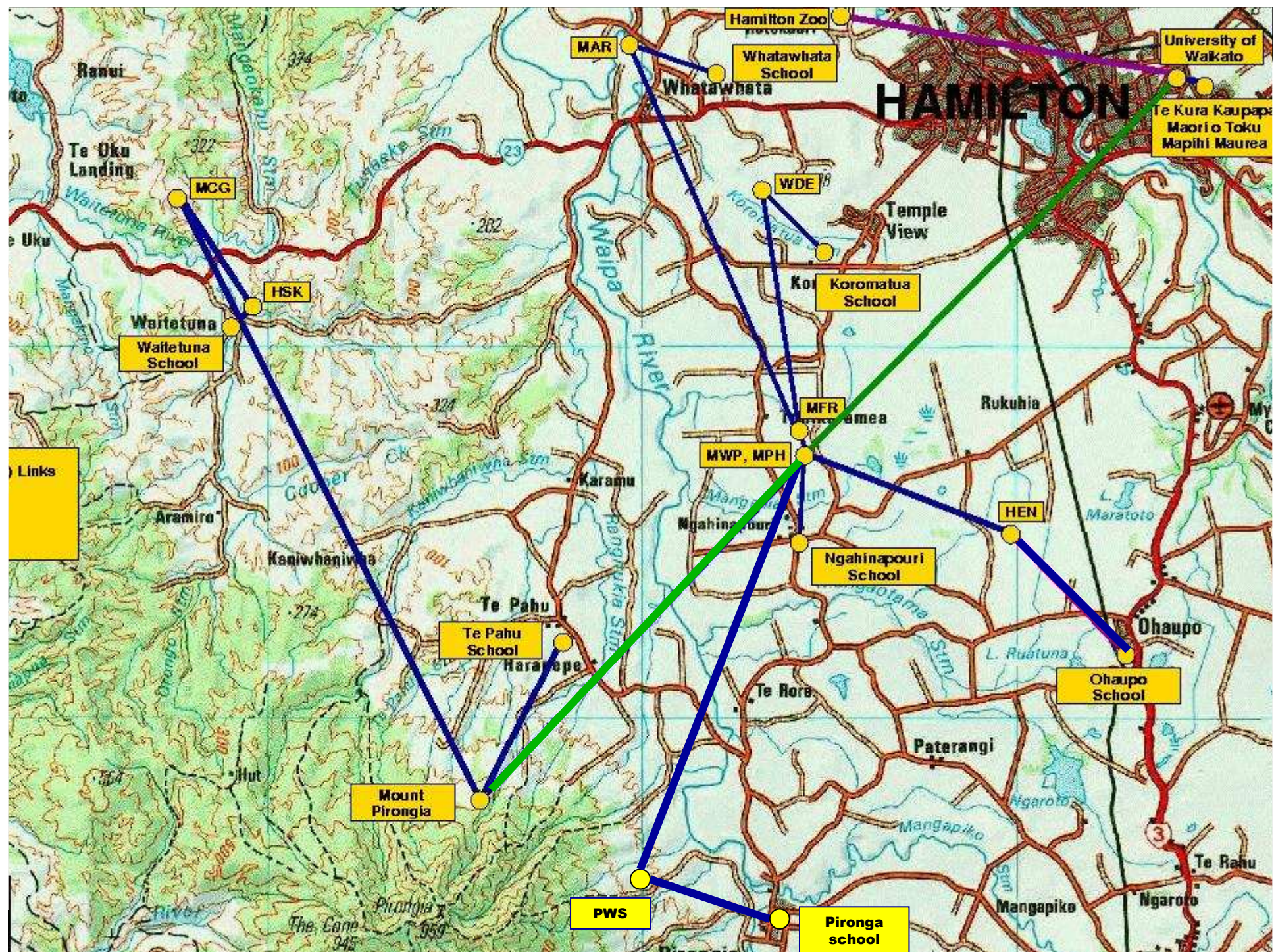
Stage 2
Develop next generation
platform

Stage 2a
Commercialise current
technology



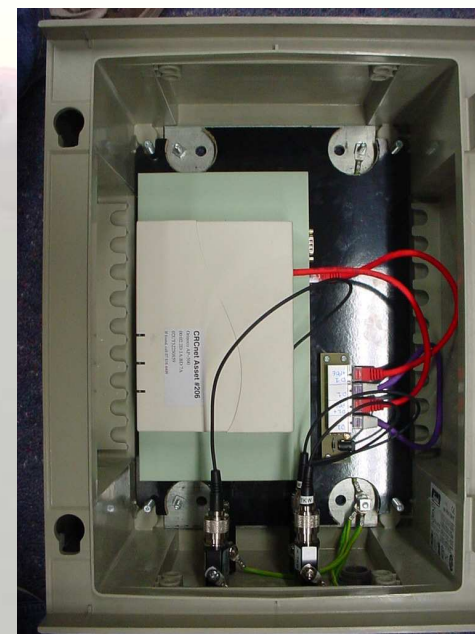
Soekris Router





ସମସ୍ତଙ୍କୁ ସ୍ୱାଗତ କରୁଛି

RCH Site



ସମସ୍ତଙ୍କୁ ସ୍ୱାଗତ କରୁଛି

ମହାନଦୀମାନଙ୍କର ପ୍ରାକୃତିକ ସମୃଦ୍ଧି

HSK Site



ମହାନଦୀମାନଙ୍କର ପ୍ରାକୃତିକ ସମୃଦ୍ଧି





Pirongia Site

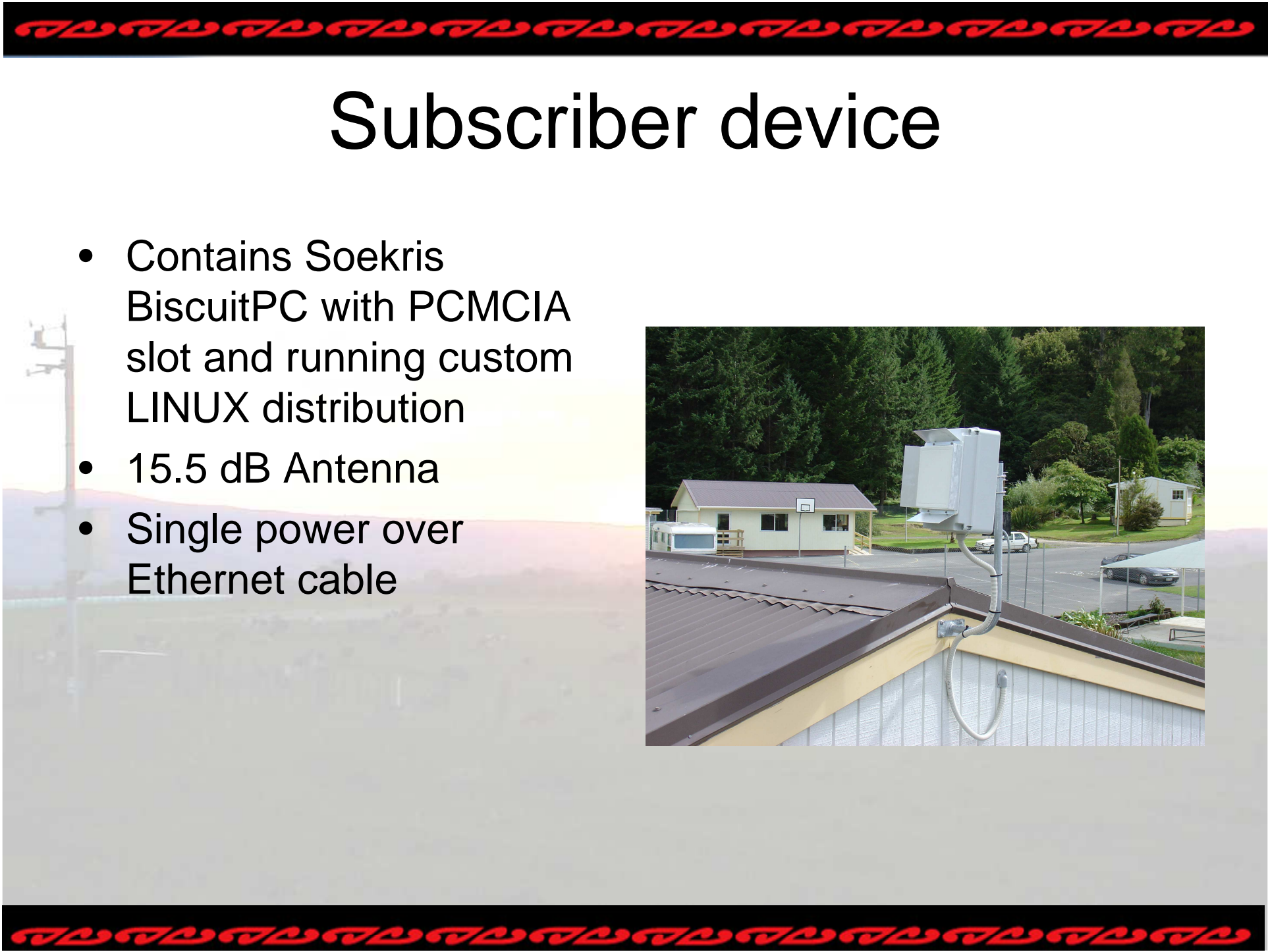


Subscriber device

- Contains Soekris BiscuitPC with PCMCIA slot and running custom LINUX distribution
- 15.5 dB Antenna
- Single power over Ethernet cable

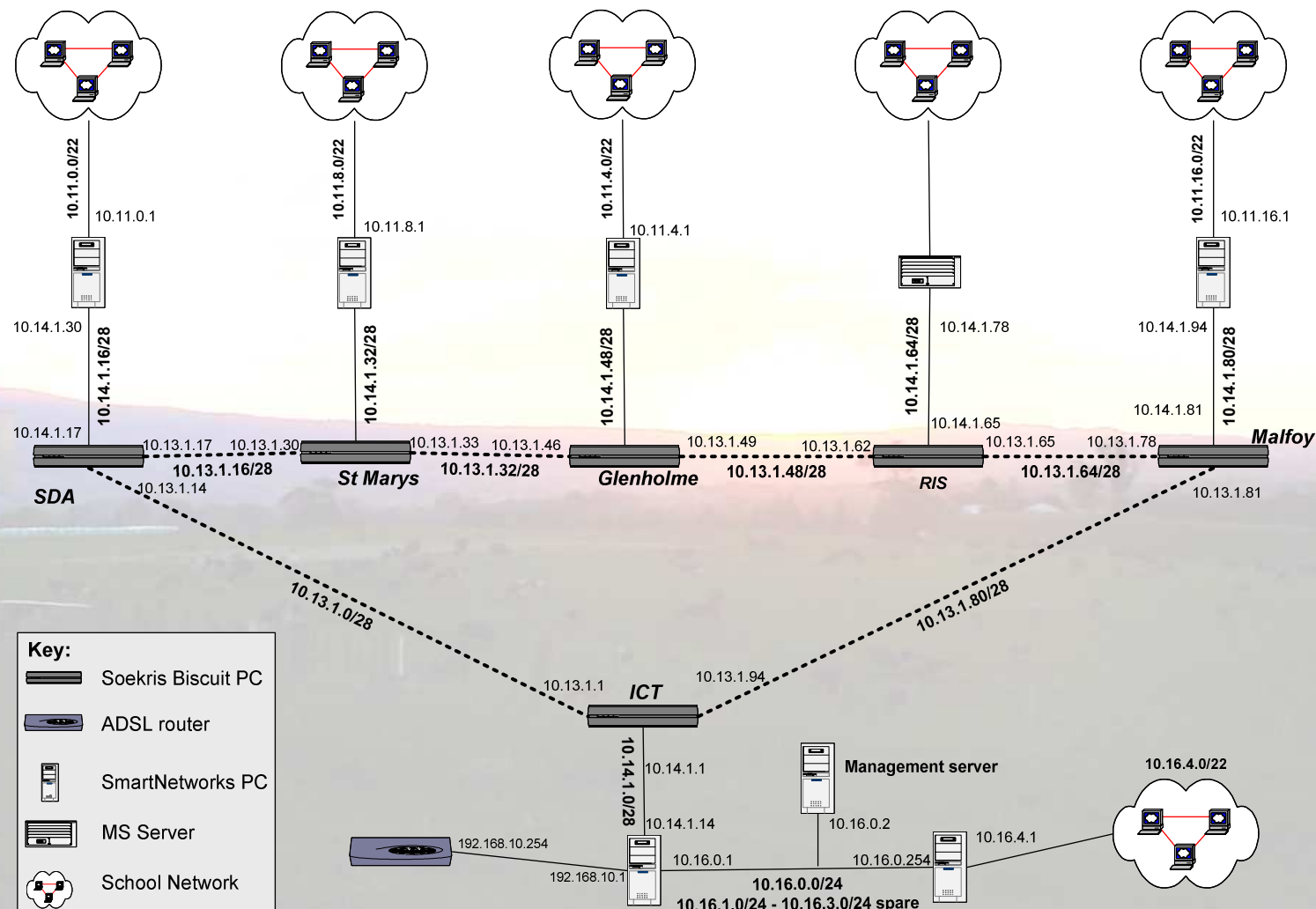


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- Contains Soekris BiscuitPC with PCMCIA slot and running custom LINUX distribution
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- 



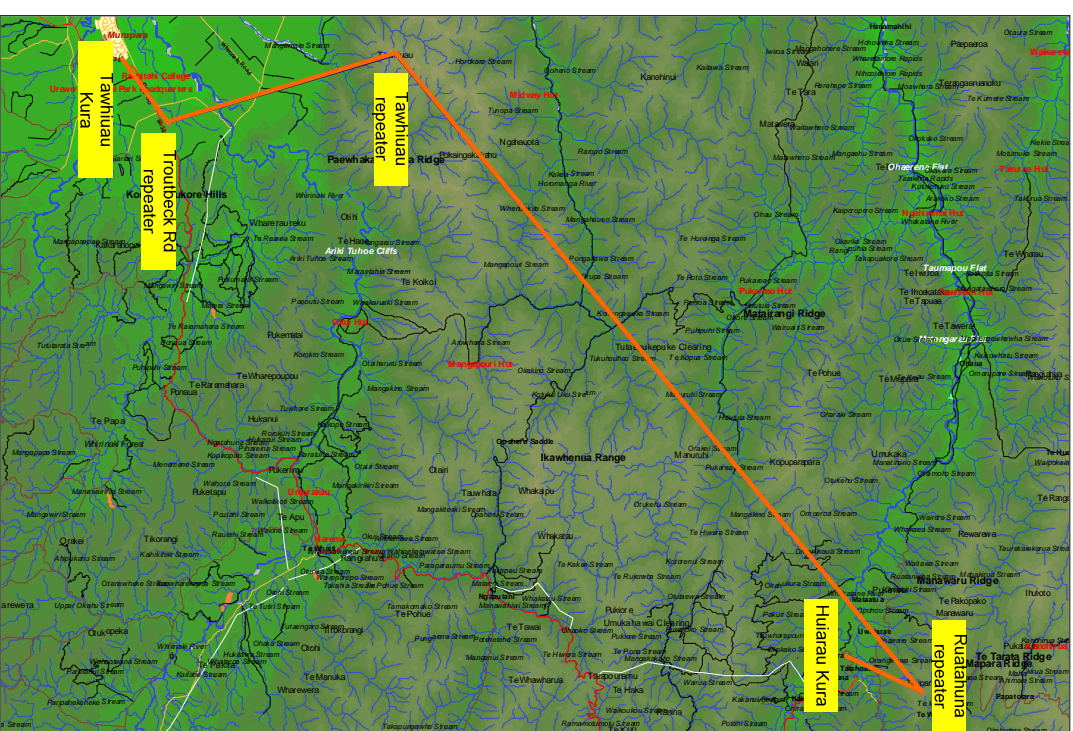


Rotorua Network



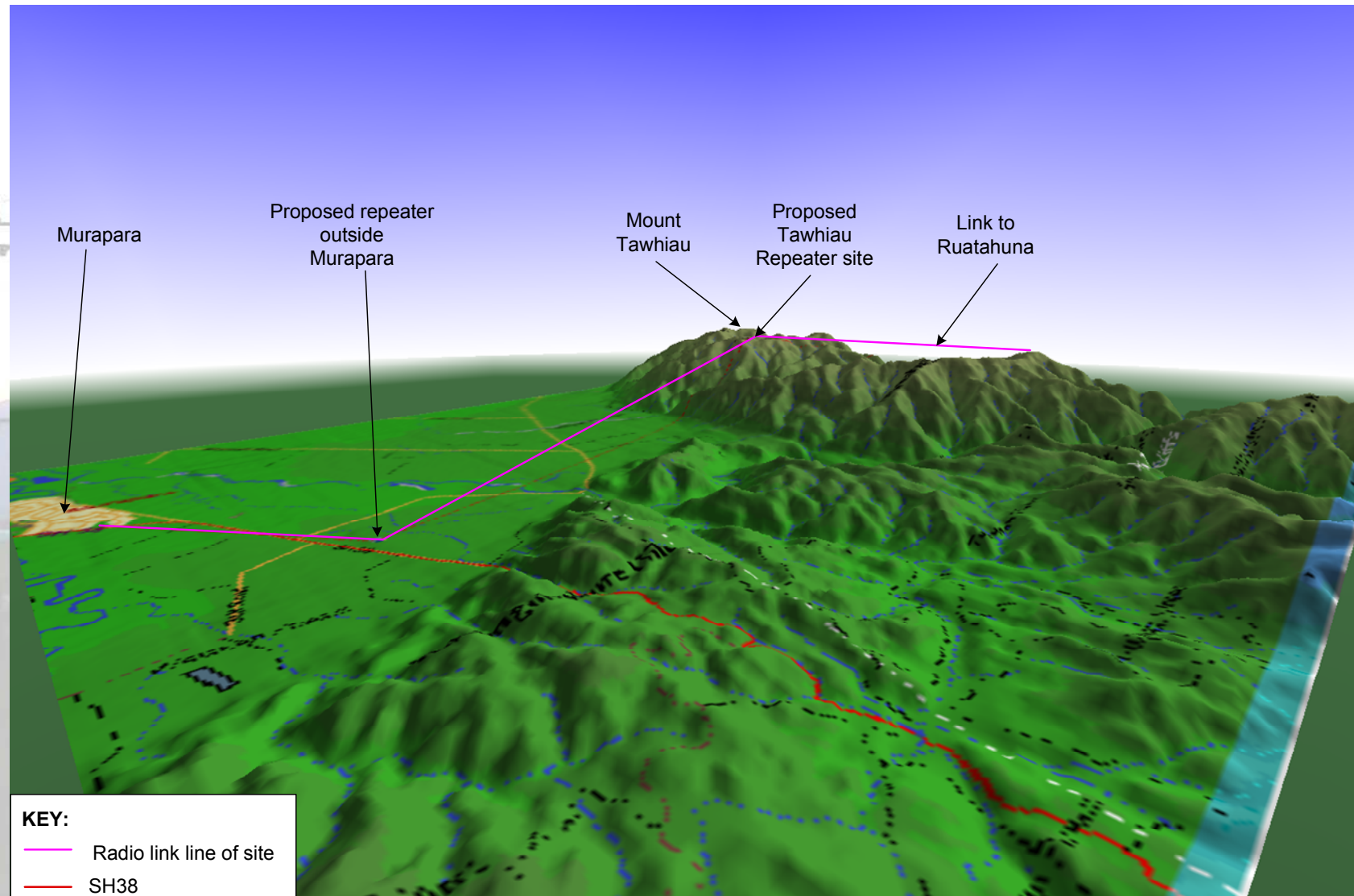
Connecting Huiaarau

- Attempting to connect Huiaarau School back to Murupara
- Four Links
 - Two solar powered repeaters
 - No vehicle access to one
 - Very challenging environment





3-D Map







ಮೂಲಕವಾಗಿ ಸರ್ಕಾರದಿಂದ ಸಹಾಯವಿಲ್ಲದೆ ಸ್ವಯಂ ಸಹಾಯದಿಂದ ಈ ಕಾರ್ಯವನ್ನು ಪೂರ್ಣಗೊಳಿಸಿದೆ



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Applications

- Applications also important
 - For schools
 - Web Surfing
 - Email
 - Video Conferencing
 - Web casting
 - Content filtering
 - Remote backup
 - Windows update





Web Casting

- Between Hamilton Zoo and the Fieldays site
 - 6 wireless links





Configuration/Management

- Complex set of tools to manage current CRCnet
- Need an integrated set of tools to minimise expertise required to build and manage new networks
- Currently building a new web-based Configuration/management tool



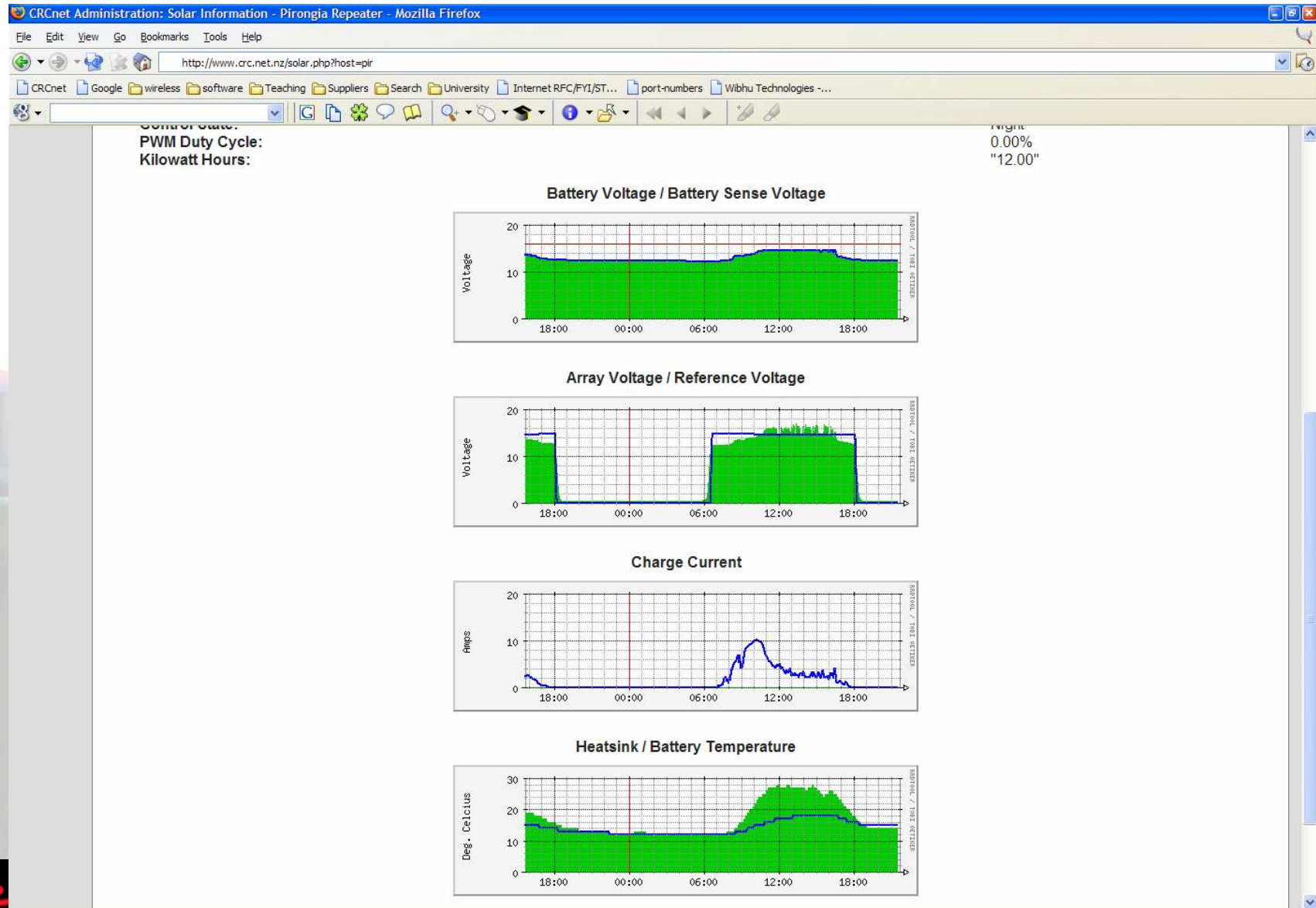


Configuration/Management

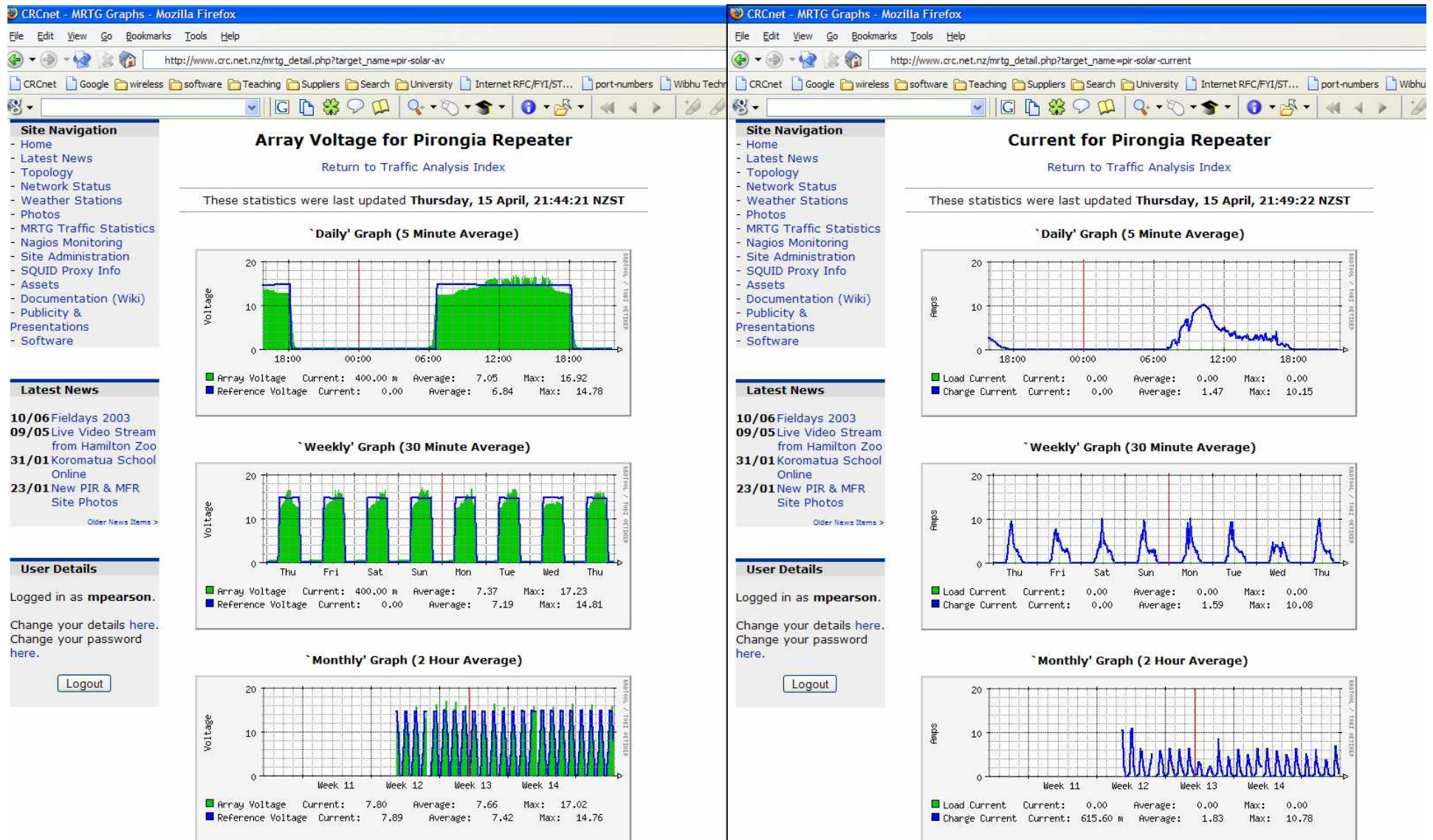
- System built around a central database containing information about the network
- Range of tools modified to make use of Database:
 - Configuration system (based on CFengine)
 - Package Manager
 - Network Monitoring using Nagios, MRTG and DARPCWATCH
 - Squid proxy log reporting
 - Email accounts



MRTG – monitoring of Solar Sites



MRTG – monitoring of Solar Sites





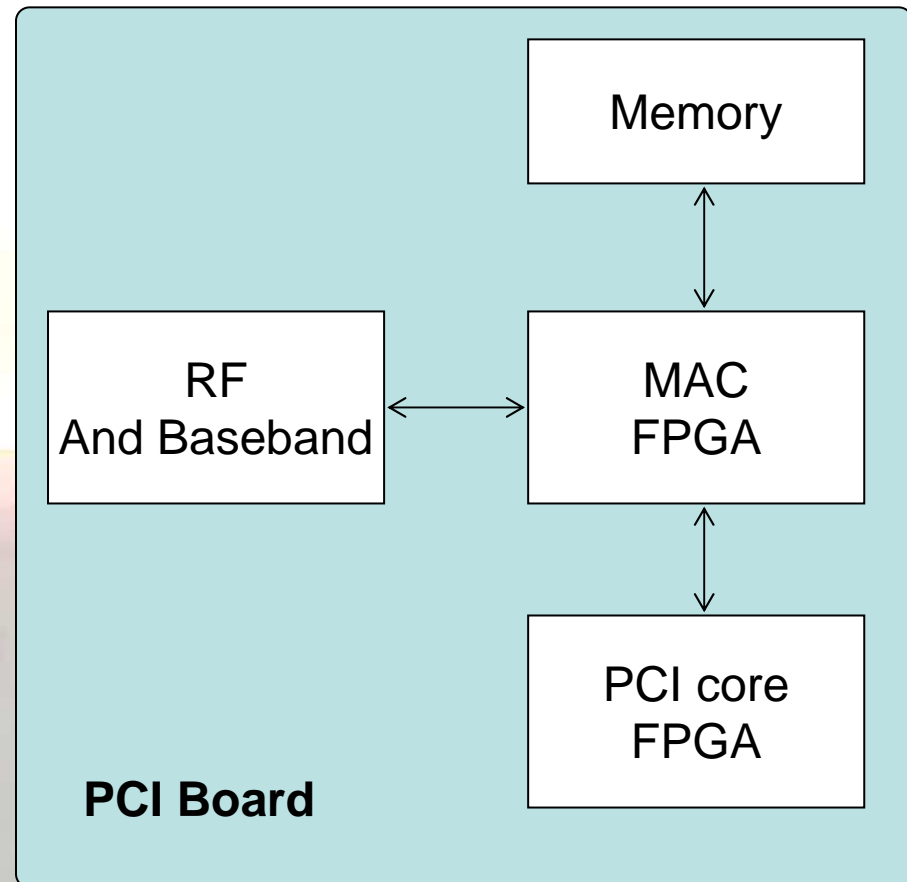
Stage Two - Develop new platform

- Easy Installation and maintenance
 - Use of multipoint to multipoint
- Customised link layer protocols
 - Possibly 802.16 or HyperLANII
- Mesh like features
 - Ability to follow landscape
 - Self forming and self healing
 - routing
- Support for Quality of Service
- Multiple radios and sectorised Antenna

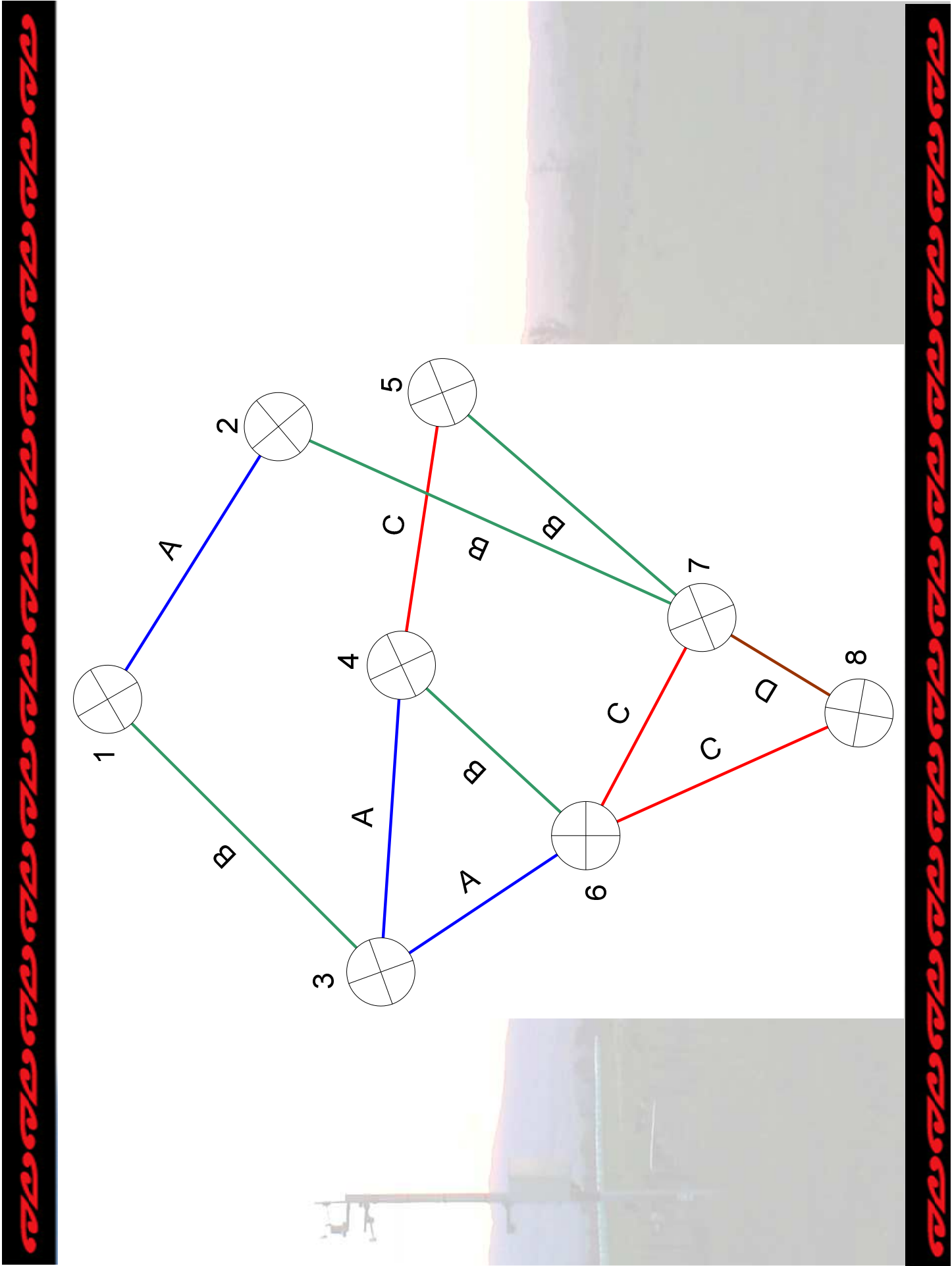


Design of a new node

- Goals:
 - Easy to install
 - Low power
 - Multiple radio interfaces
 - Implement own MAC
- Iteration One
 - PCI card inside a PC







Further Information

- CRCnet Project:
 - <http://www.crc.net.nz>
- WAND group
 - <http://wand.cs.waikato.ac.nz>
- Contact
 - mpearson@cs.waikato.ac.nz

