

1. How I got into this
 - a. Understudy to Dave Hughes, Summer 2001 – 2002
 - b. George told me I should come, so I came.
2. What we've done
 - a. No-license COTS equipment, mostly interfacing with Campbell data loggers
 - b. Land-based, point-to-point and point-to-multipoint
 - c. Serial data
 - i. FreeWave radios — excellent sensitivity, 900 MHz, cuts through foliage
 - ii. Also Campbell radios, very power-efficient, direct connection to CSIO ports, less range than Freewaves, but can be helped by greater antenna gain
 - iii. Wisconsin
 - (1) Forests, lakes
 - (2) Measuring Met and limnological (lake) data
 - iv. Alaska (Fairbanks/Bonanza Creek)
 - (1) Old-growth deciduous forest, somewhat dense
 - (2) Links in excess of 20 km, on rugged terrain
 - (3) Solar Panels vertical, pointing South
 - v. Puerto Rico
 - (1) Heavy Canopy
 - (2) Solar Panels Horizontal, on towers above the canopy, pointing straight up
 - vi. Thus we're all set up to get data through the dense forests of Antarctica
 - vii. More to the point, there is some hope for rugged terrain applications, using 900 MHz for near-line-of-sight connections
 - d. Internet/real-time
 - i. Alaska (Serial)
 - (1) Via Campbell NL100 Serial-to-Ethernet adaptor
 - ii. Virginia (Ethernet/Internet)
 - (1) 24 km backbone link to Hog Island using Wi-LAN 900 MHz 2 Mbps bridges
 - (2) 802.11b cloud on the island (~10km x 1km)
 - (a) Integrated numeric data, video data, web access, and videoconferencing environment
 - (b) Web accessible from laptops on the island, or from a boat, up to 20 km.
 - (c) Web access allows gathering of tide and weather radar data for operations, e.g., "What time do we have to return to shore?"
 - (d) Single network environment in Lab, on the boat, and on the island
 - (3) Looking at 5 GHz, e.g., Motorola Canopy for point-to-point links

- 3. Issues
 - a. Distance
 - i. Transmit power
 - (1) FCC rules apply?
 - ii. Receive sensitivity — enhanced via processing gain
 - iii. Physical barriers
 - (1) trees
 - (2) Earth curvature
 - b. Bandwidth (Need this? This group is already on top of it...)
 - i. Changes the kinds of data you can gather
 - (1) Numeric samples
 - (a) Met and Tide stations, BUT:
 - (b) Met station in CR has increasing data rates, e.g., instantaneous wind measurements
 - (2) Still Photographs
 - (3) Sound
 - (4) Live video
 - (5) Videoconferencing
 - c. Power
 - i. Photovoltaic Panels at the poles?
 - ii. TWW looking for answers there.