

## Line of Sight and Limits on Speed

Establishing a viable connection to the tower on Pocahontas has been a long and painfully slow process, but keep in mind that we are a group of amateurs who initially had little experience in this field. However, we have learned many things along the way. One of the most important is that, for a fast and stable system, good line of sight from client radios to the transmitter is critical. Another factor that greatly decreases the system speed for everyone is excessive data use by a few individuals.



If you have a good line-of-sight you should be able to see 6 towers on Pocahontas. They are (L to R) BC Hydro, Canadian Electronics Corp, Telus (low down), DFO/RCMP, GBIS and CBC.

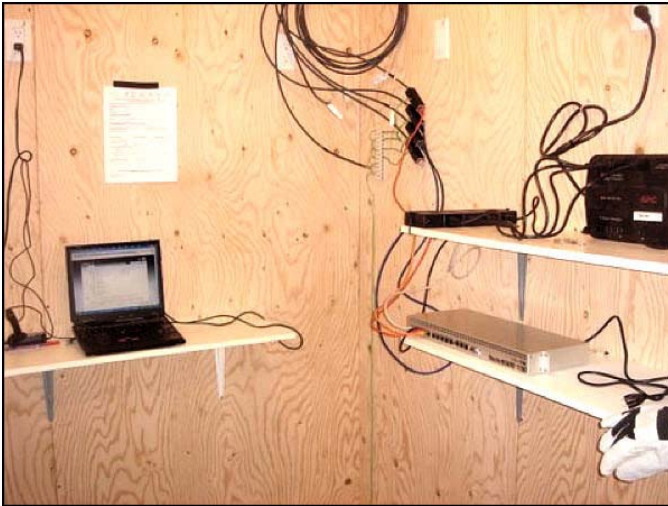
Obstacles in the line of sight, excessive data use and slow speeds are related and cause us the most headaches, so here is some background that might help you understand the system better.

If you consider the backhaul to and from the Point of Presence (PoP or gateway in and out of the network) as a pipe with a limited diameter, then the more data you try to push through the pipe, the slower the data travels – it gets plugged up. So connection speeds slow down as more clients connect, noticeable at certain times of day. Remember that a wireless system is a shared medium, and any time one client requests data, if the pipe is full, others are put in a queue and might be “on hold” until earlier requests are fulfilled.

Repeatedly filling the pipe with the same data is obviously not efficient, but that is what happens when there is one poor connection in the system. We found this out the hard way when we initially accepted clients with marginal connections. A poor connection drags the entire system down to the detriment of the other clients. The radio with the poor connection (maybe due to trees in the line of sight) is continually requesting retransmission of the same data due to errors, so everyone else has to wait. Avoiding this problem will form part of our protocol for connecting new clients. Our commitment is to first connect clients with line of sight; secondly we will look at solutions to connect

marginal customers. It is possible to go around obstacles such as trees or hills, but this involves setting up a repeater access point. This is not usually practical for less than four or five clients in a similar locale. We currently have several repeaters around Gillies Bay

Excessive data use by one client also slows speeds for everyone else. GBIS has established a data cap at 30 gigabytes (GiB) a month without overage charges. In the future we can consider raising the cap as the system evolves. The logical answer to this problem would be to increase the size of the pipe. However, this can get expensive, but is not out of the question.



Equipment in the GBIS building on Pocahontas; on the right is the PEP emergency repeater equipment.

We welcome feedback and suggestions to improve the system.

The GBIS Board.  
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