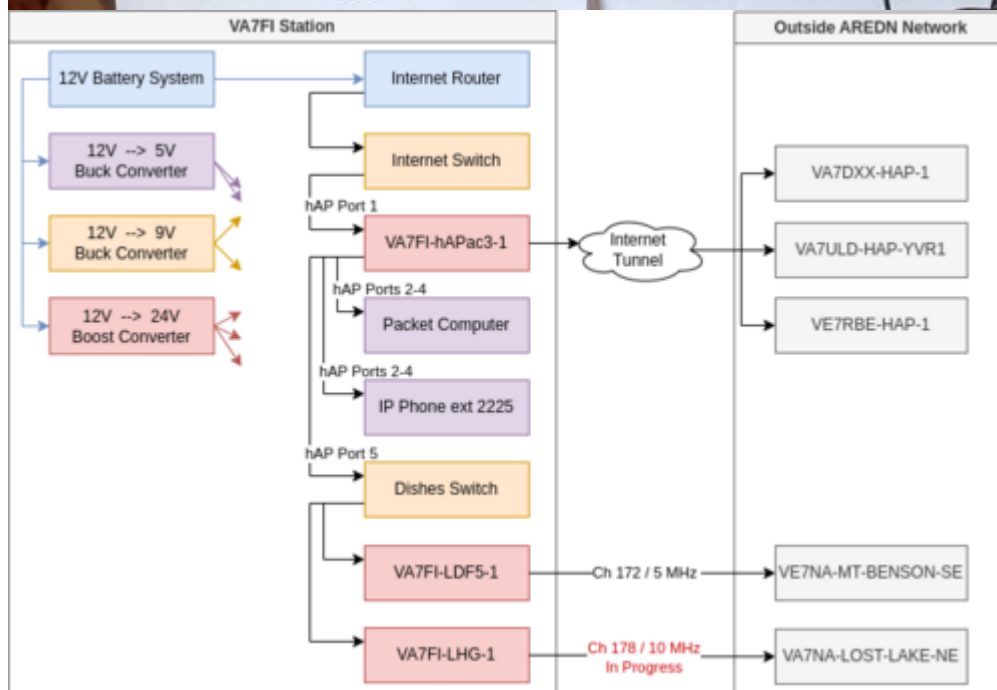


Patrick (VA7FI)

The goal is for my computers and IP phone¹⁾ to connect to other AREDN nodes. Currently, I achieve this via two different paths:

1. via internet tunnels to VA7DXX, VA7ULD, and VE7RBE (which is not really ham radio), and
2. via the 5.8 GHz band to one of the Mount Benson nodes on Vancouver Island.

My system also runs off of 12 V batteries so it (and my internet connection) continues to work during power outages. To easily connect different equipment in different ways, I created a “patch panel” using ethernet female-to-female connectors:

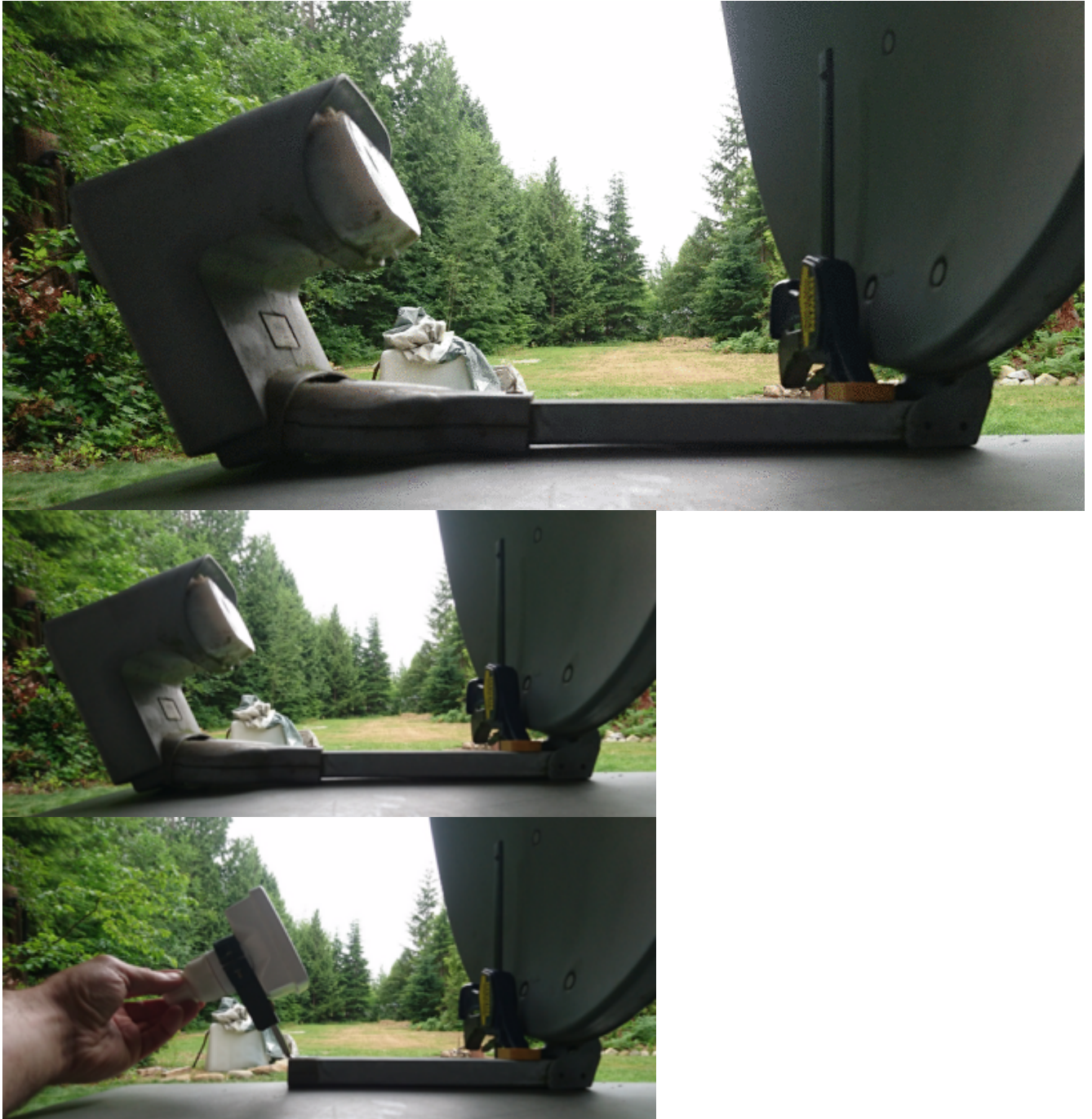


In the default configuration, everything is connected to the hAP. But I can very quickly connect my Winlink computer or the phone directly to the dishes to ensure I'm using RF.

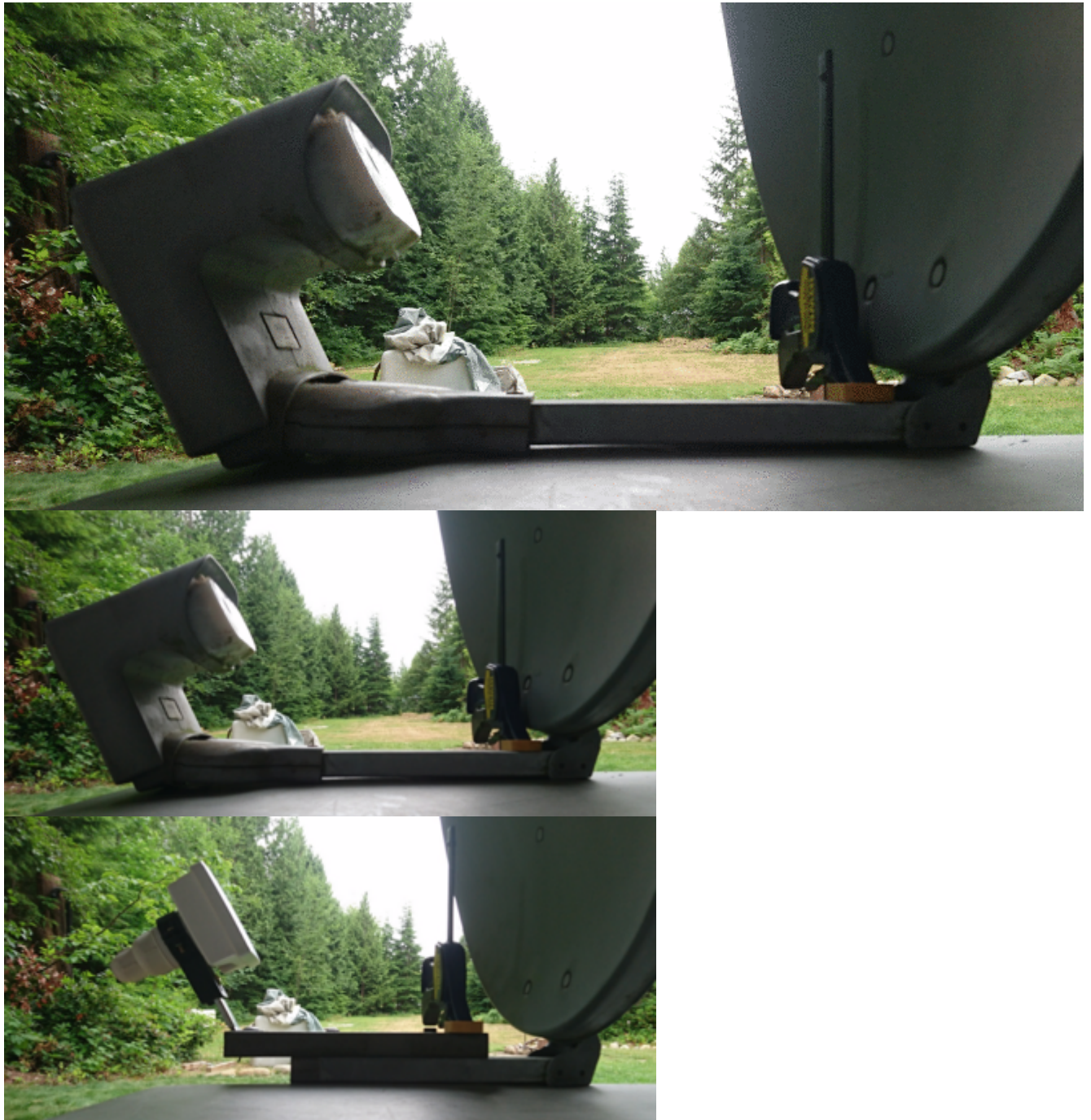
July 1, 2021

I installed a [Mikrotik LDF-5](#) (the n model, **not** the ac model) on a used TELUS satellite TV dish.

- The first task was to mount the LDF-5 to the dish roughly where the old receiver was. Unfortunately, the arm and the LDF-5 mounting bracket were both a bit too short so the LDF-5 was too close to the dish, and it was too low:



- So I bolted a second arm on top of the first to raise the LDF-5 and move it a bit further away:



- Initially, the dish was mounted on a post with a 45° angle, but after field testing it, it was found to be a bit much (an angle of 20° would be ideal, but I used a vertical post later).

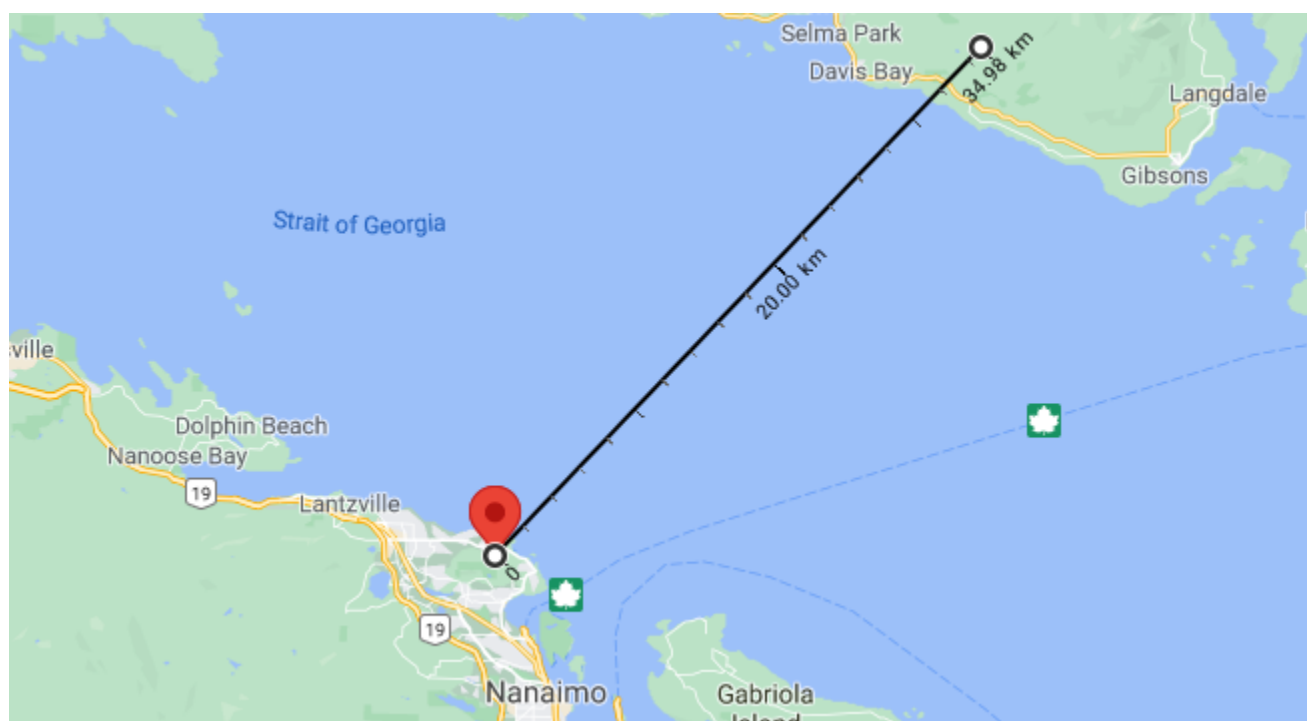


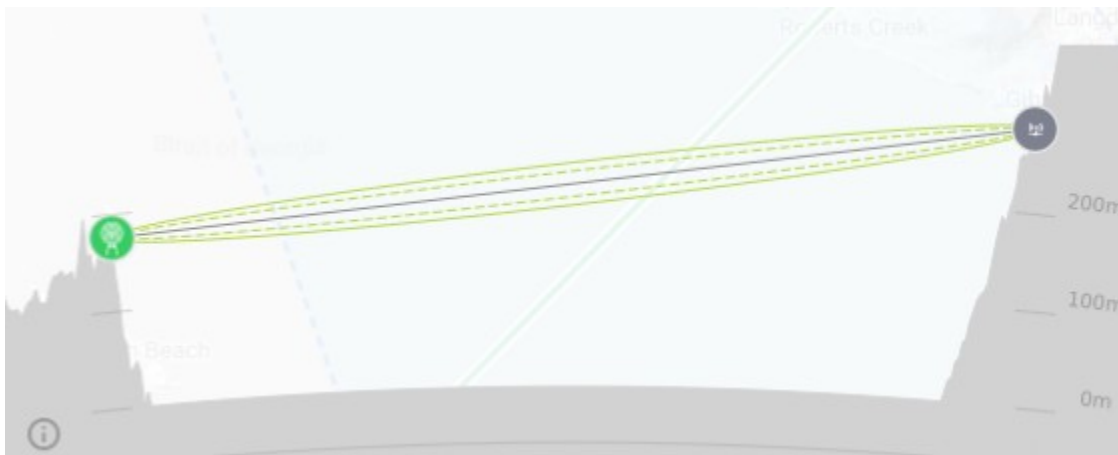




July 4, 2021 Test

A few days later, Chris (VE7TOP) and I made a successful connection on 5.860 GHz (Ch. 172) between Nanaimo (49.227263, -123.975836) and Roberts Creek (49.45465, -123.64199): a distance of 35 km.





- Here's my setup and the view from the dish. The red circle marks the spot where Chris is. The [log periodic](#) was so Chris and I could talk on VHF to perform the adjustments.





- Here are my settings:

Node Status	Basic Setup	Port Forwarding, DHCP, and Services	Tunnel Server	Tunnel Client	Administration	Advanced Configuration
<div>Help Save Changes Reset Values Default Values Reboot</div>						
Node Name		VA7FI-LDF5-1			Password	
Node Description (optional)		Roberts Creek, BC			Verify Password	
Mesh RF		LAN		WAN		
Enable ☒		LAN Mode 5 host Direct		Protocol DHCP		
IP Address 10.171.240.5		IP Address 10.95.128.41		DNS 1 8.8.8.8		
Netmask 255.0.0.0		Netmask 255.255.255.248		DNS 2 8.8.4.4		
SSID AREDN		DHCP Server ☒				
-5-v3		DHCP Start 42				
Channel 172 (5860)		DHCP End 46				
Channel Width 5 MHz						
Active Settings				Advanced WAN Access		
Tx Power 23 dBm				Allow others to use my WAN ☐		
Distance to FARTHEST Neighbor 0.00 mi				Prevent LAN devices from accessing WAN ☐		



- For the first test, Chris used a dish (: add details). After adjusting the dish's directions and elevations, the best signal strength I received was above -60dBm (which is pretty impressive!) with an SNR of over 35dB:

VA7FI-LDF5-1

Location: 49.43316 -123.65199

Roberts Creek, BC

[Help](#)[Refresh](#)[Mesh Status](#)[WiFi Scan](#)[Setup](#)[Select a theme](#) ▼

Wifi address 10.171.240.5 / 8

LAN address 10.95.128.41 / 29

WAN address none

default gateway none

SSID AREDN-20-v3

Channel 172

Bandwidth 20 Mhz

Signal/Noise/Ratio -60 / -95 / 35 dB

[Charts](#)

firmware version 3.21.4.0

system time Sat May 8 2021
20:53:14 PDT

uptime 8 min
load average 0.56, 0.19, 0.08

flash = 8824 KB
/tmp = 29940 KB
memory = 44540 KB

OLSR Entries
Total = 6
Nodes = 2

VA7FI-LDF5-1

[Archive](#) [Realtime](#) [Quit](#)

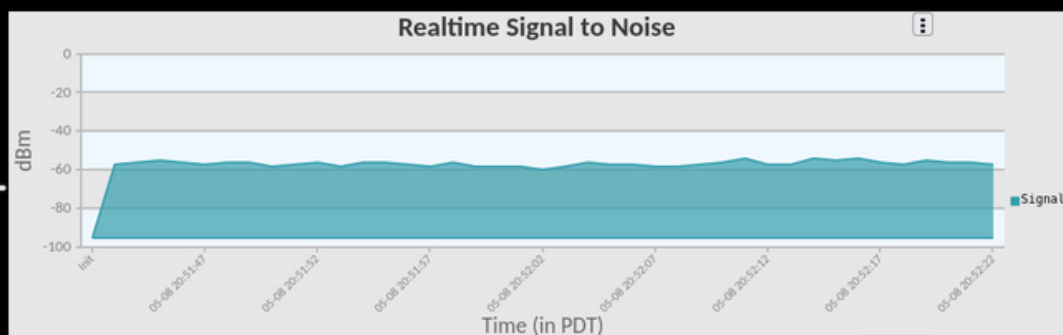
Selected Device: Average signal for all connected stations ▼

SNR: 38dB

Sound: ☒ On ☐ Off

Pitch:

Volume:



VA7FI-LDF5-1 mesh status

Location: 49.43316 -123.65199

Roberts Creek, BC

[Refresh](#) [Auto](#) [Quit](#)

Local Hosts	Services	Current Neighbors	LQ	NLQ	TxMbps	Services
VA7FI-LDF5-1		VE7NA-ROCKETM5-1	75%	100%	23.2	

Remote Nodes	ETX	Services	Previous Neighbors	When
VE7TOP-HAP1	1.44		none	

OLSR Entries

Total	6
Nodes	2



- For the second test, Chris switched to a 120° sector antenna ([Fix Me!](#): add details). Here, the best signal strength I received was a bit above 80dBm with with an SNR of about 17dB:

VA7FI-LDF5-1

Location: 49.43316 -123.65199

Roberts Creek, BC

[Help](#)[Refresh](#)[Mesh Status](#)[WiFi Scan](#)[Setup](#)[Select a theme](#) ▼

Wifi address 10.171.240.5 / 8

LAN address 10.95.128.41 / 29

WAN address none

default gateway none

SSID AREDN-5-v3

Channel 172

Bandwidth 5 Mhz

Signal/Noise/Ratio -79 / -95 / 16 dB

[Charts](#)

firmware version 3.21.4.0

system time Sat May 8 2021
21:27:30 PDT

uptime 22 min
load average 0.14, 0.25, 0.18

flash = 8824 KB
free space /tmp = 29940 KB
memory = 45048 KB

OLSR Entries Total = 6
Nodes = 2

VA7FI-LDF5-1

[Archive](#) [Realtime](#) [Quit](#)

Selected Device: VE7TOP-8-ROCKETM5-1.local.mesh ▼

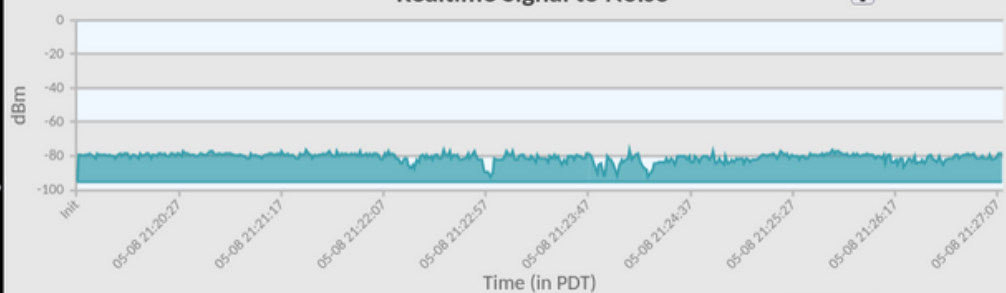
SNR: 17dB

Sound: ☒ On ☐ Off

Pitch:

Volume:

Realtime Signal to Noise



VA7FI-LDF5-1 mesh status

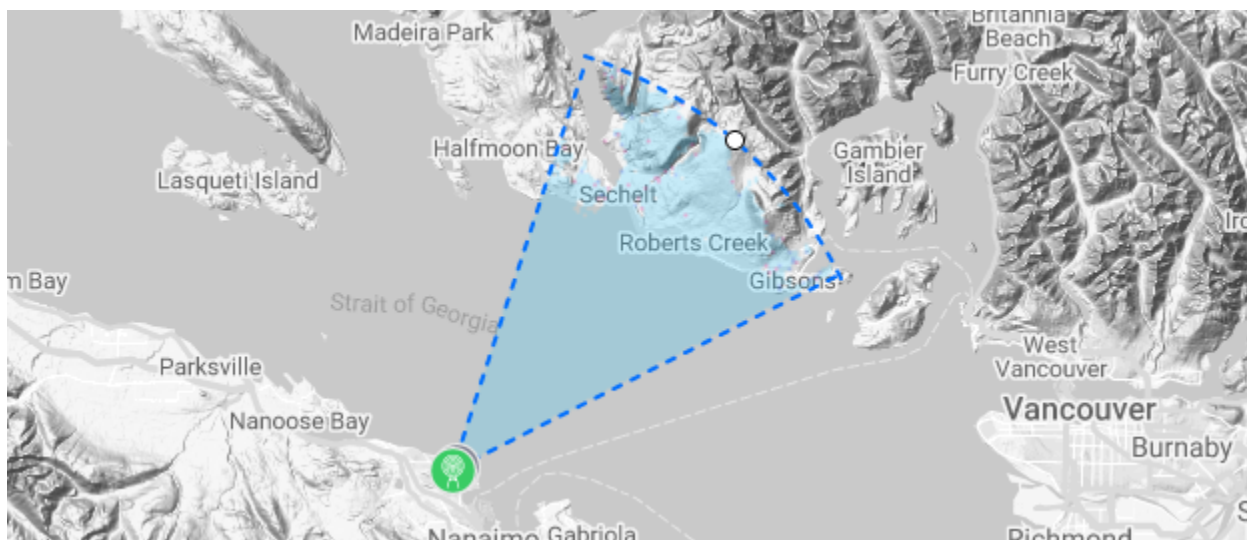
Location: 49.43316 -123.65199
Roberts Creek, BC

Stop **Quit**

Local Hosts	Services	Current Neighbors	LQ	NLQ	TxMbps	Services
VA7FI-LDF5-1		VE7TOP-8-ROCKETM5-1	100%	89%	0.0	

Remote Nodes	ETX	Services	Previous Neighbors	When
VE7TOP-HAP1	1.23		VE7NA-ROCKETM5-1	15 minutes ago

These two tests show that it is possible to establish a connection between Nanaimo and the Sunshine Coast. The 120° sector antenna might be pushing it a little bit, but a 60° sector antenna would be enough to cover Gibsons through Halfmoon Bay and would offer an additional 4dB of gain over the 120° sector antenna.



Aug 1, 2021

Today, I managed to install my AREDN dish up the tree, run the CAT5 to the house, and connect it to the hAP. I started working at 7:45 this morning and finished around 5pm (after climbing up and down three times).

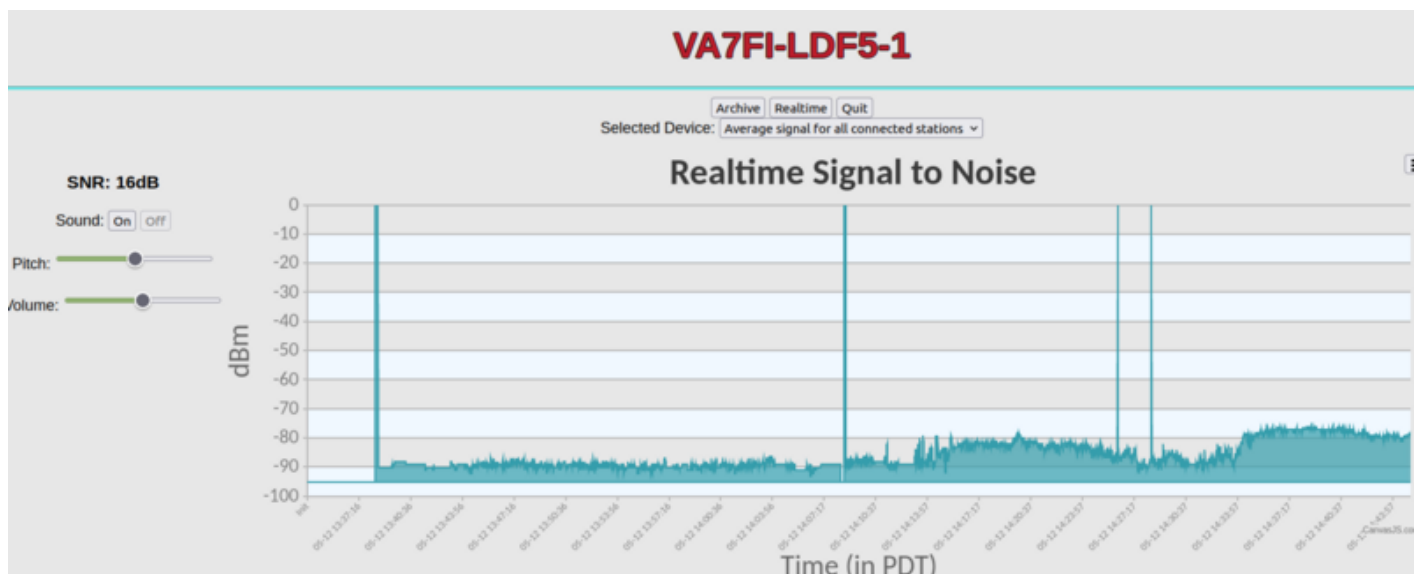
I aimed the dish roughly towards Mount Benson (222°), but unfortunately, I didn't manage to make a connection to the node there.



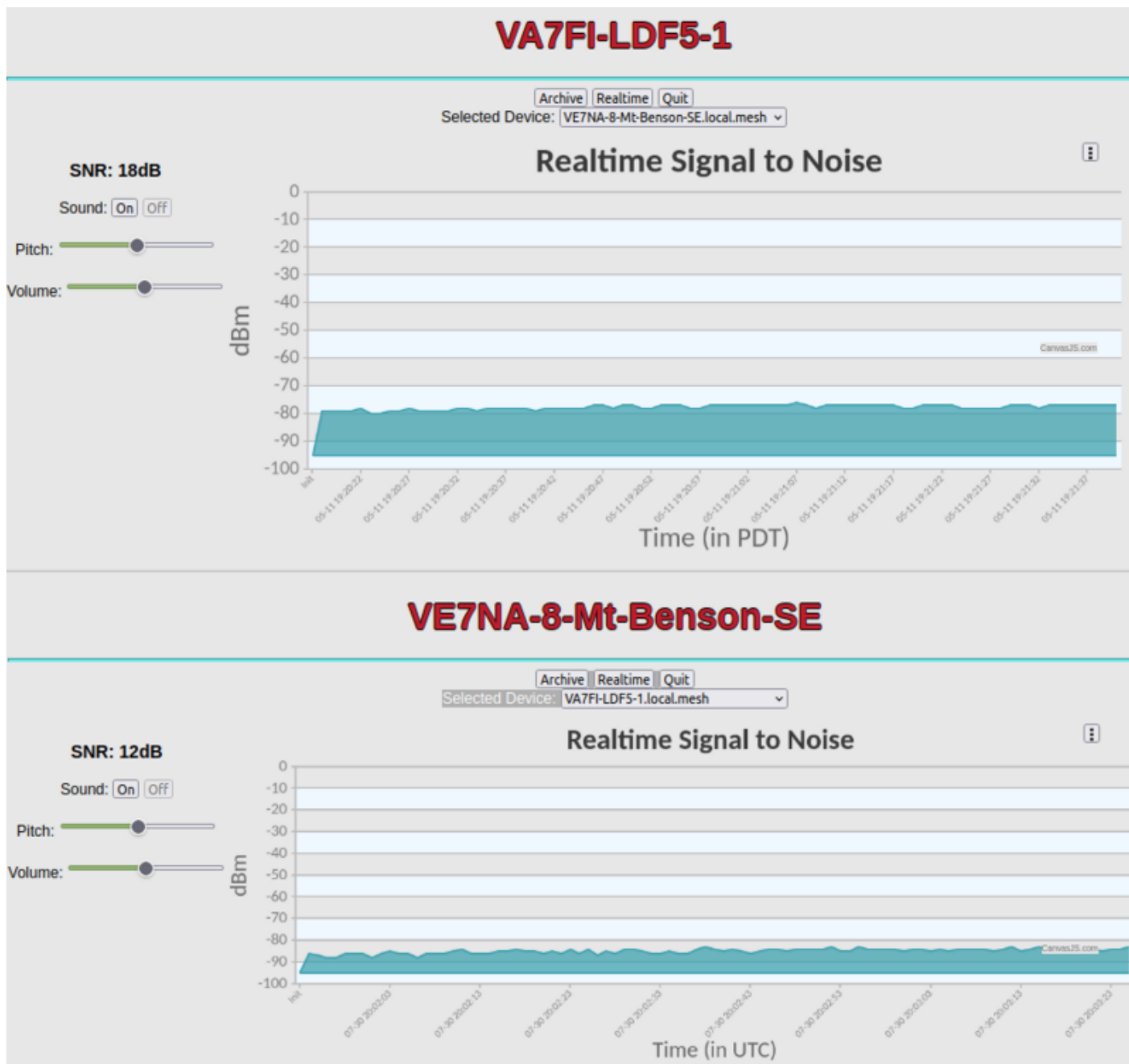


Oct 31, 2021

Yesterday, the folks on the Island went back to Mount Benson and adjusted the tilt on their antennas. After the adjustment, I started getting an intermittent signal. So today, I went back up the tree and used that signal to fine-tune the adjustment of my dish and managed to squeeze an extra 5-10 dB! Here's a graph of the signal before, during, and after the adjustment:



Unfortunately, it looks like I can hear the Mount Benson node 6-7 dB more strongly than it can hear me. I'm transmitting at 25 dBm. The equipment on mount Benson can transmit at 27 dBm.²⁾



Here's the status report pages for both nodes. It looks like I might be able to reach 1.6 Mbps, which is pretty impressive compared to VHF packet, but still pretty slow compared to the other stations.

VA7FI-LDF5-1 mesh status

Location: 49.43316 -123.65199
Roberts Creek, BC

Refresh

Auto

Quit

Local Hosts	Services	Current Neighbors	LQ	NLQ	TxMbps	Services
VA7FI-LDF5-1		VA7FI-HAP-1 (dtd)	100%	100%		
		VE7NA-8-Mt-Benson-SE	100%	40%	1.6	

Remote Nodes	ETX	Services	Previous Neighbors	When
VE7NA-3-Mt-Benson-NE	2.62			

VE7NA-8-Mt-Benson-SE mesh status

Location: 49.149815 -124.050796
Mount Benson 120 Degree Sector South East BW 5
Mhz CH 172

Stop

Quit

Local Hosts	Services	Current Neighbors	LQ	NLQ	TxMbps	Services
VE7NA-8-Mt-Benson-SE		VA7DXX-BENSON-LINK	92%	100%	19.5	
		VA7FI-LDF5-1	56%	100%	6.5	
		VE7GDE-BENSON-LINK	100%	100%	22.0	
		VE7NA-3-Mt-Benson-NE (dtd)	100%	100%		
		VE7ODG-BENSON-LINK	63%	100%	4.9	

Remote Nodes	ETX	Services
VE7GDE-HAP-1	1.10	

Sept 29, 2022

This afternoon, Chris (VE7TOP), Devan (VE7LSE) and ran a few tests with a 60° sector antenna in Nanaimo and an LHG dish in Roberts Creek:



The results were very promising:

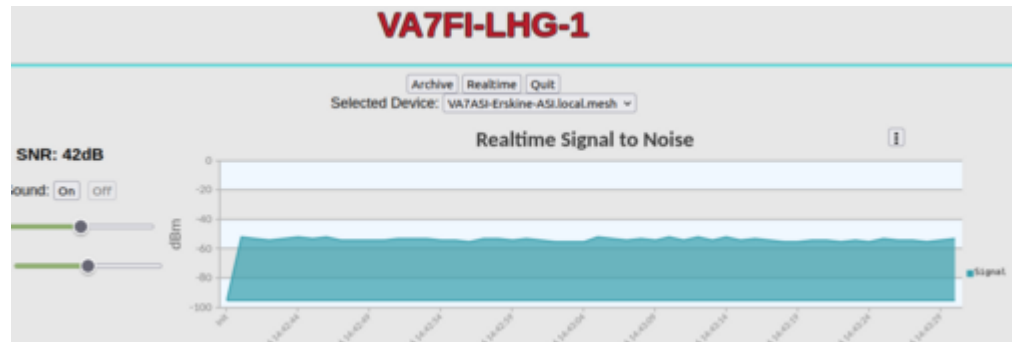
The sector antenna was at 24 dB SNR:

While point-to-point with another dish was 38 dB SNR:

VA7FI-LHG-1 WiFi scan								VA7FI-LHG-1 WiFi scan							
Stop Quit								Refresh Auto Quit							
SNR	Signal	Chan	Enc	SSID	Hostname	MAC/BSSID	802.11 Mode	SNR	Signal	Chan	Enc	SSID	Hostname	MAC/BSSID	802.11 Mode
24	-71	178		AREDN-5-v3	VE7TOP-RocketM5-3	04:18:D6:AA:7B:AE	Connected Ad-Hoc Station	38	-57	135		AREDN-5-v3	VE7TOP-RBLHD5HPNDx1	2C:C8:1B:DC:3E:B8	Connected Ad-Hoc Station

While I was there, I scanned the portion of the Island that I could see for other signals and was incredibly surprised that I could connect to a few other stations. From south to north:

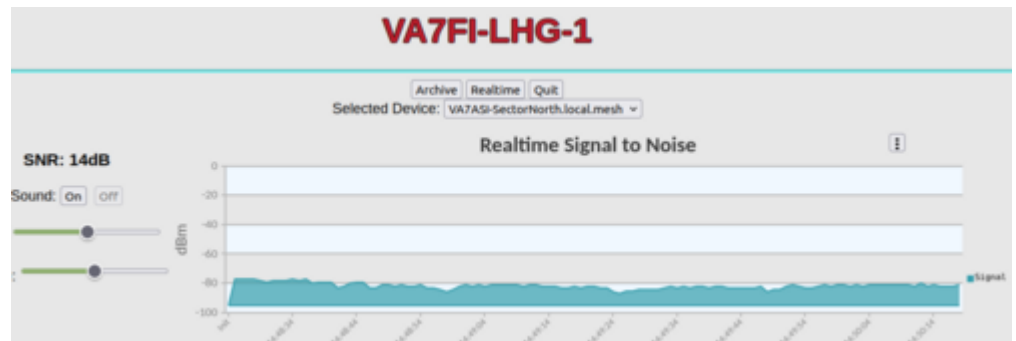
VA7ASI-Erskine-ASI



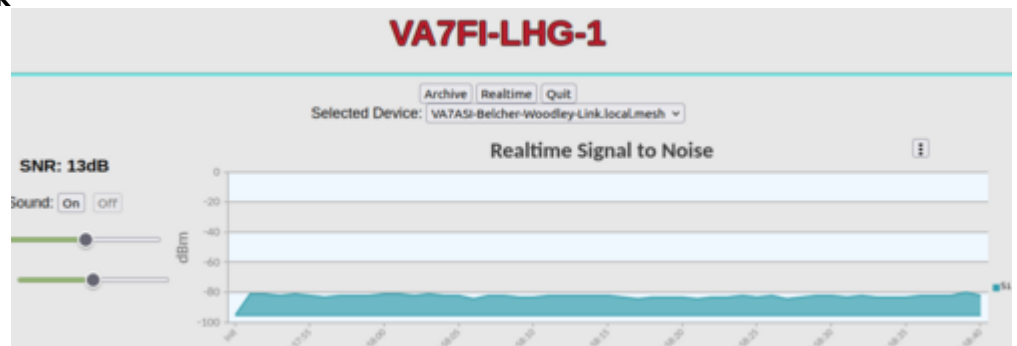
- Ch: 140
- Bearing: 217°
- SNR: 42 dB



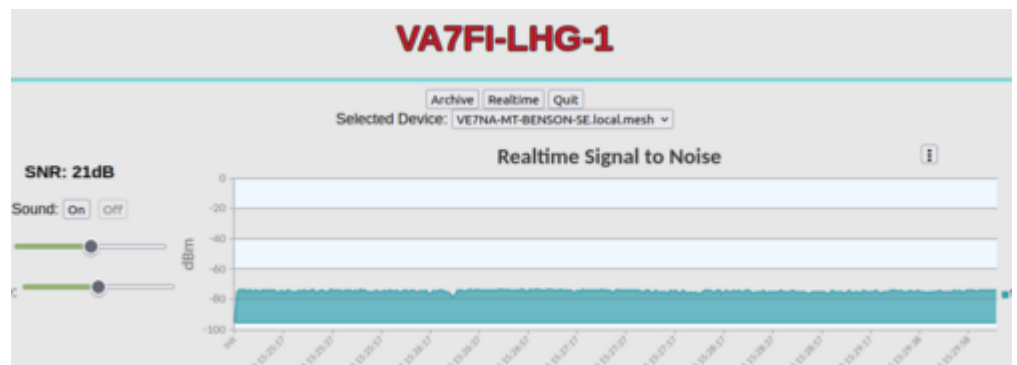
VA7ASI-SectorNorth



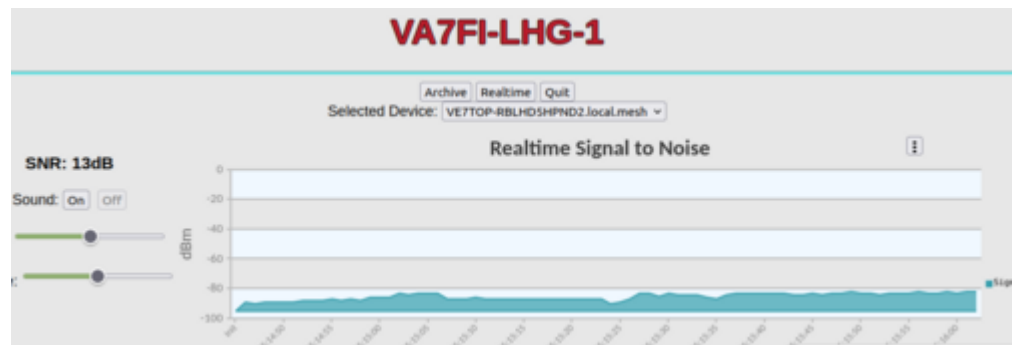
- Ch: 133
- Bearing: 219°
- SNR: 14 dB

VA7ASI-Belcher-Woodley-Link

- Ch: 135
- Bearing: 219°
- SNR: 13 dB

VE7NA-MT-BENSON-SE

- Ch: 172
- Bearing: 238°
- SNR: 21 dB

VE7TOP-RBLHD5HPND2

- Ch: 133
- Bearing: 243°
- SNR: 12 dB

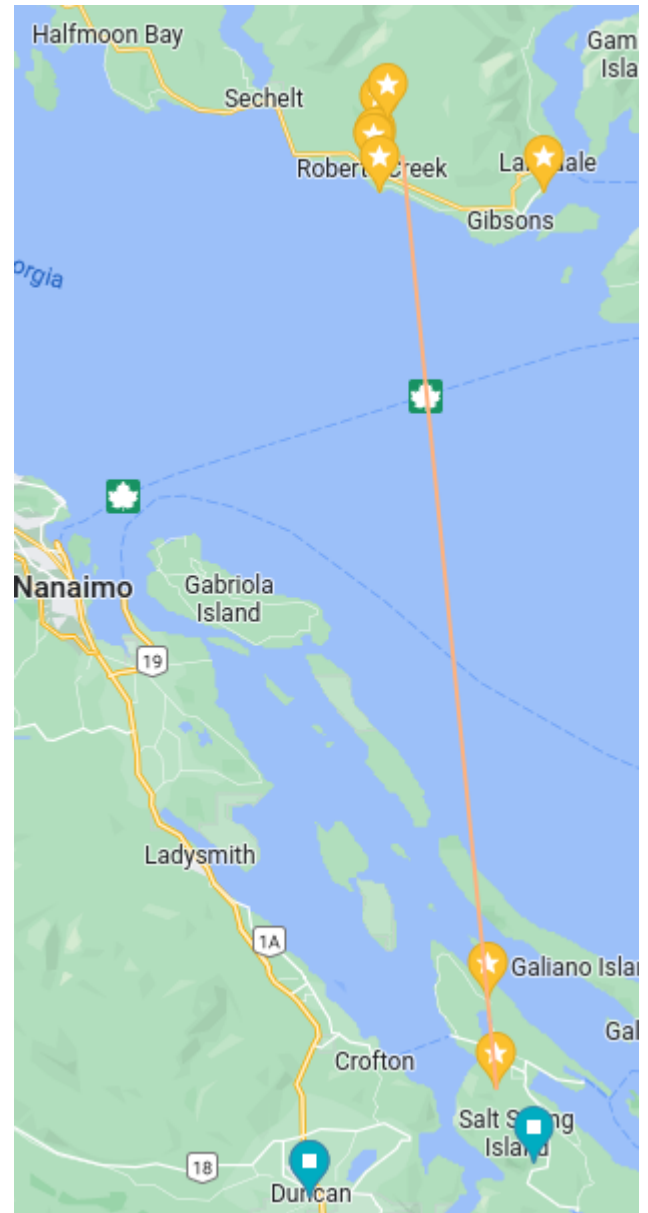
Big thanks to Chris and Devan for their time and patience!



Next test will be when the sector antenna is installed at Lost Lake. To be continued...

Footnote

Using the coordinates for VA7ASI-Erskine-ASI and VA7ASI-Fernwood-Erskine, I can now see why I got such a good signal from the dish that's pointed north.



- 1) One of these computers is a cheap laptop that I use as a [Linux Server](#) to host different [services](#) on AREDN.
- 2)

$$25 \text{ dBm} = 10^{2.5} \text{ mW} \approx 320 \text{ mW}$$

$$27 \text{ dBm} = 10^{2.7} \text{ mW} \approx 500 \text{ mW}$$