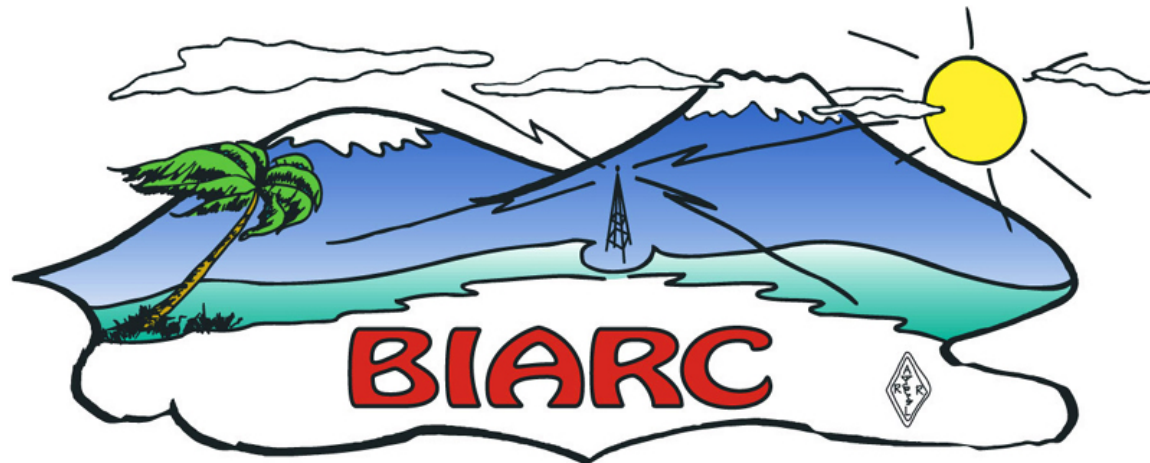


Simplex Tips and Tricks

Can you hear me now?

Can you hear me now?

Can you hear me now?



Big Island Amateur Radio Club

Presented by:

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What we will discuss:

- What is simplex?
 - What is duplex?
- Common use cases.
- How to improve your simplex game:
 - Better!
 - Faster!
 - Cheaper?

What is simplex?

- Webster's defines it as:
 - sim·plex | \ 'sim-,pleks \
 1. SIMPLE, SINGLE.
 2. Allowing telecommunication in only one direction.
- The ITU defines it a:
 - Operating method in which information can be transmitted in either direction, but not simultaneously, between two points.*

*William thinks that this definition is more accurate, and that Webster's should up their game.

Useless facts!

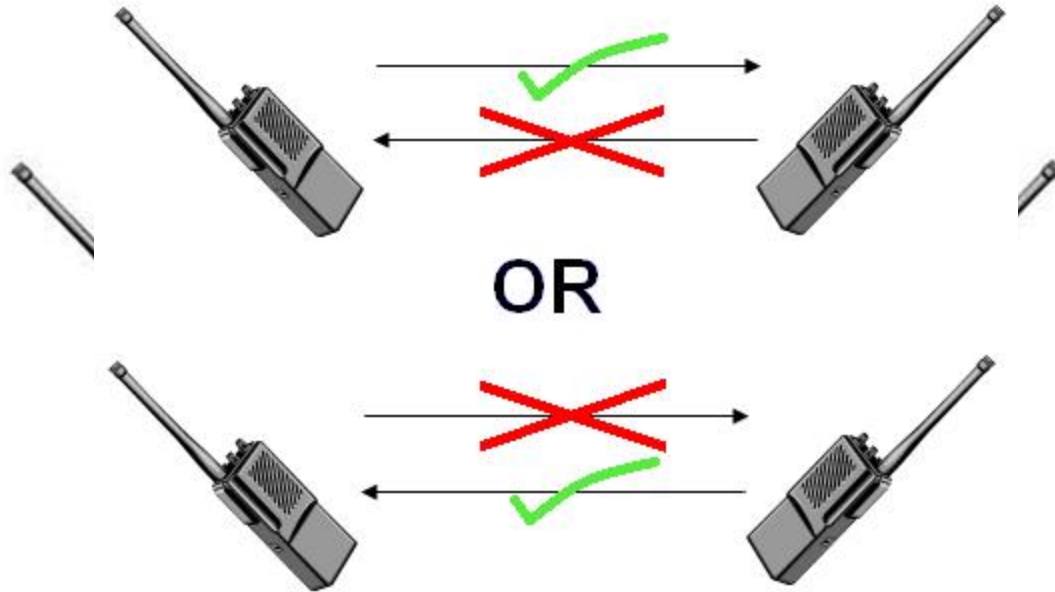
- It comes from the Latin word “simplic,” which means simple.
- The plural of simplex is simplices.
 - Nobody needs to know that; but now you do...

So, its simple...

- It's the most basic form of radio communication; a transmitter talking to a receiver – with nothing else in the middle.
- Two people can still talk back and forth, just not at the same time.
 - Even if the conversation is going back and forth, it is still simplex.
- Often done using a single frequency.
 - Though it can be operated split, using a different frequency for each direction.



One way at a time



Duplex

- Webster's:
 - du·plex | \ 'dü-,pleks \
 1. Allowing telecommunication in opposite directions simultaneously.*
- ITU:
 - Operating method in which transmission is possible simultaneously in both directions.

*William no longer has any respect for Webster's



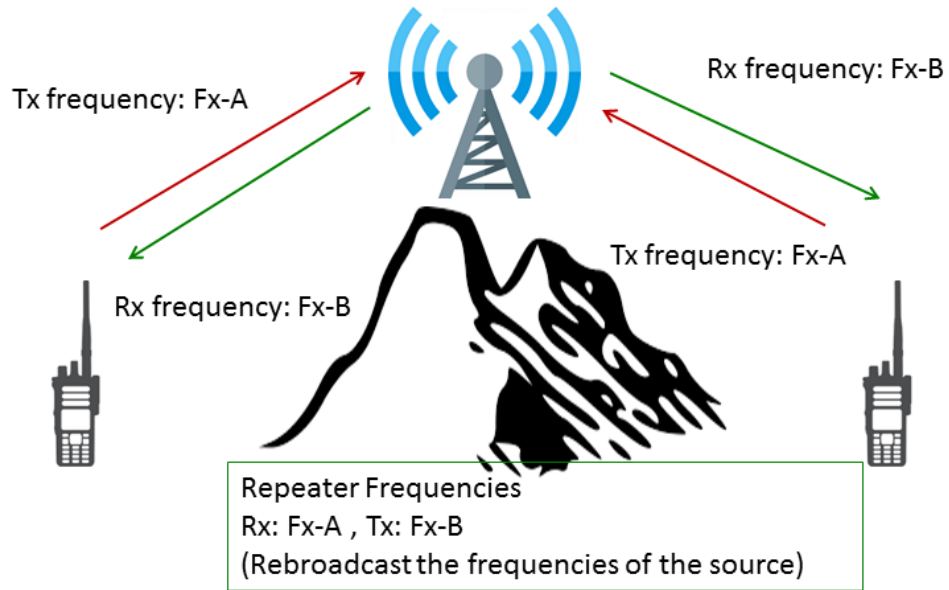
No going back and forth



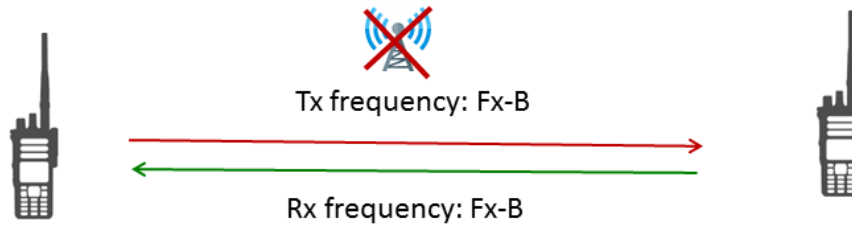


Radio Communication via Repeater or talk around

Case -1
(Communication
via Repeater)
* Duplex *



Case -2
(Communication
via Talk around)
* Simplex *



Don't get confused

- In almost all other technology realms the terms used are:
 - Half-Duplex, for what we call simplex.
 - Full-Duplex, for what we call duplex.

Why Simplex?

- Simple.
 - Less to go wrong and prevent communication.
- Reliable.
 - No additional infrastructure to break down.
 - Again, less to go wrong and prevent communication.
- Cheaper.
 - No additional infrastructure costs.
 - Lower station costs:
 - Only one radio is needed.
 - One antenna can be used for both transmit and receive, without an expensive duplexer being required.

Duplex operation is expensive



Use Cases for Simplex Operation

- Local communications
 - You're not tying up a repeater.
 - You're not using linking resources.
 - You're not bothering the people who monitor these resources, with your ragchew.

Use Cases for Simplex Operation

- Emergency communications
 - No additional resources are required.
 - Unaffected by power outages.
 - Can reach areas where the fixed infrastructure can't.
 - Can reach great distances through the use of relays.
 - Some practice and pre-planning is important for this to work well.

Use Cases for Simplex Operation

- For fun!
 - Achieving great distances can be a unique and fun challenge to your skill as an operator.
- It's so fun that contests have been created around the activity.
 - Stan?

Improving Your Simplex Game

- Power.
- Antenna Height.
 - Height Above Average Terrain (HAAT!)
 - Terrain can be used to your advantage. Or, it can shut you down.
- Gain.
- Polarization.
- Frequency.
- Mode.
 - Weak signal work is done on SSB for a reason

Power

Power

Power

(Needs more cowbell?)

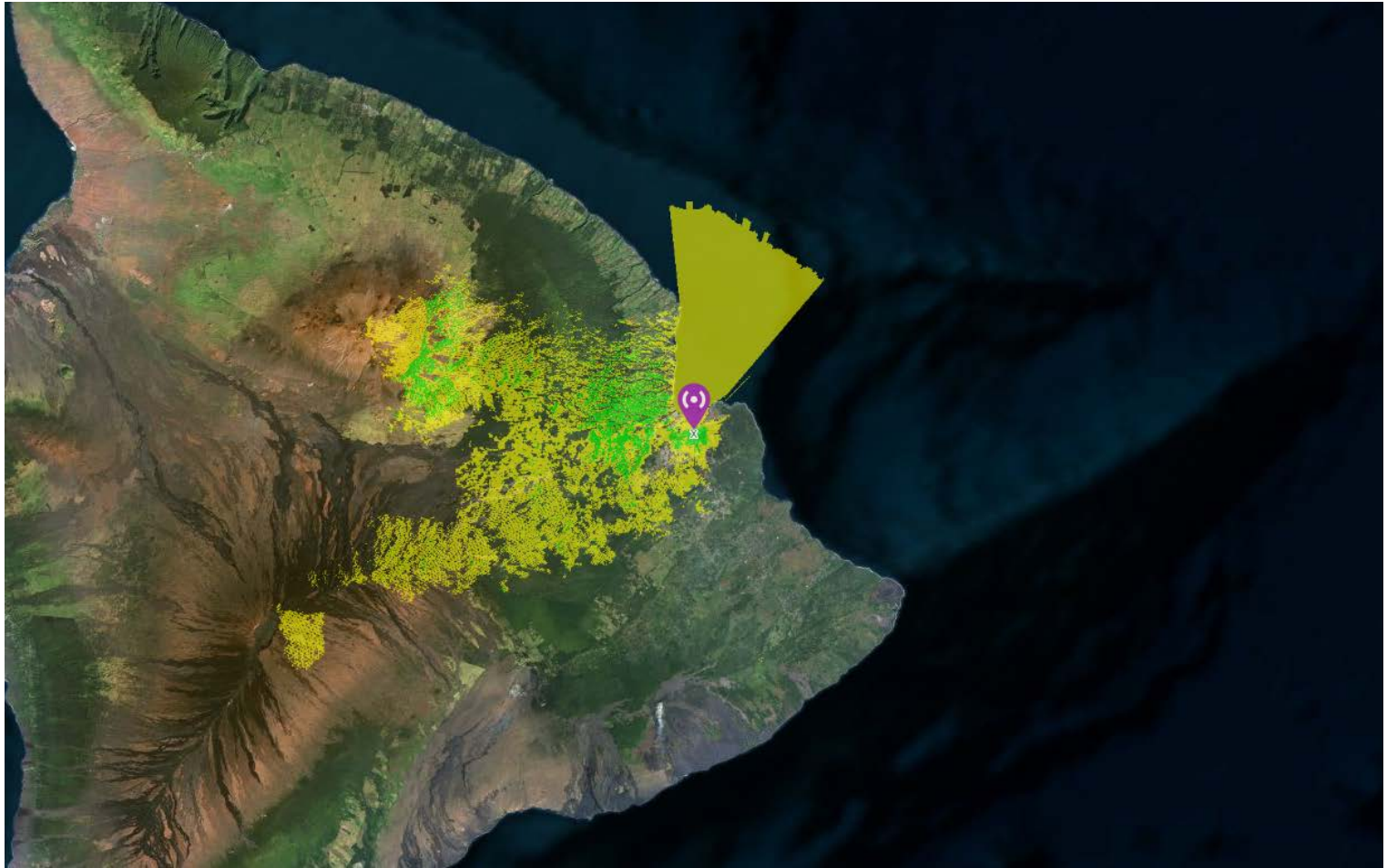
5 Watts 70cm



50 Watts 70cm



500 Watts 70cm



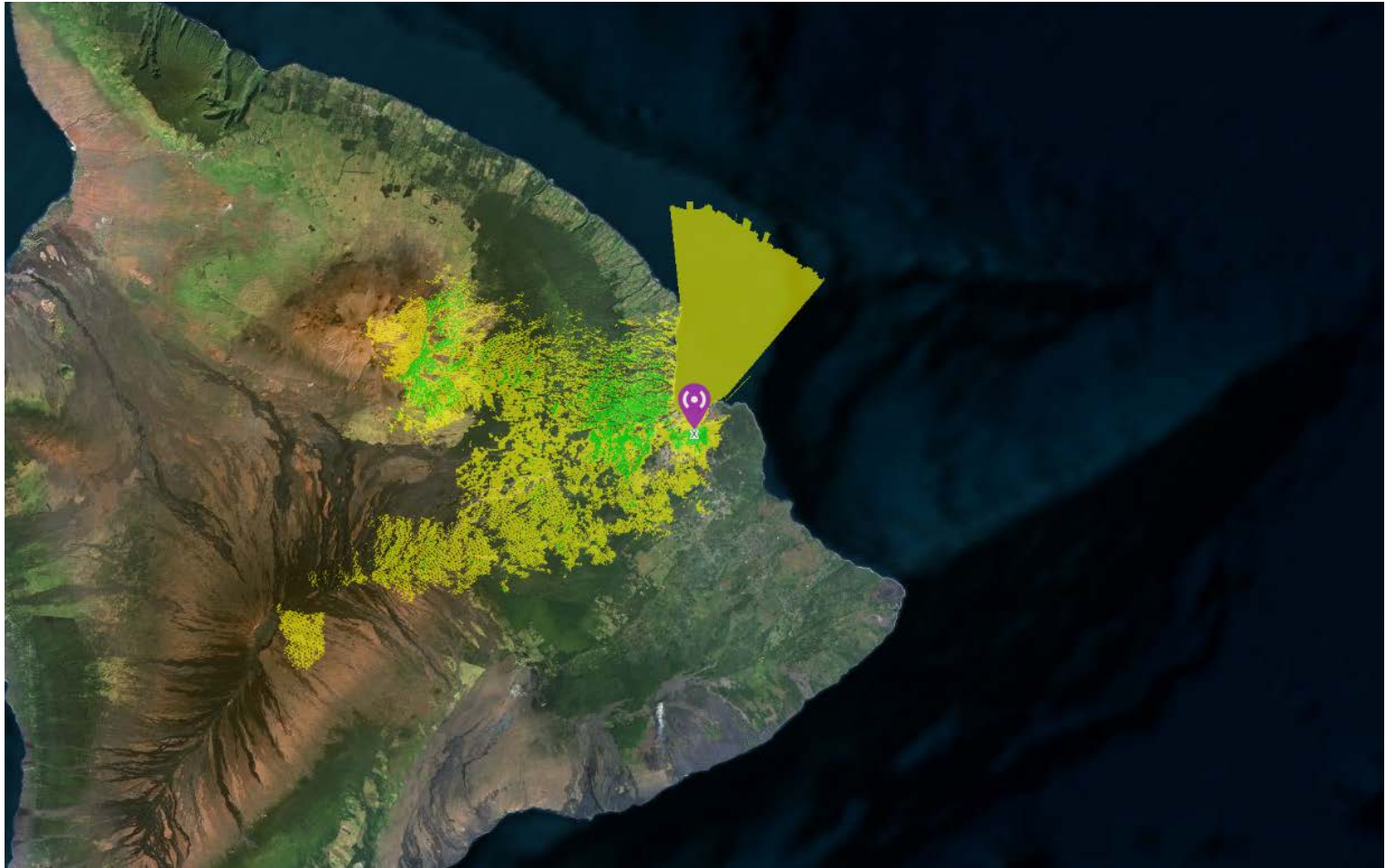
Alligatoring

- All mouth, no ears...

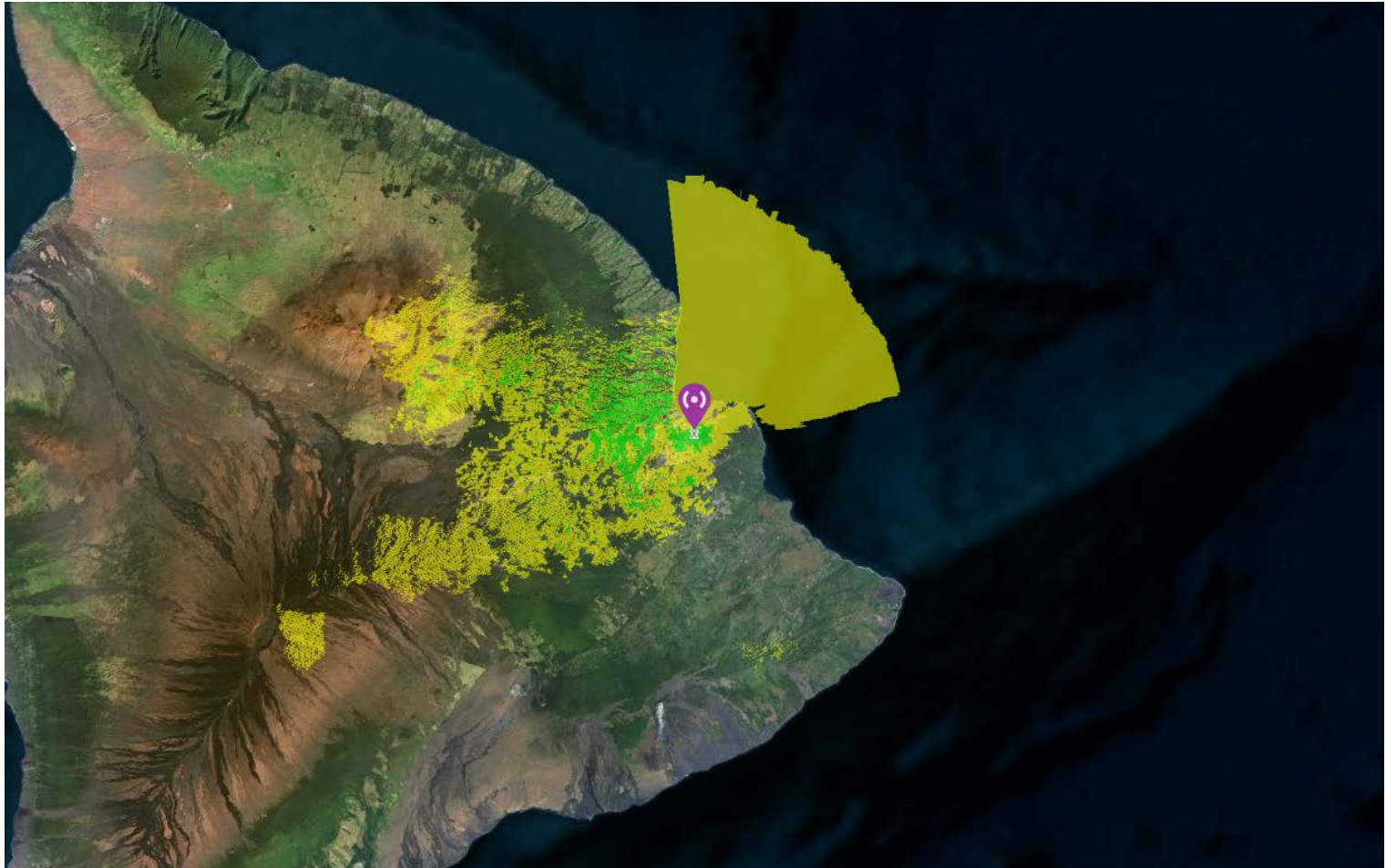


- Gain beats power – in both directions!

500 Watts 70cm, 0 Gain



50 Watts 70cm, 10dB of Gain



Going Up?

5 feet AGL at 50 Watts 70cm



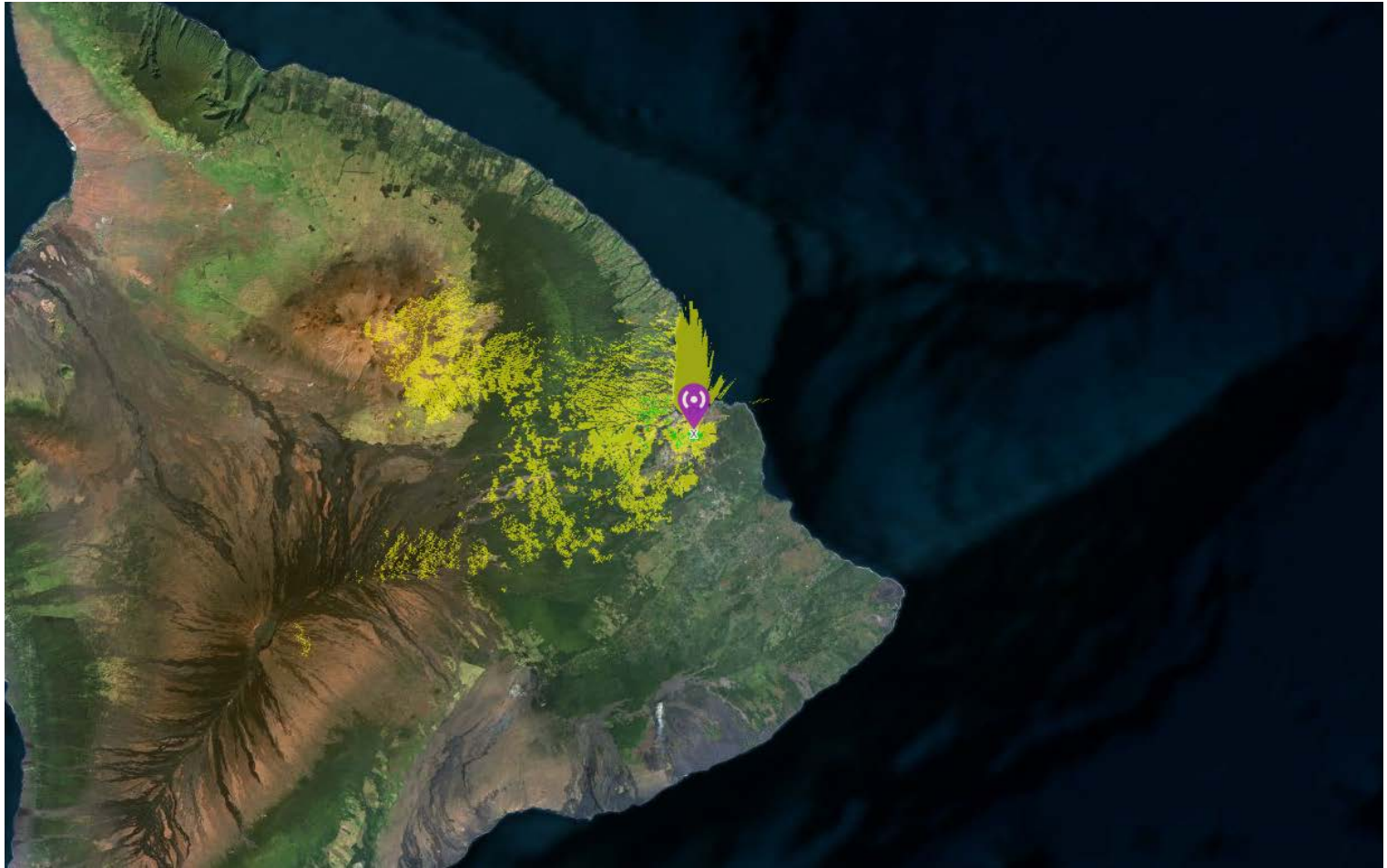
25 Feet AGL at 50W 70cm



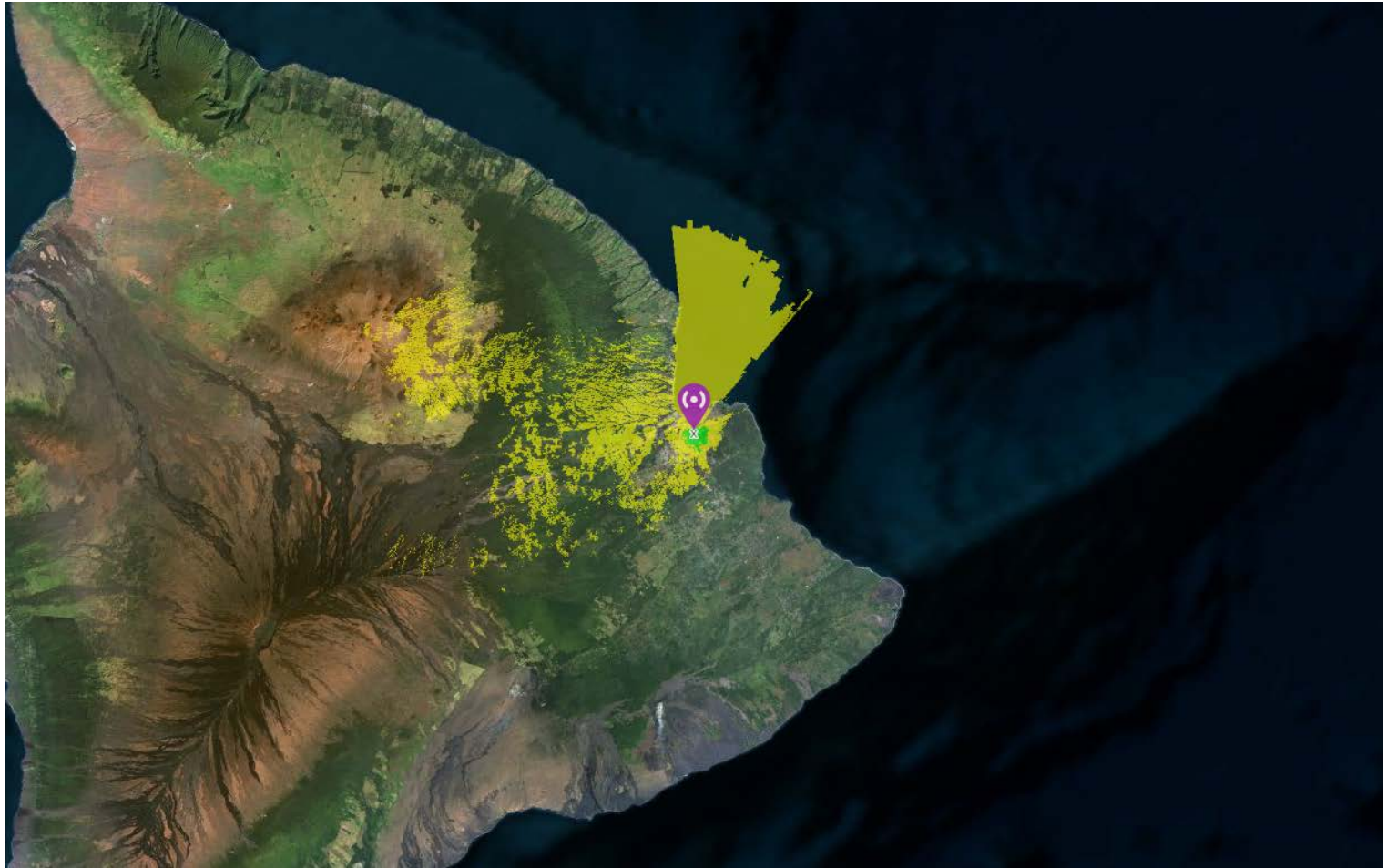
If you can't get higher, go lower.

Frequency make a huge difference.

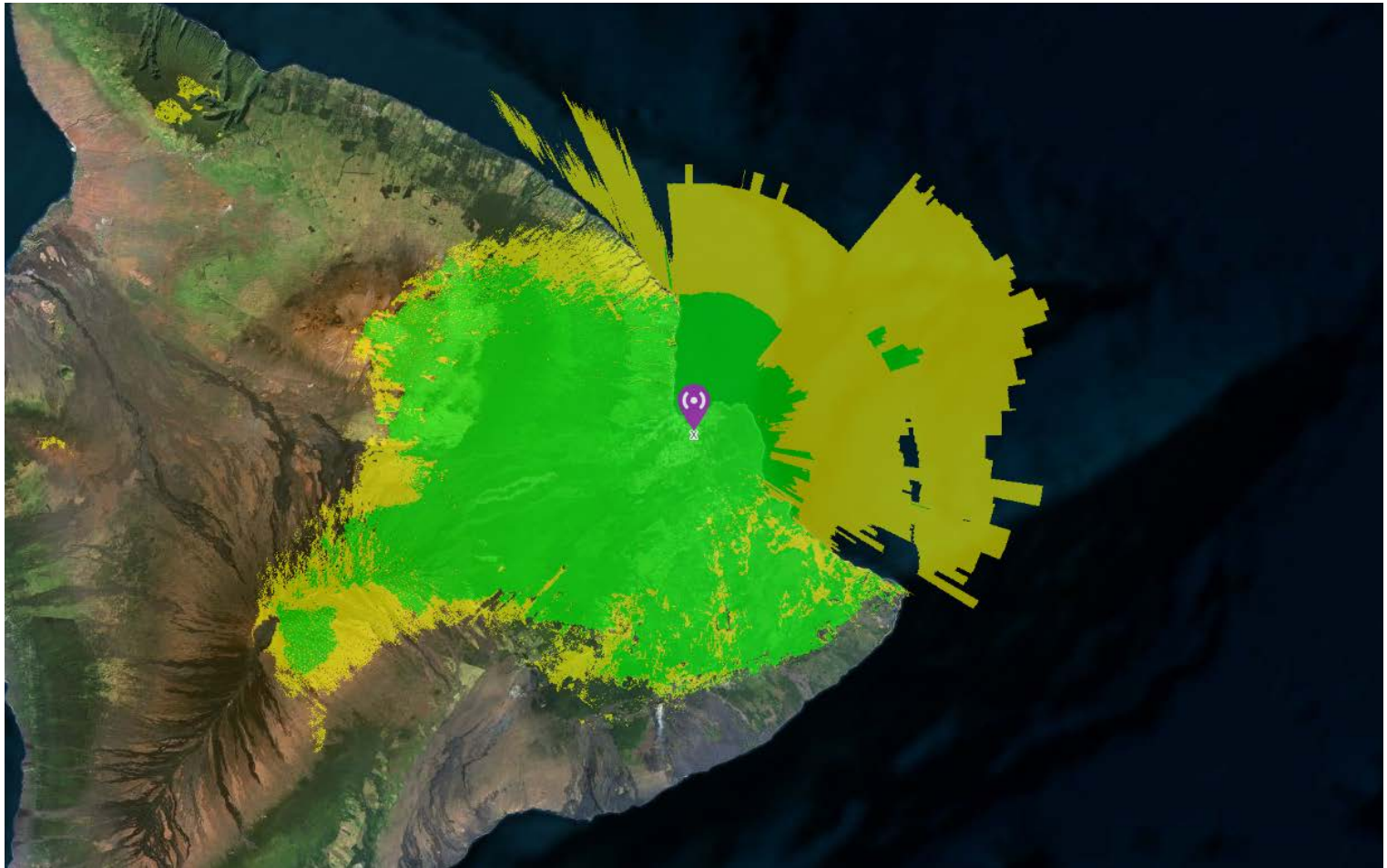
25 Feet AGL at 50W 70cm



2M, at ONLY 5 feet, at ONLY 5 watts



That same 5 watts, at only 5 feet, but
down to 1.8MHz (a 160m portable?)



Realistic, no. But, I think you see the effect clearly

Putting it all together

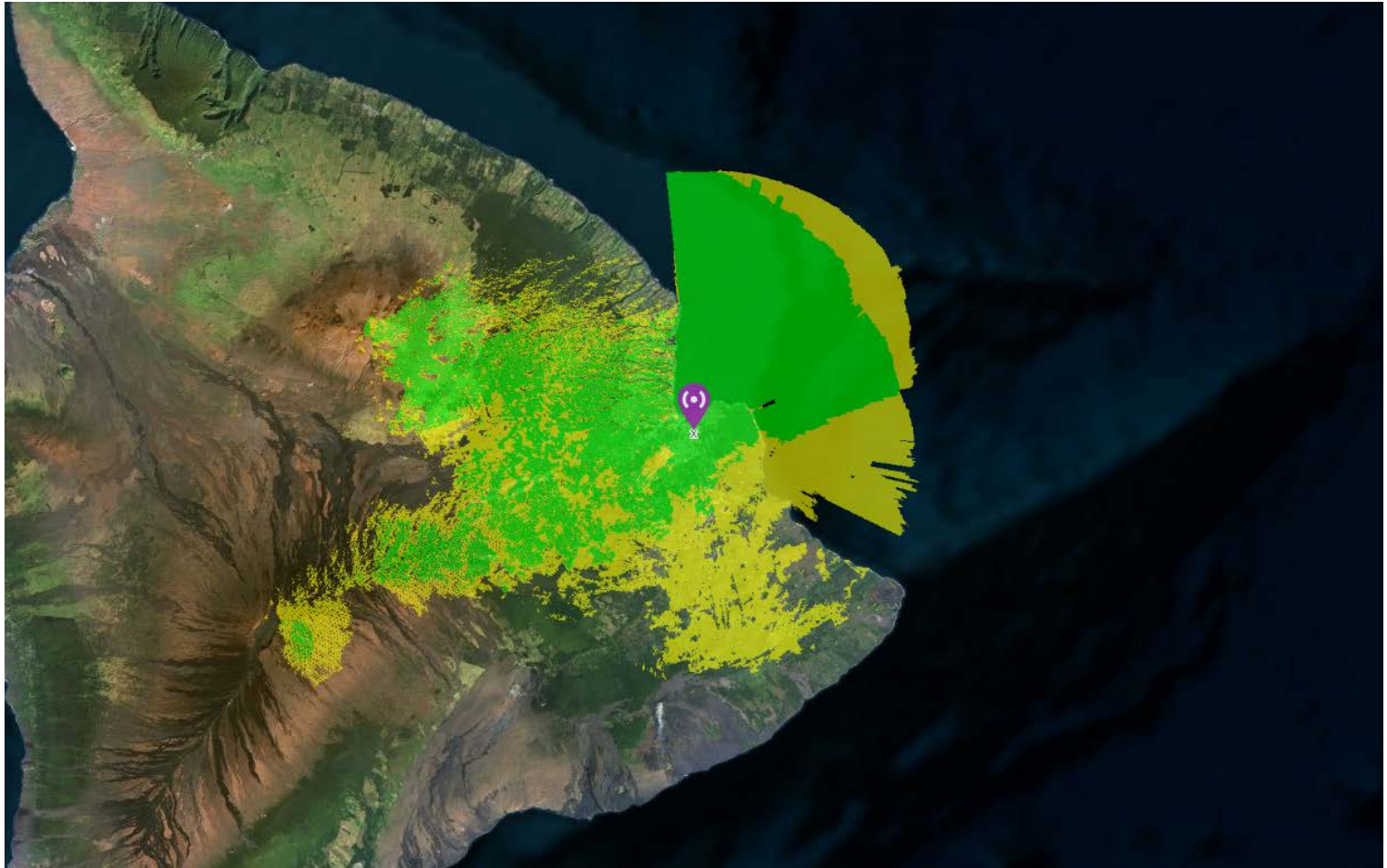
- Step outside.
 - No, seriously, an antenna in a house can lose up to 20dB pushing through the wall.
- Use a bit more power, but nothing too crazy.
- Use a higher gain antenna.
- Get the antenna up high.
- Run on as low a band as you can.

We just went from this...



5 watts, 70cm, with no gain, at 5 feet

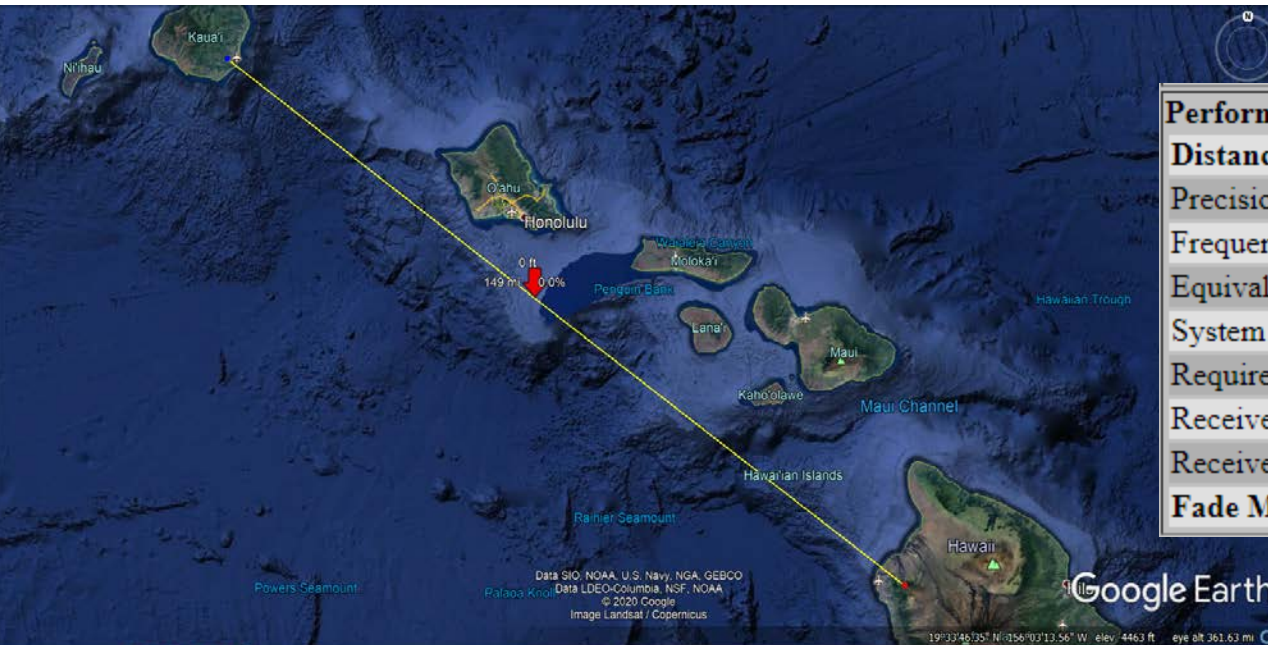
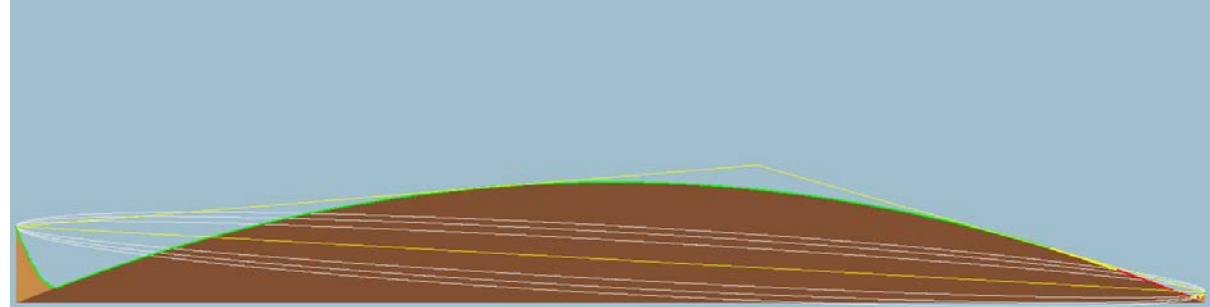
...To this!



50 watts, 2 meters, 10dBi of gain, at 25 feet

William's Goal

**Big island to Kauai,
on 2 Meter simplex**



| Performance | |
|---|--------------|
| Distance | 448.745 km |
| Precision | 224.5 m |
| Frequency | 146.000 MHz |
| Equivalent Isotropically Radiated Power | 22228.493 W |
| System gain | 199.36 dB |
| Required reliability | 90.000 % |
| Received Signal | -113.05 dBm |
| Received Signal | 0.50 μ V |
| Fade Margin | 2.95 dB |



A very real possibility.
Some day...