



**72nd International DX Convention**  
**May 15–16, 2021**  
**Virtual Meeting**



# **Testing RIB (Radio In a Box) Technology in a DXpedition Environment**

**By**  
**AA7JV, KN4EEI, W6IZT and W8HC**

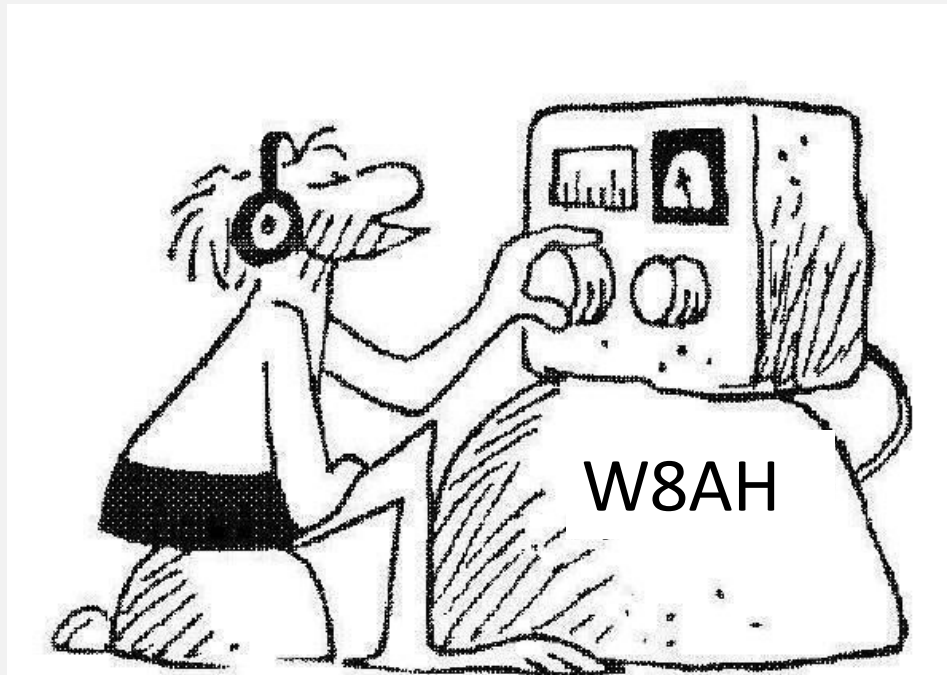
A New Recipe for:  
“RIBs”



**The basic requirement for working DX is (fairly) simple.....**



**DXCC = DX is QRV & DXer is QRV**



**For the DXer... he must be “in the chair”**





**For the DX... he must be “on the air”**



## DXCC Most Wanted List Top 25

Rank	Prefix	Entity Name
1.	P5	North Korea
2.	3Y/B	Bouvet Island
3.	FT5/W	Crozet Island
4.	BS7H	Scarborough Reef
5.	CE0X	San Felix Islands
6.	BV9P	Pratas Island
7.	KH7K	Kure Island
8.	KH3	Johnston Island
9.	3Y/P	Peter 1 Island
10.	FT5/X	Kerguelen Island
11.	FT/G	Glorioso Island
12.	VK0M	MacQuarie Island
13.	YV0	Aves Island
14.	KH4	Midway Island
15.	ZS8	Prince Edward & Marion Islands
16.	PY0S	Saint Peter & St. Paul Rocks
17.	PY0T	Trindade & Martin Vaz Islands
18.	KP5	Desecheo Island
19.	SV/A	Mount Athos
20.	VP8S	South Sandwich Islands
21.	KH5	Palmyra & Jarvis Islands
22.	ZL9	New Zealand Sub-Antarctic Islands
23.	JD/M	Minami Torishima
24.	EZ	Turkmenistan
25.	YK	Syria



## DXCC Most Wanted List Top 25

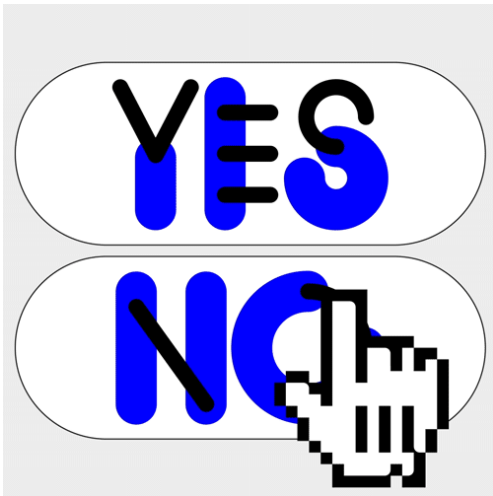
- All are restricted access
- 21/25 are Islands, atolls, rocks or reefs
- Many of these are environmentally “protected”

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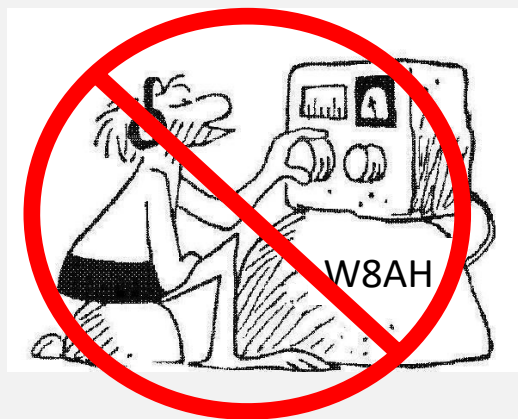
# Getting the “Yes”

For the DXpedition, getting accreditation - the required permission, landing permits and operating license— getting the “Yes” to operate from these rare island entities, offers many challenges. These hurdles may come from that DXCC entity’s “Parent”:

- Government(s)
- Military
- Environmental oversight agency *or* agencies
- Private governing agency or body
- Any combination of the above



In the past 10-15 years we have seen many DXCC island entities move up the Most Wanted List because they have been designated as “Protected” areas or “Eco-Reserves” by their Parent governments. As a result, access by amateur radio DXpeditioners is being denied...



....from a recent federal agency denial response to a amateur radio DXpedition permit application:

*“The increased footprint required to accommodate the proposed amateur radio camp and personnel would negatively impact the island’s terrestrial habitat.”*



## DXCC Most Wanted List Top 25

Five of the 25 (20%) are  
protected U.S. possessions  
requiring special permission  
for access

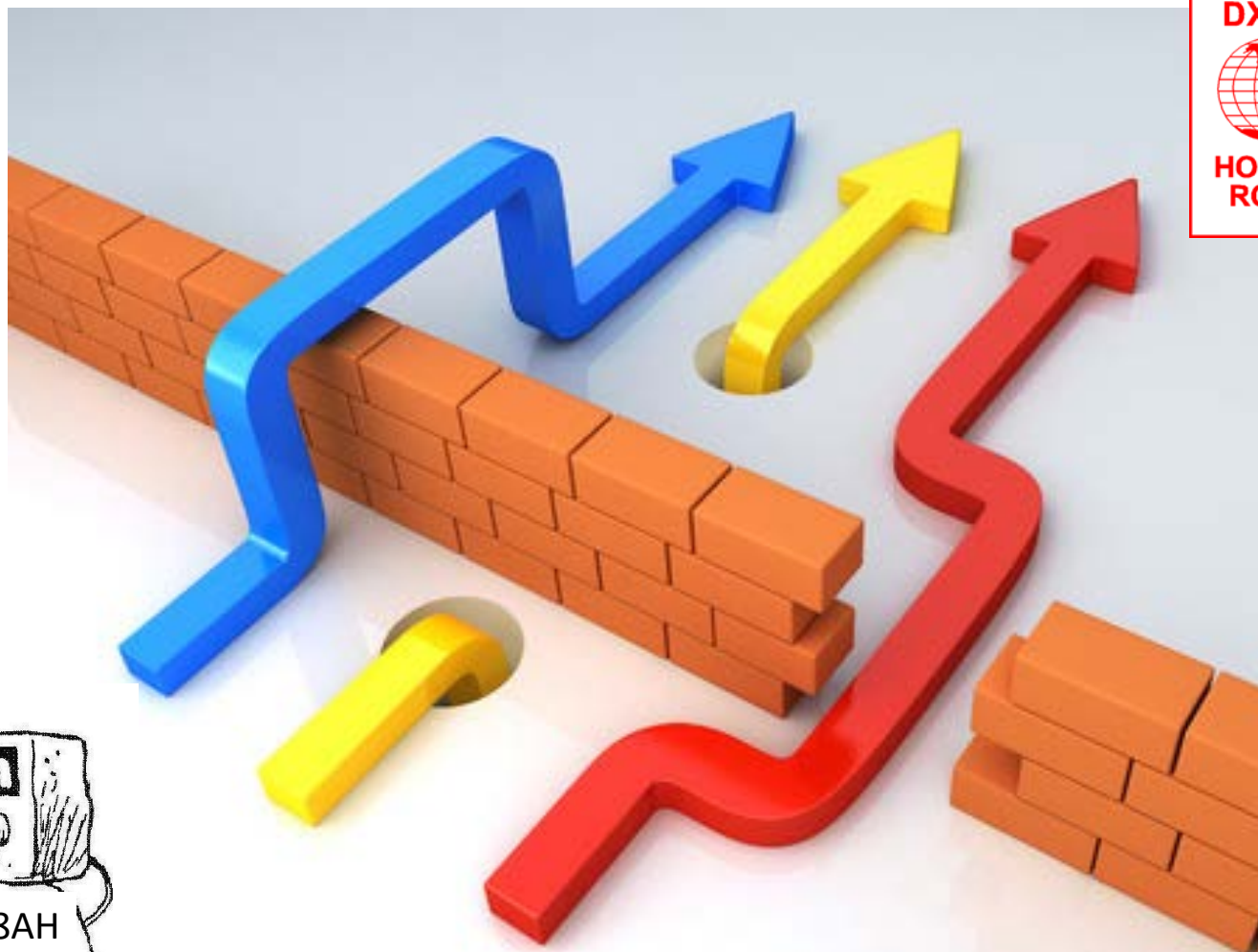
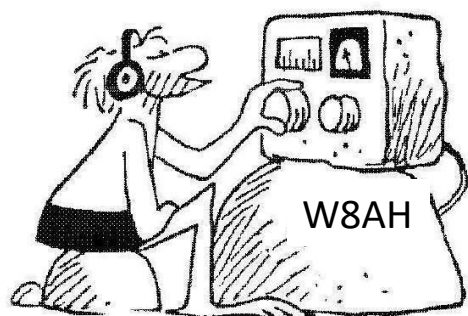
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Nobody Wants To Make A Mistake, Look Stupid Or Mess Up







**Introducing---**

## **RIB (Radio In a Box) Technology**

**A possible solution  
for DXpeditions to gain access  
to “No-Go” Places**





RIB development is being sponsored by the NCDXF which has a major stake in this project and in their ongoing efforts to enable future DX from rare island entities.



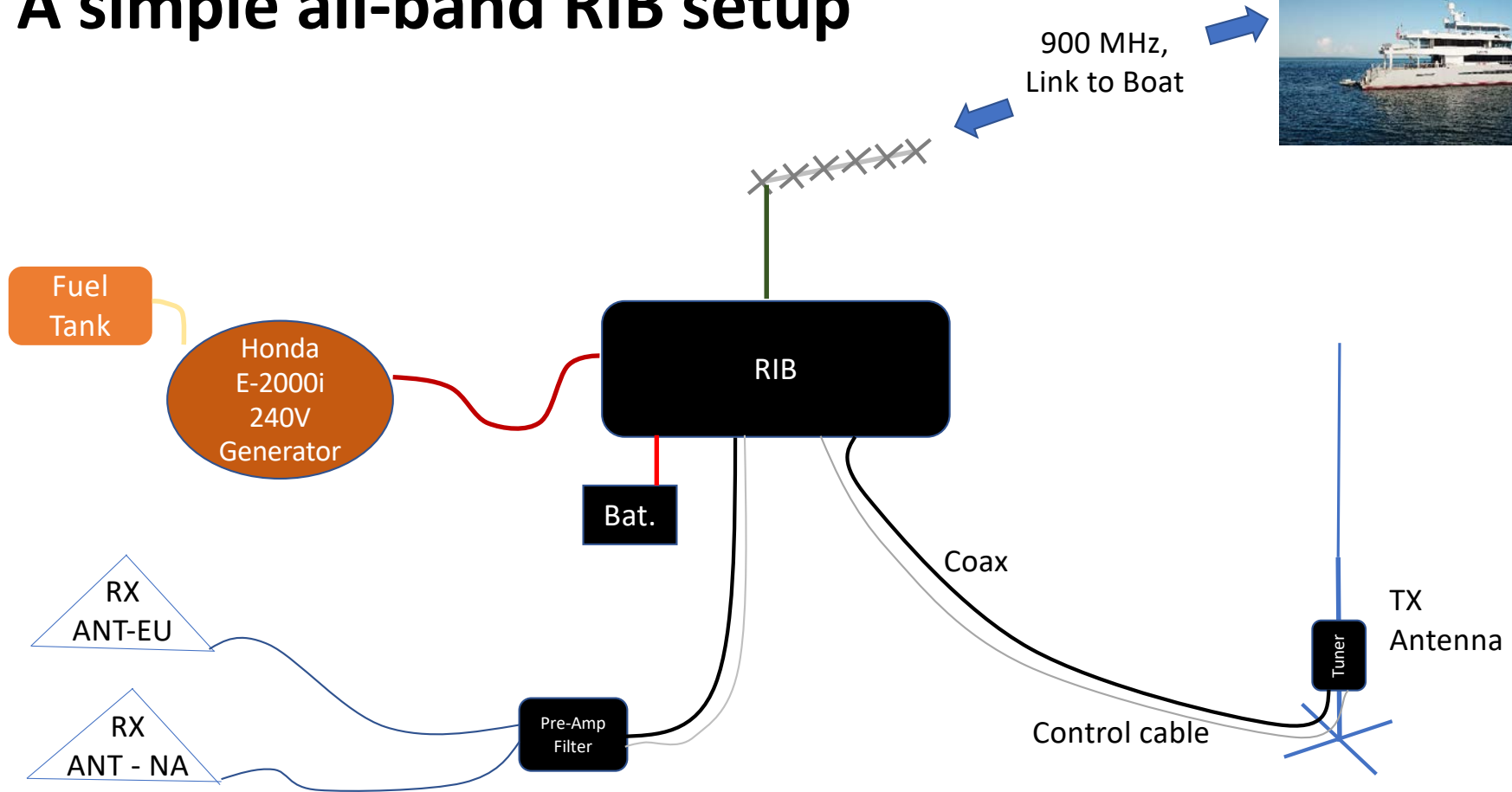


## The RIB concept is simple

- Stations on the island are controlled remotely – Radio In a Box (RIB) utilizing FlexRadio 6000 series SDR
- Operators work from the boat with FlexRadio Maestros
- No people camping on the island
- Boat stays anchored or on station within a couple of miles
- Once a day, two people visit the island to top up generators, do maintenance, make inspections
  - Minimal environmental impact – on island “footprint” is greatly reduced
  - No time is wasted on setting up and maintaining tents, and operator support infrastructure
  - No time is wasted moving operators and supplies to and from the boat
  - Operator endurance enhanced - comfort factor

**More time to make QSOs!**

# A simple all-band RIB setup





Simplified logistics...











Whereas, RIB technology offers this logistically....





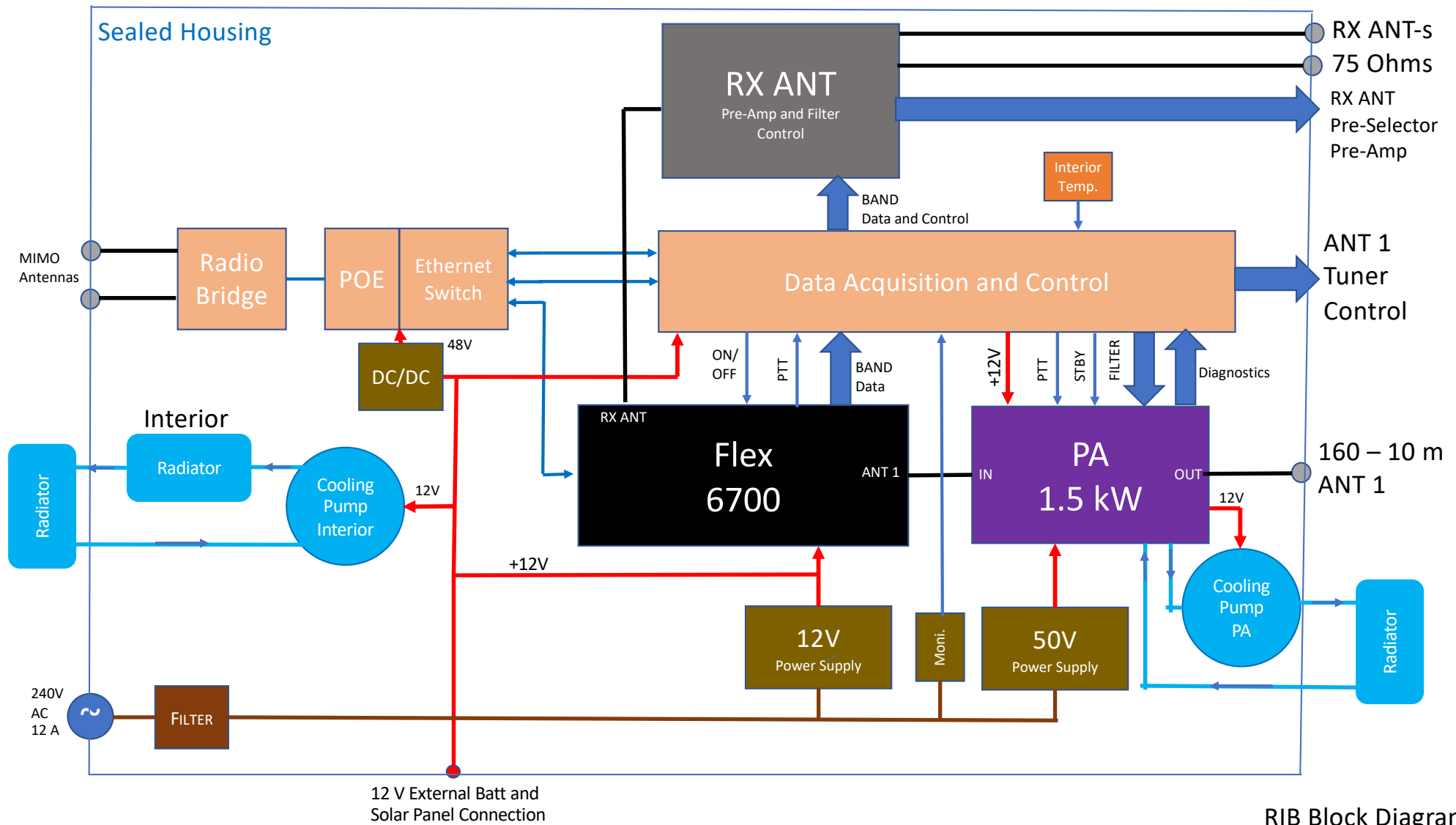






### RIB in operation.

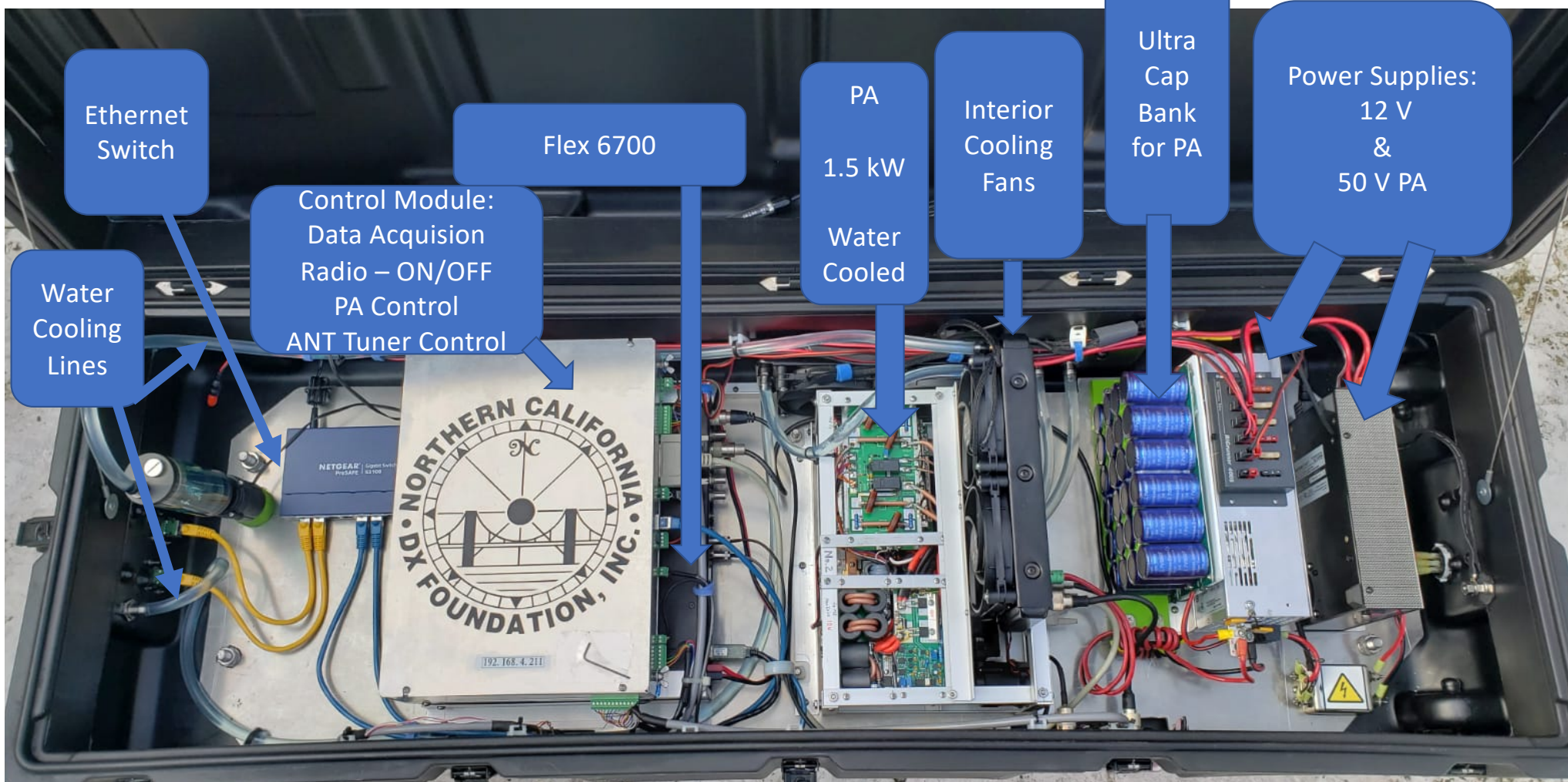
An elaborate but effective water cooling system is used to remove heat from the amplifier and the interior.

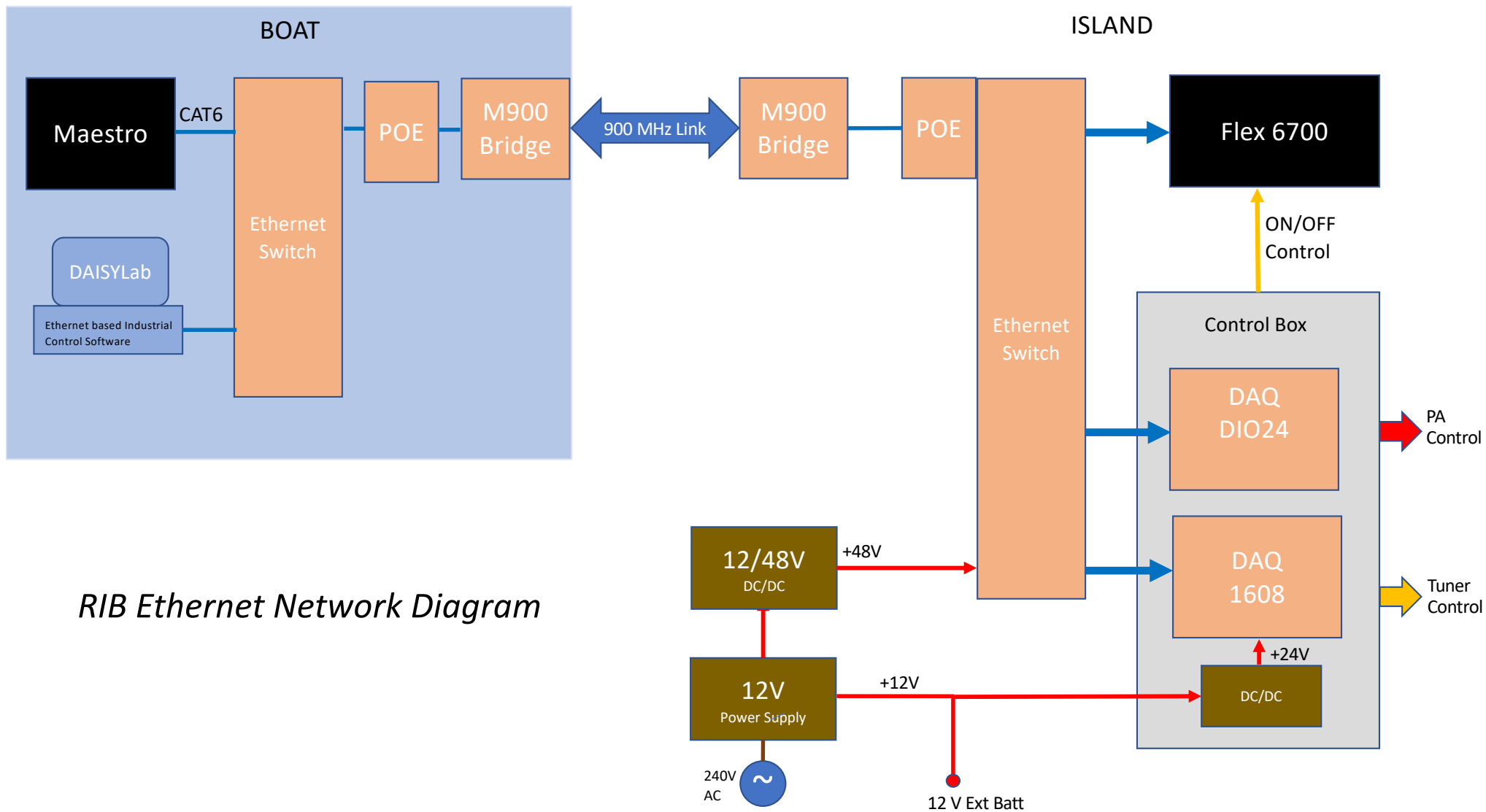


RIB Block Diagram



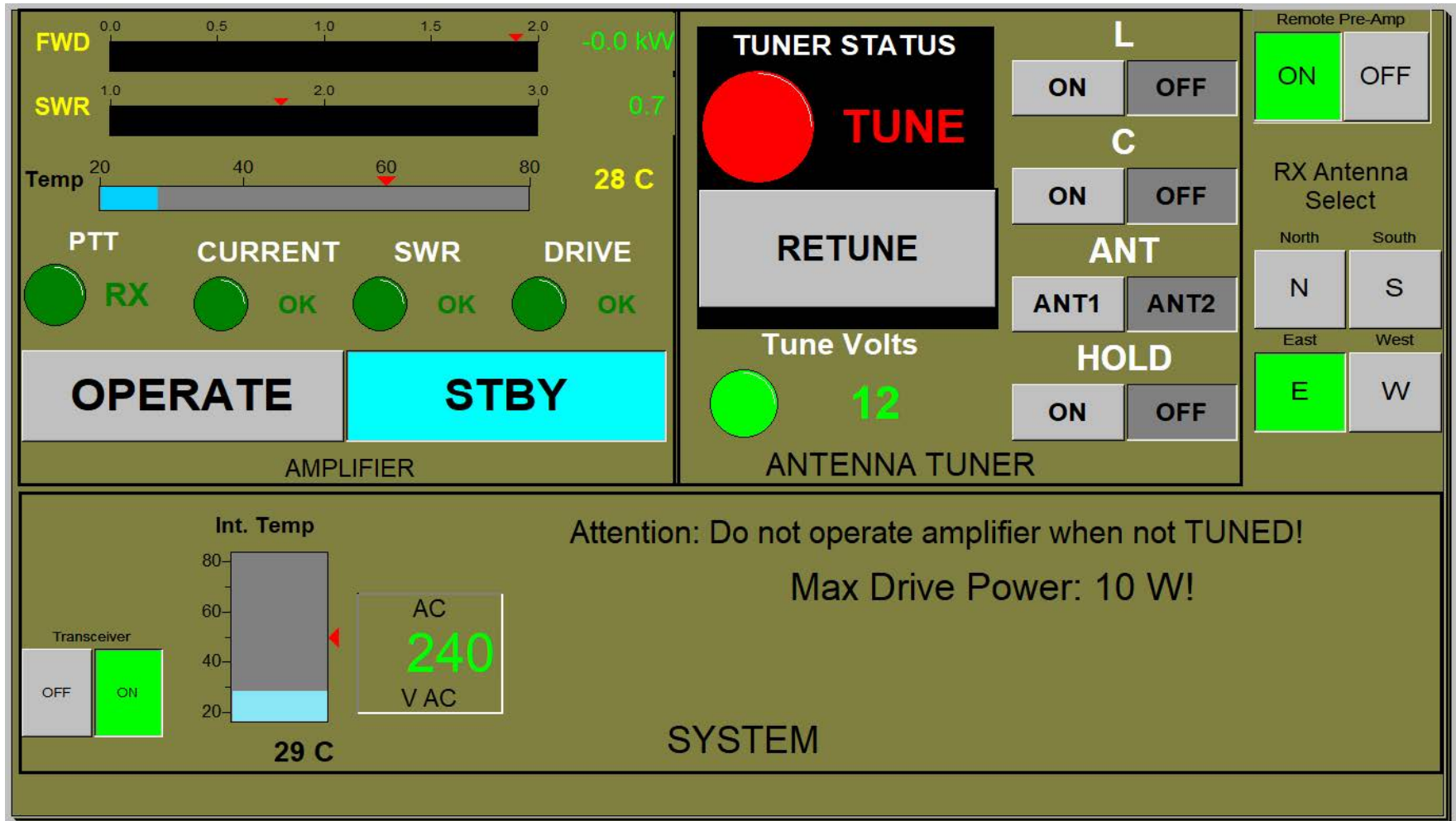
## Inside the RIB





*RIB Ethernet Network Diagram*

## Remote Control Screen





## 900 MHz Radio Bridge:

Ubiquiti Rocket M-900

Antennas: MIMO

2 x Yagis on Island and 2 x Verticals on boat

ISLAND-end  
2 x 900 MHz Yagi Antennas



BOAT-end  
2 x 900 MHz Omni-directional Antennas







November 12, 2020











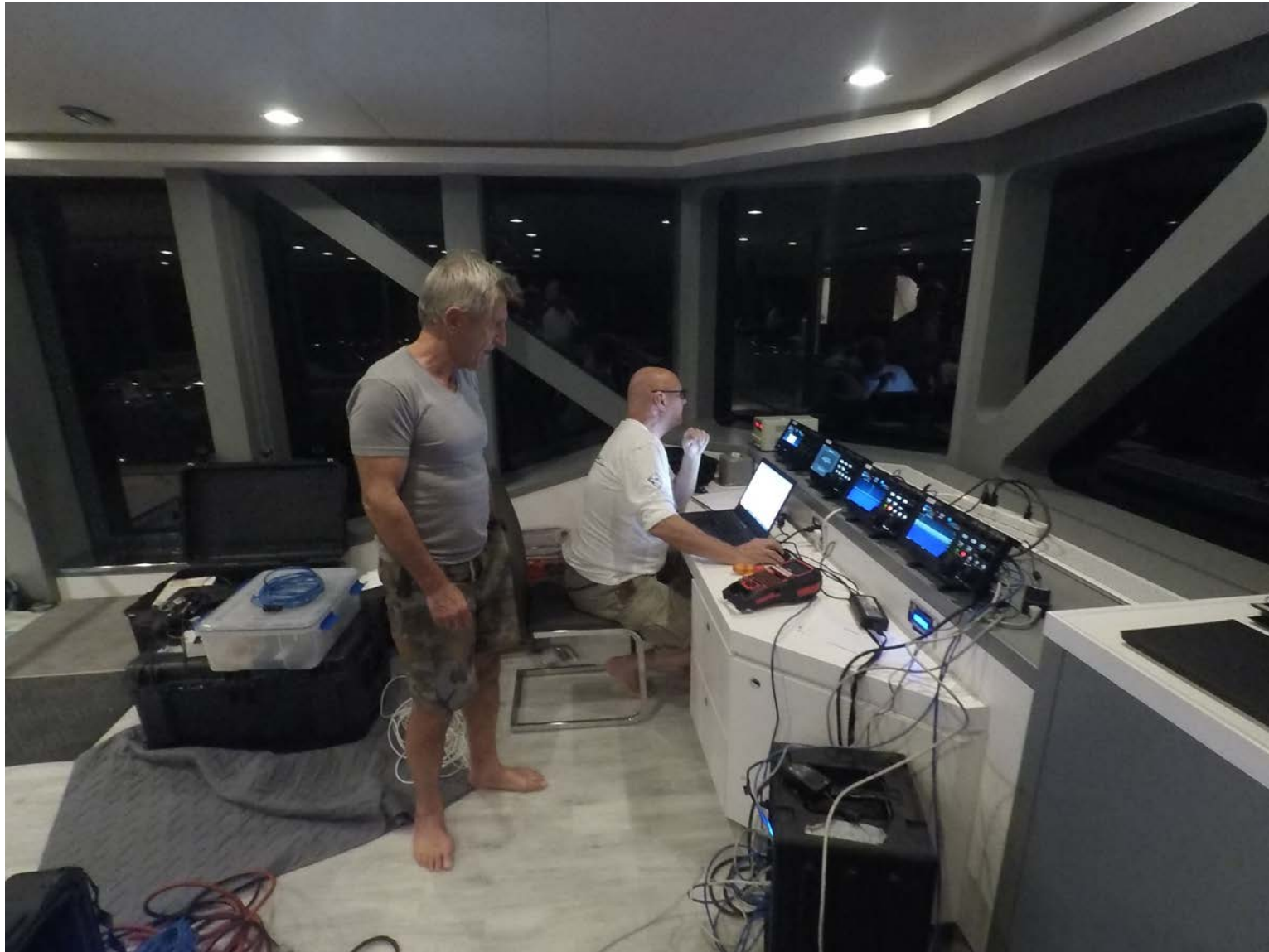




















## C6AGU CQWW Antenna Configuration:

- 160m top loaded vertical (w/ tuner also used on 10m)
- 80m Vertical
- 40m Vertical (w/ tuner)
- 20m VDA
- 15m VDA
- Steerable RX Array (w/preamp)























## C6AGU CQWW RIB Configuration:

- 4 RIBs using FlexRadio 6000 series SDRs
- RIBs were connected using shielded Ethernet cables into single network
- Network operated via 900 MHz Ubiquiti data bridge w/ 2 vertically polarized yagis
- Each RIB contained control DAQ and 1 kW water cooled amplifier and power supply











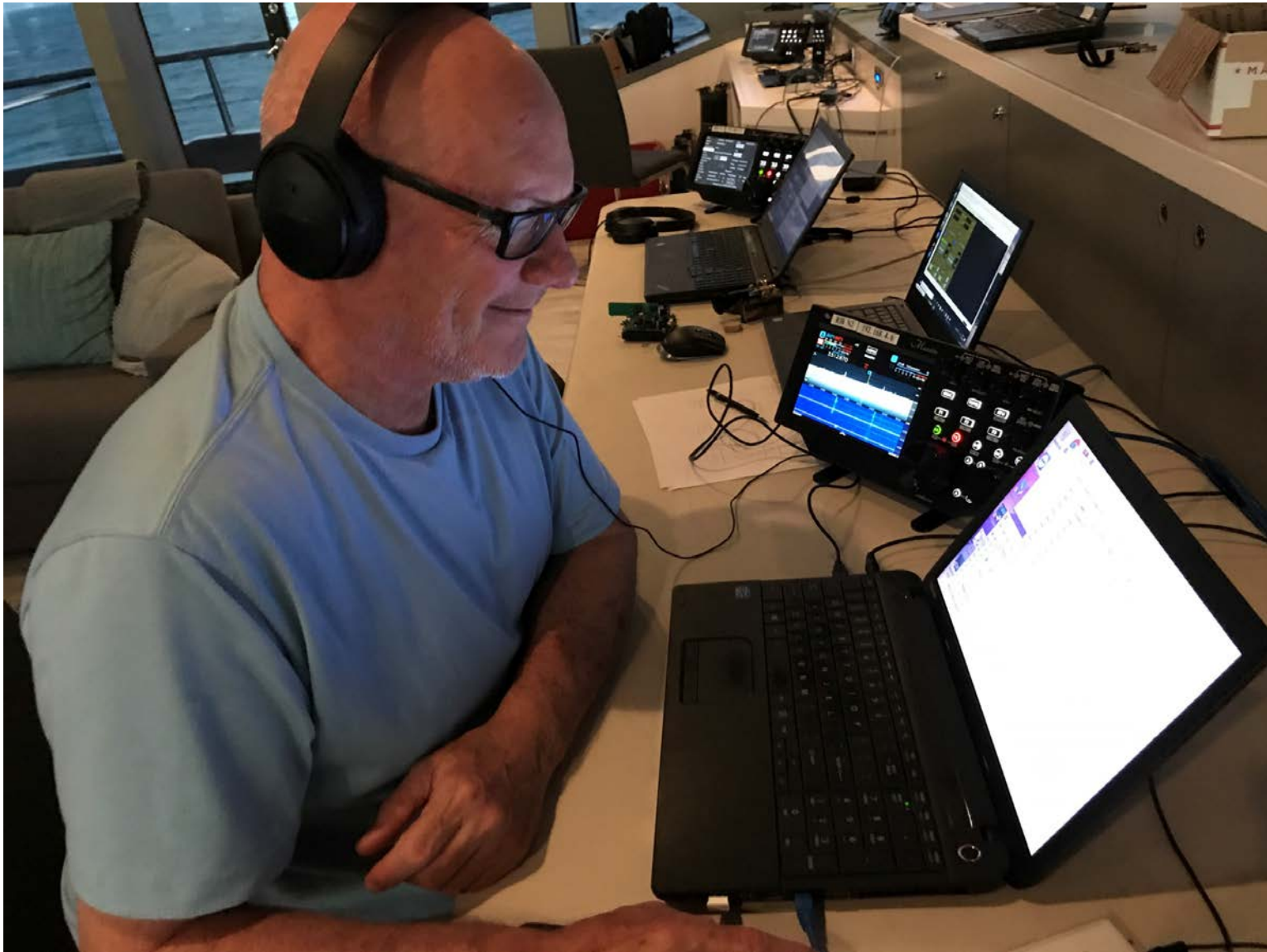
## C6AGU CQWW Boat Configuration:

- 4 FlexRadio Maestros – paired with ea. RIB
- 2 laptops running TightVNC Viewers for DaisyLab control software
- Laptop at each operating position running N1MM Contest Logging Software
- 900 MHz data bridge w/ 2 vertical antennas mounted above flybridge on “Magnet”











AA7JV – 160m & 10m

W6IZT– 40m & 15m

W8HC – 80m & 20m











Score - 7,989,102 Points

C6AGU

Band	QSOs	Pts	ZN	Cty	Pt/Q
1.8	938	2007	20	55	2.1
3.5	1269	2893	24	61	2.3
7	1536	3636	25	72	2.4
14	1601	3590	22	63	2.2
21	1619	3708	20	66	2.3
28	500	1128	15	28	2.3
Total	7463	16962	126	345	2.3

Score: 7,989,102

1 Mult = 15.8 Q's









# Summary

- Evaluation and testing of RIB technology at C6AGU was deemed very “successful”
- A few minor hardware changes and revisions have been identified and will be implemented
- The 900 MHz link performed extremely well with 4 RIBs -- believe system is capable of running six remote RIBs simultaneously
- IT and networking skills are essential



# Problems Encountered

- Experienced NO problems from the RIBs!! ★★★★★
- Generator issue resulting from being in ECO mode with three amplifiers loading simultaneously --switched to Normal mode.
- Spent many hours trouble-shooting network dropouts on the island when operating >500w to 700w --suspecting RF entry. Found battery not connected to bridge POE port and w/ QRO, power sag in 12v caused Ethernet switch to reset and lose link.
- Rain water entered Ethernet connection on Island Ubiquiti bridge – reconfigured bridge and re-insulated connection.
  - The above problems resulted in approx. 9 hours total lost in the CQWW Contest and half the contest operating at lower power levels (500-700w)

## C6AGU Operating Results:

- Extensive Testing using 4 RIBs/Maestros remotely with DXpedition condx (1.2 NM & .5 NM)
- Nov. 23 to Dec. 6 on Wood Cay, C6AGU (FL15)
  - CQWW CW Contest M/M: 7,463 Qs
  - ARRL 160m CW Contest: 1,321 Qs
  - Misc. DX: 836 Qs
  - Total QSO-s 9,620 Qs

## **Other advantages to RIB Technology Making it Cheaper and Easier – and Make More QSO-s**

- **Cost of Life Support**

- Big % of costs are Life Support System (including shipping costs)
  - Operating Tents, Sleeping Tents, Showers, Toilets, Meal/Social Tent, Food, Water, Cots, Tables, Chairs, Lamps, Fans, Coffee Machine.... All according to the rules!

- **Time Spent not making Q-s:**

- Moving all the above gear onto the island
- Building and Maintaining the operator life support systems
- Moving operators and food to and from the island daily

- **Risks:**

- We are getting older (still preferable to the alternative)
  - Small boats, surf, heat, sun, soft sand, stinging insects, etc.

- **Comfort:**

- Operator discomfort reduces the number and quality of QSO-s!





**Will  
RIB (Radio In a Box)  
Technology  
help get the “Yes”**

**for DXpeditions to gain access  
to “No-Go” entities??**



Will we soon see RIBs in use  
@  
Rare “Protected” DXCC Entities???

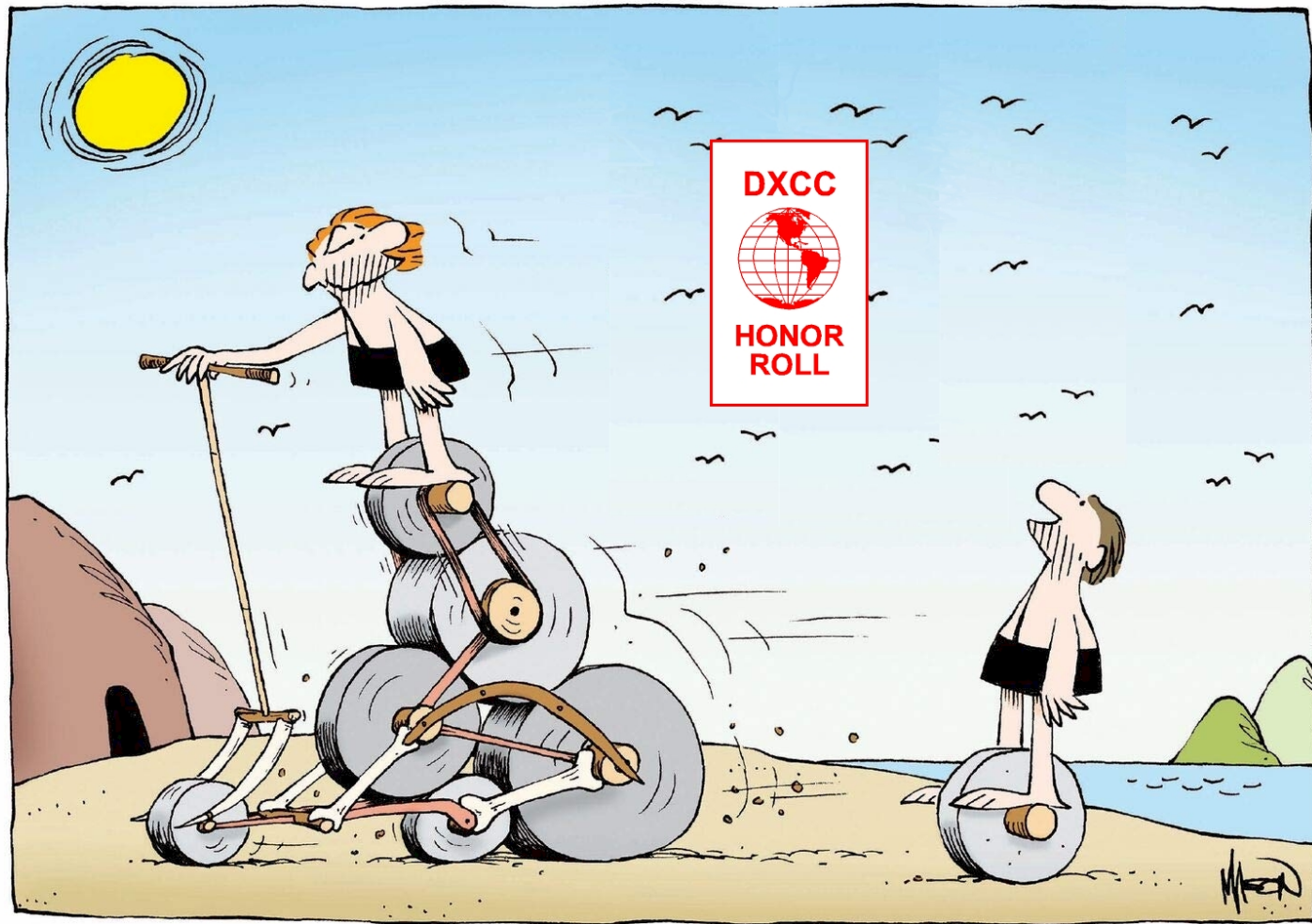
QRX....







BS7H Scarborough Reef - 2007



“Think outside the box” ...

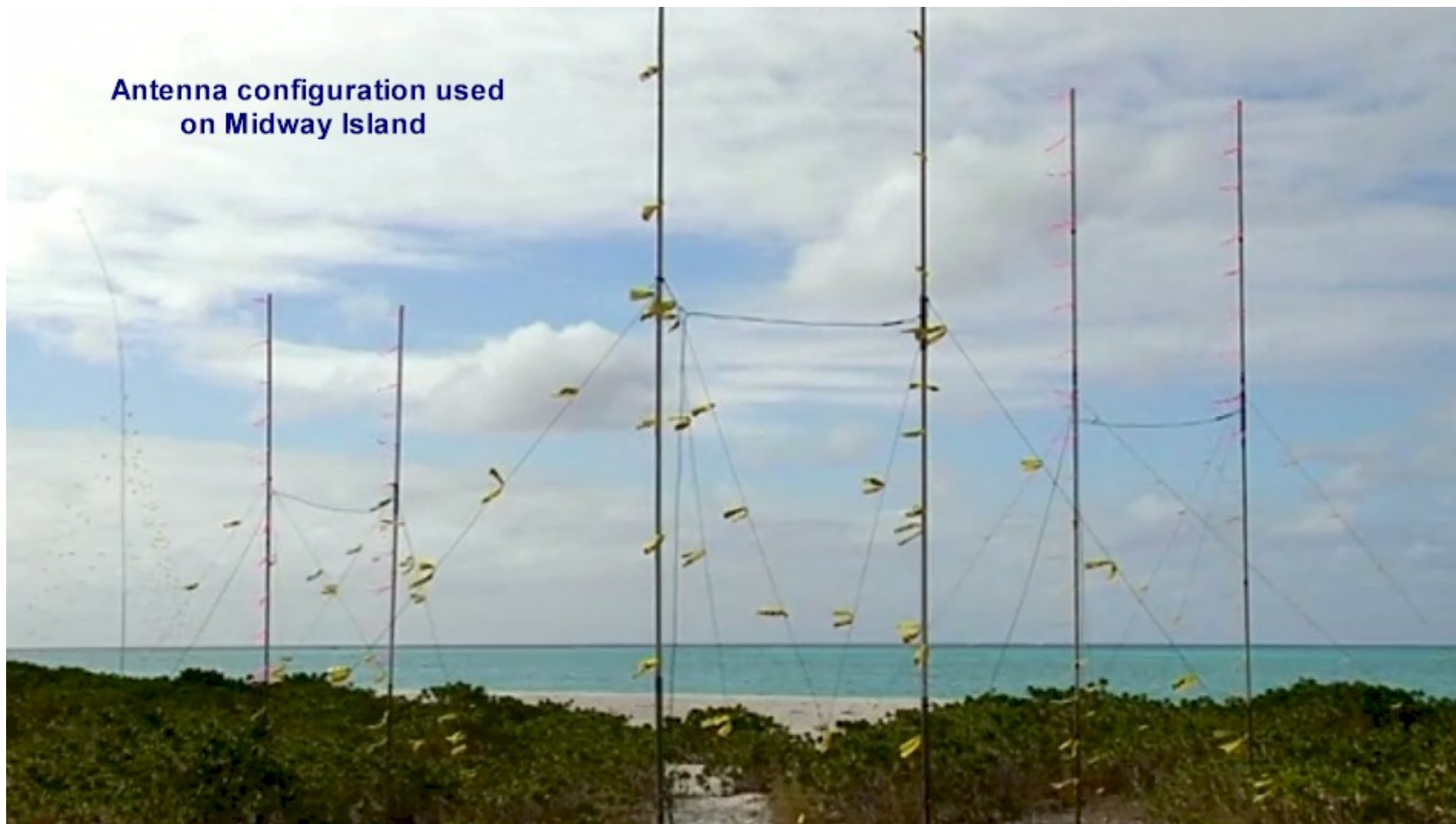








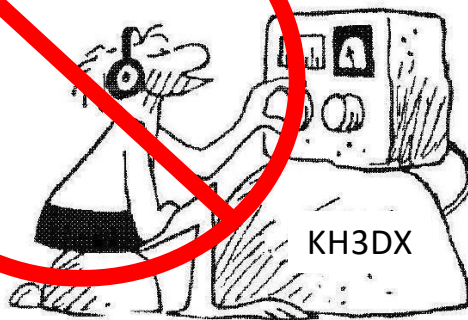
**Antenna configuration used  
on Midway Island**



## In addition to the Operator “Footprint” ....

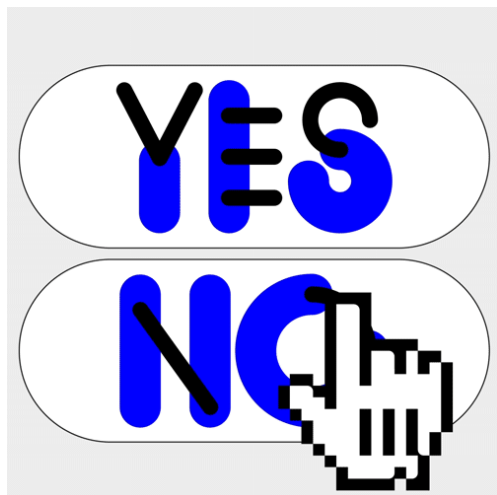


....from a recent federal agency denial response to a  
amateur radio DXpedition permit application:



*“We have determined that deployment of vertical structures would pose an inherent collision risk to the native seabird populations on the Atoll. Low flying birds have inhabited these open areas for thousands of years and would not be accustomed to avoiding newly erected radio operator tents, guy-wires and antennas...”*









C6AGU in CQWW WPX SSB  
at Wood Cay March 27-28





# C6AGU in CQWW WPX SSB at Wood Cay March 27-28

Score - 13,495,438 Points				
Band	QSOs	Pts	WPX	Pt/Q
1.8	18	76	1	4.2
3.5	662	2888	170	4.4
7	1337	5906	432	4.4
14	1689	3646	289	2.2
21	444	1040	89	2.3
28	23	62	10	2.7
Total	4173	13618	991	3.3
Score: 13,495,438				
1 Mult = 4.2 Q's				



# C6AGU in CQWW WPX SSB at Wood Cay March 27-28

M/2 HP

Call	SO2R	Remote	QSOs	Prefixes	Op Time	Score	Club
II2S			5896	1551	48	25,878,435	ICC
RT4F			6714	1510	48	21,522,030	RCC
HG7T			4799	1397	47	16,308,578	HADXC
C6AGU			4173	991	45.5	13,495,438	SECC
RA5G			4734	1241	48	12,150,631	RCC
KL7RA			3325	1107	48	11,709,846	
NI4W(@N4UU)			4310	1195	42	10,634,305	FCG
A73A(@A71A)			2789	891		8,521,524	
SO4R			3492	1076		8,277,668	
NJ6G(@W6YX)			3606	928	48	7,037,024	NCCC
AA4VT			2680	955	43:49	6,281,990	CDXA
E2A(@E21EIC)			2337	841	45.37	5,261,296	SIAM DX GROUP
VE7SZ			2000	804	35	5,139,168	Orca DXCC
KT7E(@K7ZS)		x	2565	903	48	4,707,339	WVDXC
KW7Y		x	2912	905	33	4,661,655	WWDXC
			1367	700	36:15	3,155,750	YCCC

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# Testing DX Engineering's TW Antenna (with RIBs) @ C6AGU



March 2021



## **TW2010\***

- **Manufactured by DX Engineering**
- **Marketed as “portable” “stealth” antenna**
- **“Non-invasive”**
- **The TW is an omni-directional center fed vertical dipole**
- **8.5 feet high by 5 feet wide**
- **Weights 10 pounds**
- **5 band: 20m thru 10m**
- **30m, 40m, 60m avail.**
- **Power Handling: 1200 W SSB, 800 W CW, 500 W RTTY, 375 W AM**
- **Advertised with 27 degree take-off angle**

\* Thanks to Joe Pater W8GEX for loaning us this antenna

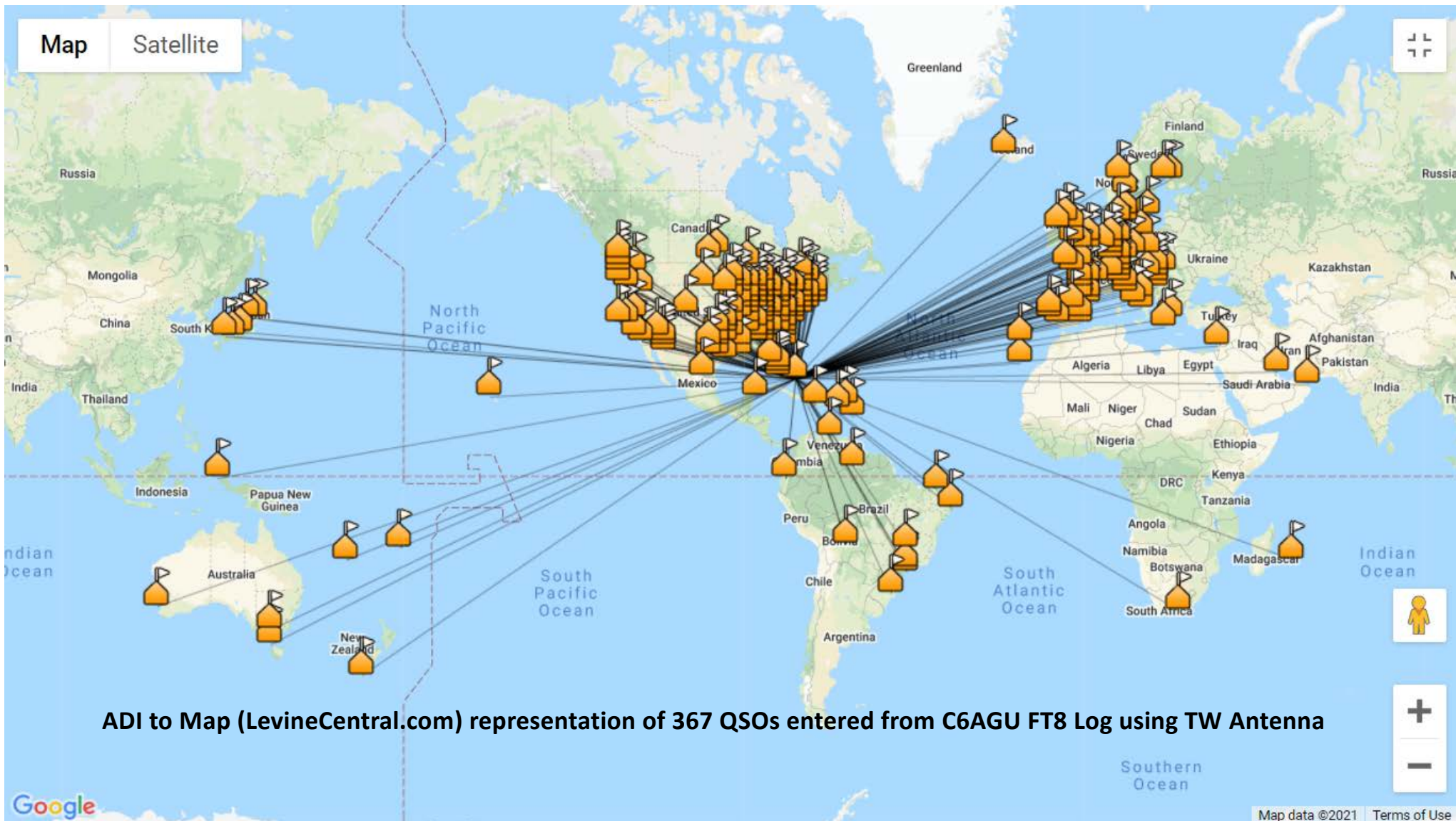




## TW Testing at C6AGU

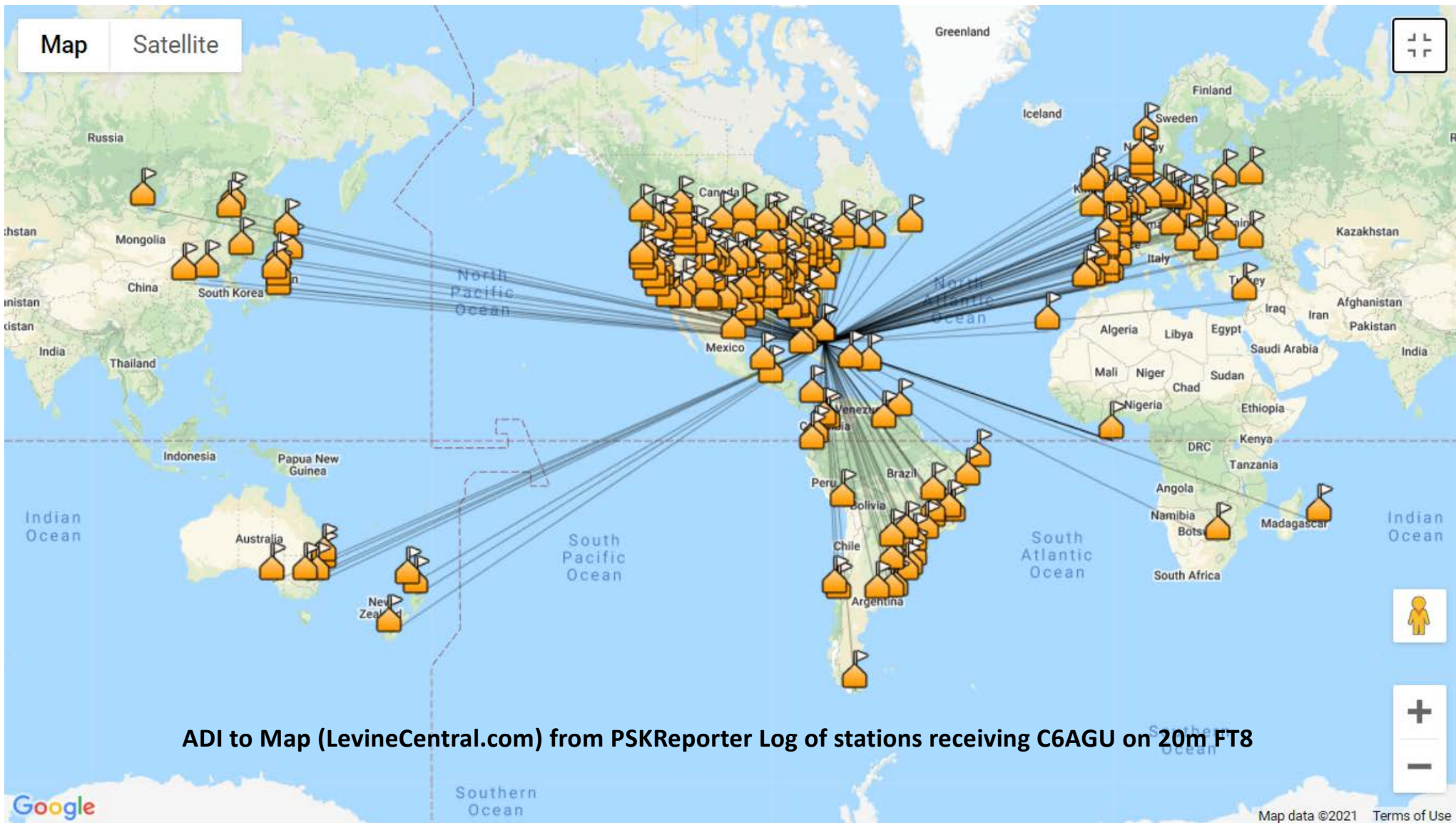
- > Paired with remotely operated RIB N1 / FlexRadio 6700: 100W (~ 85W on Maestro) during testing
- > Operated FT8 mode using JTDX v2.1.0-rc148 (PSKReporter)
- > 5 days “sporadic operating” – March 21, 22, 23, 25, 26  
Approx. 14.5 hours total operating time
- > SFI: 78 – 80; A Index: 12 – 25; K Index: 2 – 5
- > 367 QSOs in C6AGU Log  
20m – 151 QSOs  
30m – 216 QSOs
- > C6AGU logged 22 Zones, 49 DXCC entities on the two bands.
- > Stations from FR, YB, JA, VK, 3D2, FK, ZL, A92, 4X were worked as well as most of EU.
- > On 30m VK6IR (south of Perth) was worked at a distance of 11,304 miles to win the longest Q “honors”.

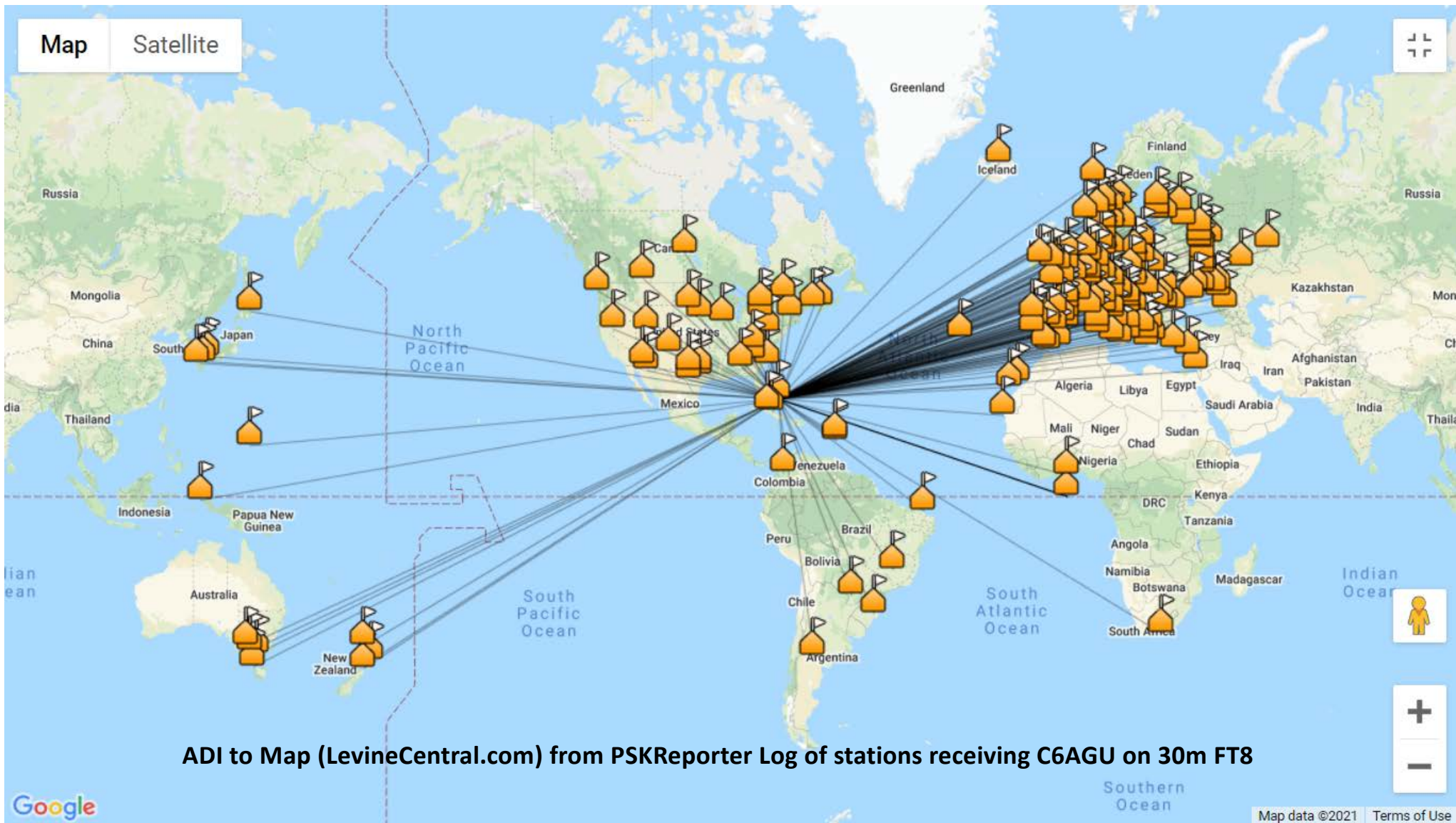




ADI to Map (LevineCentral.com) representation of 367 QSOs entered from C6AGU FT8 Log using TW Antenna

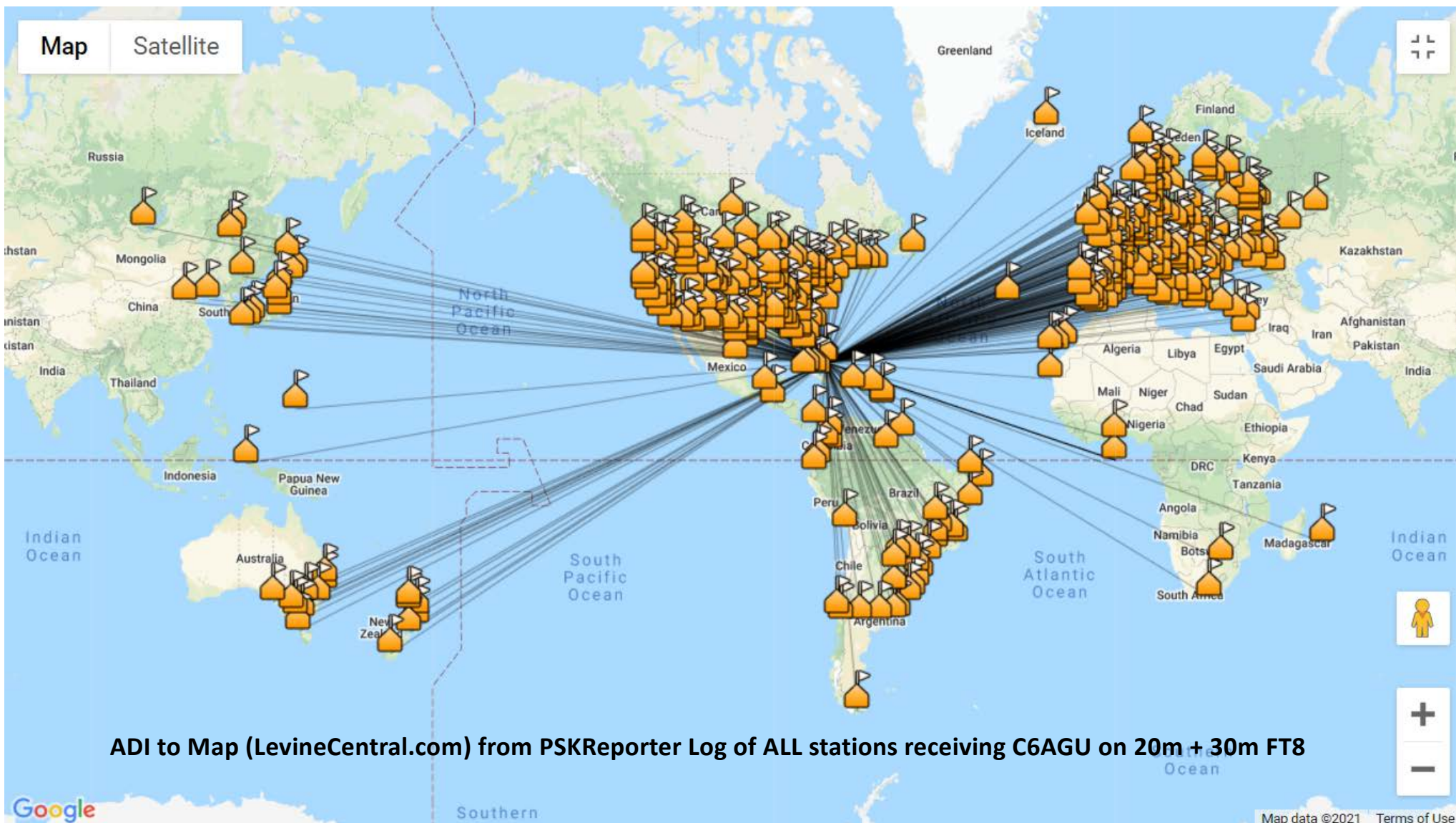






ADI to Map (LevineCentral.com) from PSKReporter Log of stations receiving C6AGU on 30m FT8







# Conclusions:

- The TW Antenna offers rapid deployment for portable operation or DXpedition - it can be erected by one person in a matter of minutes (4 parts)
- Testing was limited to 30m and 20m
- A/B comparison testing with full size antennas needs to be conducted
- Remote band switching 20m thru 10m could be easily integrated into the RIB package
- C6AGU and PSKReporter Log data indicate TW being effective DX antenna, even at low power levels
- Testing should continue to evaluate other small footprint, “non-invasive” antennas

THANK YOU!!



# THANK YOU!



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## Comments, Questions?