Ultralight EME

The Camb-Hams Way

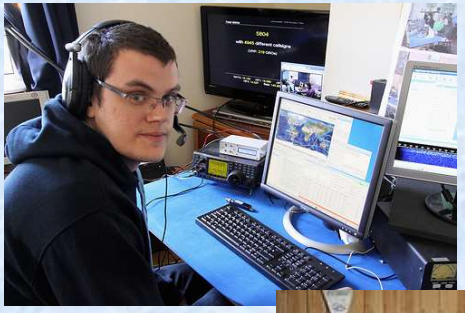
Or

Reflections from Lewis2014

John Worsnop G4BAO

The Camb-Hams – a very different type of radio club

- The “Social Arm” of the Cambs Repeater Group
- G3PYE, G6PYE, G5PI
- Historical connection to the Pye Telecom Amateur Radio Group
- Close ties to CUWS C&DARC, Raynet, Codgers.
- No Committee, No Clubhouse, No Bullshit
- We welcome “givers”, not “takers”
- Our clubhouse is “the radio”
- Monthly “Pye and Pint” meetings in a local pub
- Annual Fun DXpedition
- Members age from 18 to 80
- Interests from VLF via Sats and Microwaves to Optical comms.



Camb-Hams Scottish islands activations

- Have become an annual event
- Mainly HF with some VHF
- "Wildcard Activity"
  - Mull 2012
    - Staffa
    - 10GHz – 2 QSOs (with the same station!)
    - 144MHz EME – happened by accident
  - Mull 2013
    - 472 kHz – bit of a failure
    - Optical Comms
    - 144MHz EME – better!
  - Lewis 2014
    - Shiants Islands
    - Ultralight 1.3GHz EME
  - Mull 2015
  - Arran 2016

Camb-Hams Scottish islands activations

- Objective #1
  - Have fun!

Why 23cms Portable EME?

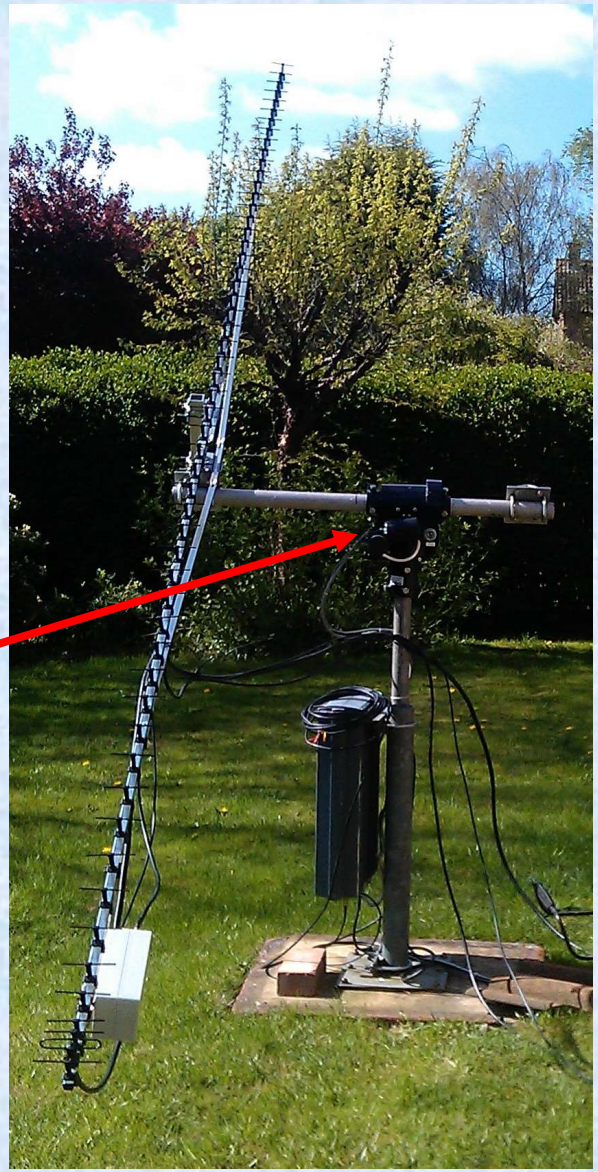
- Plenty of activity and big stations on 1296MHz JT modes
- My “buzz” is making things work, not making QSOs!
- Microwave EME is not “easy”
- JT mode makes it a practical proposition
- It is within the grasp of a moderate station
- Great fun!

Equipment

- Antenna
  - Decided to use Yagi(s) not a dish
- Upside
  - Easier to pack and carry
  - Lower windage
    - Important on a Scottish Isle
- Downside
  - Plane polarised not circular
    - 3dB system disadvantage before you start
  - Noisier
    - Sidelobes
  - Lower gain

Equipment

- Rotor – Az El mount or Polar Mount?
- Chose an Az-EL mount because
  - I already own one
  - The hardware and tracking software is tried at tested at home
- Spid - RAS



Equipment

- Rig – Transverter or Multiband?
  - Chose to use the TS2000X
    - Covers 1.3GHz as standard
    - Stable enough (with Fan mods) for JT modes
    - Tried and tested as a transverter driver for 2.3GHz EME
- Preamp
  - G4DDK VLNA23
    - Simply the best, field tested and inexpensive

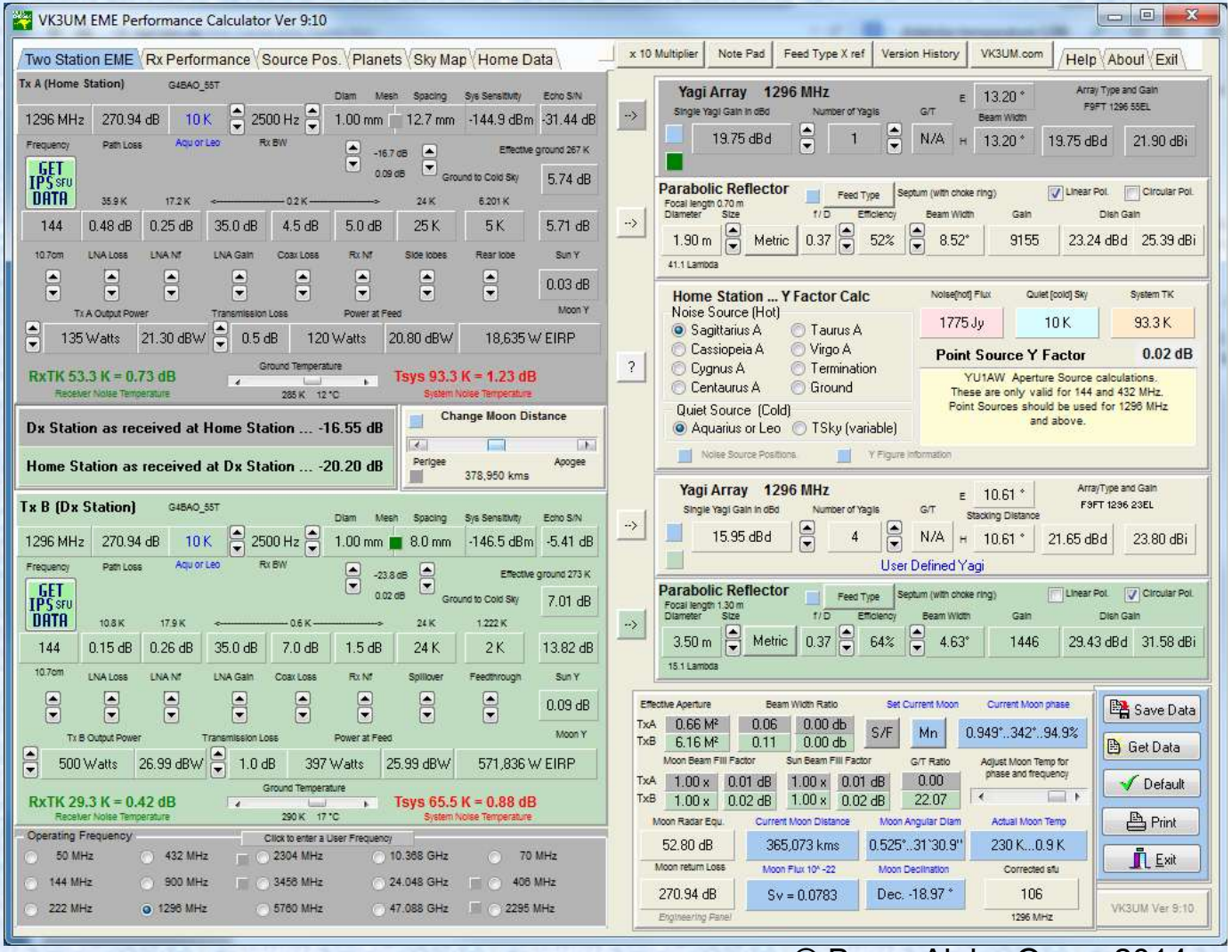
Equipment

- Power Amplifier
  - Must be rated for JT modes, Continuous 1 min on, 1 min off cycle
  - Must be reliable…..no standby unit
  - DB6NT 150W unit with large heatsink

Ultralight EME – Reflections from Lewis John Worsnop G4BAO

VK3UM EMECalc

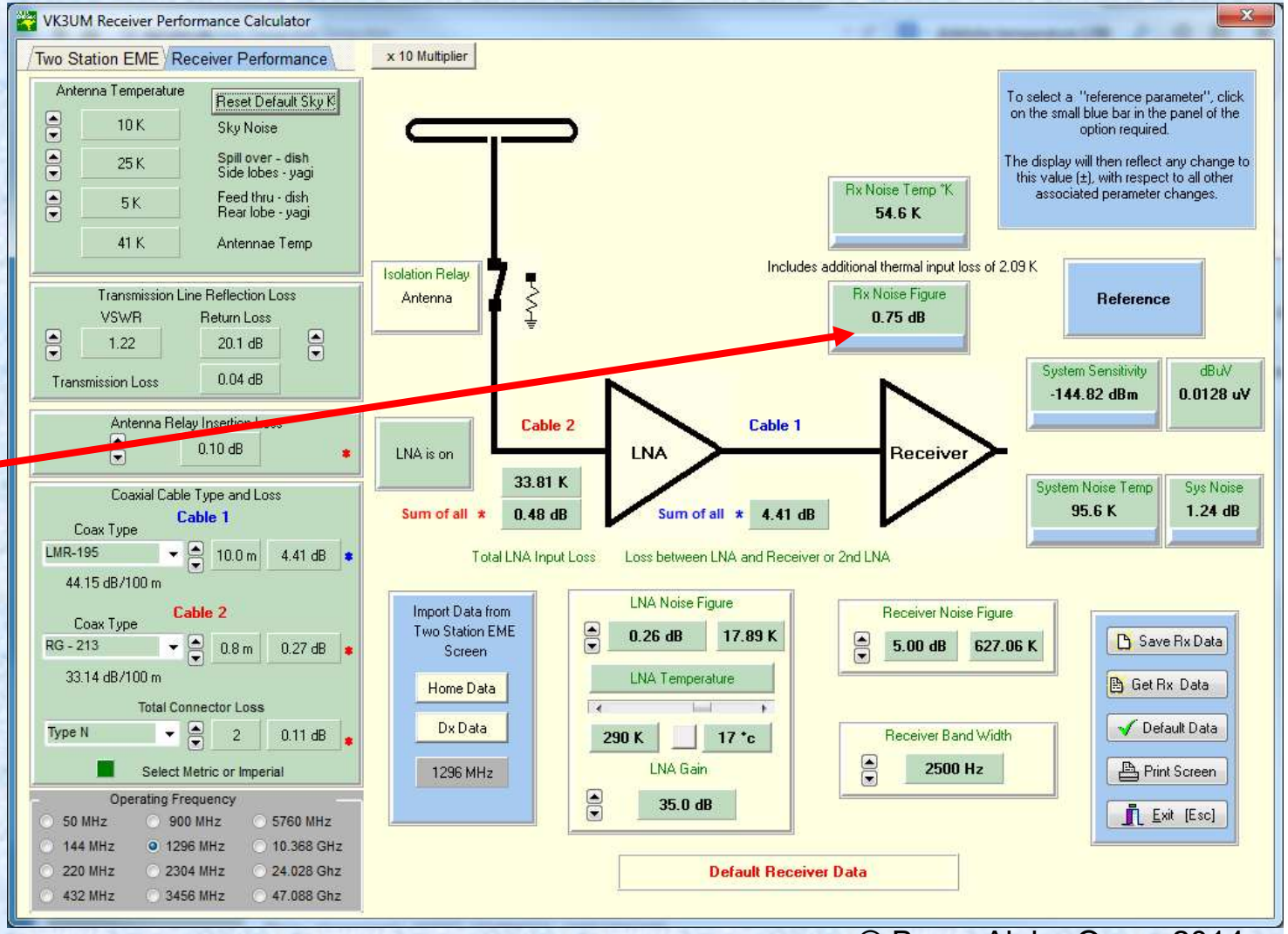
- "Must Have"
- Automates system calculations.
- Used for "What if" analysis of
  - Band
  - Antenna
  - Feed Type
  - Power
  - Receiver performance
  - Moon distance
  - Sun noise



System calculations

Receiver parameters

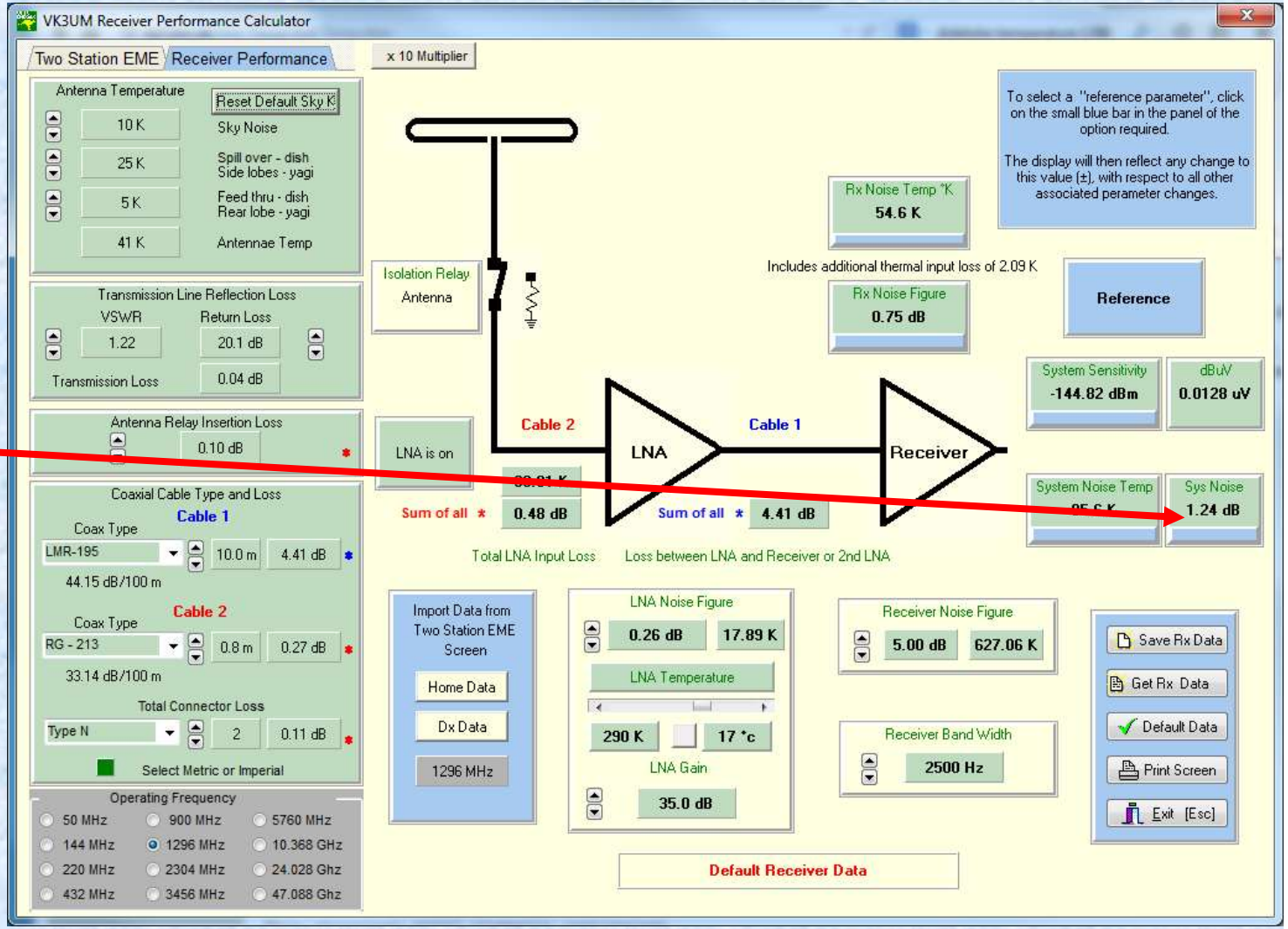
- **LNA noise figure 0.26dB**
- **Preamp > feed loss**
  - **0.48dB**
- **Gain**
  - **35dB**
- **RX feeder loss**
  - **4.5dB**
- **TS2k noise figure**
  - **5dB**
- **RX NF 0.75dB**



System calculations

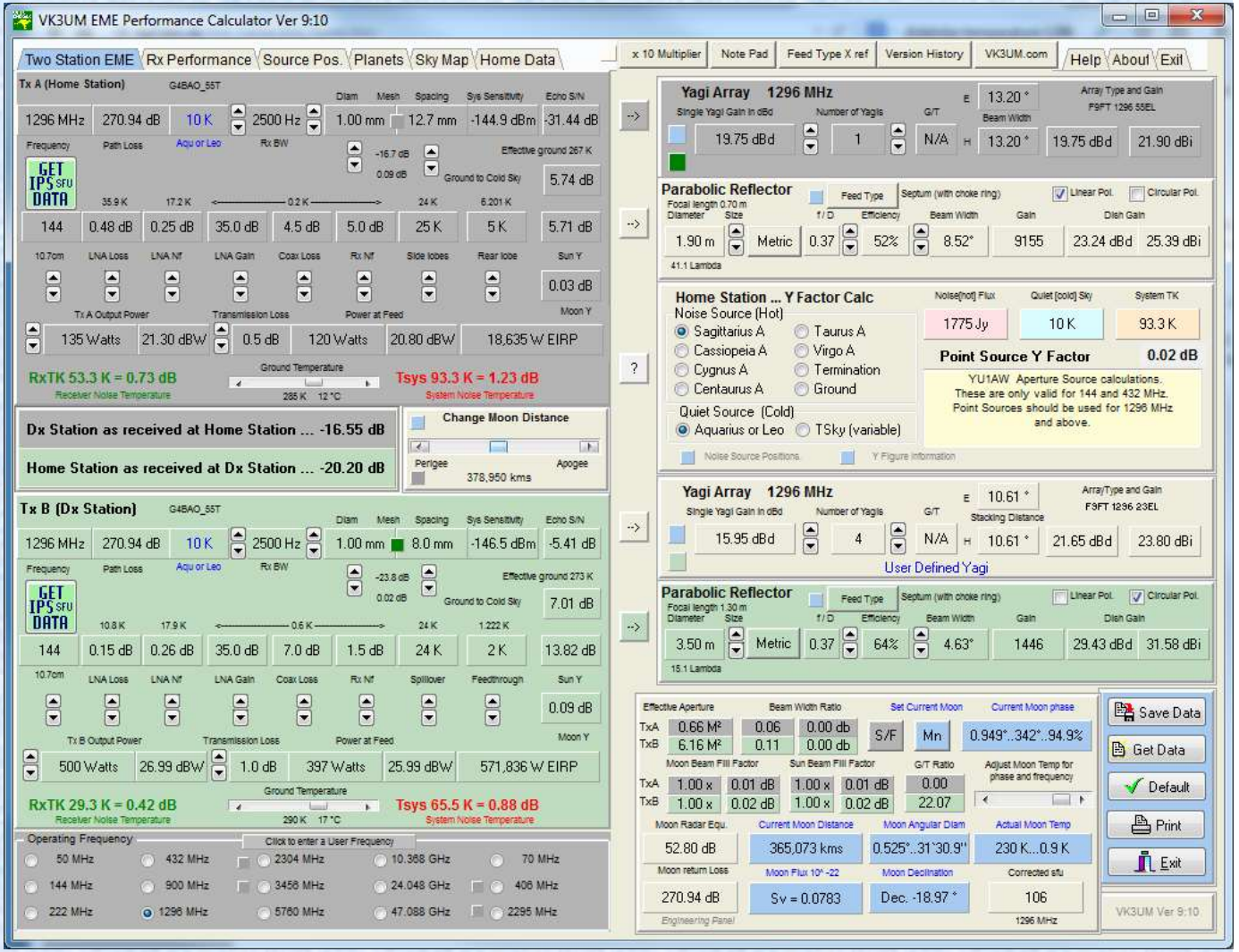
Antenna parameters

- **Antenna gain 21dBi**
- **Antenna Temp (best guess based on pattern)**
  - **Sky temp 10K**
  - **Rear lobes 5K**
  - **Side lobes 25K**
- **System NF 1.24 dB**
- **JT65c 2.5kHz BW**



Putting it all together

- **Expect -19/-23 JT reports with a 3.5m Dish station running 500W circular**



The Equipment

- **There was Lots of it……**

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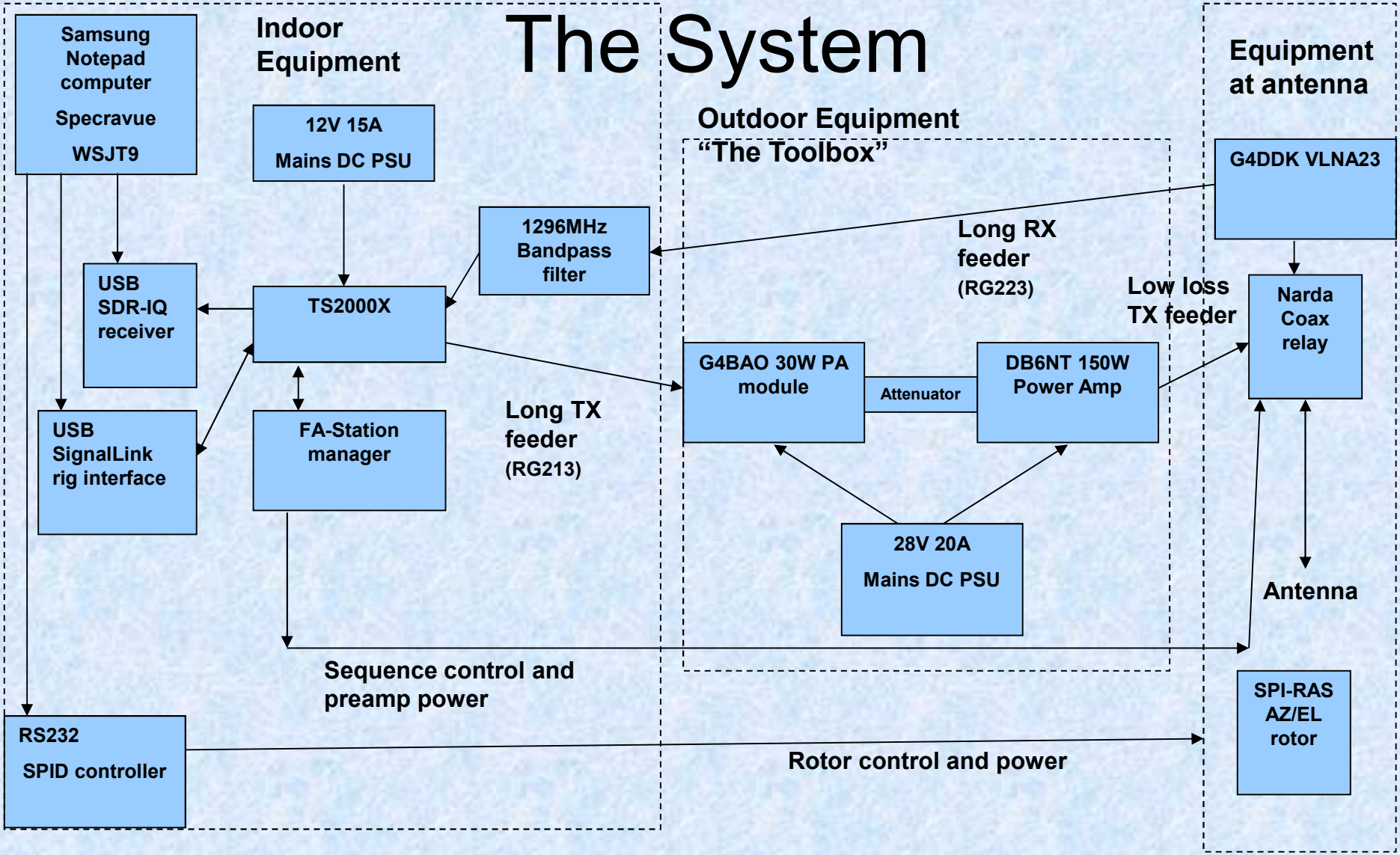
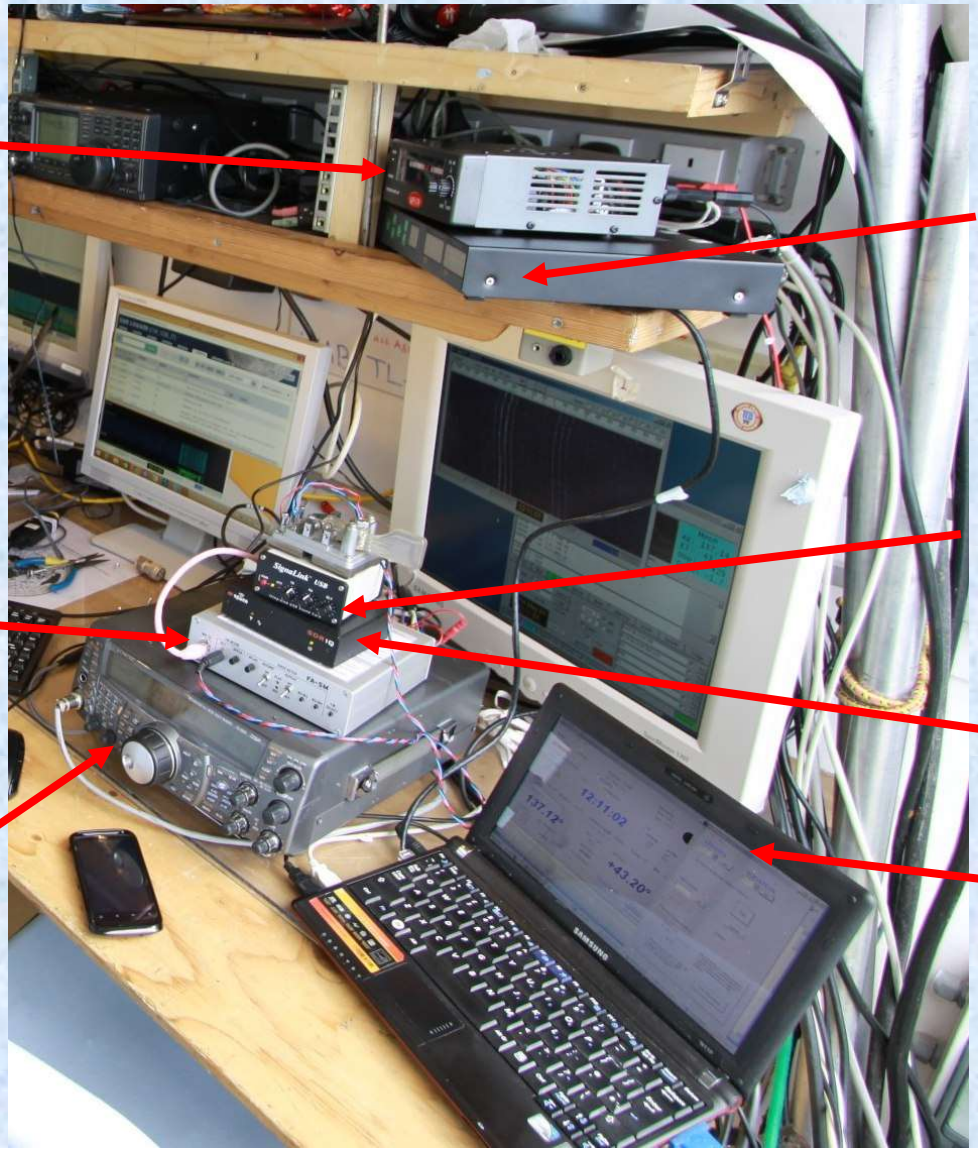
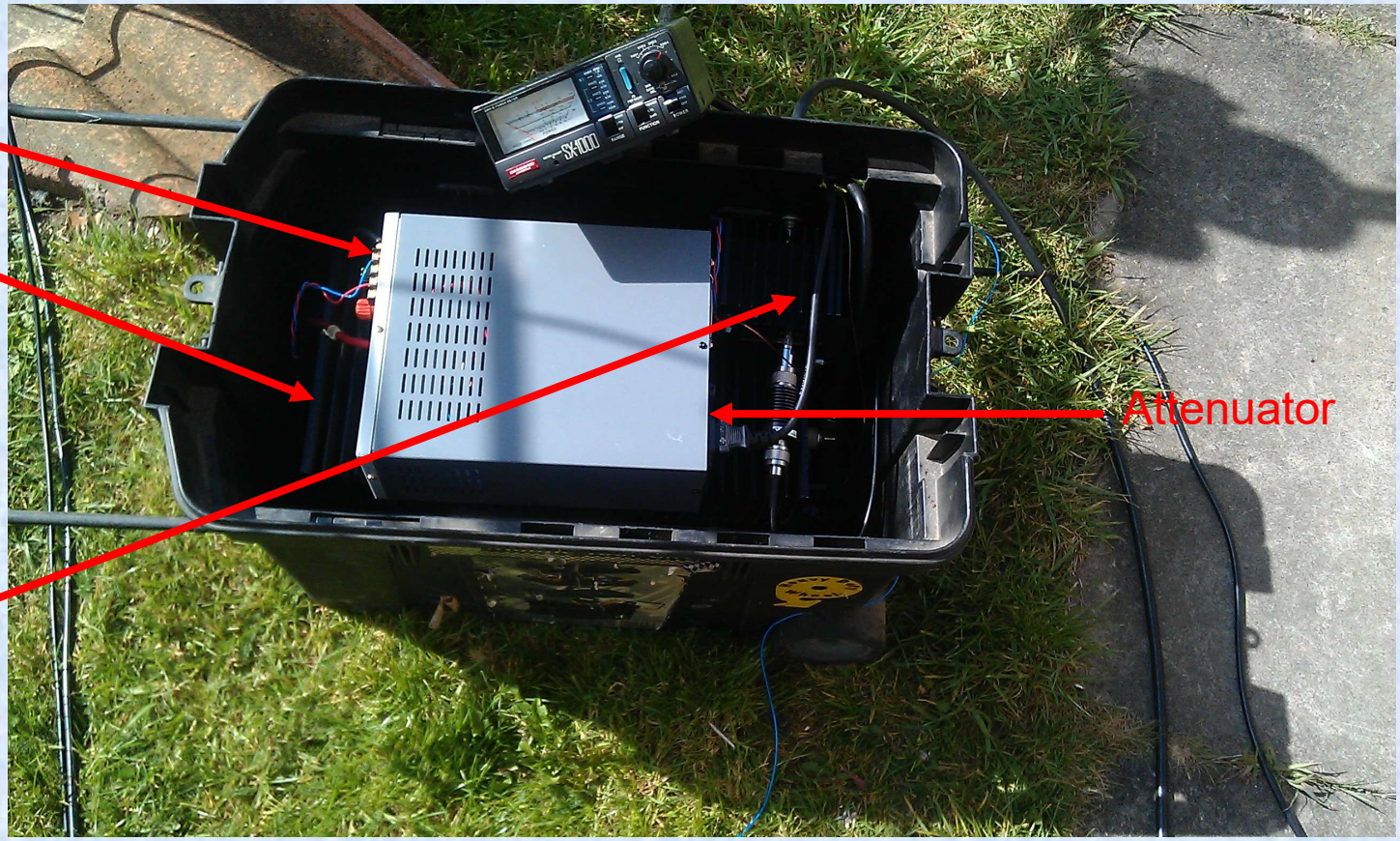


Indoor equipment



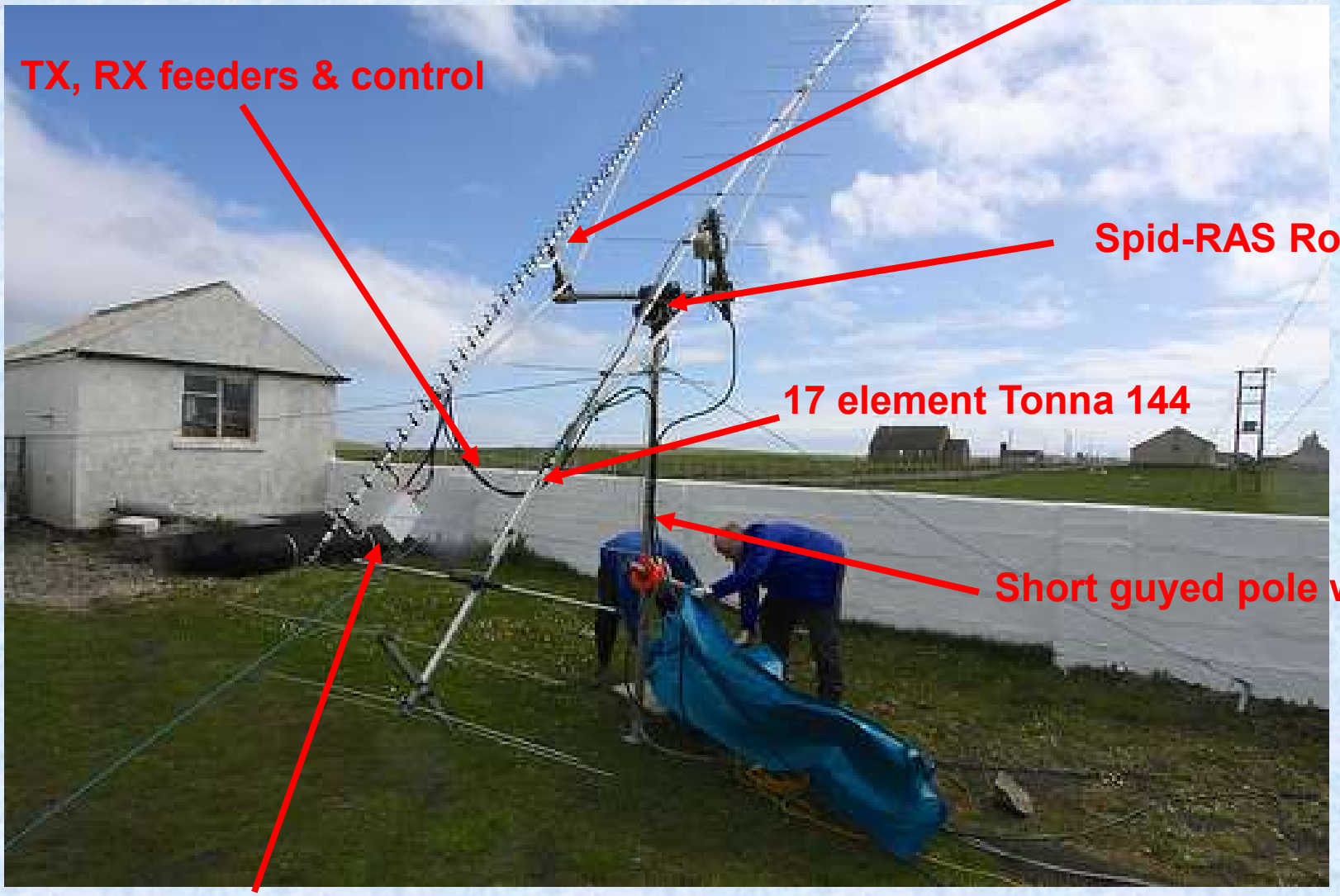
Outdoor equipment “The toolbox”



The Antenna

- We didn't use this antenna…. But pictures like this are compulsory for EME talks
- ☺
- Moving on…….

The Antenna



Log of stations worked

14 “initials” in 11 DXCCs on 4 continents

Date	Time	Callsign	DX Station Details
27/04	12:29	I1NDP	10m Prime focus dish 500W
27/04	12:35	UA4HTS	6m Prime focus dish 700W
27/04	12:47	UA3PTW	3.7m Prime focus dish 300W
27/04	13:05	W1AW/2	9m Prime focus dish 500W
27/04	13:07	K2UYH	9m Prime focus dish 500W
28/04	12:36	PA0BAT	3m Prime focus dish 500W
28/04	12:57	HB9Q	10m Prime focus dish 1kW
30/04	09:56	OH2DG	8m Prime focus dish 500W
30/04	12:56	DF3RU	6m Prime focus dish 500W
01/05	09:12	JA6AHB	7m Prime focus dish 500W
01/05	09:20	OE5JFL	11.2m Prime focus dish 1kW
01/05	16:34	PY2BS	5.1m Prime focus dish 500W
01/05	16:37	PI9CAM	20m “Dwingeloo” Dish
01/05	16:45	OK1KIR	10m Prime focus dish 1kW

Acknowledgements

- The Camb-Hams.
  - A very different type of radio club
- Sam, G4DDK for the loan of his 150W PA
- Steve M1ACB for some of the photos

Sunset on Lewis

Acknowledgements

- **Pete and Louise**
- **The owners of "The Decca" Isle of Lewis**

"Amazing place to stay and forget about a crazy world." B & V, Berlin. 11.7.12