SIMPLE SATELLITE OPERATING

Swindon and District Amateur Radio Club

June 8th 2017

THE INSPIRATION

- Tweets from Pete 2E0SQL with pictures of him operating on satellites with an FT-817 and a portable (hand held yagi)

EARLY EXPERIMENTS

- A simple handheld, receiving on 436.800 picked up some signals from the SO-50 satellite

SO-50 (SAUDISAT)

- Launched in 2002 by a Saudi group
- 145.850MHz uplink and 436.795MHz downlink
- CTCSS tone 67Hz (74.4Hz to arm timer)
- Orbits around every 100 minutes

ANTENNA OPTIONS FOR SO-50

- Decided to use an Elk 144/432MHz log periodic, available from AMSAT UK shop
- Arrow portable yagis now also available from AMSAT UK
- Separate yagis for 2m and 70cms (separate handhelds)
- Don't try and use your collinear for SO-50

SO-50 OPERATING CONSIDERATIONS

- Satellite normally appears around 436.800MHz and then dopplers down to 436.780 or thereabouts
- Easy to track by ‘hand’ and follow across the sky
- Try and find somewhere with a low horizon – and see what you can hear, particularly to the east (UA4CRI, UA9 etc)
- Full duplex or semi-duplex?
- Weekend and evening passes can be a bit of a zoo!
- Dual receiver mobile rigs (eg FT8900) can work well

- Program the rig using the Baofeng software
- Memories can have transmit and receive frequencies on different bands
- Program a series of memories so you can follow the satellite down in frequency as it passes over
- Consider a headset for better audio

BAOFENG UV-5R- A £30 GROUND STATION FOR SO-50

WORKING ZB2GI ON SO-50

A WHEELIE BIN IS A PERFECT OPERATING PLATFORM

WD9EWK's home station

SATELLITE PREDICTIONS

- Gpredict (Windows or Linux)
- SatPC32 (Windows)
- SatExpPro (iOS)
- AMSATDroid (Android)
- WX-Track (great for working out mutual footprints)

OTHER FM SATELLITES

- AO-85 – worth listening on 145.980 with a standard handheld or on your mobile. Very strong. 435.170 uplink
- Lilacsat-2 – one of the Chinese launches. Irregular operating schedule. Uplink on 144.350 (FM) – Check AMSAT operating status page amsat.org/status

AO-85 OPERATING TECHNIQUES

- Full duplex more important as the uplink dopplers more than SO-50
- Some handhelds will run full duplex on AO-85. Mobiles like FT-8900 useful too.
- Peak up the antenna on receive and then twist through 90 degrees when you transmit as you hear yourself coming back
- Fox telemetry to decode – subsonic audio – which is why it sounds a bit rubbish at times

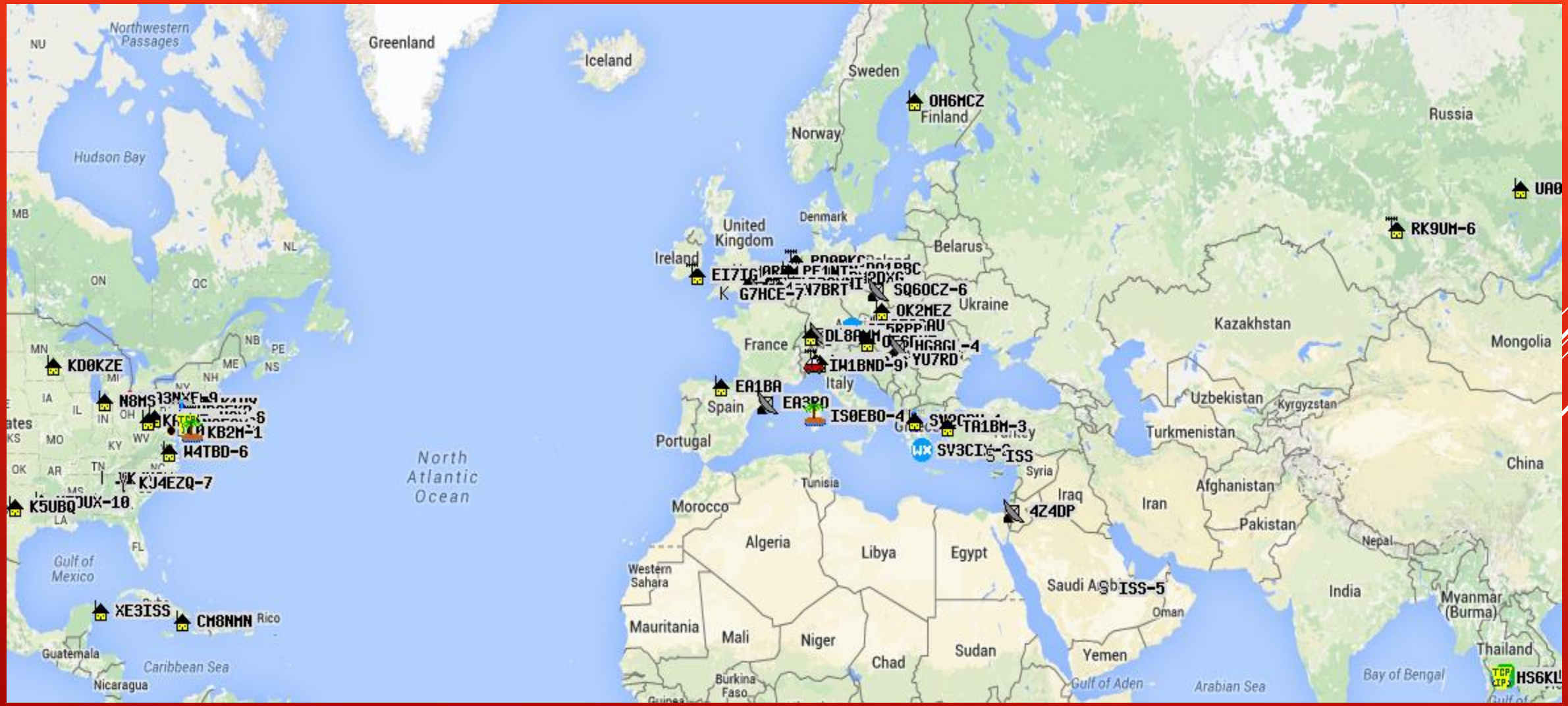
INTERNATIONAL SPACE STATION

- Occasional voice activity on 145.800MHz – so always worth scanning that channel
- Packet on 145.825MHz.

ISS APRS DIGIPEATER

- APRS handheld with an extended antenna can digipeat through on an overhead pass – on 2m at least!
- Handheld and portable antenna works well
- Set Unproto path to ARISS or RS0ISS
- Can receive some packets using home station or mobile. Try UISS software by ON6MU and UZ7HO Soundcard modem. Very good for quickfire QSOs
- Simplest receive only system a handheld and packet decoder on smartphone

Stations heard through the ISS digipeater are recorded at ARISS.NET



FUN TO WORK THE ISS DIGI FROM PORTABLE LOCATIONS

Sometimes used to announce satellite dxpedition activity

FO-29

- 435.850MHz downlink and 145.950MHz uplink
- Terrestrial beams work well for low passes and good DX! Even a vertical will work close to the horizon – use a duplexer
- Can operate half duplex with FT-817, for example – work out frequencies in advance using PCSAT-32. Or two FT-817s is the deluxe version for full duplex.
- SATPC32 will control your rig and automatically adjust frequencies for Doppler as you tune.

INSPIRATION TO USE FO-29

- Check out some of the videos on YouTube from KG5CCI, WD9EWK and W5PFG
- KG5CCI in particular works some amazing DX from a mountain near Little Rock in Arkansas
- Fun holiday operating mode

KG5CCI'S FAMOUS BLUE BOX – ONE END OF A 7000KM + FO-29 QSO

THE OTHER END OF A 7000KM + QSO: NEAR LONGWORTH

CHINESE XW-2 SATELLITES

- 145MHz down and 435MHz up
- Not all of them in the IARU satellite subband.
- Very sensitive
- Possible to make simple CW QSOs when sateliite close to horizon with a vertical antenna. Probably phone too!

SATELLITES NOT MENTIONED!

- AO-73 – Funcube 1, UKUBE-1, Nayif-1 similar designs.
- AO-7 – Venerable and amazing coverage – when in sunlight. Warbles if you run too much power…
- Upcoming FOX launches

BE INSPIRED

- Join AMSAT-UK
- Nice bunch of satellite active amateurs on Twitter
- PW VHF column ☺

QUESTIONS?