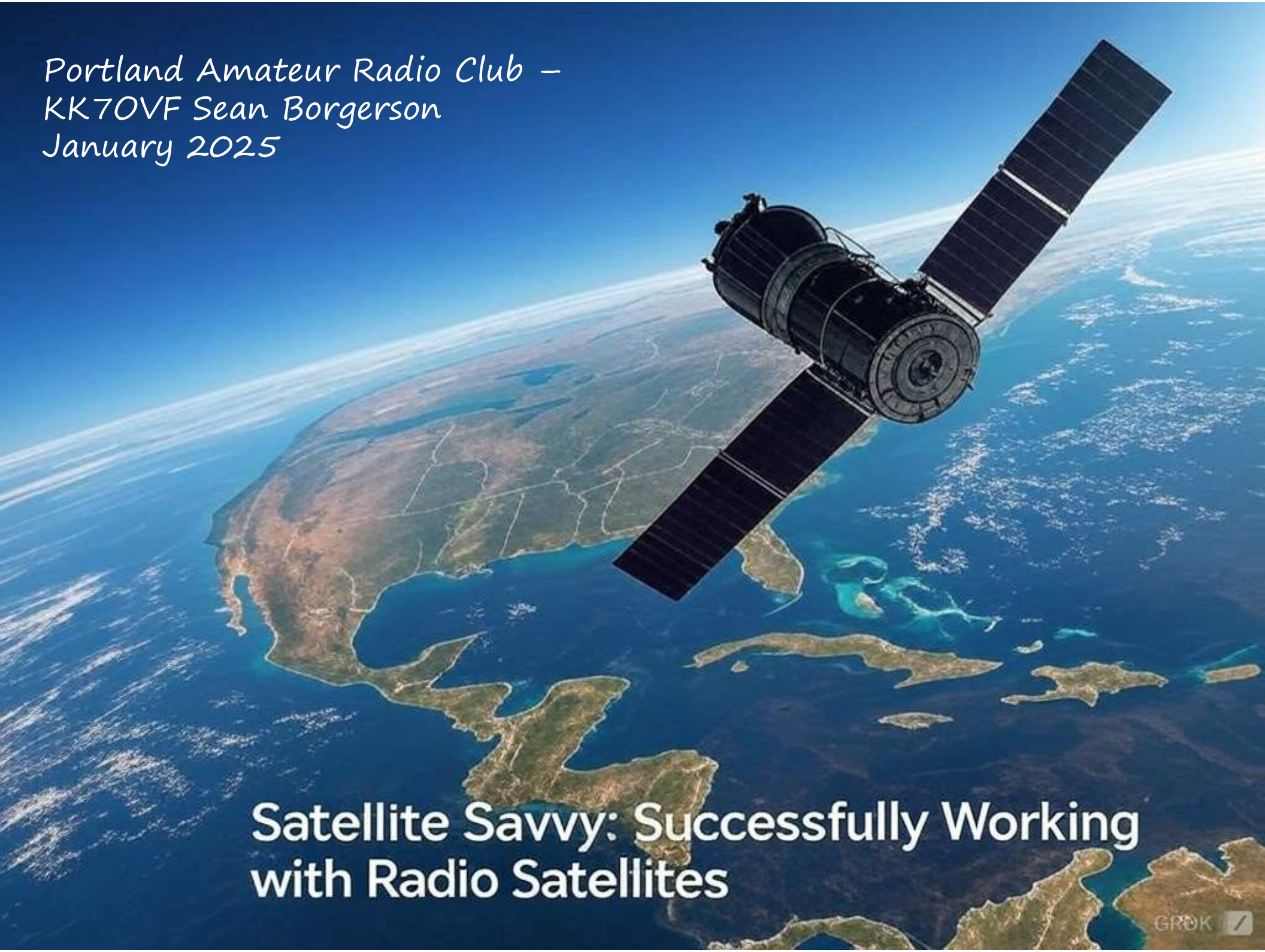
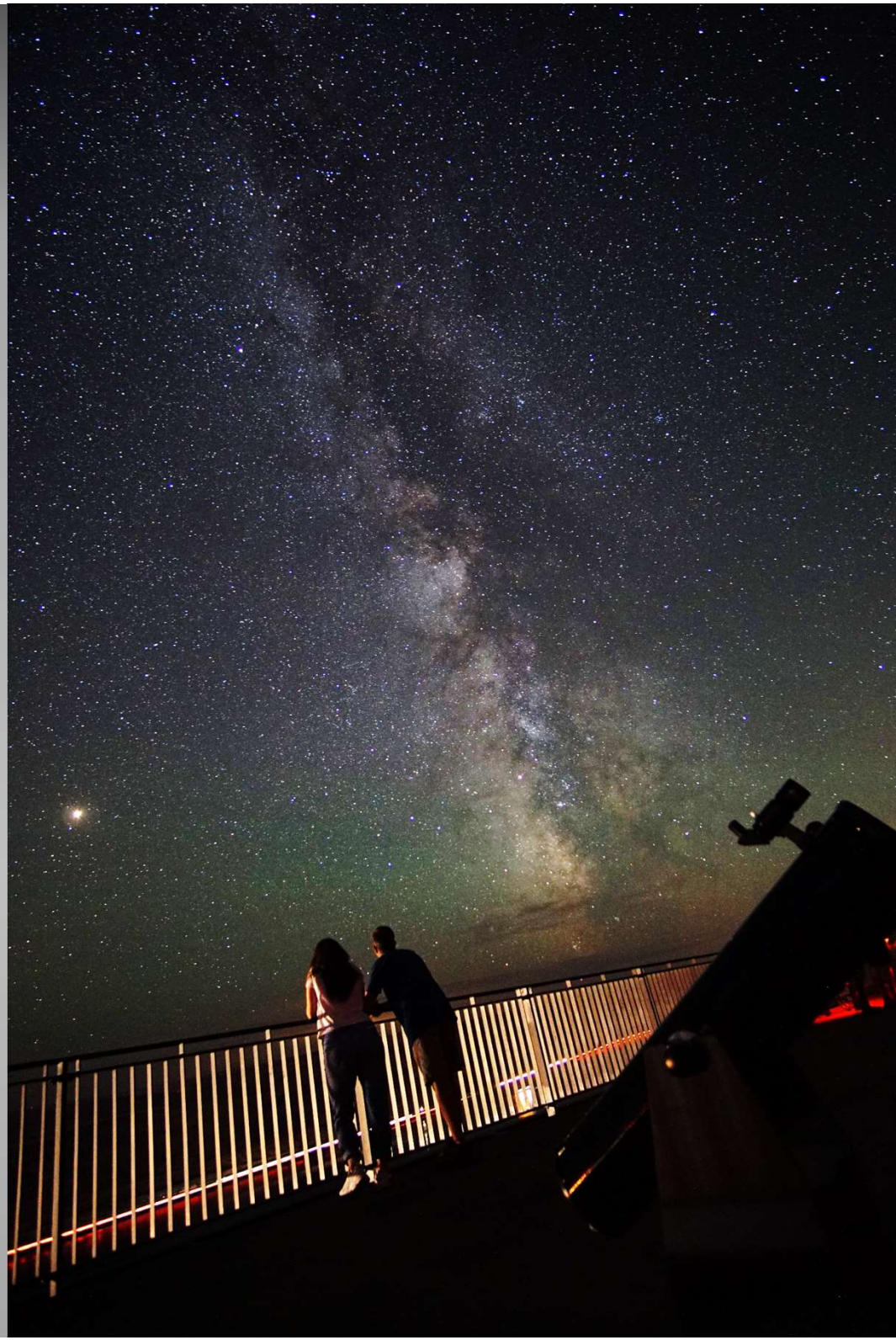
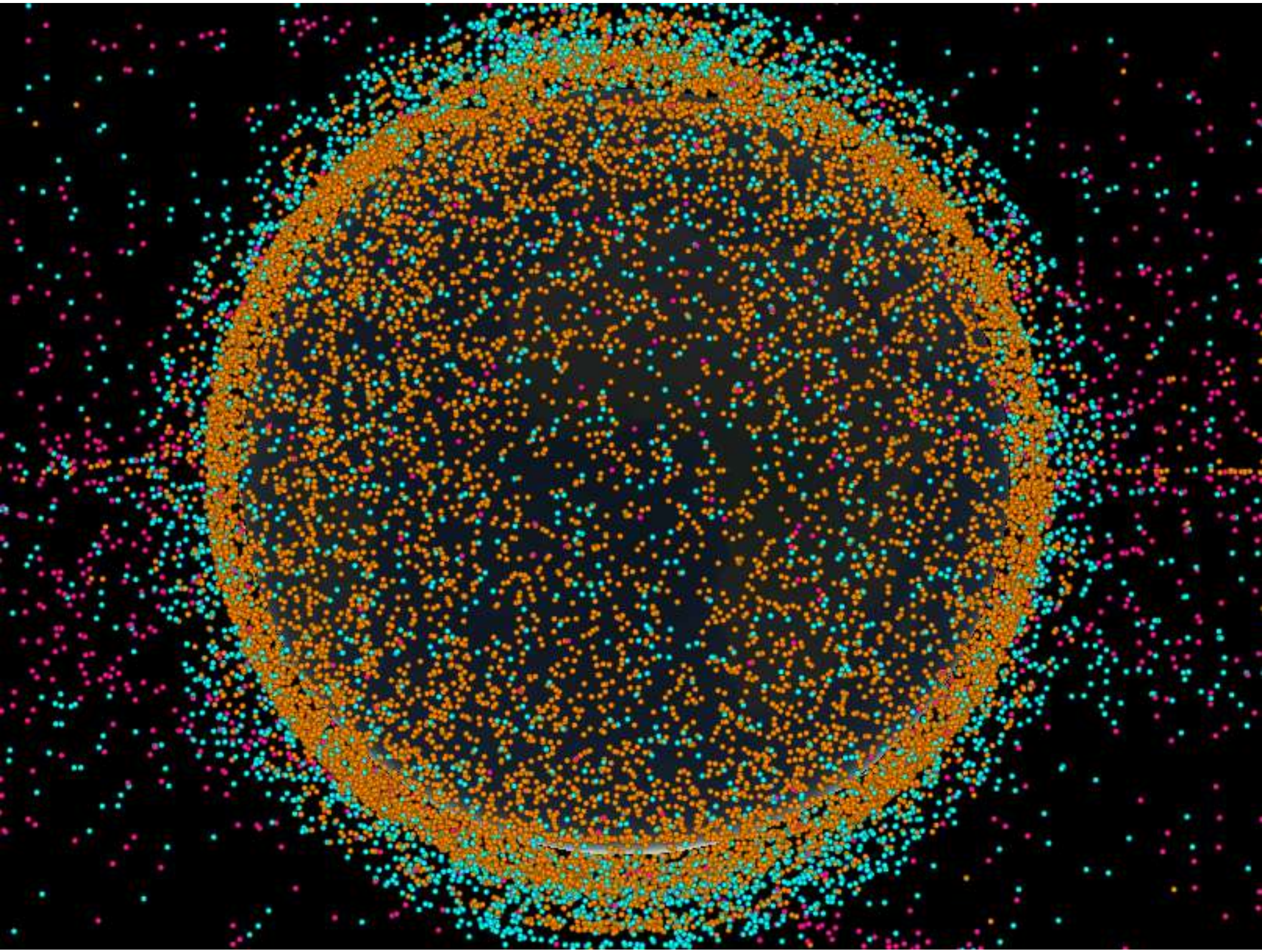
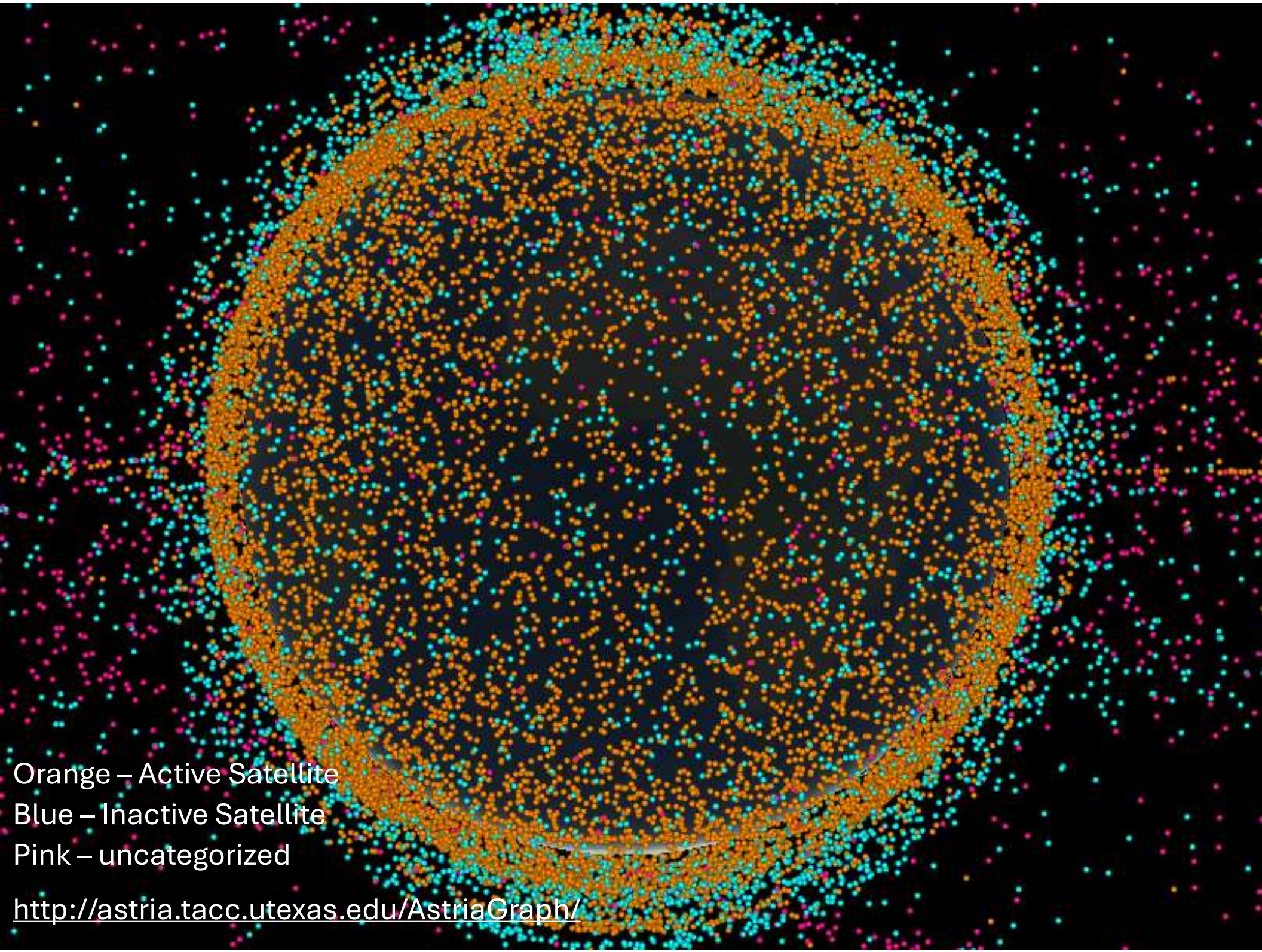
Portland Amateur Radio Club –
KK7OVF Sean Borgerson
January 2025



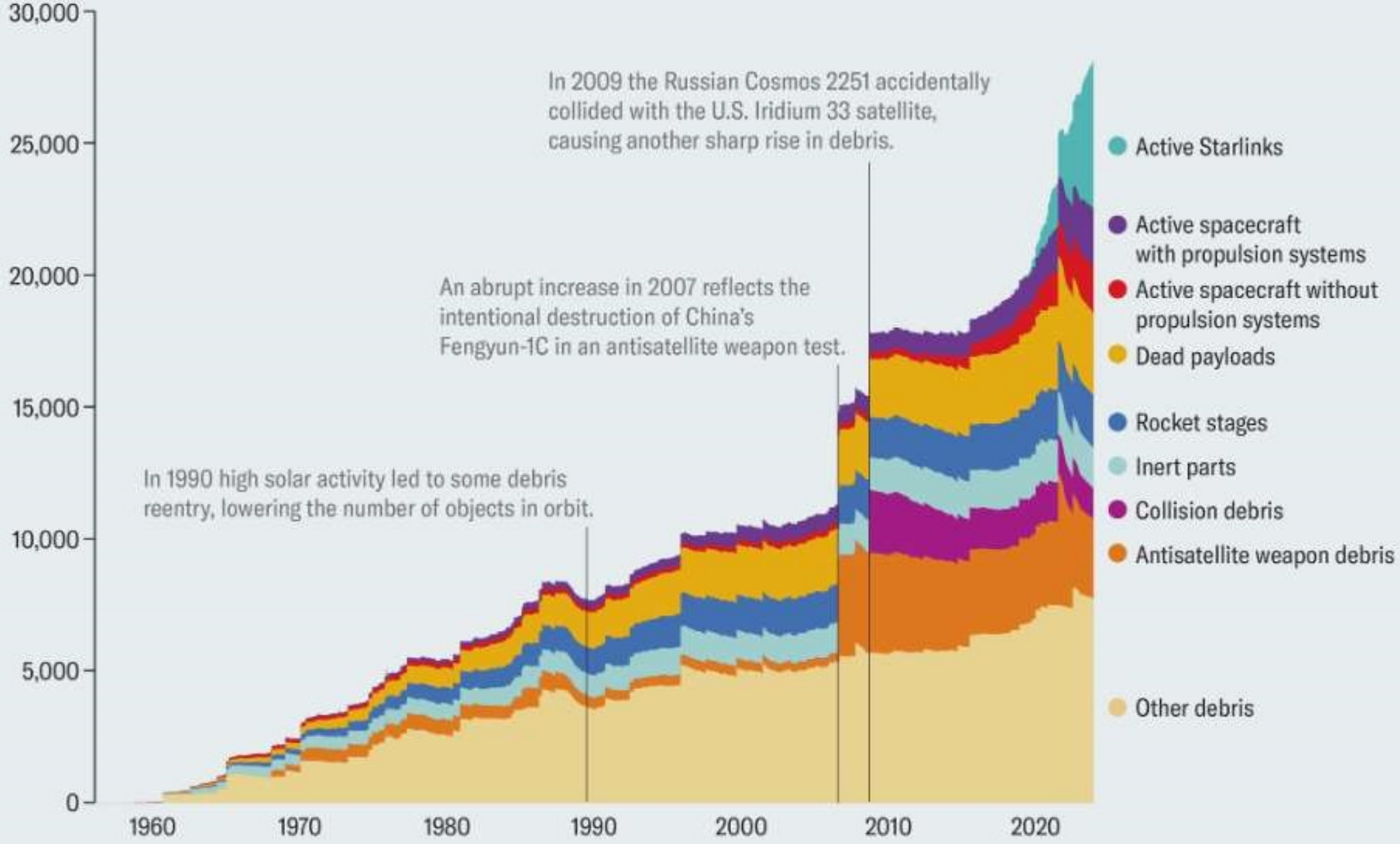
Night Sky – Maryhill Museum July Star Party



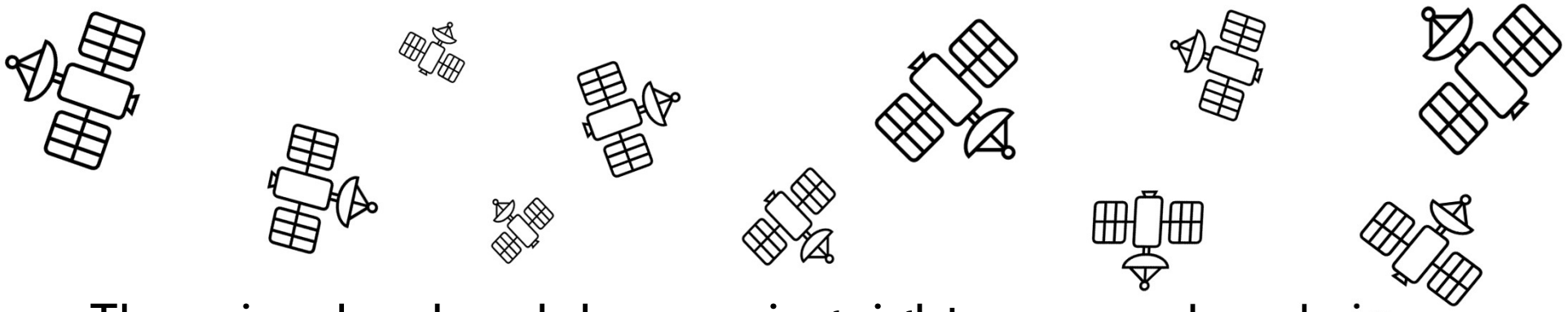



Orange – Active Satellite
Blue – Inactive Satellite
Pink – uncategorized
http://astria.tacc.utexas.edu/AstriaGraph/

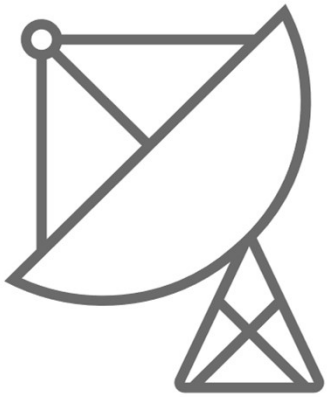
Number of Tracked Objects in Orbit, 1957–2024

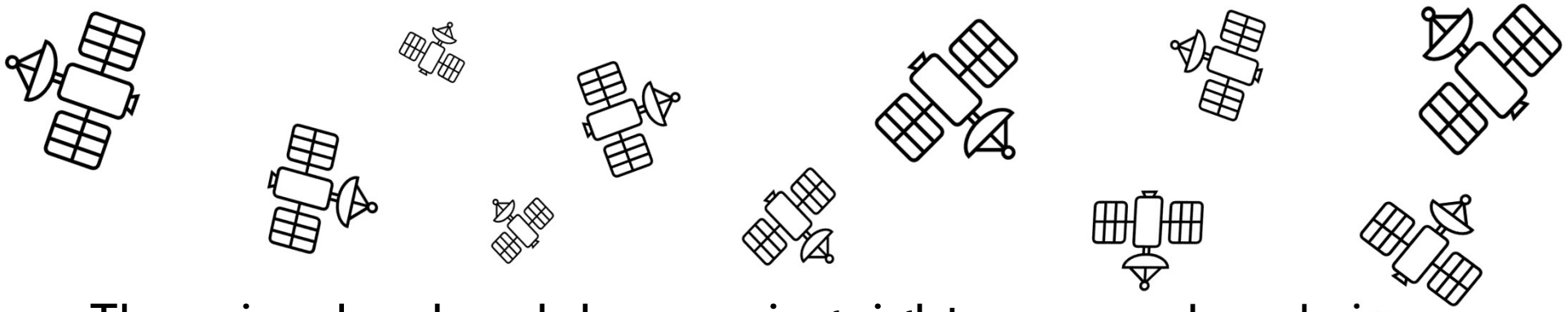


Amanda Montañez; Source: "Satellite Statistics: Satellite and Debris Population," Jonathan's Space Report (*data*)



- There is a land rush happening right over our heads in space – by private companies
- Almost 10,000 ‘active’ satellites in orbit right now, up from 6,500 only three years ago.
- The nearly 6,000 Starlink satellites launched by Elon Musk’s SpaceX now make up more than half of the total, and they are part of a planned fleet of up to 42,000.





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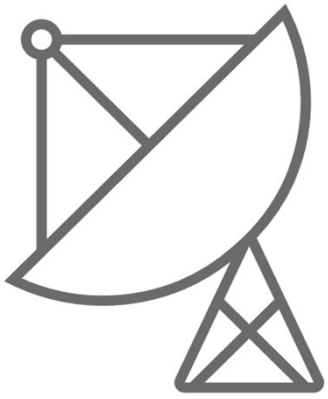
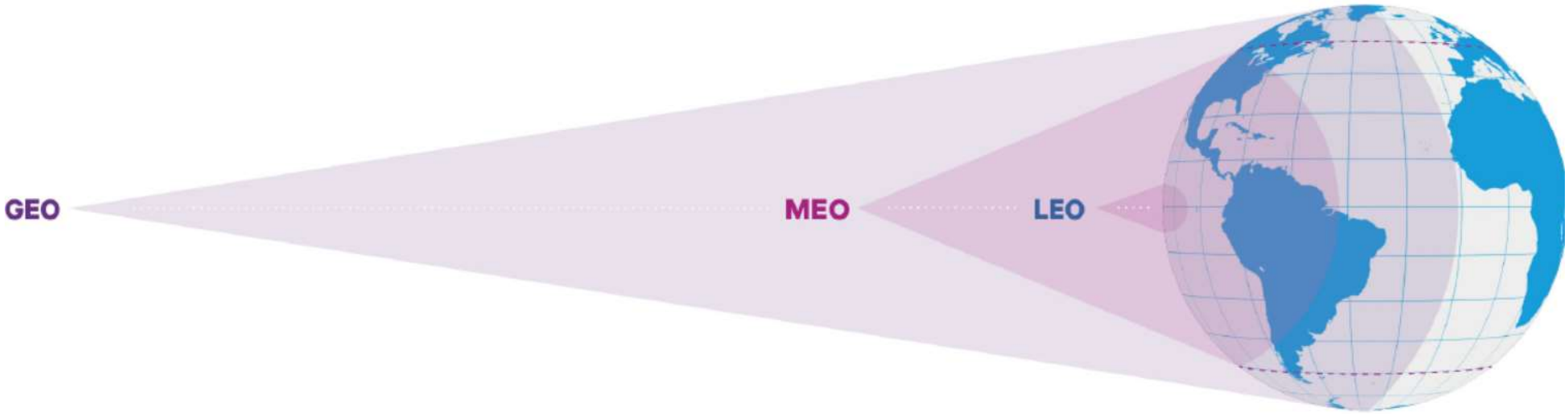
- Starlink is only the first of 21 planned ‘mega-constellations’ underway
- 555,127 planned satellites (see - Jonathan McDowell, https://planet4589.org)



Let’s Meet the ‘Easy’ Amateur Radio Satellites

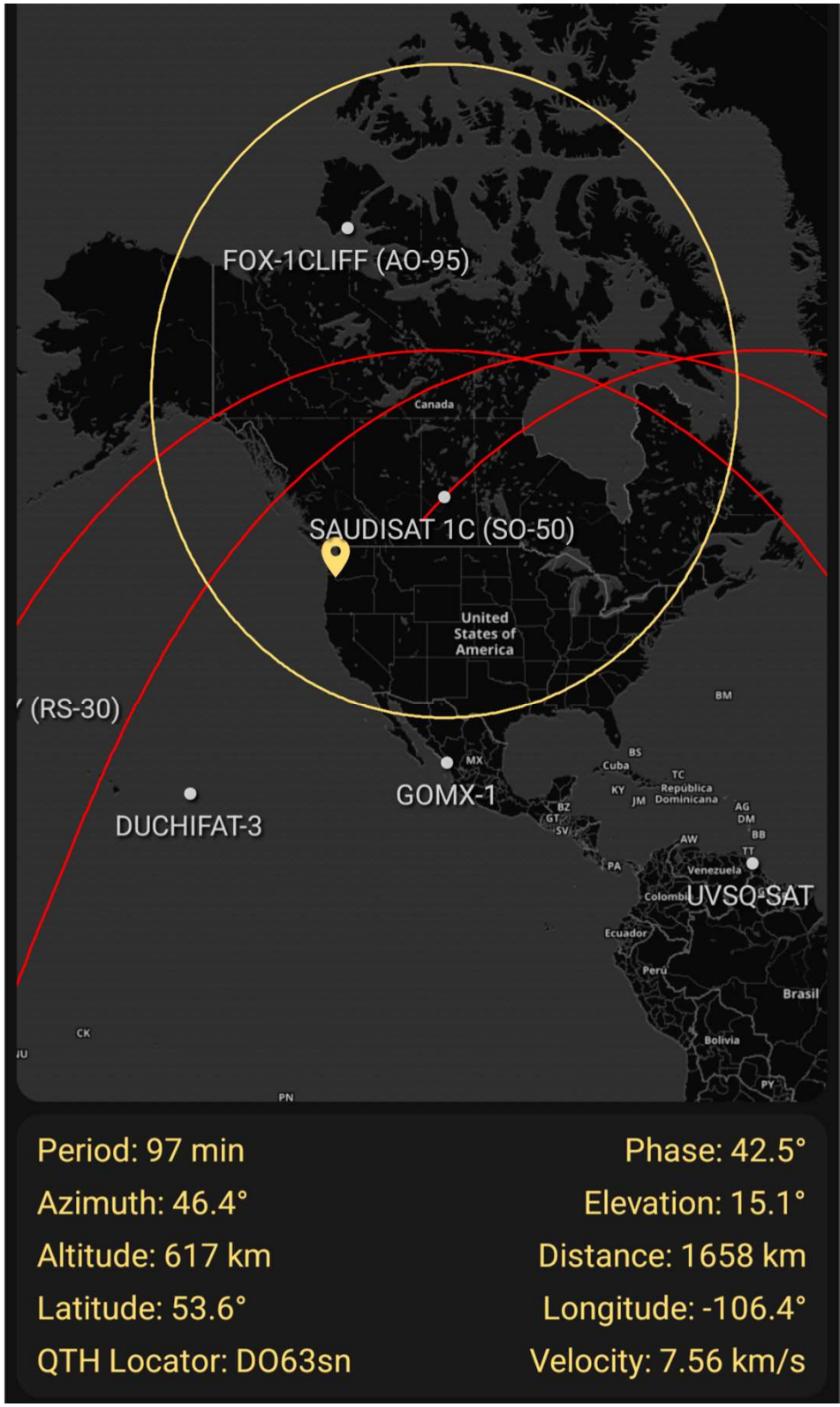
- Orbiting in ‘LEO’ – Low Earth Orbit
- Accessible with an FM dual band radio (vhf/uhf) HT / mobile / base station



SO-50 (Saudi-OSCAR 50)

Dimensions: 25cm Cube
Downlink power: 250 mW

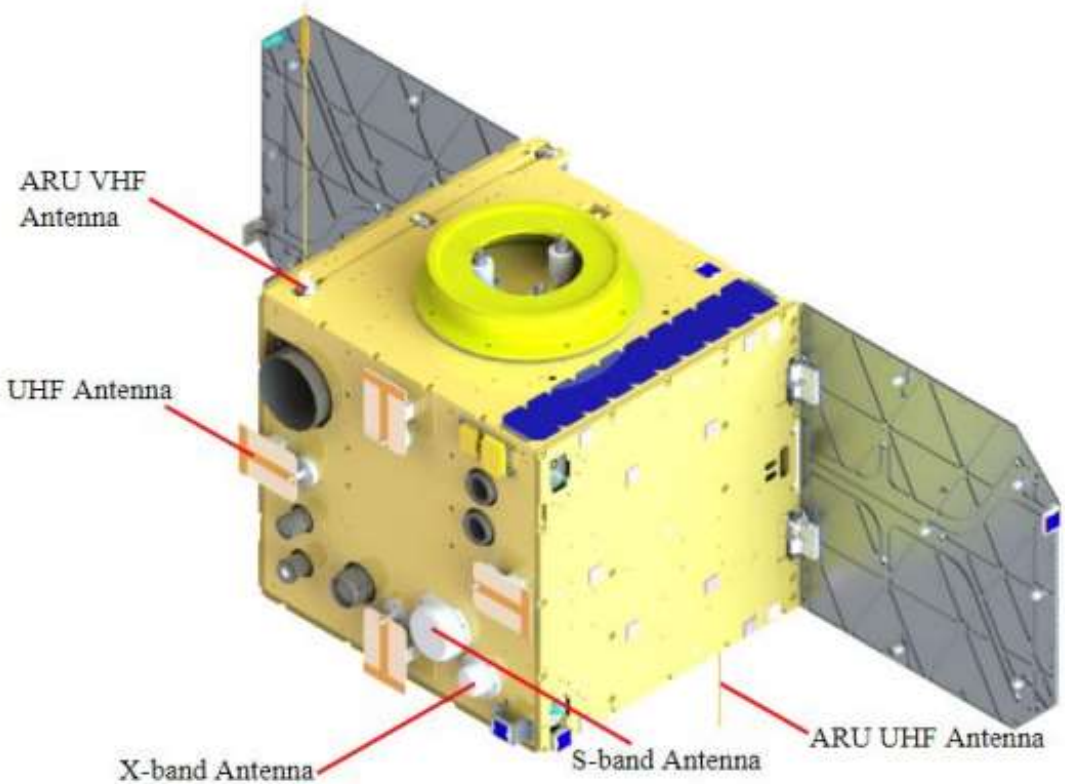
2002



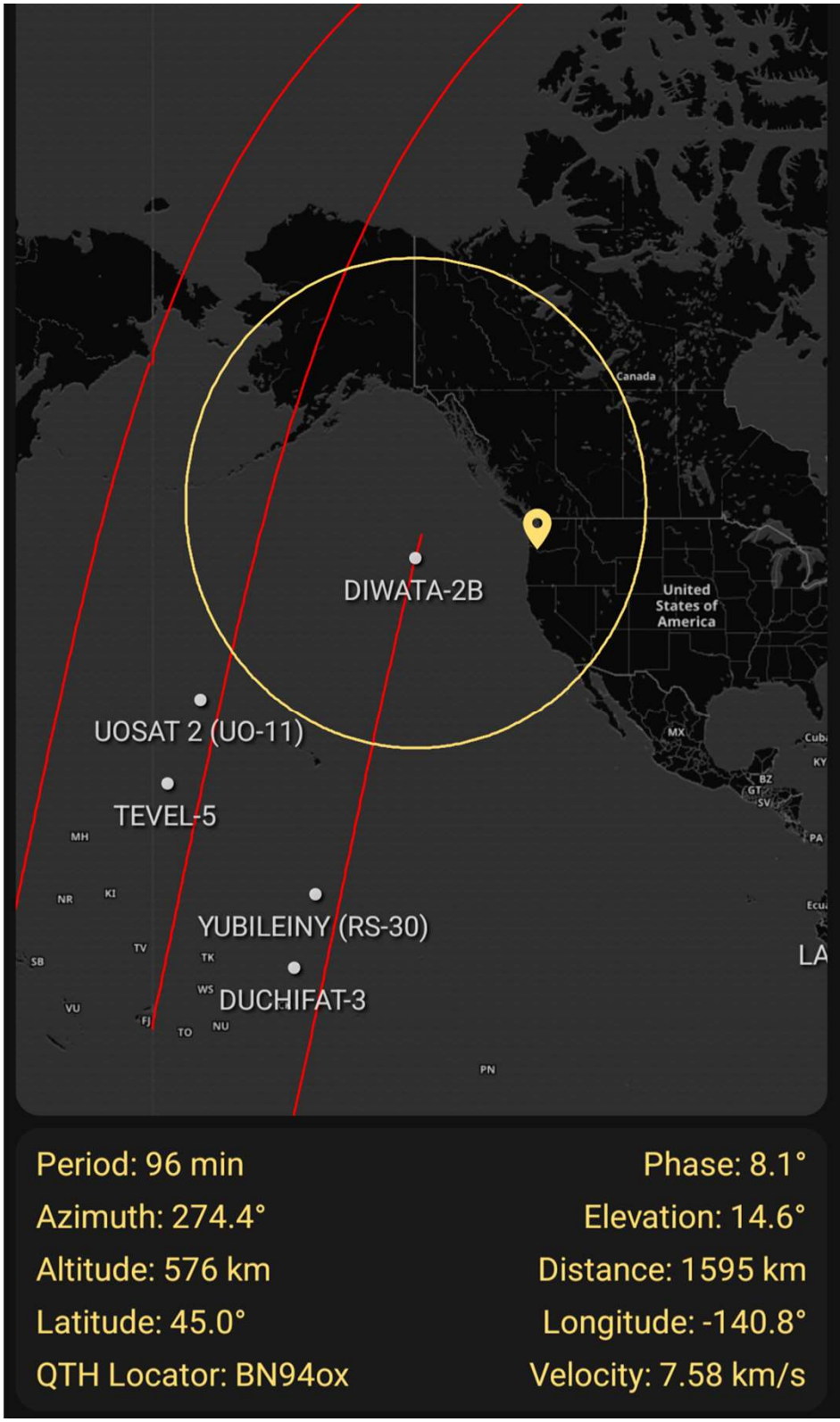
PO-101 (Philippines-OSCAR 101)

AKA: DIWATA-2B

Dimensions: 50cm Cube

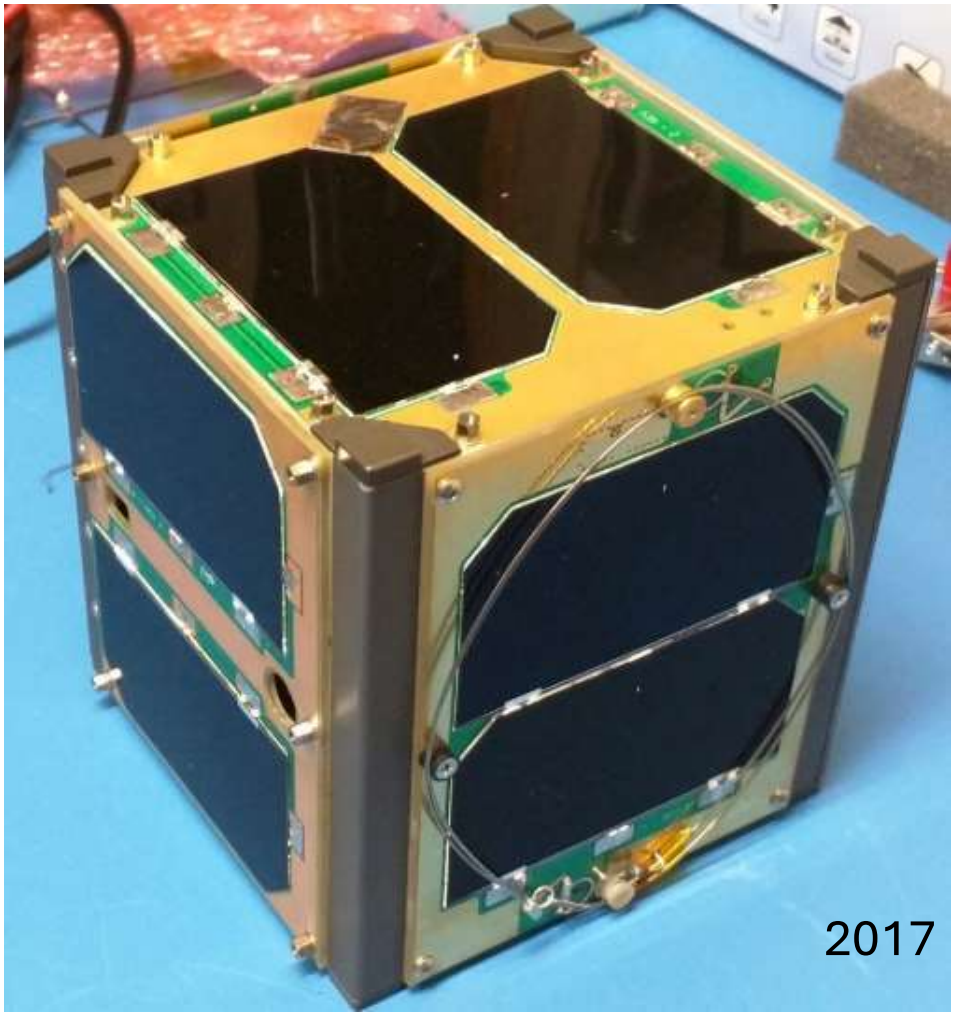


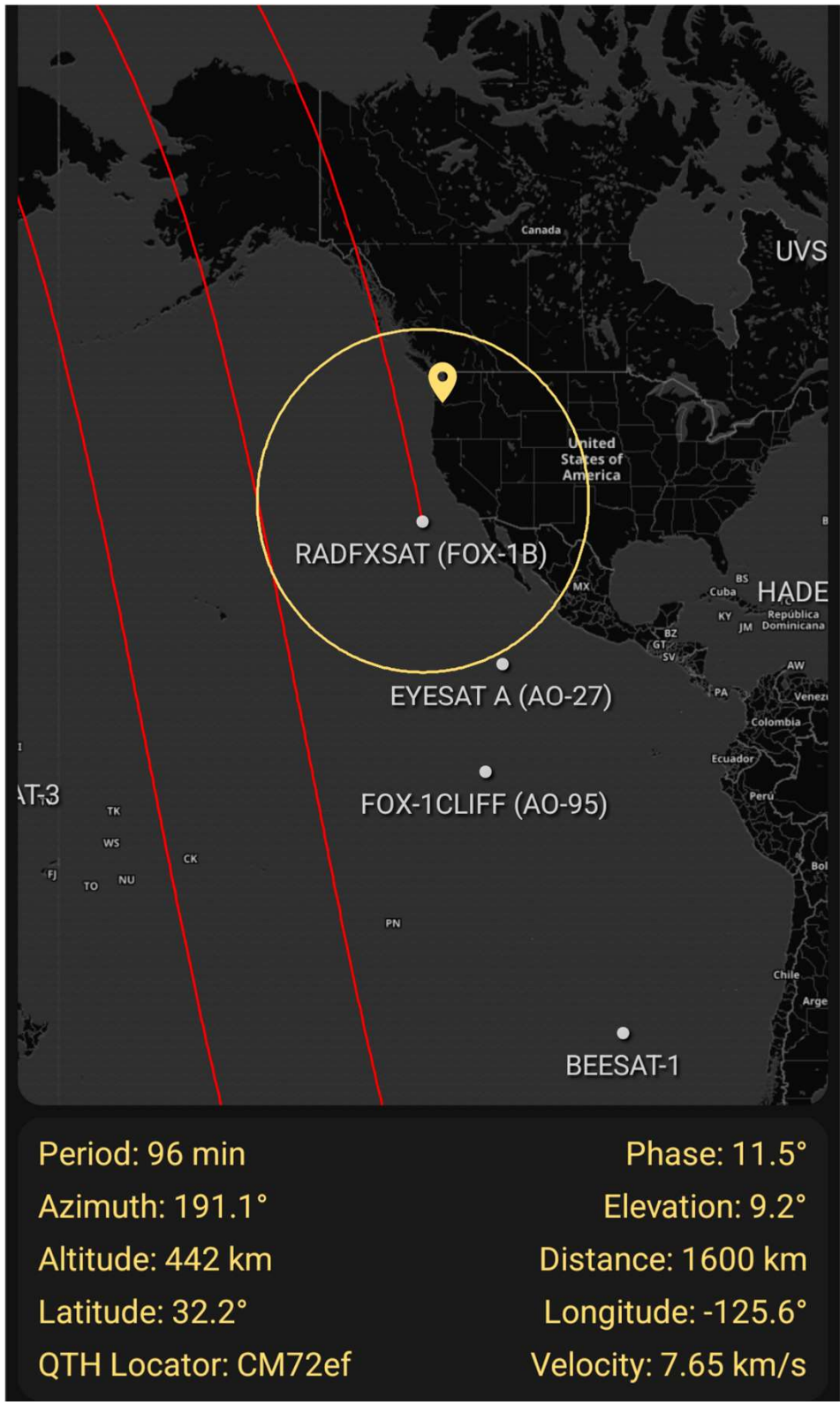
2018



AO-91(AMSAT OSCAR 91)

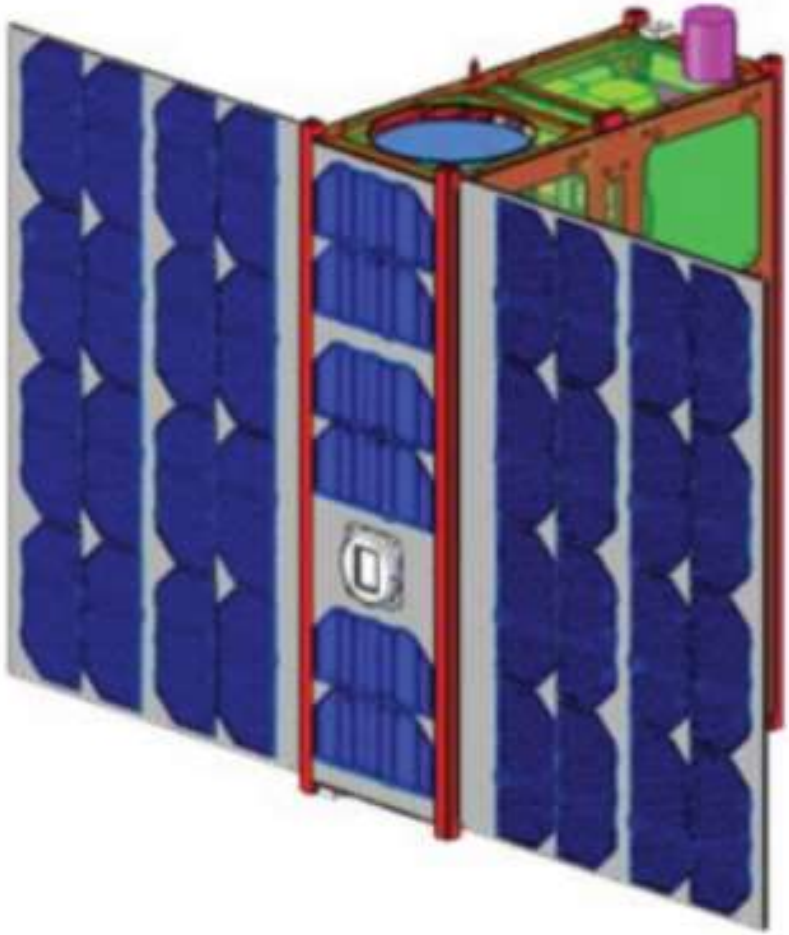
Dimensions: 1U CubeSat
Downlink power: 500 mW



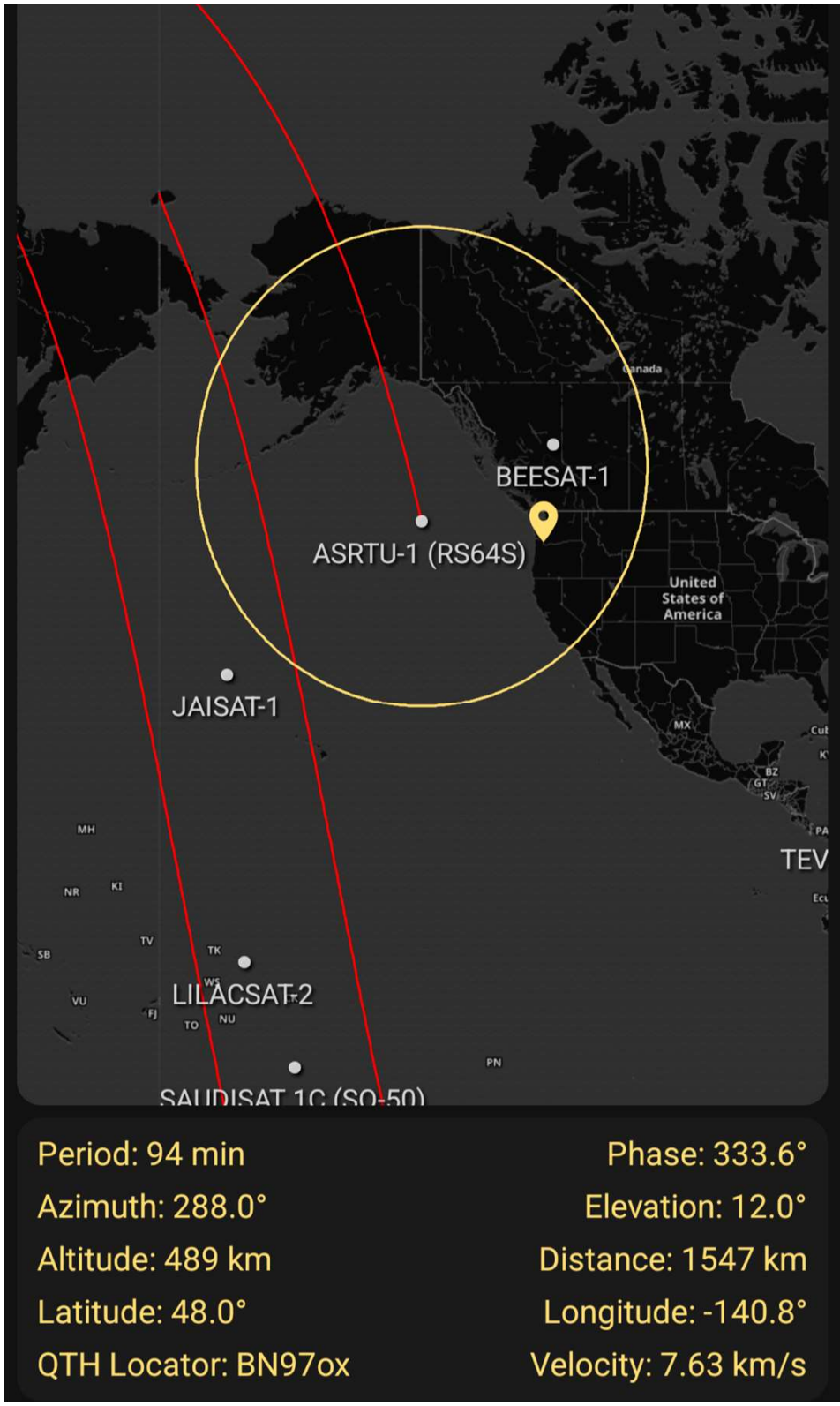


AO-123(ASRTU OSCAR 123)

Dimensions: 12U CubeSat



2024

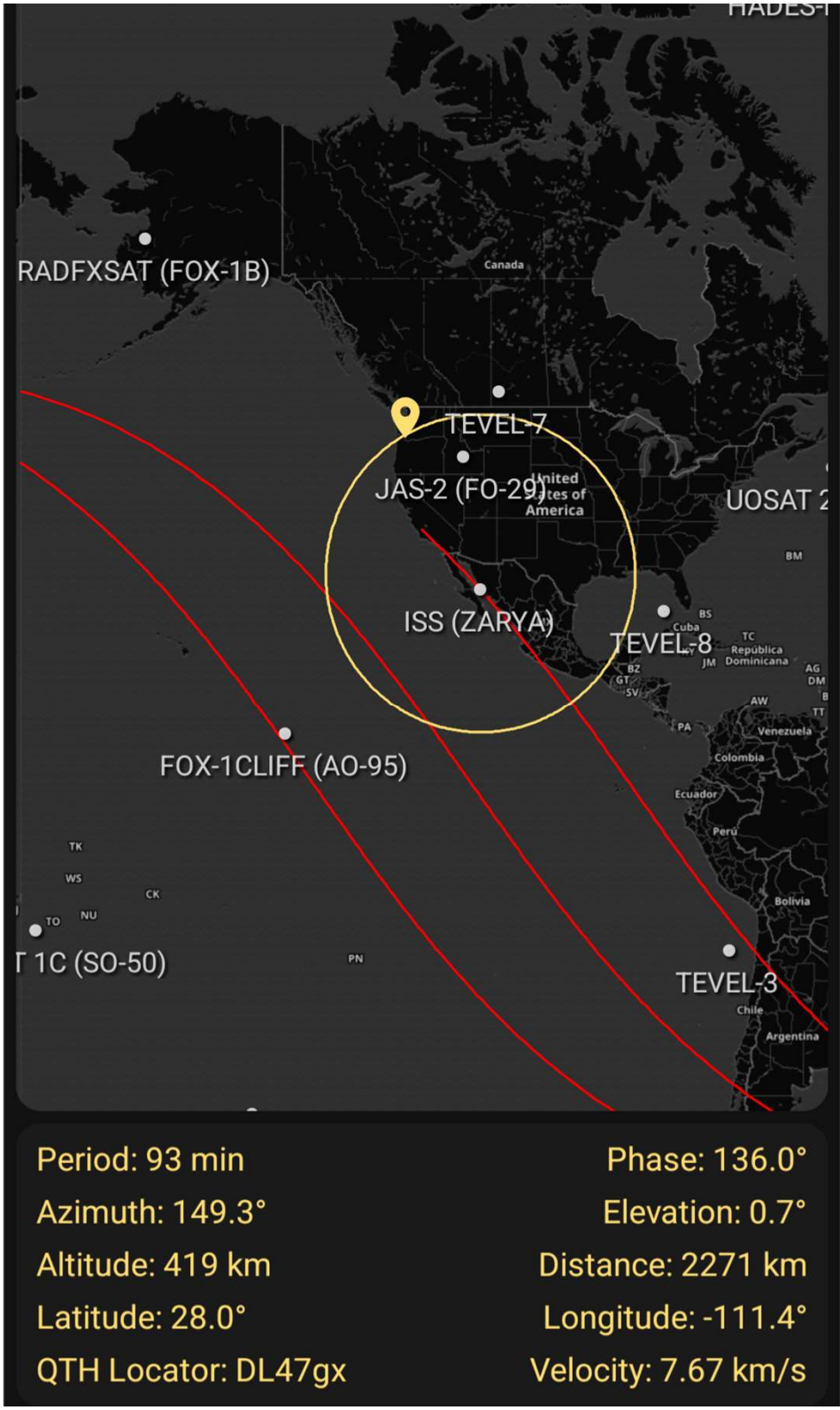


ARISS (Amateur Radio on the ISS)

Dimensions: 356 feet (109 meters) end-to-end, one yard shy of the full length of an American football field including the end zones

Downlink power: 5 W

2030 Retirement



New FM Satellites Coming in 2025

CAS-11

- 6U CubeSat
- Estimate 250mW downlink

HADES-ICM & HADES-R

- 1.5p PocketQubes
- 250 mW downlink

Launching January 14th!!

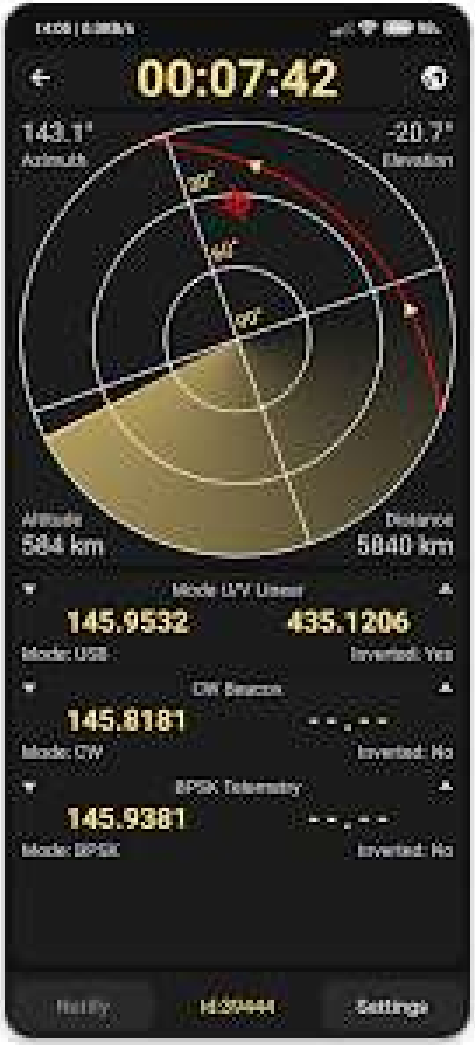
How do I find the satellites?

Apps for Smartphone / Tablet			
	Android	**Apple**	
Look4Sat	X		*free*
ISS Detector Pro	X	X	*paid*
Heavens Above Pro	X		*paid*
GoSatWatch		X	*paid*

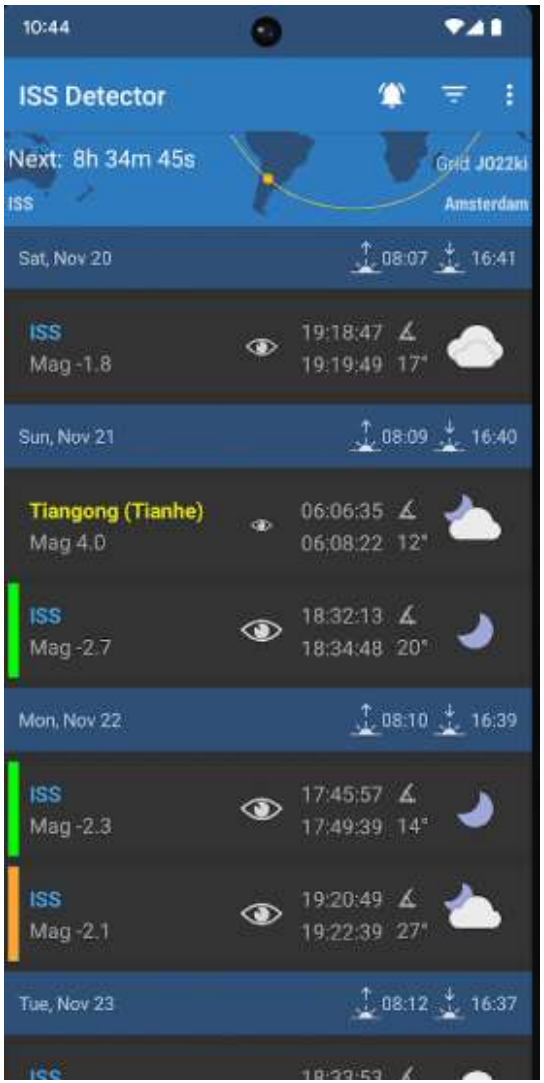
Web Based - Access via Browser		
https://www.amsat.org/track/index.php	X	*free*
SatMatch.com	X	*free*
Hams.at	X	*free*
n2yo.com	X	*free/ads*
Satview.org	X	*free*

Programs for Computers				
	Windows	**Linux**	**Apple**	
Gpredict		X		*free*
SatPC32	X			*free/paid*
HamClock		X		*free*
MacDoppler			*X*	paid

- Predicting satellite positions and passes for up to a week
- Showing the list of currently active and upcoming satellite passes
- Showing the active pass progress, polar trajectory and transceivers info
- Showing the satellite positional data, footprint and ground track on a map
- Custom TLE data import is available via files with TXT or TLE extensions
- Offline first: calculations are made offline. Weekly update of TLE data is recommended.

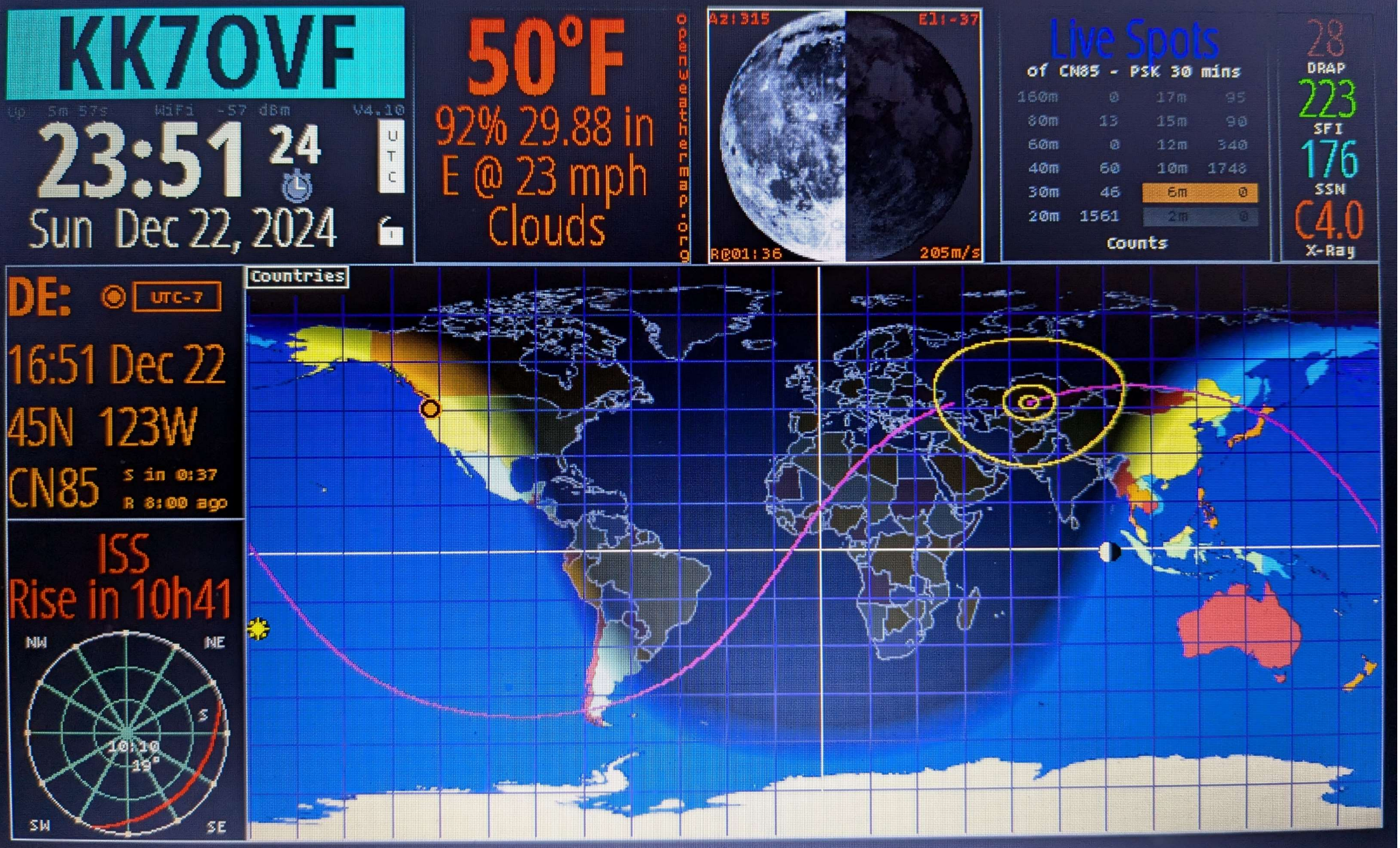


-Track dozens of ham and weather satellites. Includes transmitter frequencies and Doppler shift calculations.
- Overview of the coming passes
- Weather conditions for perfect sightings
- Notifications and Alarms



- See what's in the sky above you right now or at a given moment
- Get precise predictions for passes of the International Space Station (ISS) and most visible satellites
- Get passes for amateur radio satellites, complete with uplink and downlink information
- Predictions are generated right on your phone so you only need a data connection every few days.

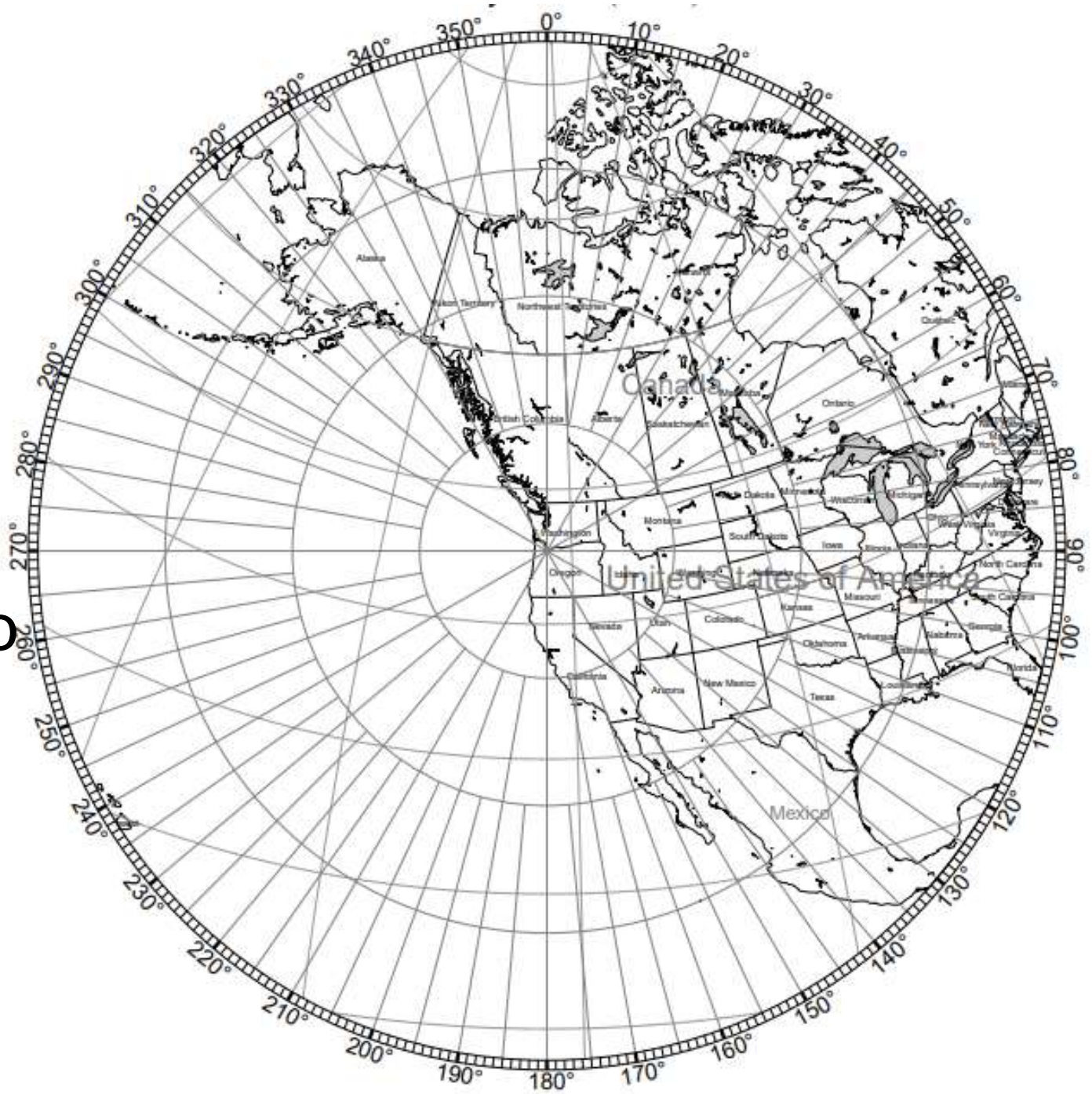
Hamclock - https://www.clearskyinstitute.com/ham/HamClock/



How Far Away Can I Make a Contact?

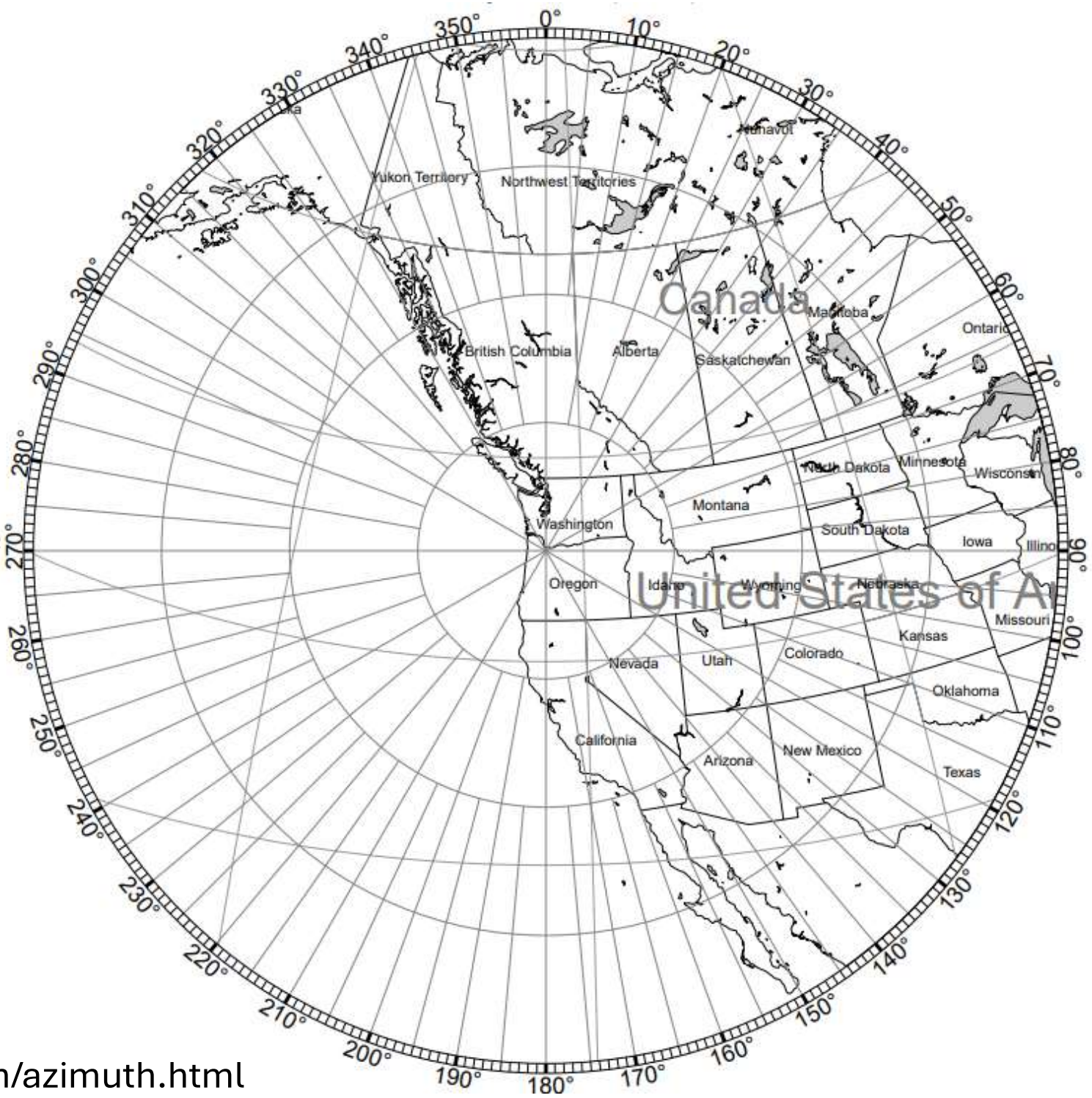
- SO-50 can reasonably go 4,200 km if both parties have good horizons

(2,600 miles)



- ARISS can reasonably go 2,800 km if both parties have good horizons

(1,740 miles)



https://ns6t.net/azimuth/azimuth.html

Satellite Contact Distance Records

- **AO-91 – 6,215 km.** KE9AJ in EN53ba86 <> G0ABI in IO80bu56. 10-Feb-2022 at 13:16 UTC
- **SO-50 – 5,584 km.** KE9AJ in EN55wu90gp <> MI0ILE in IO64wn80. 24-May-2023 at 13:16 UTC
- **PO-101 (FM) – 5,256 km.** F4DXV in JN04or70cl <> A65GC in LL74el99hm. 10-Oct-2021 at 12:21 UTC
- **ISS FM Repeater (V/U) – 4,403 km.** VE1PK in FN84eo <> G0ABI in IO80bu. 29-May-2021 at 20:13 UTC
- **AO-123** ??

https://www.amsat.org/satellite-distance-records/

What Are the Radio Frequencies?

Satellite	Uplink	Tone	Downlink	
AO-91	435.250 MHz	67 Hz CTCSS	145.960 MHz	*a*
PO-101	437.500 MHz	141.3 Hz CTCSS	145.900 MHz	*b*
SO-50	145.850 MHz	67 Hz CTCSS	436.795 MHz	*c*
AO-123	145.850 MHz	67 Hz CTCSS	435.400 MHz	*d*
ARISS	145.990 MHz	67 Hz CTCSS	437.800 MHz	

a - Do not operate while in eclipse of sun - weak batteries

b - Activated by schedule - see https://x.com/Diwata2PH

c - Has a 10 minute timer. Transmit 2 seconds on 145.850 w/ 74.4 Hz to activate

d - Will transmit telemetry 0.5s after transponder activitated if not reactivated

Recognized satellite frequencies posted at https://www.amsat.org/fm-satellite-frequency-summary/

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Do I Just Program Those Frequencies into My Radio?

Do I Just Program Those Frequencies into My Radio?

NO

If it was that easy – everyone would be doing it.

We need to account for the doppler effect

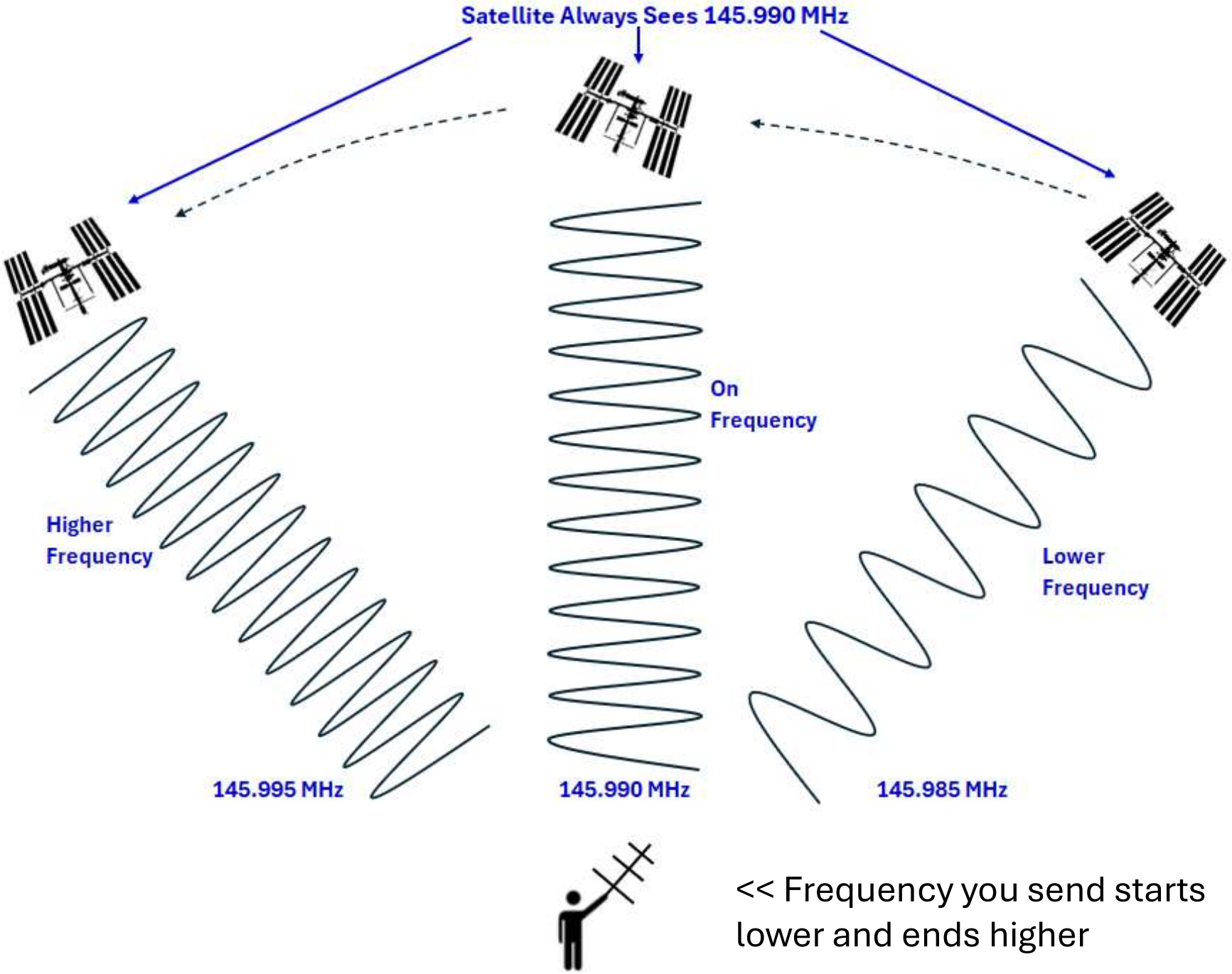
The Doppler Effect

The apparent change in the frequency of a wave caused by relative motion between the source of the wave and the observer

In our case:

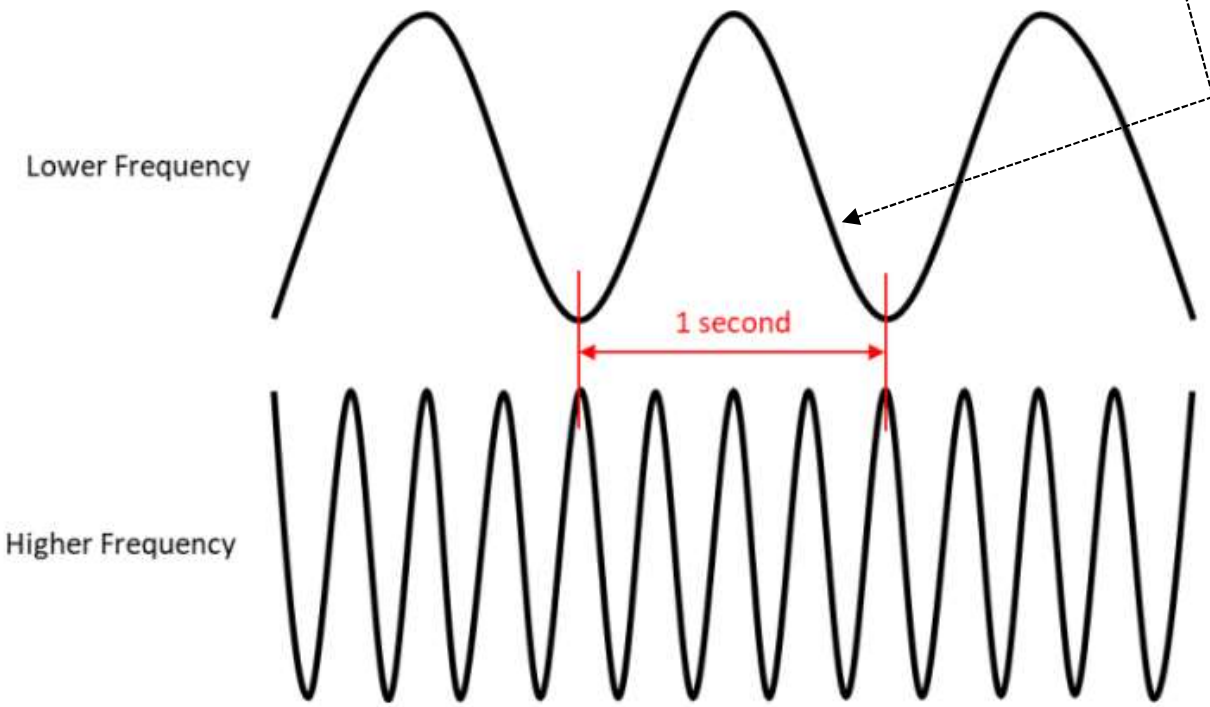
The apparent change in the radio frequency caused by the motion between the RF transmitter and the RF receiver

Transmission ‘to’ the ARISS Transponder



<< Frequency you send starts lower and ends higher

2 Meter Band - Wavelength

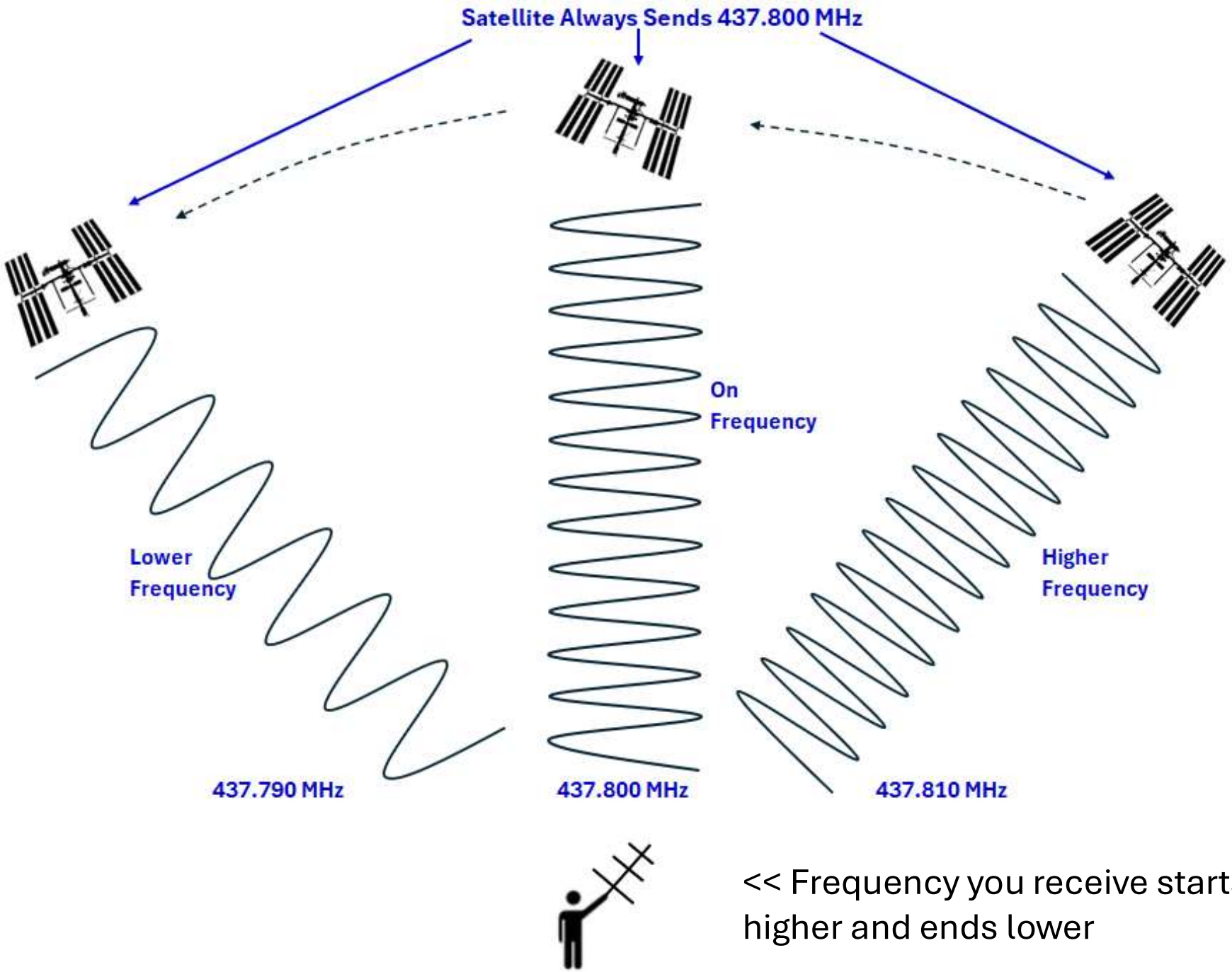


Number of radio waves passing a point in 1 second? (frequency/hertz)

145.990 MHz	Speed of Light (m/s) / Frequency (Hz)	299,792,458 / 145,990,000	=	2.05351	Wavelength (m)
145.985 MHz	Speed of Light (m/s) / Frequency (Hz)	299,792,458 / 145,985,000	=	2.05358	Wavelength (m)
				0.00007	Difference

hertz (Hz) = waves per second *wavelength = meters per wave*

Transmission ‘from’ the ARISS Transponder



<< Frequency you receive starts higher and ends lower

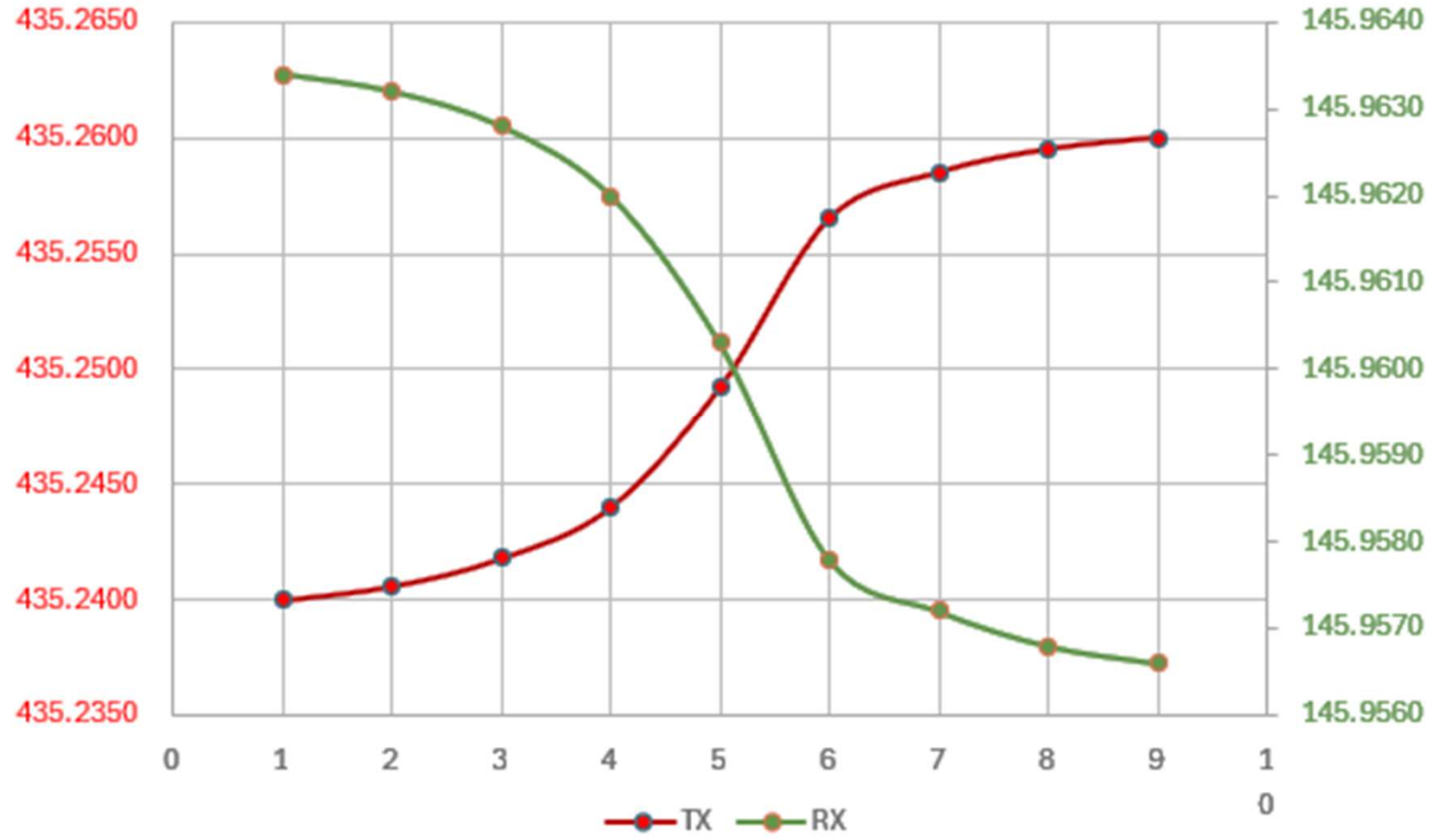
AO-91

32 Degree Pass to West

(South to North)

10 minutes 38 seconds

	AO-91	TX	+\- KHz	RX	+\- KHz
1	AOS	435.2400	(9.2)	145.9634	3.10
2	8 deg.	435.2406	(8.6)	145.9632	2.90
3	16 deg.	435.2418	(7.4)	145.9628	2.50
4	24 deg.	435.2440	(5.2)	145.9620	1.70
5	32 deg.	435.2492	-	145.9603	-
6	24 deg.	435.2565	7.3	145.9578	(2.50)
7	16 deg.	435.2585	9.3	145.9572	(3.10)
8	8 deg.	435.2595	10.3	145.9568	(3.50)
9	LOS	435.2600	10.8	145.9566	(3.70)



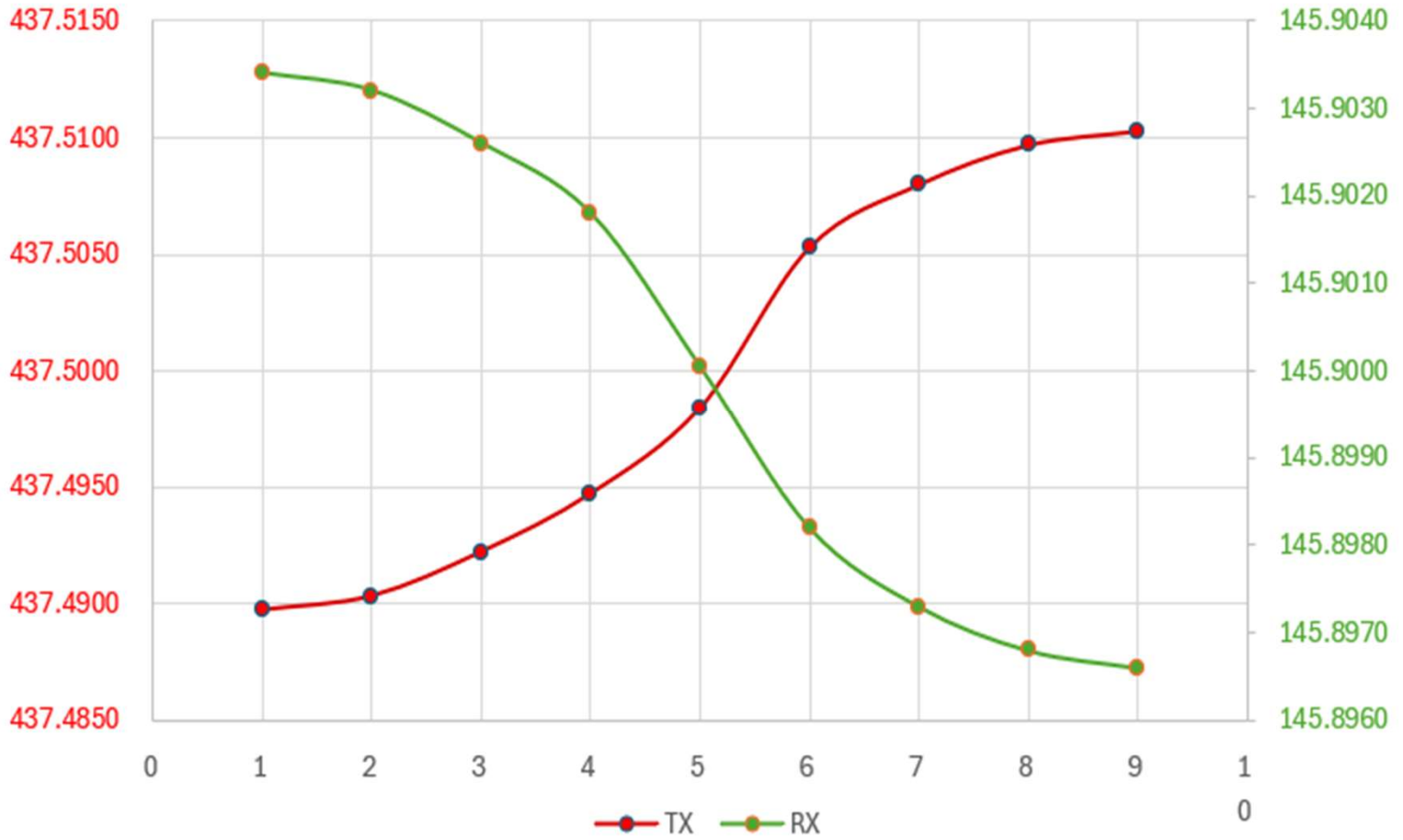
PO-101

77 Degree Pass Overhead

(North to South)

12 minutes 12 seconds

	PO-101	TX	+\- KHz	RX	+\- KHz
1	AOS	437.4897	(8.7)	145.9034	3.35
2	19 deg.	437.4903	(8.1)	145.9032	3.15
3	38 deg.	437.4922	(6.2)	145.9026	2.55
4	57 deg.	437.4947	(3.7)	145.9018	1.75
5	76 deg.	437.4984	-	145.9001	-
6	57 deg.	437.5053	6.9	145.8982	(1.85)
7	38 deg.	437.5080	9.6	145.8973	(2.75)
8	19 deg.	437.5097	11.3	145.8968	(3.25)
9	LOS	437.5103	11.9	145.8966	(3.45)



Programming to Account for Doppler

Name	TX Freq	CTCSS (TX)	RX Freq
SO50ON	145.845	74.4	436.810
SO50-1	145.845	67.0	436.810
SO50-2	145.850	67.0	436.805
SO50-3	145.850	67.0	436.800
SO50-4	**145.850**	**67.0**	**436.795**
SO50-5	145.850	67.0	436.790
SO50-6	145.850	67.0	436.785
SO50-7	145.855	67.0	436.780

Name	TX Freq	CTCSS (TX)	RX Freq
AO1231	145.845	67.0	434.415
AO1232	145.850	67.0	434.410
AO1233	145.850	67.0	434.405
AO1234	**145.850**	**67.0**	434.400
AO1235	145.850	67.0	434.395
AO1236	145.850	67.0	434.390
AO1237	145.855	67.0	434.385

Name	TX Freq	CTCSS (TX)	RX Freq
AO91 1	435.235	67.0	145.965
AO91 2	435.240	67.0	145.960
AO91 3	435.245	67.0	145.960
AO91 4	**435.250**	**67.0**	**145.960**
AO91 5	435.255	67.0	145.960
AO91 6	435.260	67.0	145.960
AO91 7	435.265	67.0	145.955

Name	TX Freq	CTCSS (TX)	RX Freq
PO1011	437.485	141.300	145.905
PO1012	437.490	141.300	145.900
PO1013	437.495	141.300	145.900
PO1014	**437.500**	141.300	**145.900**
PO1015	437.505	141.300	145.900
PO1016	437.510	141.300	145.900
PO1017	437.515	141.300	145.895

Name	TX Freq	CTCSS (TX)	RX Freq
ISS 1	145.985	67.0	437.810
ISS 2	145.990	67.0	437.805
ISS 3	**145.990**	**67.0**	**437.800**
ISS 4	145.990	67.0	437.795
ISS 5	145.995	67.0	437.790

Programming to Account for Doppler

- A simplified approach

PO-101	141.3	*Schedule*
	Up (FM)	Down (FM)
AOS	437.490	
2	437.495	
Mid	437.500	145.900
4	437.505	
LOS	437.510	

@Diwata2PH on Twitter

AO-91	67 Hz	
	Up (FM)	Down (FM)
AOS	435.240	
2	435.245	
Mid	435.250	145.960
4	435.255	
LOS	435.260	

AO-123	67 Hz	
	Up (FM)	Down (FM)
AOS		435.410
2		435.405
Mid	145.850	435.400
4		435.395
LOS		435.390

ISS	67 Hz	
	Up (FM)	Down (FM)
AOS		437.810
2		437.805
Mid	145.990	437.800
4		437.795
LOS		437.790

SO-50	67 Hz	
	Up (FM)	Down (FM)
AOS		436.805
2		436.800
Mid	145.850	436.795
4		436.790
LOS		436.785

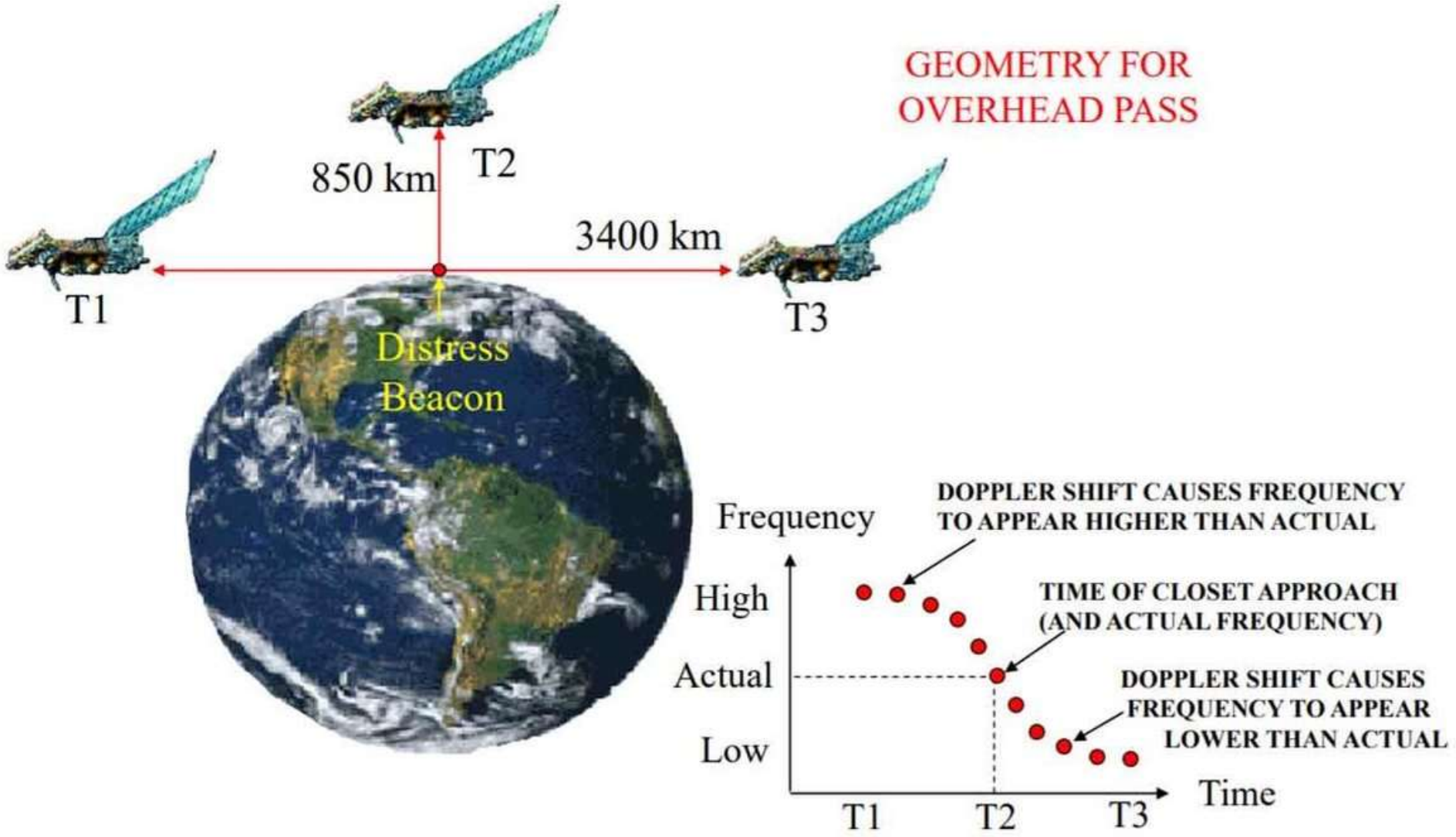
https://ke0pbr.wordpress.com/2018/12/31/my-frequency-cheat-sheet/

Other Options for Doppler Adjustment

- Some radios can accept input (CAT control) from a computer that will adjust for doppler more precisely using a specific satellite program (IC-705, IC-9700, Yaesu-991a, and similar)
- The Retevis RT3S HT w/GPS (~$100) can be programmed with OpenGD77 (free software) to adjust for doppler and display satellite location (also UV380/390, MD-9600, and others)

Search and Rescue Satellites – Doppler

SARSAT emergency beacons transmit in the 406MHz range when there is an emergency. Those signals are received by satellites and doppler is used to determine the beacon's location. www.sarsat.noaa.gov



Can I use the Stock Vertical Antenna?

- You can **listen** to the ARISS transmitting at 5 watts, but you will struggle hearing the satellites transmitting at less than 1 watt.
- Successful transmitting and receiving with these satellites is going to require some 'gain'

In a transmitting antenna, the gain describes how well the antenna converts input power into radio waves headed in a specified direction. In a receiving antenna, the gain describes how well the antenna converts radio waves arriving from a specified direction into electrical power.

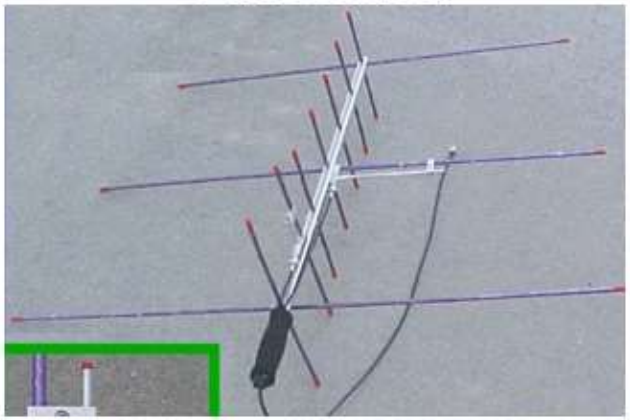
Gain is usually measured in logarithmic decibel units or dBs, making "dB gain" an expression of amplification (*3 dB gain equivalent to doubling the power*)

What Antenna Should I Use?

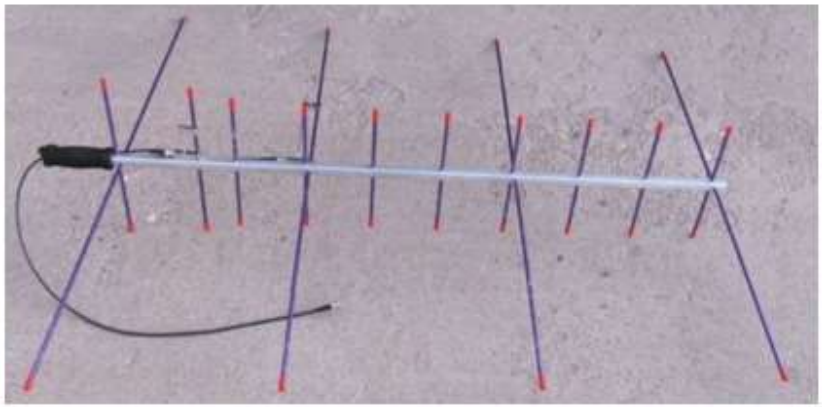
- A Yagi antenna is the classic go-to for satellite work. Some folks opt for the Log Periodic.
- You can make your own antenna or purchase them

Elk Antennas 2M/440L5 Dual-Band Antenna

Arrow II Satellite Antenna

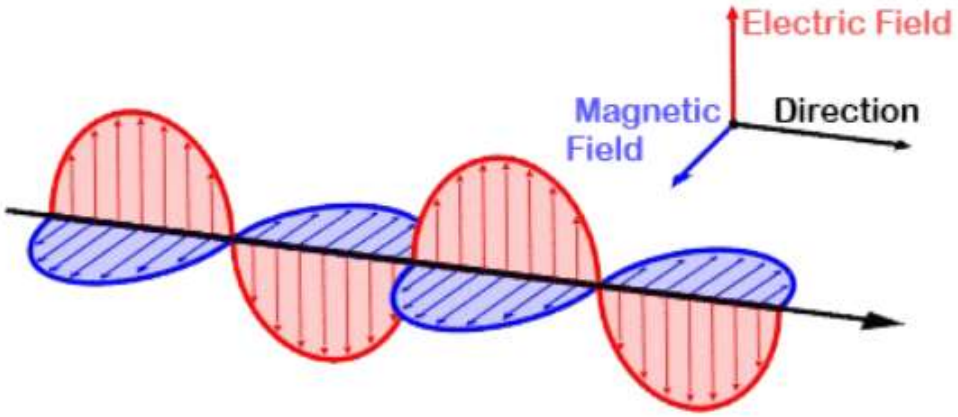


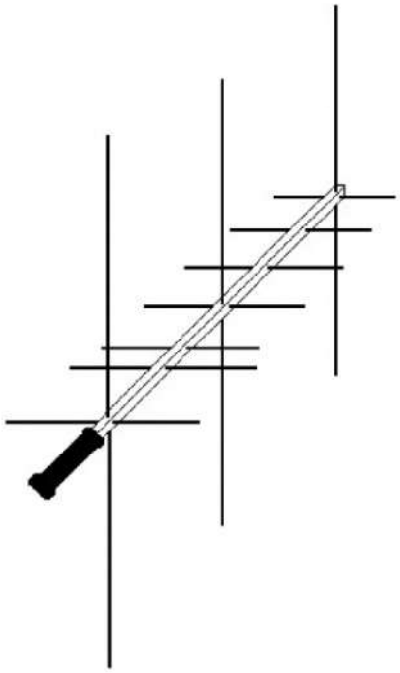
Alaskan Arrow Satellite Antenna

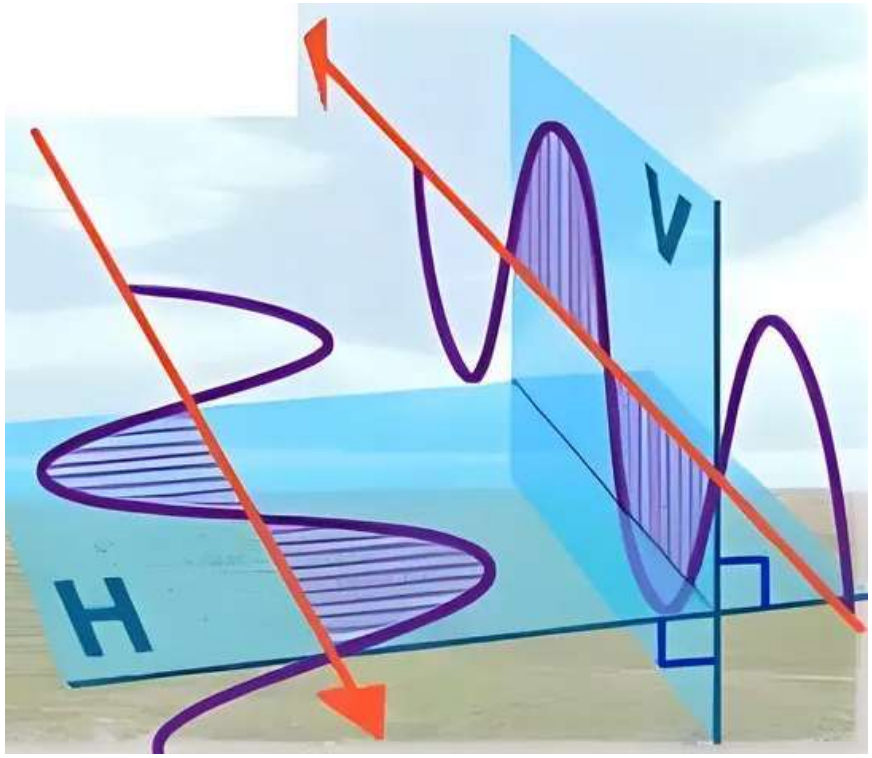


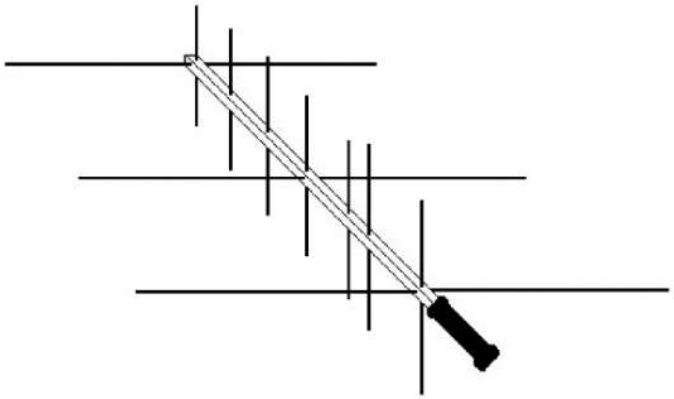
https://www.arrowantennas.com/
https://elkantennas.com/

Polarization









https://www.tesswave.com/what-is-antenna-polarization/

Let’s Review

- Know the FM satellites
- Finding / tracking the satellite
- What is footprint / possible contact distance
- Ready for doppler (programming or auto)
- Antenna with some gain on 2m/70cm

Practical Walkthrough

- Radio connected to antenna
- Power on and correct frequencies selected
- Phone app running and satellite selected (GPS & time)
- Digital recorder on – note the pass details
- 5 watts output is plenty (don't overwork sat AGC/batteries)
- Squelch off – yes, it's noisy
- Antenna up and thinking about polarization
- Listen, listen, listen… (you are sharing a 10-minute pass)
- Try an exchange – (call sign and grid square)
  - Hear: Whiskey Delta Nine Echo Whiskey Kilo, Delta Mike 43
  - Respond: Whiskey Delta Nine Echo Whiskey Kilo, this is Kilo Kilo Seven Oscar Victor Foxtrot, Charlie November 85
  - Hear: Kilo Kilo Seven Oscar Victor Foxtrot, this is Whiskey Delta Nine Echo Whiskey Kilo, QSL?
  - Respond: QSL, 73 or QSL, Thanks for the contact

What was that Exchange?

- Exchange – (call sign and grid square)
  - **Hear**: *Call sign A* (phonetically), *grid square*
  - **Respond**: *Call sign A*, *this is* *my call sign* (phonetically), *my grid square*
  - **Hear**: *My call sign*, *this is* *call sign A*, *QSL?*
  - **Respond**: *QSL 73* or *QSL thanks for the contact*

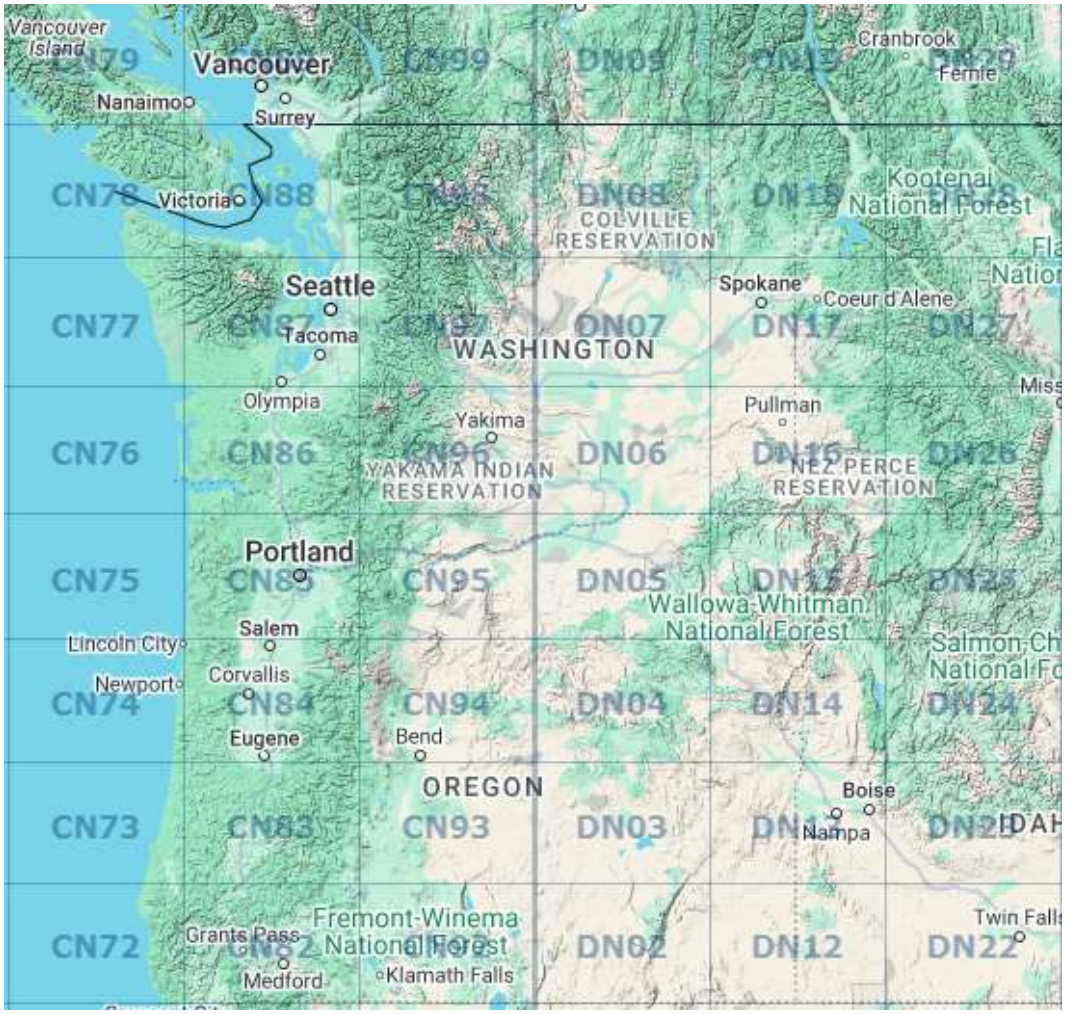
Maidenhead Grid Square

Grid squares are a shorthand means of describing your general location anywhere on the Earth.

The *Maidenhead Locator System* generally denotes a grid square which measures 1° latitude by 2° longitude (approximately 70 × 100 miles in the continental US).

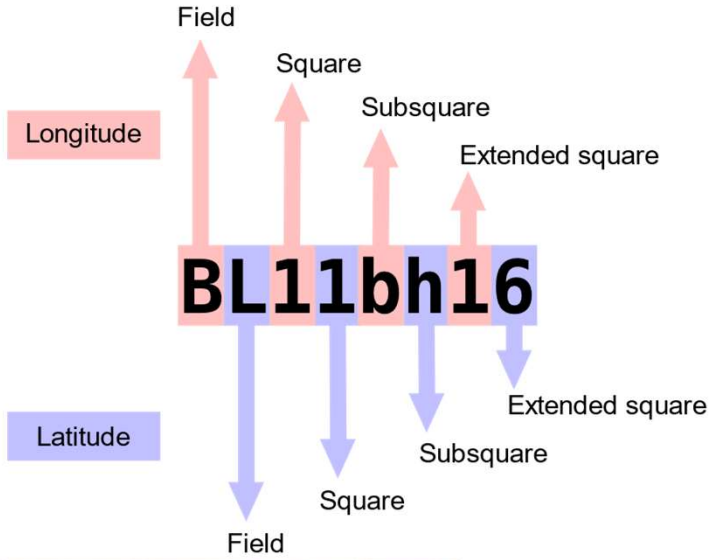
A grid square is indicated by two letters (the *field*) and two numbers (the *square*)

Field, Square, Sub-square



https://www.sotamaps.org/

Maidenhead Locator System 1980



https://www.mapability.com/ei8ic/gcm/index.php

Schedule a Satellite Contact

- You've got a friend in Denver, Colorado (DM79) and you live in Portland, Oregon (CN85)
- Use Satmatch.com to find a common ARISS pass

Satellite(s):

ISS

☐ Show Extra Options (All extra inputs are optional)

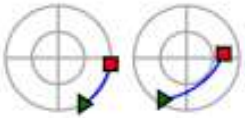
Grid1:

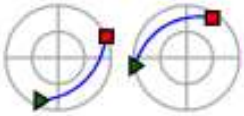
CN85

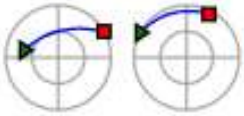
Grid2:

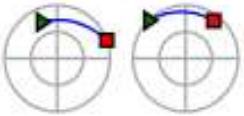
DM79

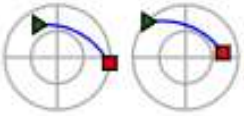
Submit


ISS-2025-01-06 04:02:14Z(+5m52s)


ISS-2025-01-06 05:37:27Z(+8m11s)


ISS-2025-01-06 07:15:49Z(+7m35s)


ISS-2025-01-06 08:53:33Z(+6m52s)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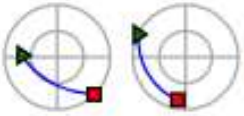
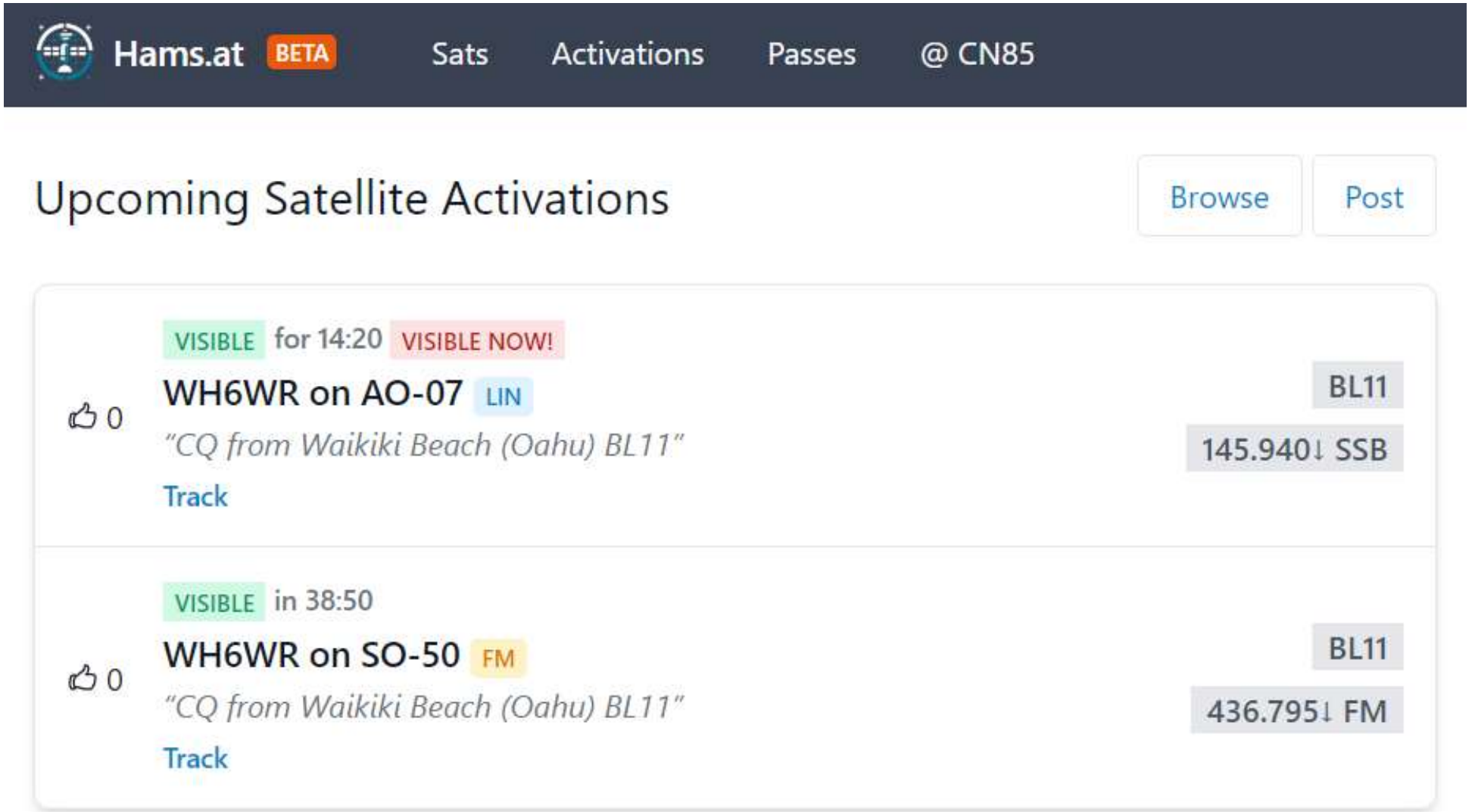

ISS-2025-01-06 12:07:03Z(+7m36s)

Find a Satellite Contact in a New Grid

- Is anyone working satellites from a new grid?
- Use hams.at to find out



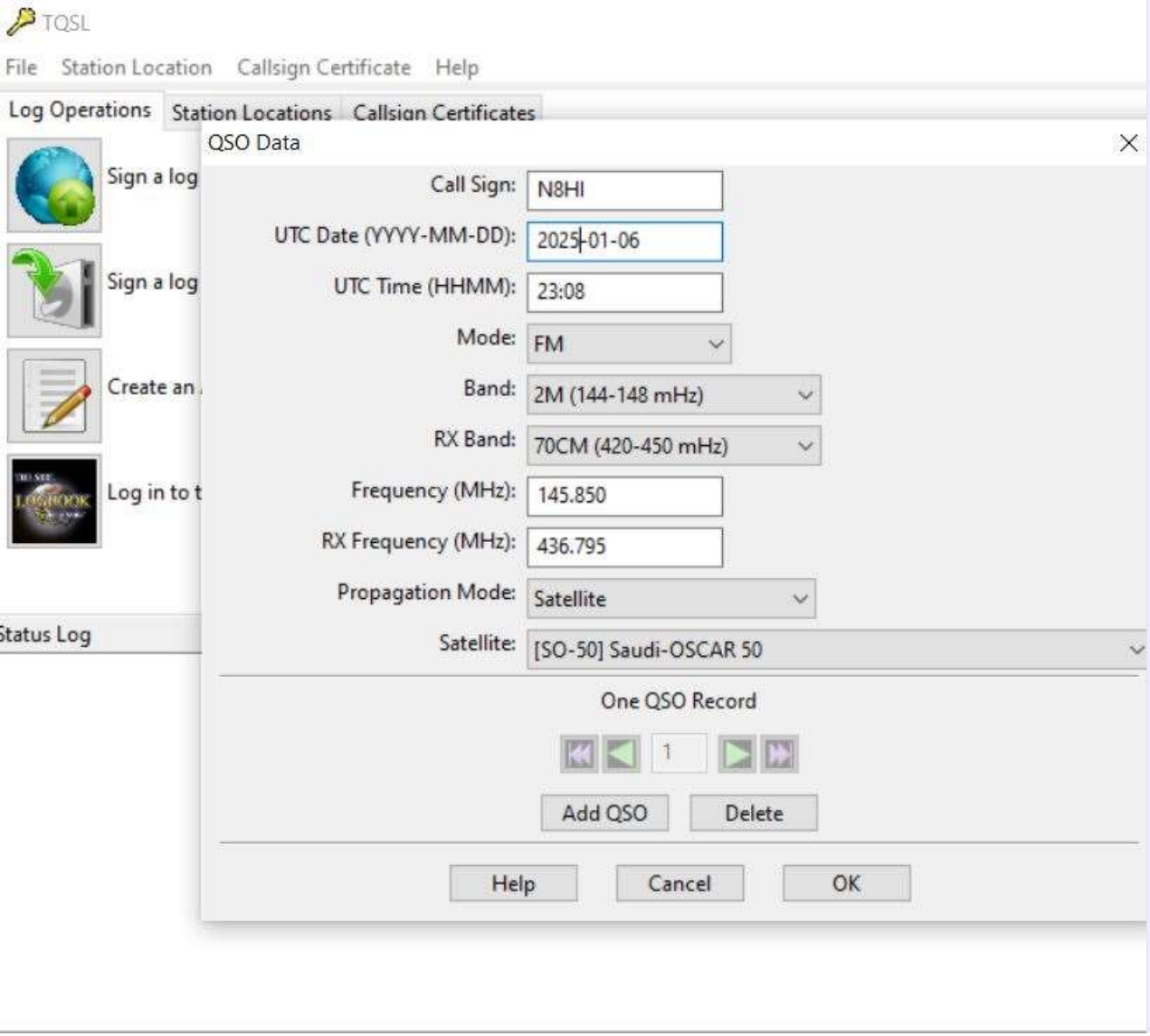
How do I Log my Satellite Contacts

The ARRL's Logbook of The World (LoTW) is the go-to logging platform for satellite contacts.

- Membership in the ARRL is not a requirement. To use LoTW, download the free TQSL application and direct it to request participation.
- The ARRL will send a postcard to the address specified in your FCC license that includes an 8-digit password.
- You'll be issued a unique callsign e-certificate and provided with access to an LoTW Account via the internet.
- After you're registered, you can submit QSOs to LoTW by either using TQSL to digitally sign those QSOs and convey them to LoTW via the internet, or by using one of the many logging applications that provide this capability.

LoTW Screenshots

- Logging a satellite contact and reviewing QSOs



Station	
Call Sign	KK7OVF
DXCC	UNITED STATES OF AMERICA (291)
CQ Zone	03
ITU Zone	06
Grid	CN85QK
State	Oregon (OR)
County	Clackamas
Worked Station	
Worked	N8HI
DXCC	UNITED STATES OF AMERICA (291)
CQ Zone	04
ITU Zone	08
Grid	EN73DA
State	Michigan (MI)
County	Kent
Date/Time	2025-01-06 23:08:00
Mode	FM (PHONE)
Band	2M
Frequency	145.85000
Receive Band	70CM
Receive Frequency	436.79500
Propagation Mode	SAT
Satellite	SO-50
QSL	2025-01-11 03:25:04

Record ID 2026476691 **Received:** 2025-01-11 03:25:04

Send a QSL Card

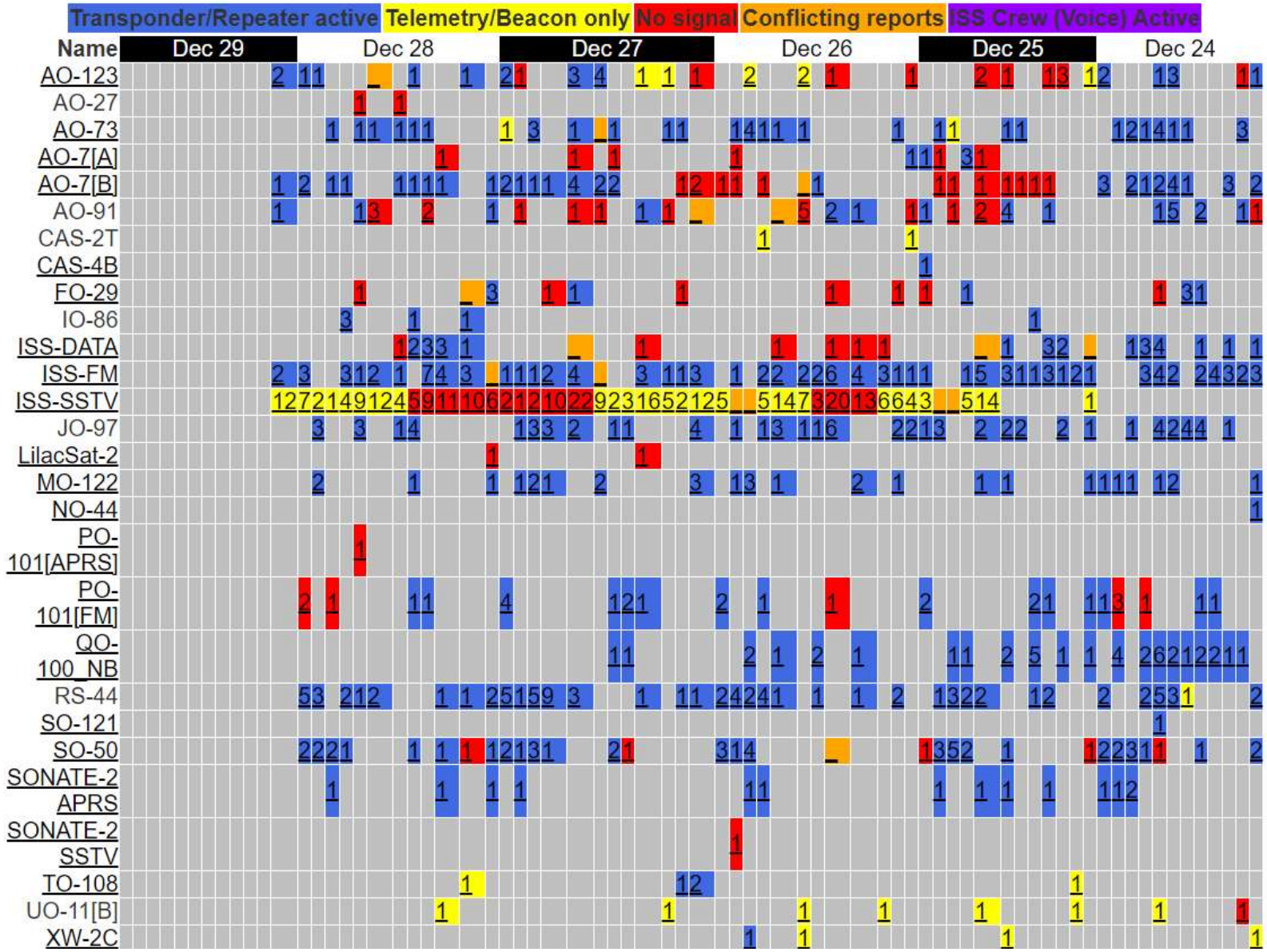
- QSL is shorthand for: “I acknowledge receipt of your message or transmission.”
- The card is like a physical handshake after a contact and can be very personalized
- Requirements for Satellite QSL cards:
  - Your callsign, address, county, country, CQ zone, grid square
  - Contacts callsign, grid square
  - Satellite name, UTC date/time, uplink band or frequency, mode (FM)
  - Size 3.5” x 5.5” << highly preferred
- Provide SASE (you might get it back)

https://www.radioqth.net/qslcards https://www.kb3ifhqslcards.com/ https://www.ux5uoqsl.com/

https://www.amazon.com/dp/B0C2HXLLNF?ref=ppx_yo2ov_dt_b_fed_asin_title&th=1 https://www.amazon.com/dp/B0C2K222NG?ref=ppx_yo2ov_dt_b_fed_asin_title

Let Others Know if the Satellite is Currently Operating

amsat.org/status/



Satellite Operating Awards

ARRL

- Century Club VUCC Satellite (QSOs w/100 unique grids from a single grid)
- Worked All States (QSOs w/all US States from single grid)

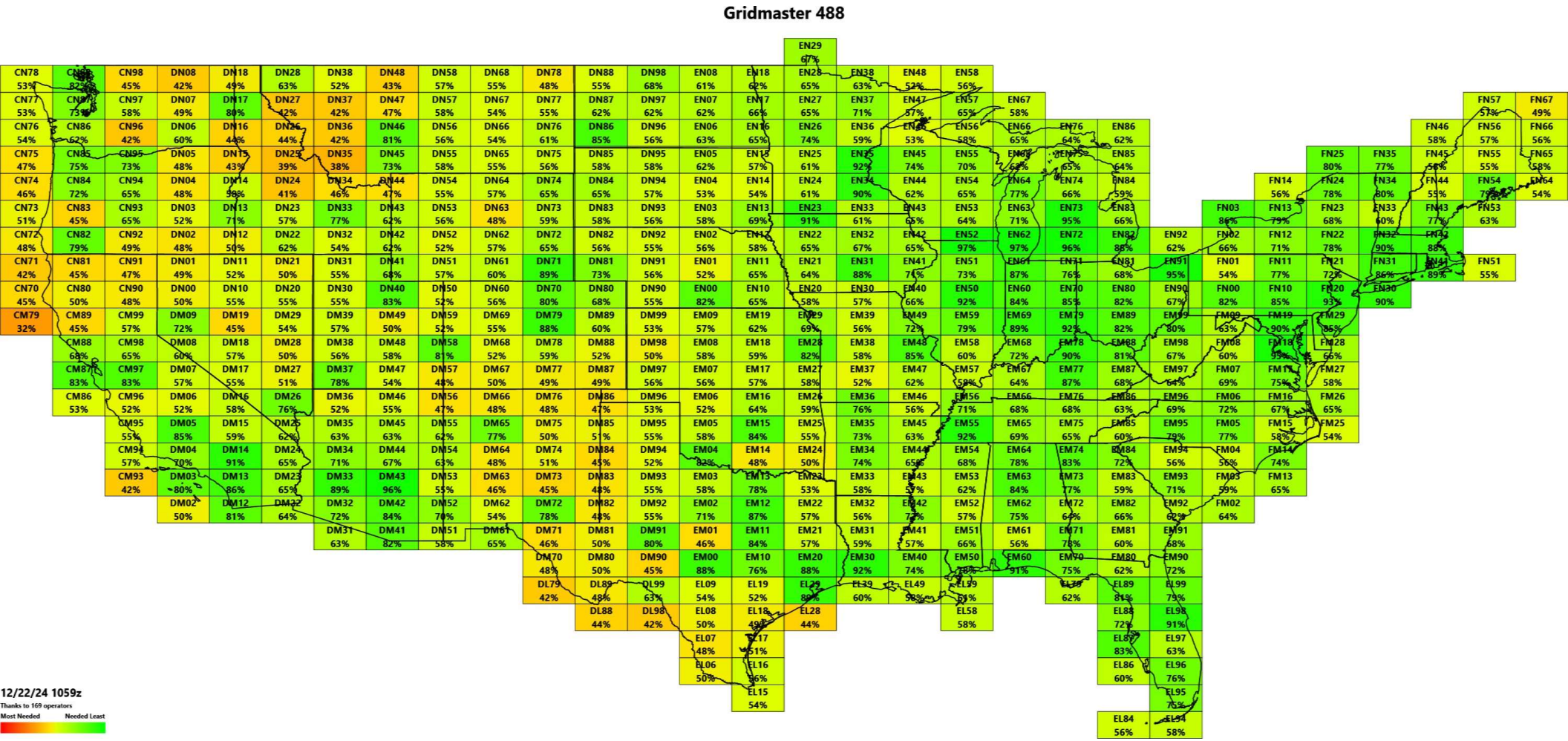
AMSAT

- Satellite Communicators' Club (1st QSO)
- Oscar Satellite Communications Achievement Award (20 QSOs, unique state/prov, one satellite). Add'l awards at 60 and 100.
- South Africa Satellite Communications Achievement Award (25 QSOs on SO-50/phase 2 sats)
- AMSAT Rover Award (25 points – see rules)
- GridMaster Award (QSOs in all 488 CONUS grids)
- Reverse VUCC (VUCC/r) Award (QSOs from 100 grids)
- Robert W. Barbee Jr., W4AMI Satellite Operator Achievement Award (1,000 non-unique QSOs – no confirmation required)

ARISS.org – QSL cards for ISS contacts/activity

Other ARRL – Worked All Continents, DX Century Club

Gridmaster Heat Map



https://ke4al.wordpress.com/2019/07/31/gridmaster-map-v2-3/

@GridMasterHeat on X.com

Let's Review

- Know the FM satellites
- Finding / tracking the satellite
- What is footprint / possible contact distance
- Ready for doppler (manual, programmed, auto)
- Antenna with some gain on 2m/70cm
- Get on the birds: Radio, antenna, sat app (gps & time), recorder, squelch off, listen…
- Make the exchange – callsign, grid square
- Schedule a contact / chase new grids
- Log the contact, maybe send a QSL card
- Contribute to AMSAT status page
- Apply for awards

Why Voice Satellite?

- Fun
- Home or mobile – very portable
- Technical challenge
- Scheduling in advance (no propagation worries)
- 10-minute time commitment
- Small ham community
- You could be someone's 1st satellite contact
- West Coast (less busy, WAS is possible on FM)
- Awards (with low numbers)
- The ISS is known to all

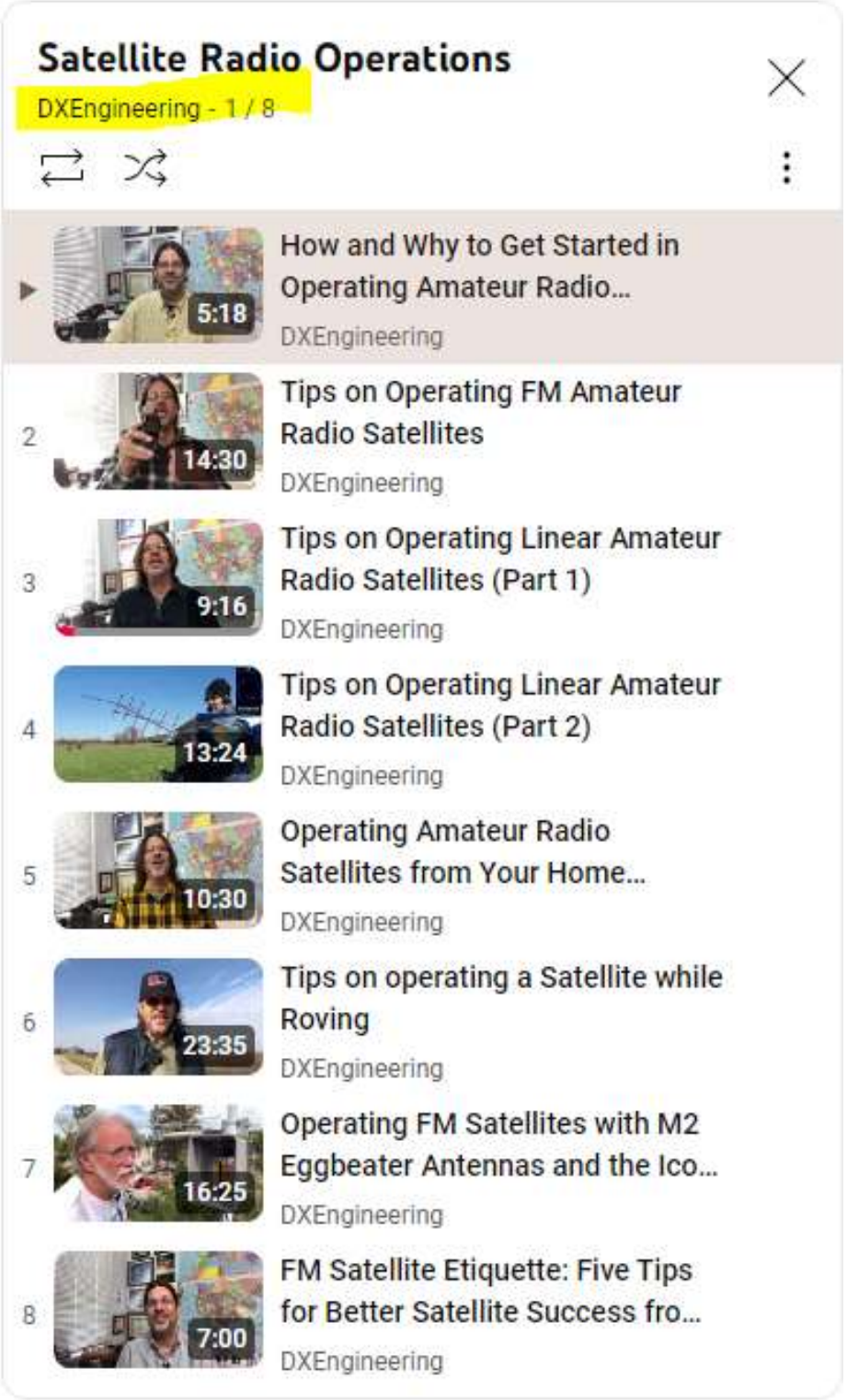
Operating Mode Abbreviations

Operating Mode	Frequency Range
U/V	435-438 MHz / 144 – 146 MHz
V/U	144 – 146 MHz / 435-438 MHz
L/U	1.26 – 1.27 GHz / 435 – 438 MHz
V/H	144 – 146 MHz / 21 – 30 MHz
H/S	21 – 30 MHz / 2.40 – 2.45 GHz
L/S	1.26 – 1.27 GHz / 2.40 – 2.45 GHz
L/X	1.26 – 1.27 GHz / 10.45 GHz
C/X	5.8 GHz / 10.45 GHz

More Resources –

Sean Kutzko, KX9X, 8-part series on YouTube ->

Patrick Stoddard's QRZ page - https://www.qrz.com/db/WD9EWK



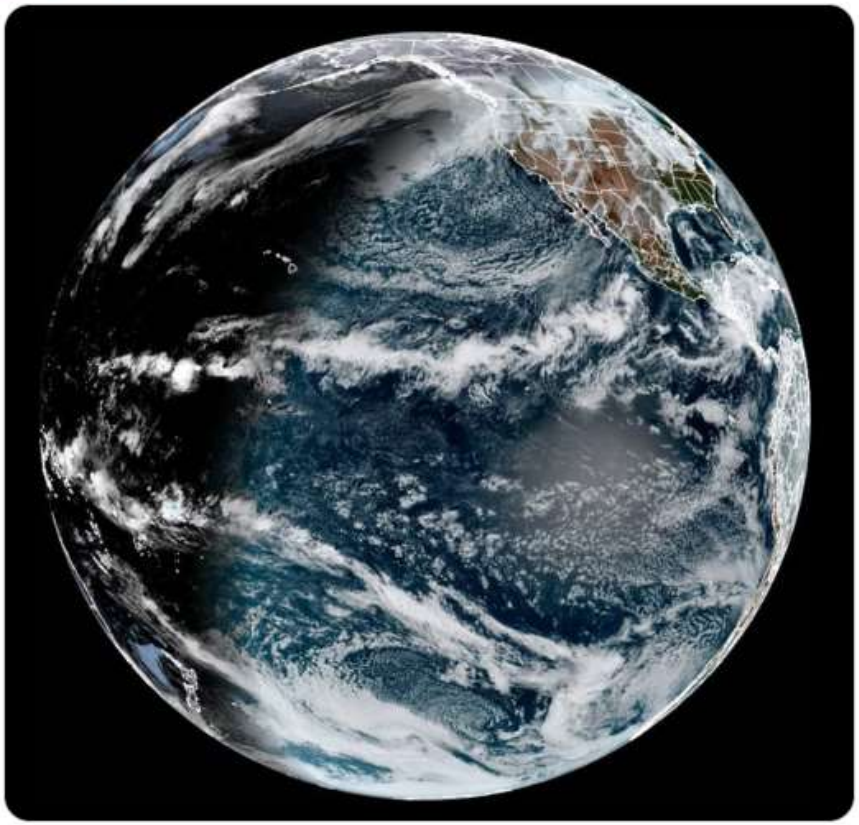
Now a Light Touch on Weather Satellites, SSTV Satellite Reception, and using APRS with Satellites

Weather Satellite Data Capture

Peter Vogel, VE7AFV Vancouver, B.C.

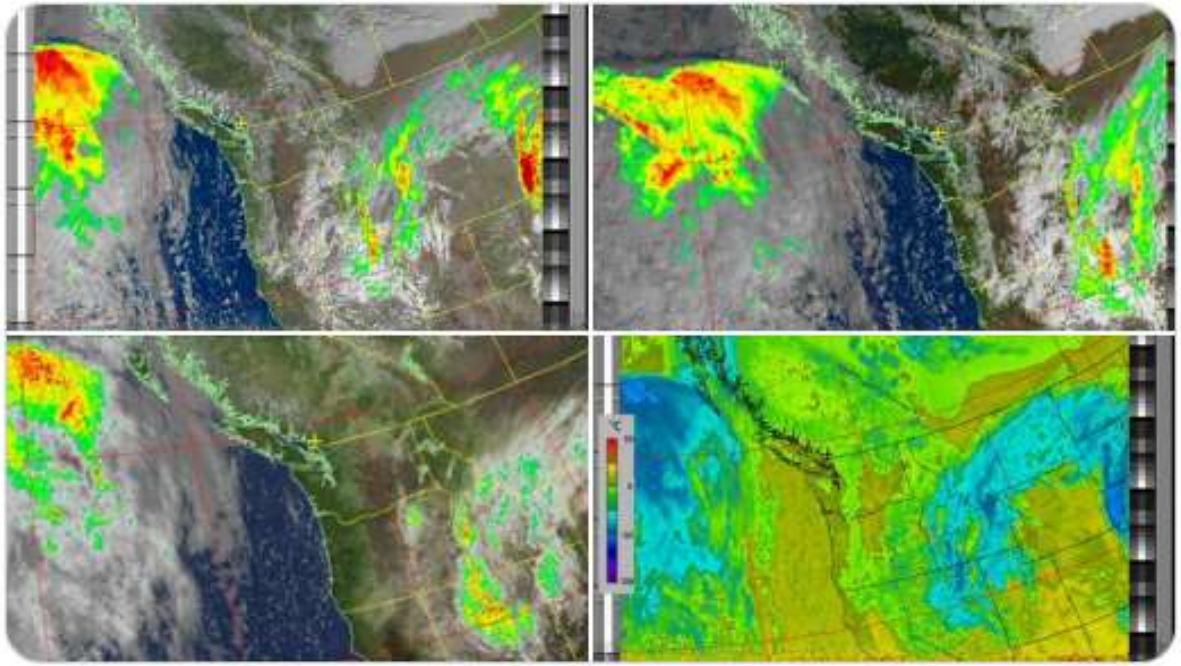
Peter Vogel @PeterVogel · 7h

GOES-18 at 1710 UTC / 9:10 AM PST. Full disk, not quite actual colour. Terminator approaching Hawaii.
@bc_news_addict #BCstormwatch



Peter Vogel @PeterVogel · Nov 15

How special. To get terrific images from each of the three active NOAA APT satellites, 18, 19, 15, along with an additional thermal image from 18. Ultracheap $35 ground station (old Raspi, @Nooelec NESDR Nano, broken TV rabbit ears antenna here in Vancouver).
#BCstormwatch



SatDump Software

- SatDump is general purpose satellite data processing software.
- Gaining popularity as it is a ‘one-stop-shop’ that covers all the stages from satellite transmission capture, decoding, to image production.
- Supports many SDRs such as RTL-SDR, Airspy, HackRF, BladeRF, LimeSDR, PlutoSDR, etc.

Satellite Tracking & Data Transmission Capture

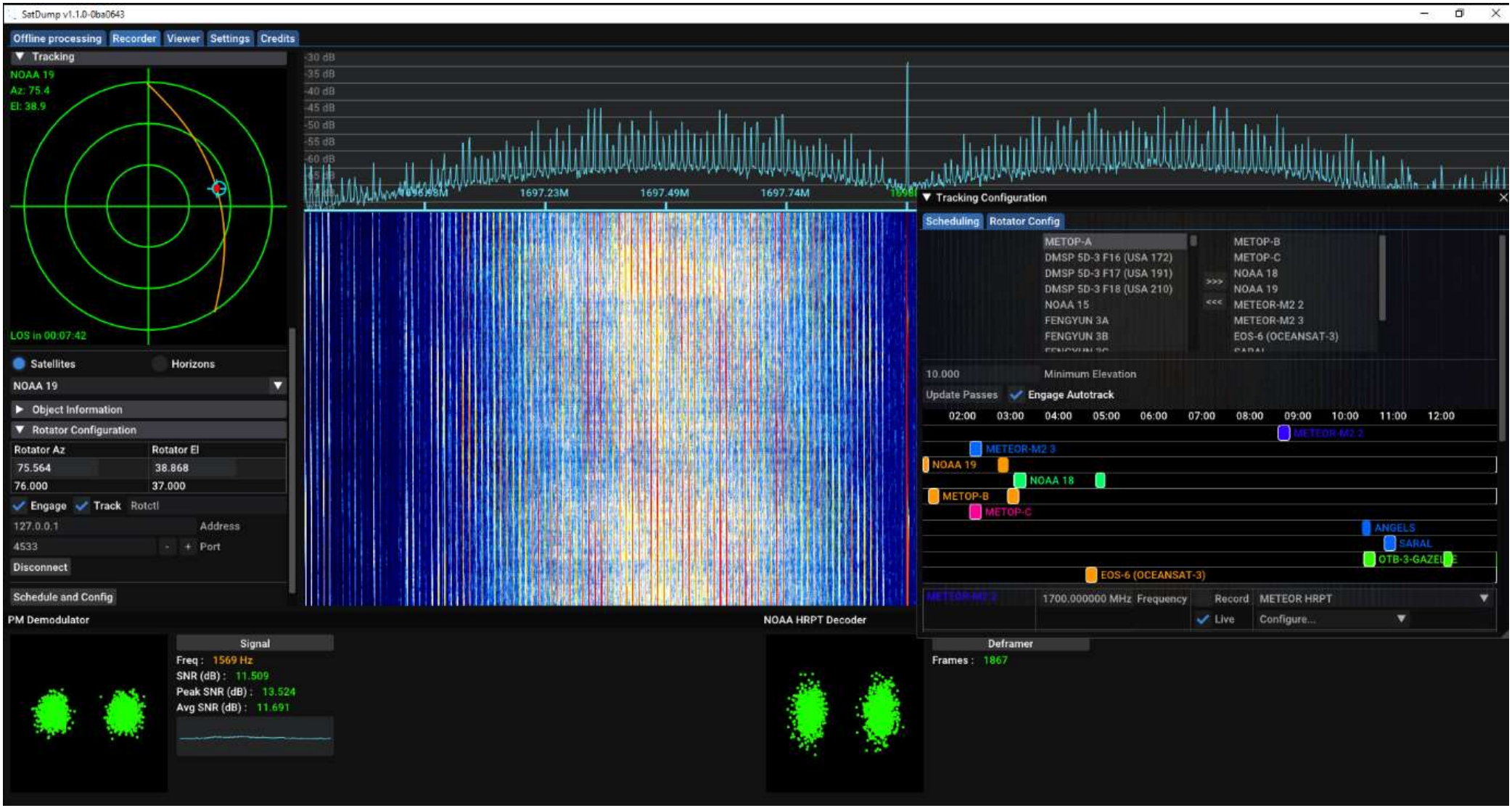
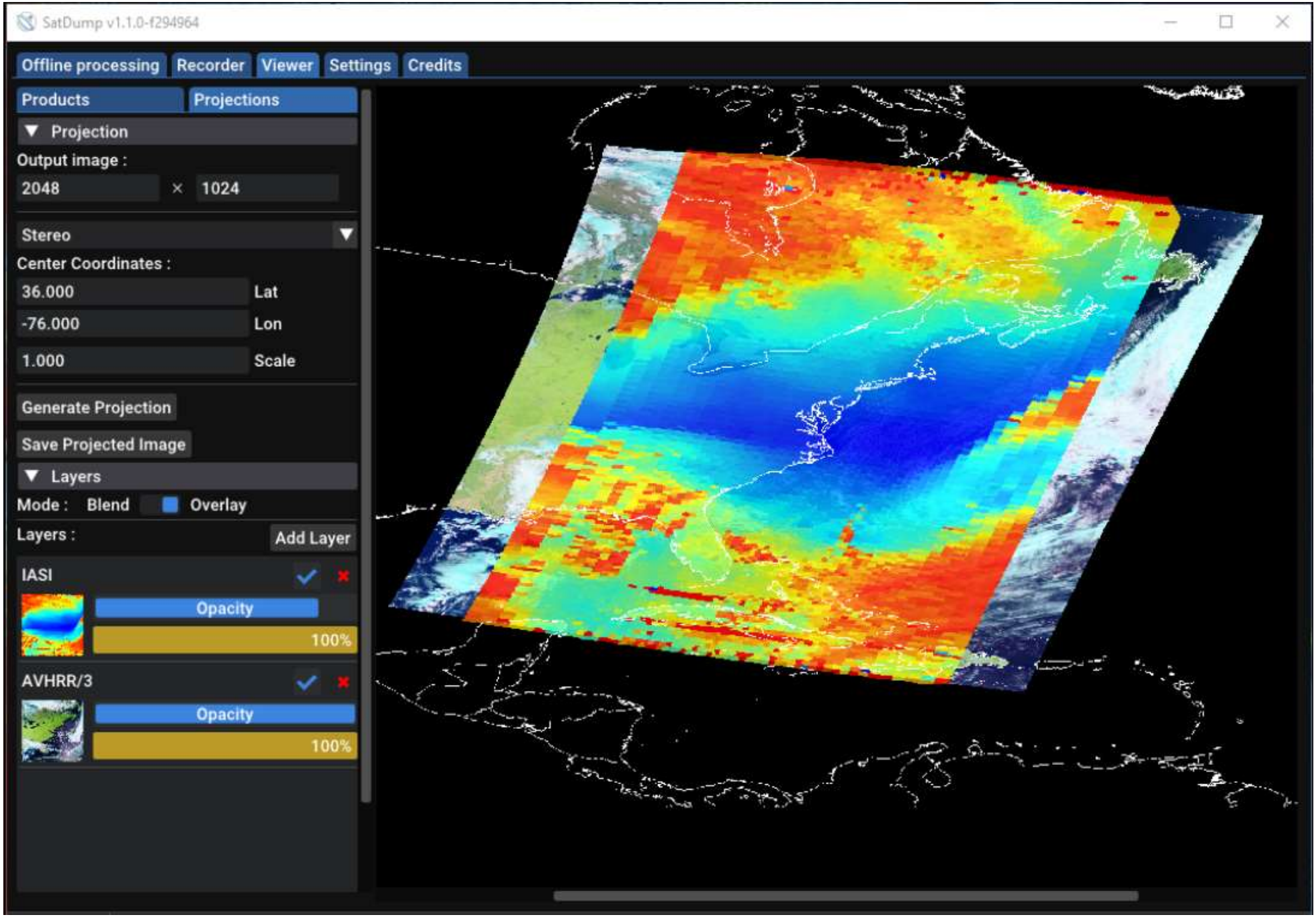


Image Processing and Overlay Map



Resources

- https://usradioguy.com/
- https://hagensieker.com/2024/01/12/capturing-noaa-satellite-imagery-with-rtl-sdr/
- https://bccatholic.ca/voices/peter-vogel/decoding-signals-from-a-geostationary-weather-satellite
- https://www.satdump.org/
- https://www.goes-r.gov/downloads/resources/documents/Beginners_Guide_to_GOES-R_Series_Data.pdf
- https://www.star.nesdis.noaa.gov/GOES/index.php
- https://www.reddit.com/r/amateursatellites/

Slow Scan Television (SSTV)

- SSTV is a method of sending photographic images, monochrome or color, using a voice channel and up to 3 kHz of bandwidth
- It's an analog signal that uses frequency shift modulation in which different values of brightness or color uses a different audio frequency
- There are a number of different modulation modes with different results – B&W, Color, low resolution, high resolution
- Transmission for a single picture can take eight seconds to several minutes (usually 1 or 2 min.)

What are the tools?

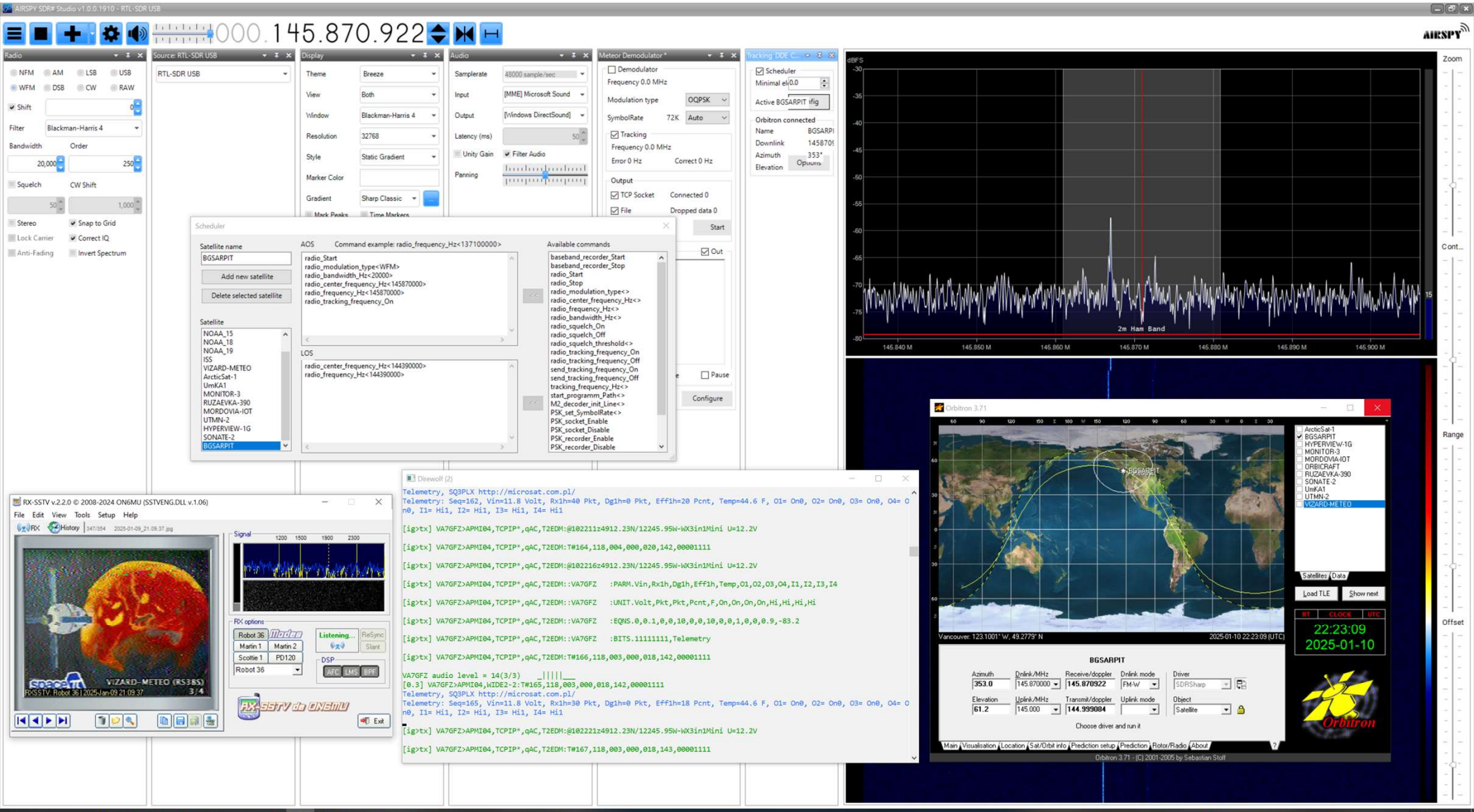
- Use a phone app like Robot36 (android) or SSTV Pad (ios); (SSTV Encoder for TX on android)
- Hold the phone up to the radio's speaker during the SSTV transmission, or record the transmission and play it to your phone later
- Use a computer program like MM-SSTV, RX-SSTV, (Win/Linux), or Black Cat SSTV (Win/Mac)
  - Connect to your radio with the appropriate cables / cords, or
  - You're just listening / receiving so an SDR is great

Watch for an SSTV Event

- Satellite broadcast of SSTV images is usually a scheduled event and is publicized
- ISS – November 2024 transmitted 12 images featuring activities from the 2024 40th Anniversary Celebrating Amateur Radio in Human Spaceflight (@ARISS_Intl on X)
- Sonate-2 transmits images of earth taken from orbit monthly/frequently (@JMUSpace on X)

Peter Vogel's SDR Approach

SDR, AirSpy, Orbitron, RX-SSTV

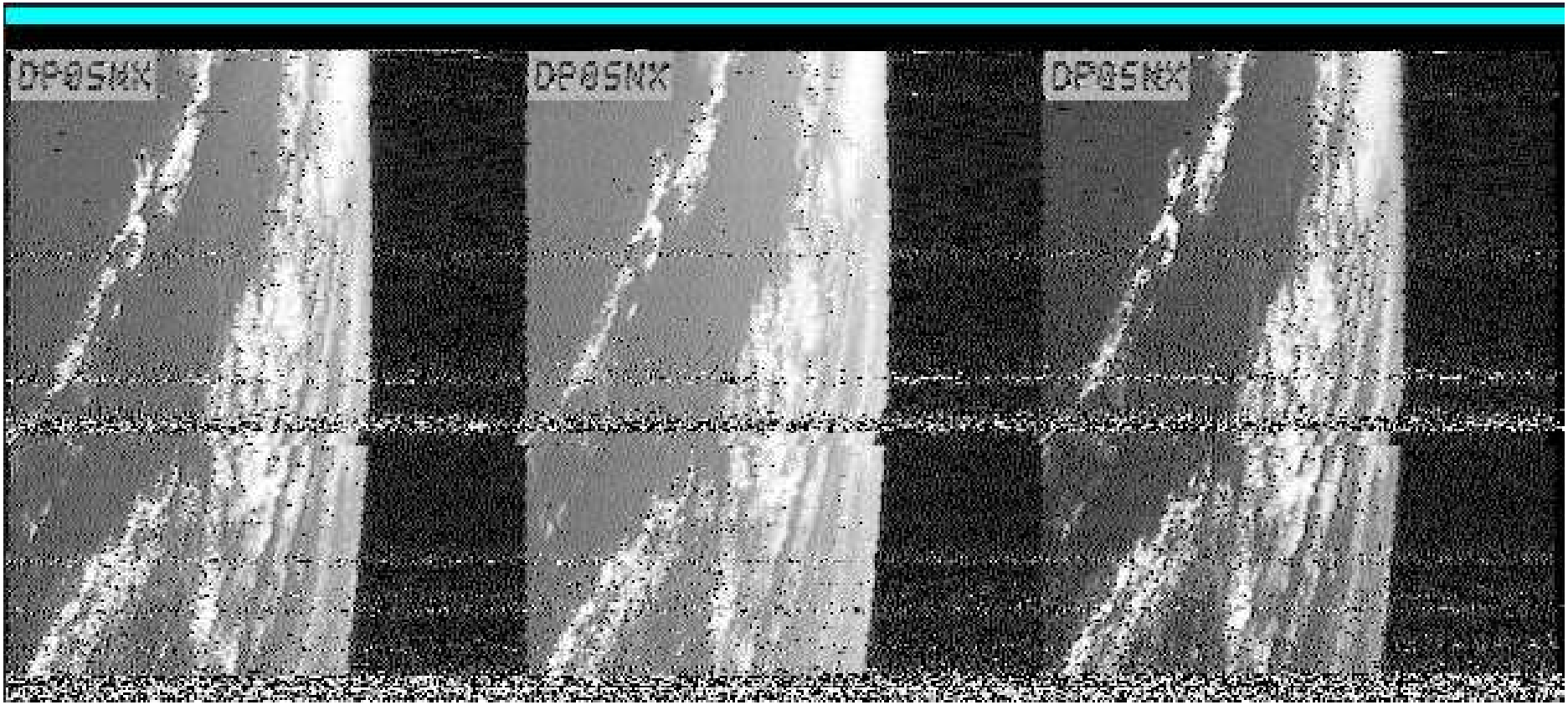


Recent SSTV Captures

ISS:

Recent SSTV Captures

Sonate-2:



APRS

- APRS stands for Automatic Packet Reporting System, a system that allows amateur radio operators to transmit information such as GPS location along with a message
- When an APRS packet is sent (usually on 144.390 MHz) it can be received by another APRS capable radio or a receiver acting as an i-Gate connected to the internet
- APRS has numerous use cases and operates world-wide – see APRS.org to learn more
- For satellite, we are going to focus on the basic functionality of sending a GPS location and a message and use 145.825 MHz

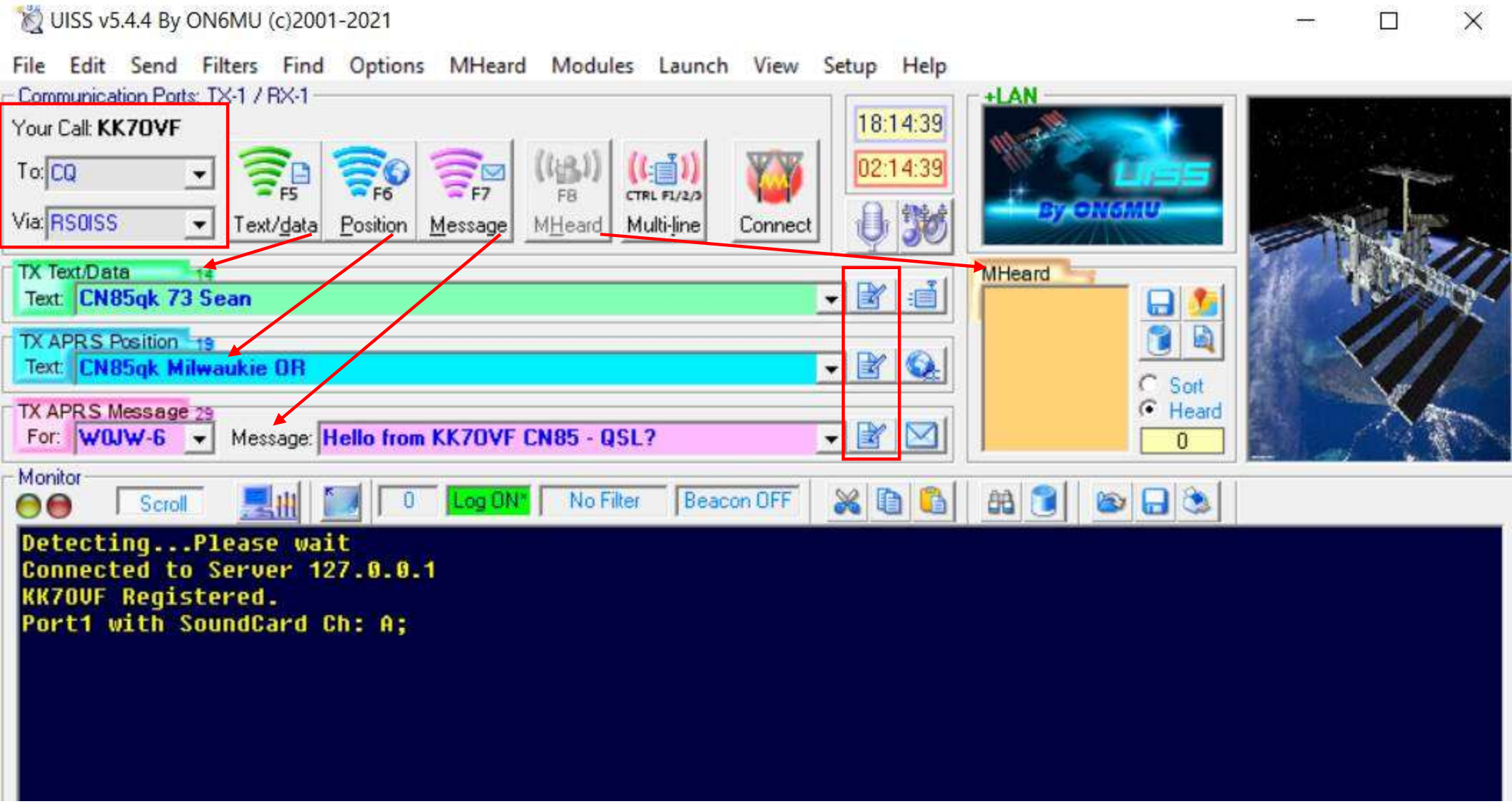
APRS for Non-APRS Radios

- Use ‘UISS’ software (will also include ‘Sound Modem’ software) qsl.net/on6mu/uiss.htm
- You will need a digital link to your radio – if you are set up for Winlink email or FT8 – you have what you need for APRS via UISS software
- Start up Sound Modem first (select com ports to your radio)
- Then start up UISS and tune your radio to 145.825 MHz (consider doppler)

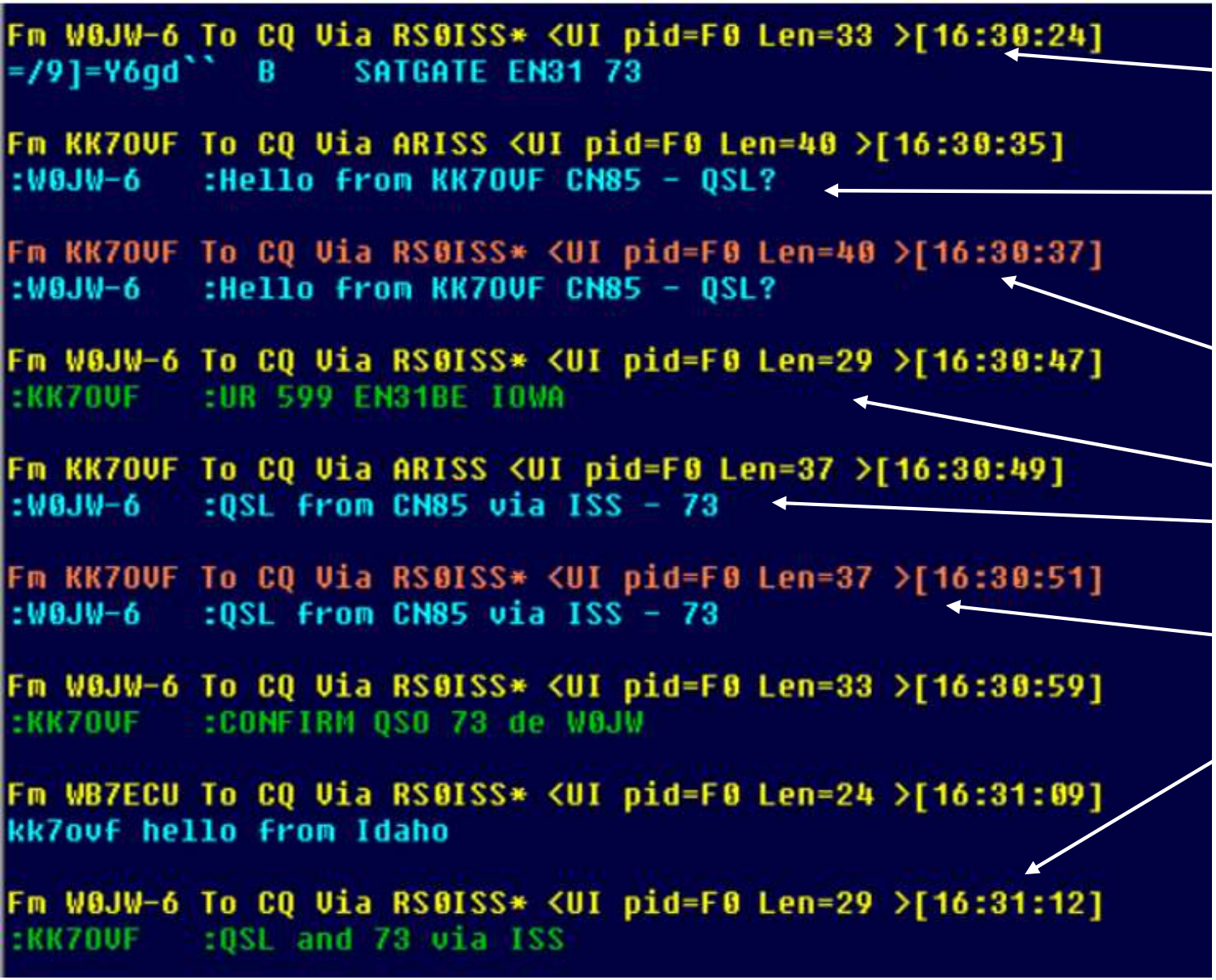
https://www.amsat.org/wordpress/wp-content/uploads/2014/01/AMSAT_Journal_ISS_Packet.pdf

UISS Interface for the ISS

Enter your call sign, address ‘CQ’ to the ISS ‘RS0ISS’. Prepopulate your messages. When the satellite is overhead and active use the buttons to send your location and messages.



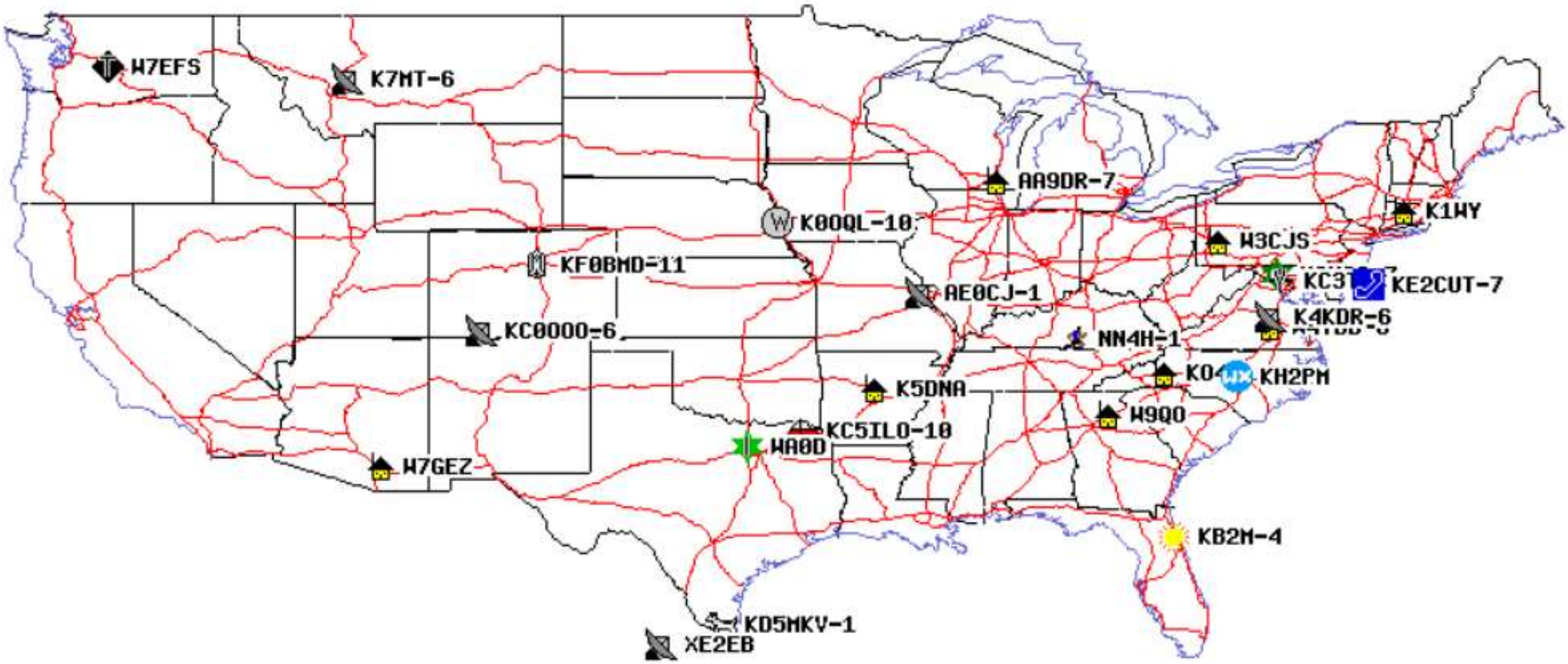
Example UISS Activity



- Listened... and heard W0JW-6
- KK7OVF sent message to W0JW-6
- KK7OVF digipeated
- W0JW responded
- KK7OVF confirmed QSL
- KK7OVF digipeated
- W0JW confirmed QSL

Did Your APRS to ISS Hit an i-Gate

- Check out ariss.net




Satellite Savvy: Successfully
Working with Radio Satellites
Portland Amateur Radio Club –
KK7OVF Sean Borgerson
January 2025
GROK