SAT-Groundstation for 2m and 70cm – HB9RYZ

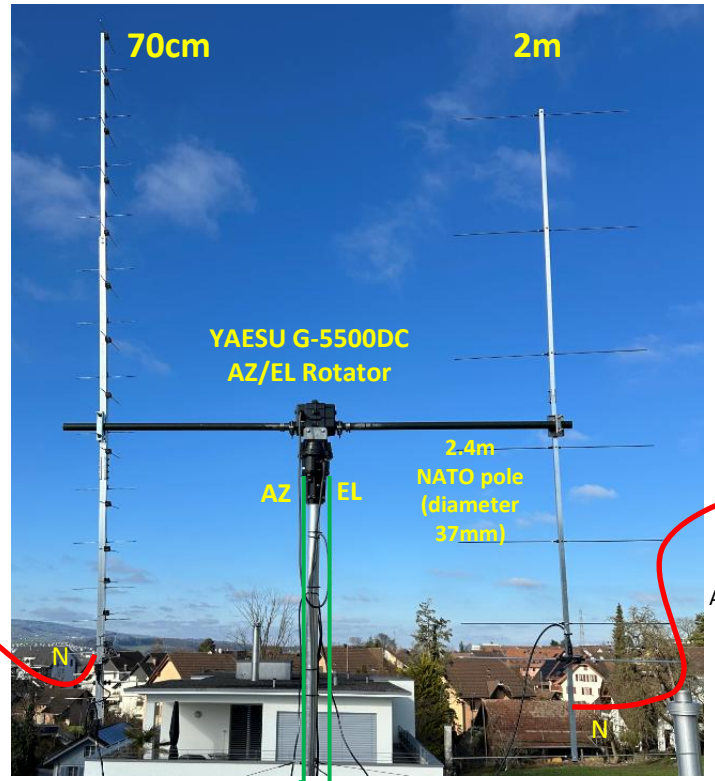
Antennas from Antenna Amplifiers (70cm) and Anjo (2m)

<u>2m</u>
YA014408 8-Element Anjo YAGI (144-146 MHz, G=12.4dBi) 3.13m, 8 Elements, 2 kW PEP

<u>70cm</u>
PA432-CROSS-30-3.5AP (432-440 MHz, G=16.7 dBi) 3.5m, 2 x 15 elements, 850 Watt PEP

- Right Circular (RHCP) for 70cm YAGI (SAT, E-Sporadic, Tropo)
- Horizontal for 2m YAGI (SAT, E-Sporadic, Tropo)
- ICOM IC-9700 with 100W
- SSB Electronic Preamp
- Low Noise Band Pass Filter for 2m and 70cm (Antenna Apmlifiers)
- YAESU G-5500 AZ/EL Rotor
- ARS-USB Box from EA4TX
- EA4TX Raspberry Pi Server for Web-GUI
- SatTrack from OZ9AAR and SAT32PC SAT-Tracking Software
- Remote Rotator Web-GUI on Raspberry Pi

SAT & EME Groundstation



3.5m
2x15 (30) Element
16.7 dBi Gain
Right Circular (RHCP) Polarization

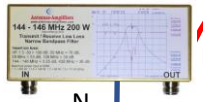
PA432-CROSS-30-3.5AP
BIG-LEO KIT

3.13 m
8 Element
12.4dBi Gain
Horizontal Polarization

YA014408 8-Element
Anjo YAGI

Satellite Tracking App SatTrack and SATPC32

2m Low Loss Band Pass Filter (200W)



N

4m
Aircell 7

N

1m
LMR/CFD300

N

SSB Pre-Amp 2m

N

15m
Ecoflex 10+

N

N

DG-503 70cm

1m H-155

70cm
(N)

IC-9700

1m H-155

2m
(PL)

N

N

DG-503 2m

6-pol

6-pol

N

N

70cm Low Loss Band Pass Filter (200W)

5.12m
Aircell 7

N

1m
LMR/CFD300

N

SSB Pre-Amp 70cm

N

15m
Ecoflex 10+

2x 6-pol
Wire (15m)

IC-9700, G-5500, LBV-Tracker, ARS-USB EA4TX

EA4TX Raspberry Pi with remoteRotator

virtual Serial Port

TCP-Port
6001

ARSVCOM

LAN

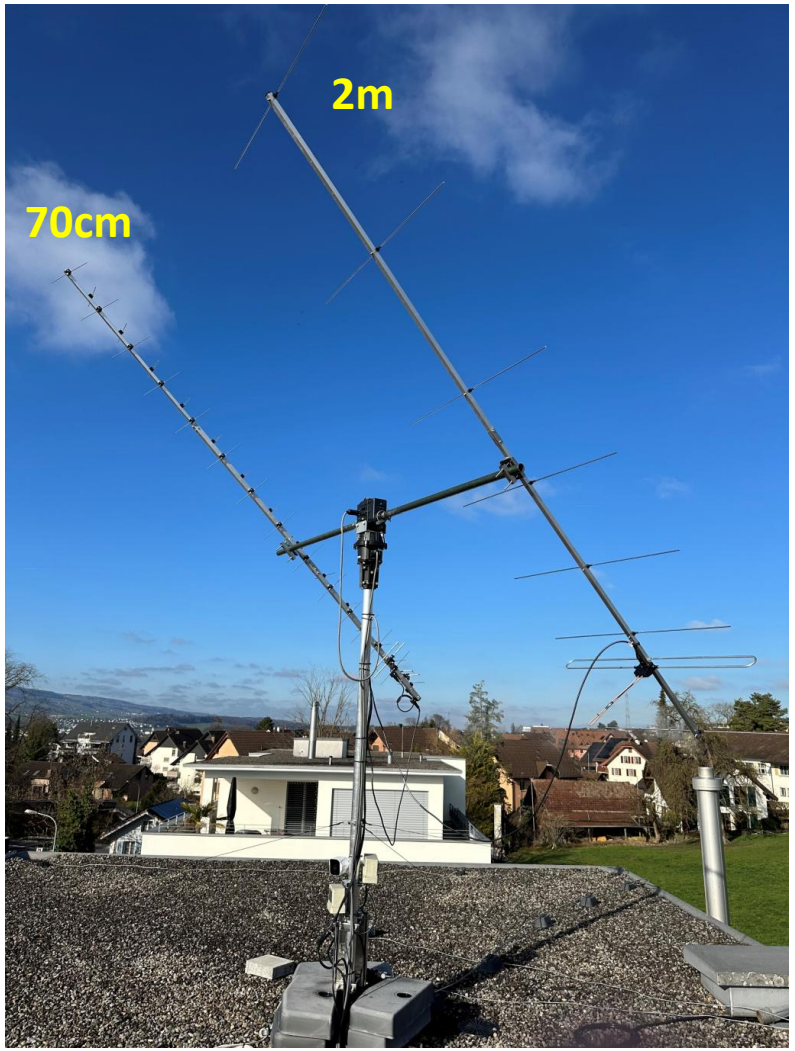
USB

EA4TX ARS-USB BOX

8-pol

HB9RYZ www.hb9ryz.ch 28. june 2025

SAT & EME Groundstation



2m = 8 element, 3.13 Boom, Gain = 12.4dBi, horizontal
70cm = 2 x 15 element, 3.5m Boom, Gain = 16.7 dBi, Right Circular (RHCP) Polarization
SSB Electronic Preamps, Low Loss Narrow Bandpass Filter from Antenna Amplifiers

SAT & EME Groundstation

- **2m = 8 element, 3.13m Boom, Gain = 12.4dBi, horizontal**
- **70cm = 2 x 15 element, 3.5m Boom, Gain = 16.7 dBi, (RHCP)**
- **SSB Electronic Preamps**
- **Low Loss Narrow Bandpass Filter for 2m and 70cm**

SAT Ground-Station for 2m and 70cm

YAESU G-5500 AZ/EL Rotor, ICOM IC-9700 (100W), ARS-USB Box from EA4TX with Raspberry Pi Server for Web-GUI

Windows

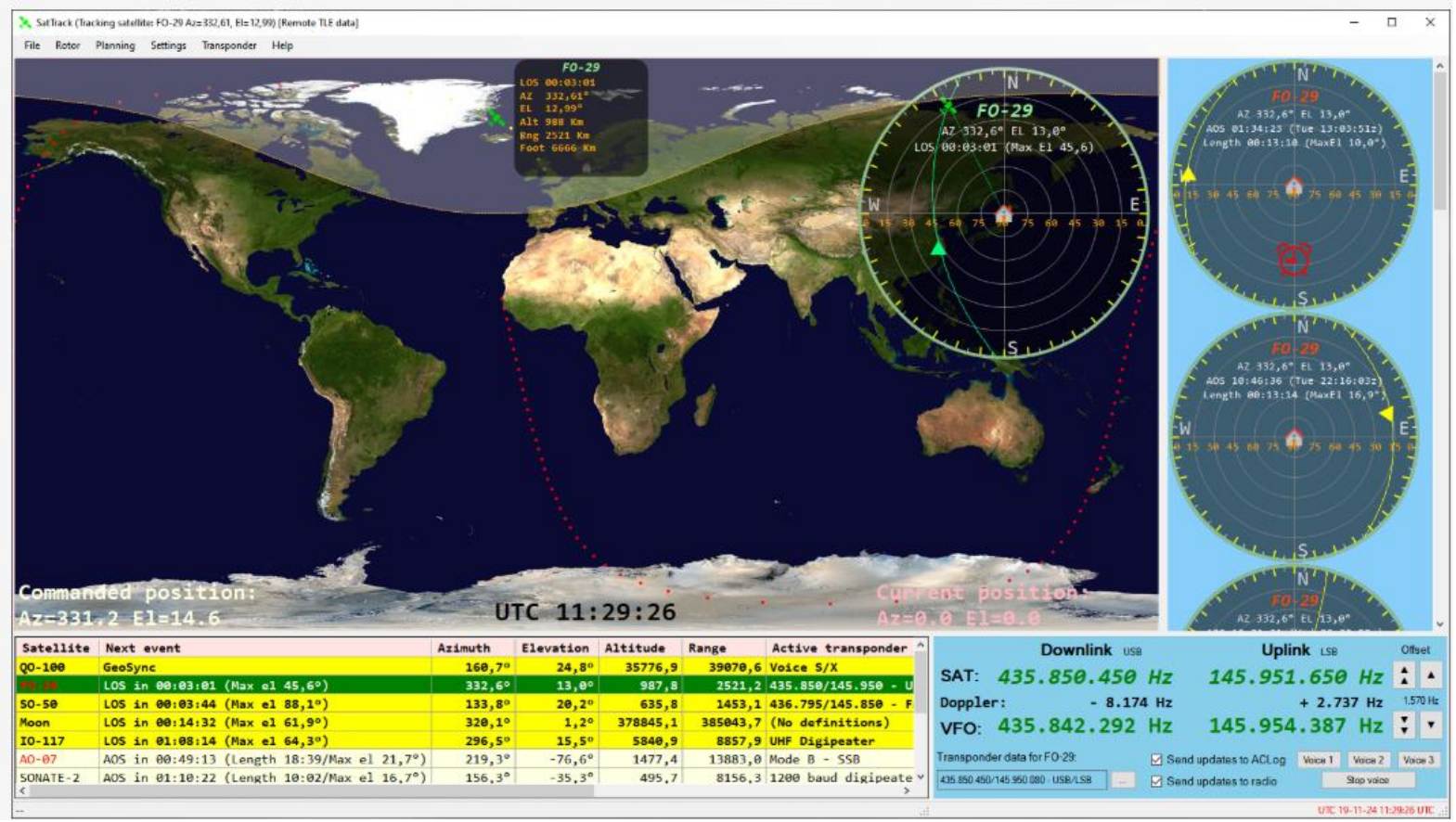
Satellite Tracking «SatTrack» from Carsten OZ9AAR

https://www.moonbounce.dk/hamradio/sattrack.html

Windows SatTrak from OZ9AAR

SatTrack will do the following:

1. Track a satellite in realtime and show calculated values for it
2. Track the moon and the sun
3. Show a list of selected satellites, ordered so that the ones rising first will be at the top of the list
4. Control your ICOM IC-9700 (and a few other ICOM radios like IC-910 and IC-706, you test it yourself) radio according to the defined transponder(s) for the satellite being tracked
5. Control your Yaesu GS-232B, PstRotator or URC rotorcontroller so you antennas will follow the tracked sat
6. Show the footprint of the currently selected satellite on a map
7. Fetch updated TLE elements from the internet at defined intervals (or use a local file)
8. Inject data (name, frequency etc) for the currently tracked satellite into log program ACLog
9. Make it easy for you to make small adjustment to the uplink frequency to put you "on the spot"
10. Allow you to set alarms (voice messages) for upcoming passes of specific satellites and specific passes
11. Give voice announcements whenever a satellite is about to rise
12. Fetch current status from AMSAT satellite status page for a selected satellite and present this in a readable way
13. Help you plan satellites and passes and alarms for these in the "Future passes" planner
14. Import/export transponder definitions, can also import SQF file from SatPC32 and use that

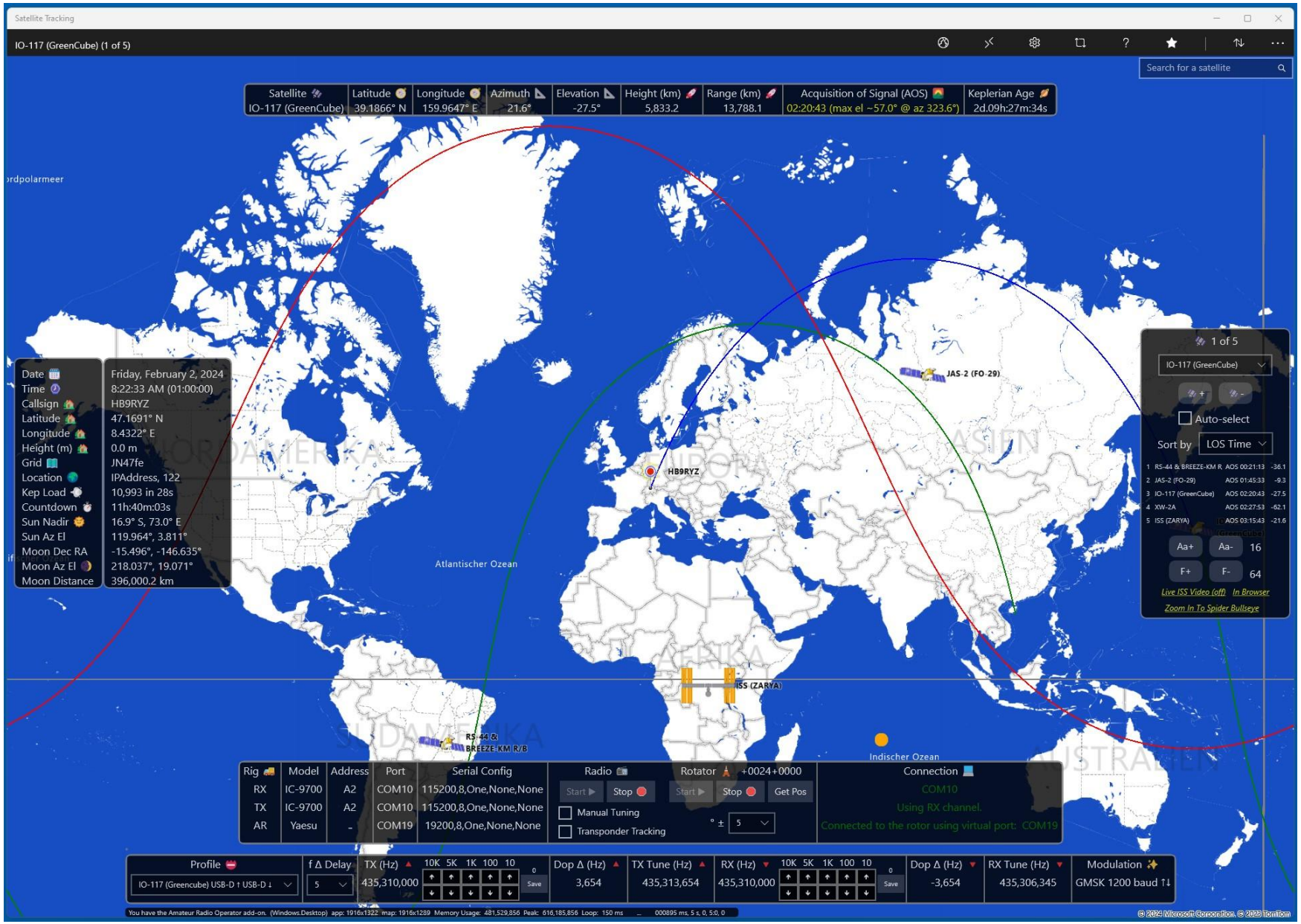


Windows

Satellite Tracking App from KarhuKoti

https://apps.microsoft.com/detail/9WZDNCRDNDF7?hl=en-us&gl=US

Microsoft Windows Satellite Tracking App



Microsoft Windows Satellite Tracking App

IC-9700 Configuration via VSPE and Omnirig

If you are going to use an already existing virtual COM port or use the SerialPort API (old-Windows-style) instead of the SerialDevice API (new-Windows-10/11-style) for device communication (note: use this old-style API if you seem to be having handshake issues), specify the port(s) here so the port(s) shows-up in the subsequent port pull-downs:

COM10 | COM10

Step 3 - Radio configuration - select your radio(s) and related settings.

Select your receive (RX) radio (typicaly for 2m band), radio CI-V address, and serial port parameters. If using FT4, it is recommended to use at least 19200 baud.

radio (default address)	address (used)	port, description
IC-9700 (A2)	A2	COM10

The IC-9700, by default uses CI-V port A2 and prefers these settings: 4800-115200 (min-max baud rate), 8 (data bits), One (stop bits), None (parity), and None (handshake)

Baud Rate	Data Bits	Stop Bits	Parity	Handshake
115200	Eight	One	None	None
		Two		

Select your receive (TX) radio (typicaly for 70cm band), radio CI-V address, and serial port parameters. If you are using the same radio for both RX and TX, be sure to select the same radio, address, and port in both sections. If using FT4, it is recommended to use at least 19200 baud.

radio (default address)	address (used)	port, description
IC-9700 (A2)	A2	COM10

The IC-9700, by default uses CI-V port A2 and prefers these settings: 4800-115200 (min-max baud rate), 8 (data bits), One (stop bits), None (parity), and None (handshake)

Baud Rate	Data Bits	Stop Bits	Parity	Handshake
115200	Eight	One	None	None
		Two		

Step 4 - Click the Connect to the Radio(s) button.

Connect to the Radio(s) | Disconnect from the Radio(s)

Rotator EA4TX Configuration via ARSVCOM Virtual COM-Port

Rotator Control Setup

Follow the steps below to select and test your serial device controlling a Yaesu or compatible digital controller (e.g, SPID in Yaesu GS-232 compatible mode).

Please email us if you have any questions, issues, or another brand supported: karhukoti@hotmail.com

Step 1 - Connect your serial device to the computer that is connected to your rotator.

Step 2 - Click the Refresh Serial Device List button to see the list of possible ports to use.

Refresh Serial Device List

- None, None
- COM10, virtual port user-specified (COM10)
- COM19, virtual port user-specified (COM19)
- FT232R USB UART (COM3), \\?\FTDIBUS#VID_0403+PID_6001+A506EOOLA#0000#{86e0d1e0-8089-11d0-9ce4-08003e301f73}
- HAM, \\?\VSBC8#DEVICES#0001#{86e0d1e0-8089-11d0-9ce4-08003e301f73}

If you are going to use an already existing virtual COM port or use the SerialPort API (old-Windows-style) instead of the SerialDevice API (new-Windows-10/11-style) for device communication (note: use this old-style API if you seem to be having handshake issues), specify the port(s) here so the port(s) shows-up in the subsequent port pull-downs:

COM19

Step 3 - Specify the com port connected to the rotator. The Yaesu GS232A uses 150 to 9600 baud. And, the Yaesu GS232B uses 1200 to 9600 baud.

Baud Rate	Port, Description
19200	COM19

Step 4 - Click the below buttons to connect to and disconnect from the rotator.

Connect to the Rotator | Disconnect from the Rotator

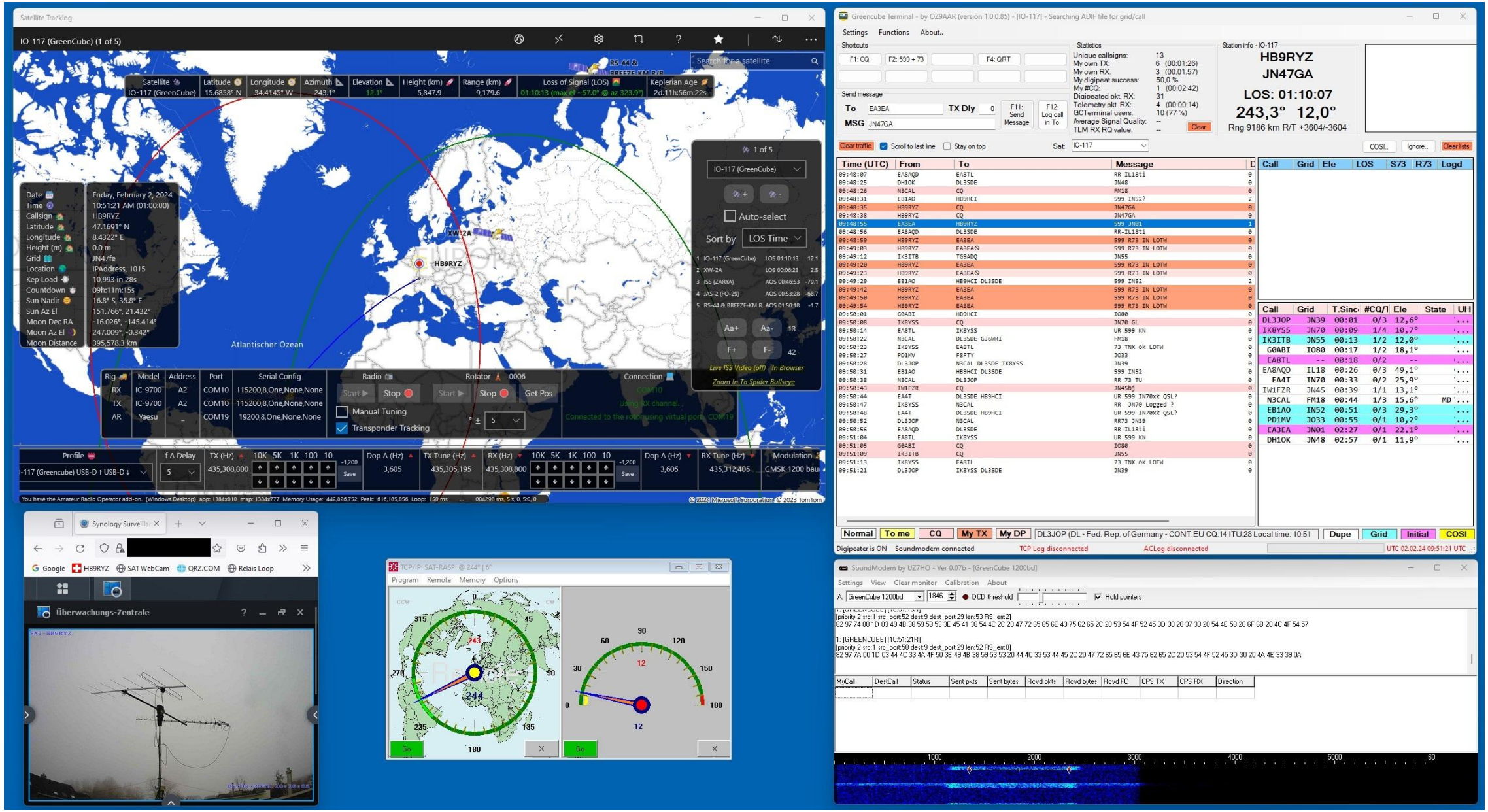
device connection status

rotator baud etc. details

Step 5 - Choose your wanted azimuth and elevation test values.

Azimuth	Elevation
1°	0°
90°	45°
180°	90°
270°	
359°	

Microsoft Windows Satellite Tracking App – Tracking Greencube (IO-117) Digi-SAT

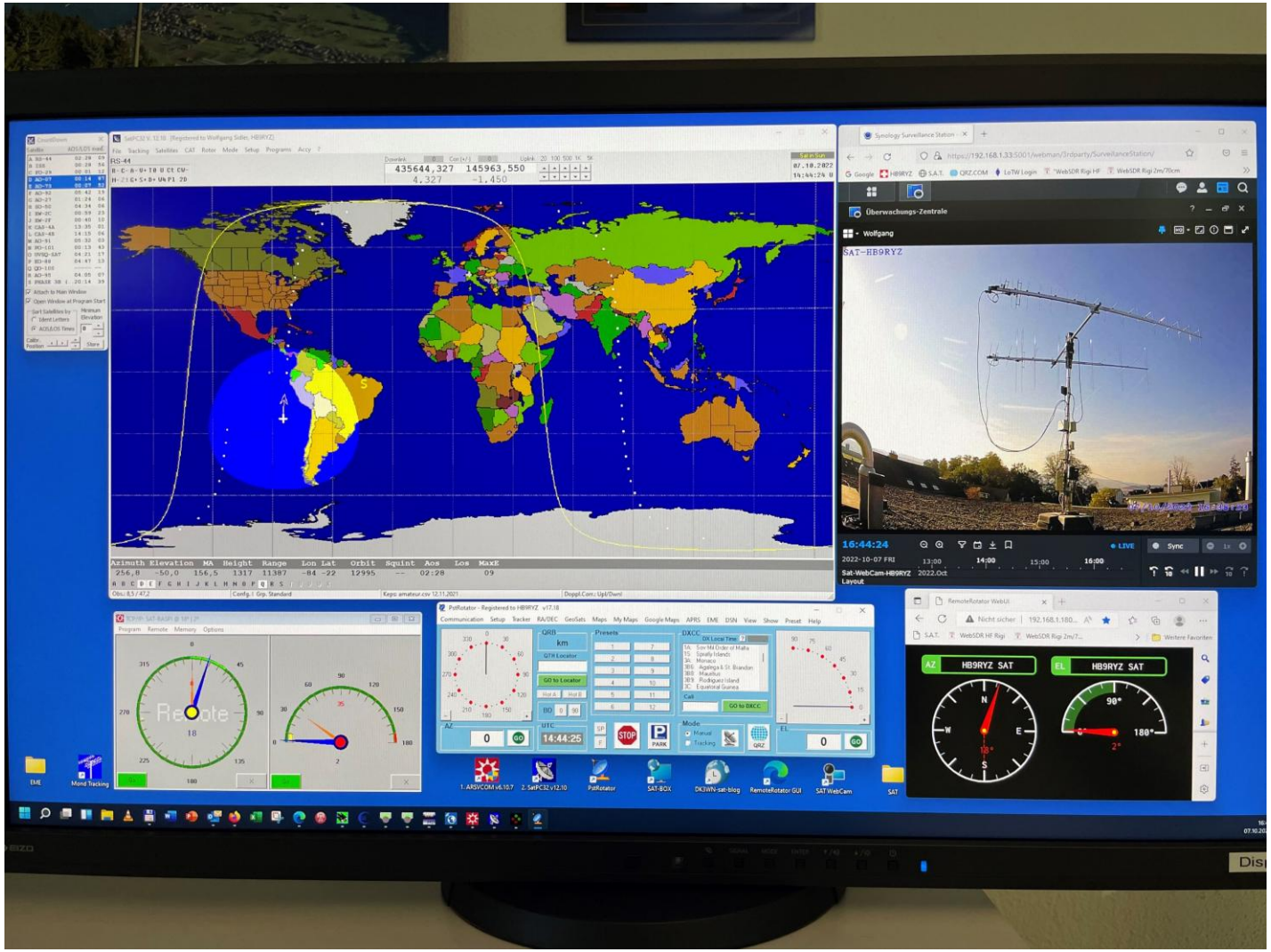


SATPC32 v12.10

with ARS-USB Box EA4TX and Raspberry Pi3 with remoteRotator from DH1TW

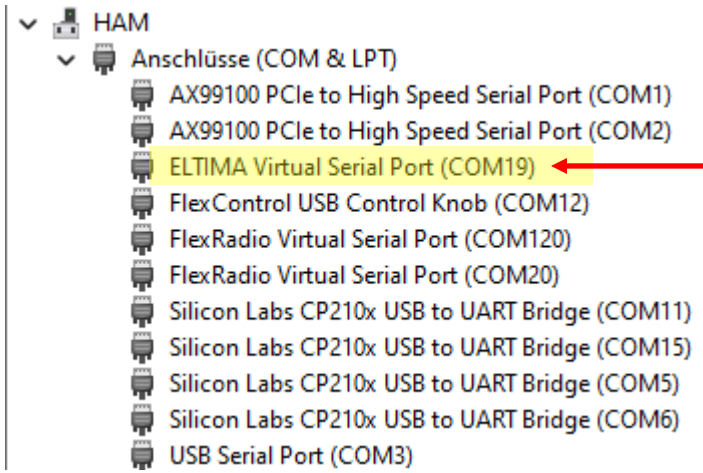
EA4TX ARS-USB Box: https://ea4tx.com/en/tienda/antenna-rotator-system/ars-usb-ae/
SATPC32 Software: https://www.dk1tb.de/indexeng.htm

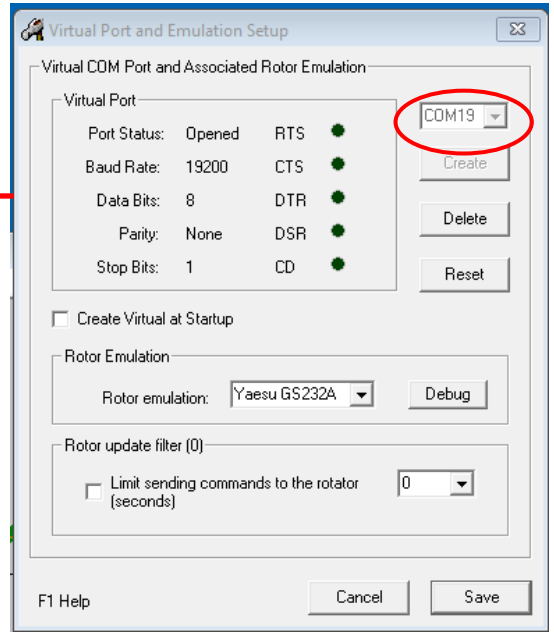
SATPC32 Satellite Tracking Software from Erich DK1TB



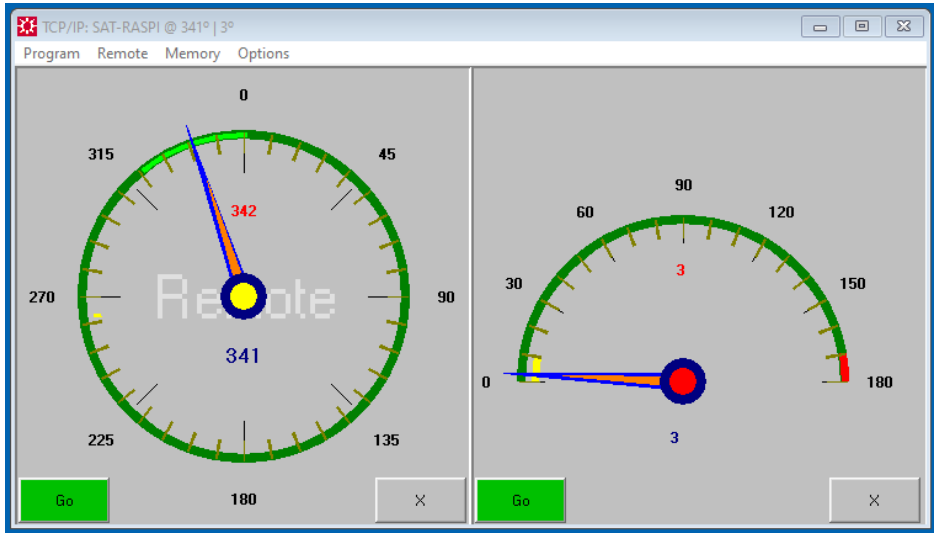
SATPC32 SAT-Tracking Software, SAT WebCam, RemoteRotator Web-GUI, PSTRotator

EA4TX ARS-USB Box (Virtual Serial Port) and SATPC32 Setup



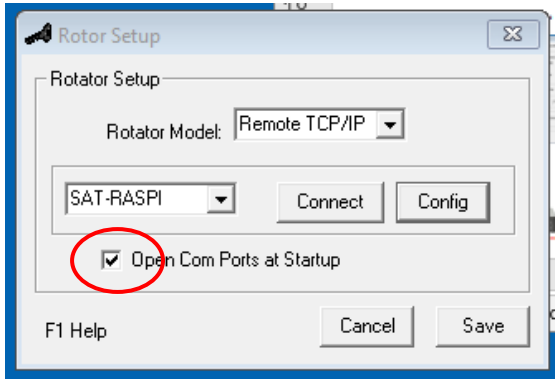


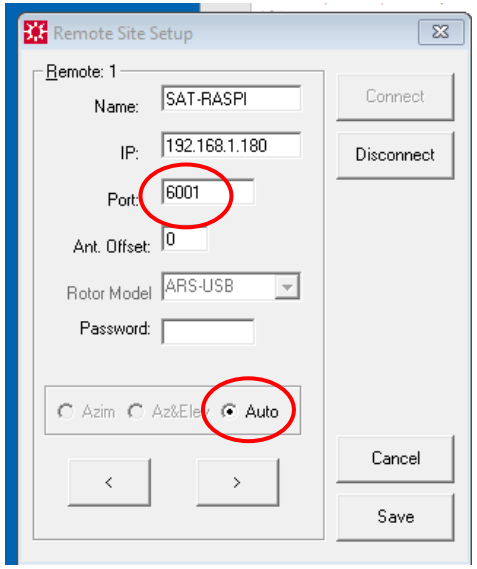
v6.10.7



The Rotators are controllled via the Virtual Serial Port COM 19 (ARSVCOM).

Thats for the Raspberry Pi IP-Connection

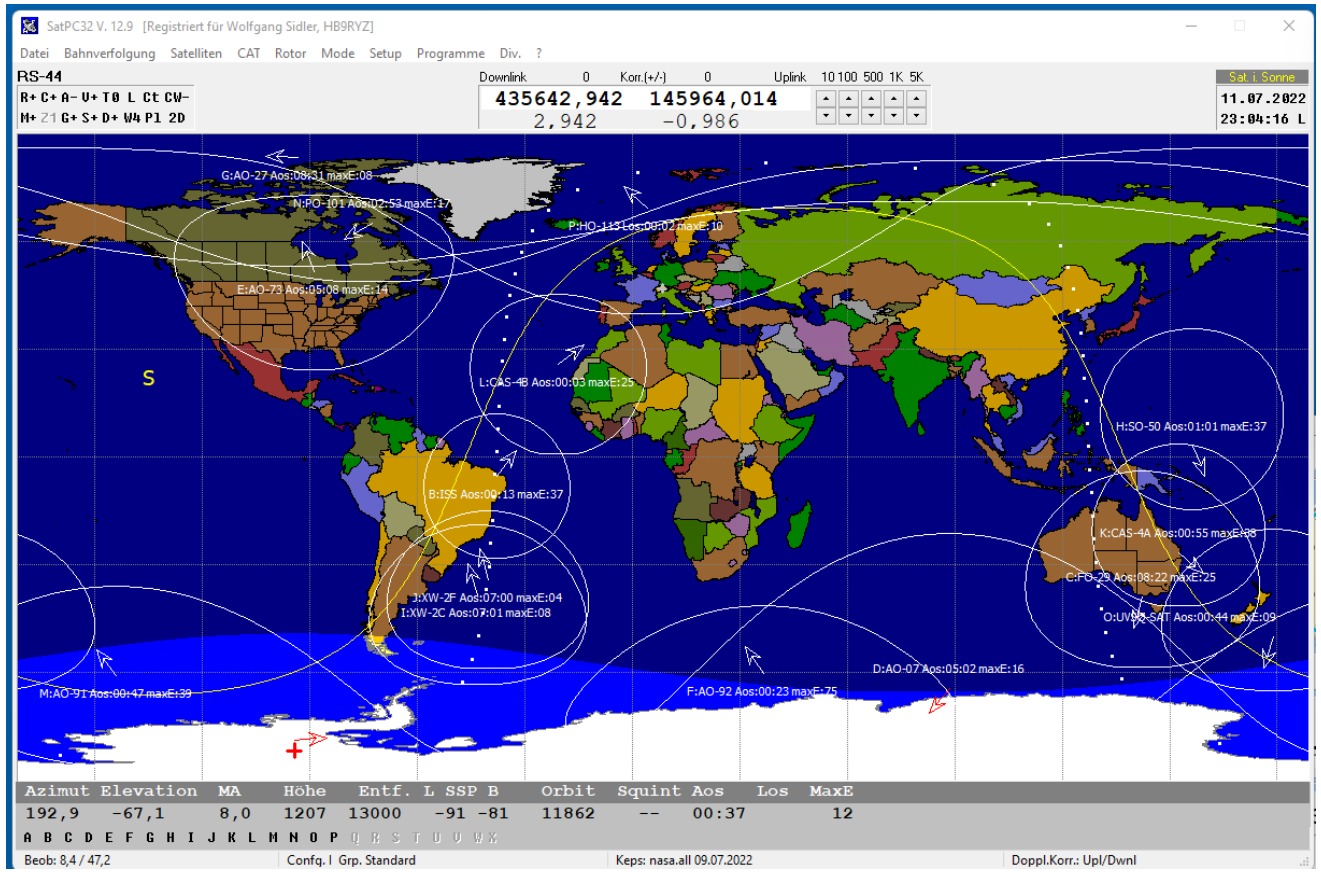


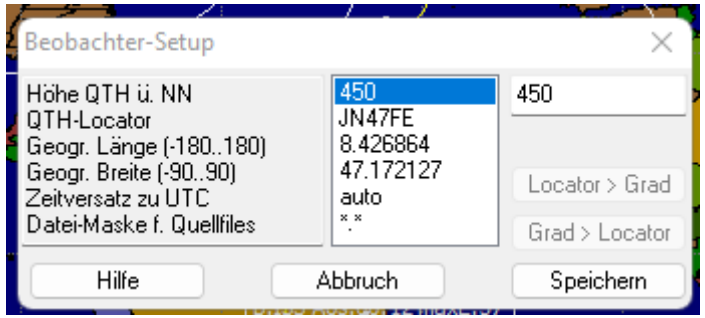


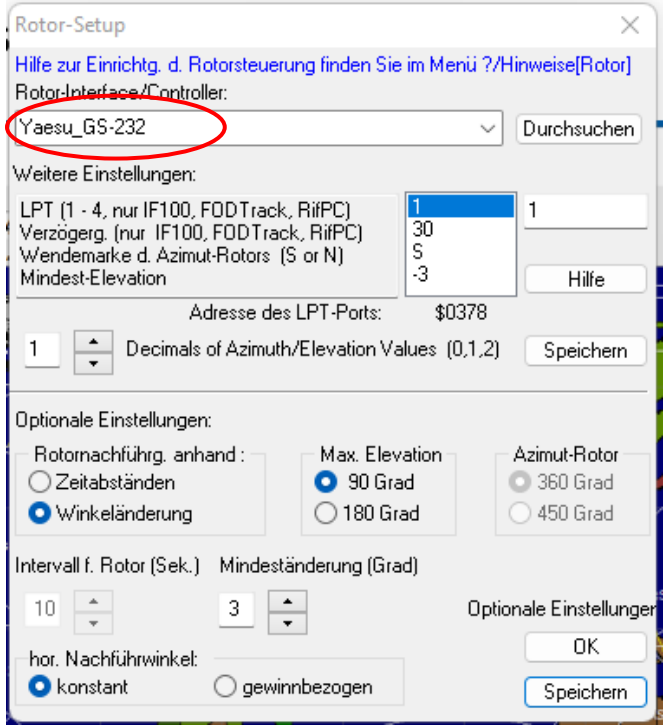
HB9RYZ www.hb9ryz.ch 13. October 2022

EA4TX ARS-USB Box (Virtual Serial Port) and SATPC32 Setup

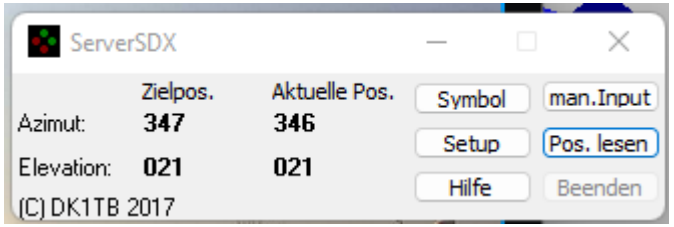
SATPC32 v12.10

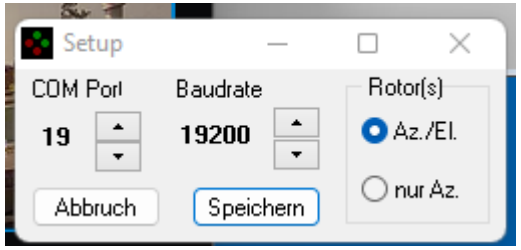






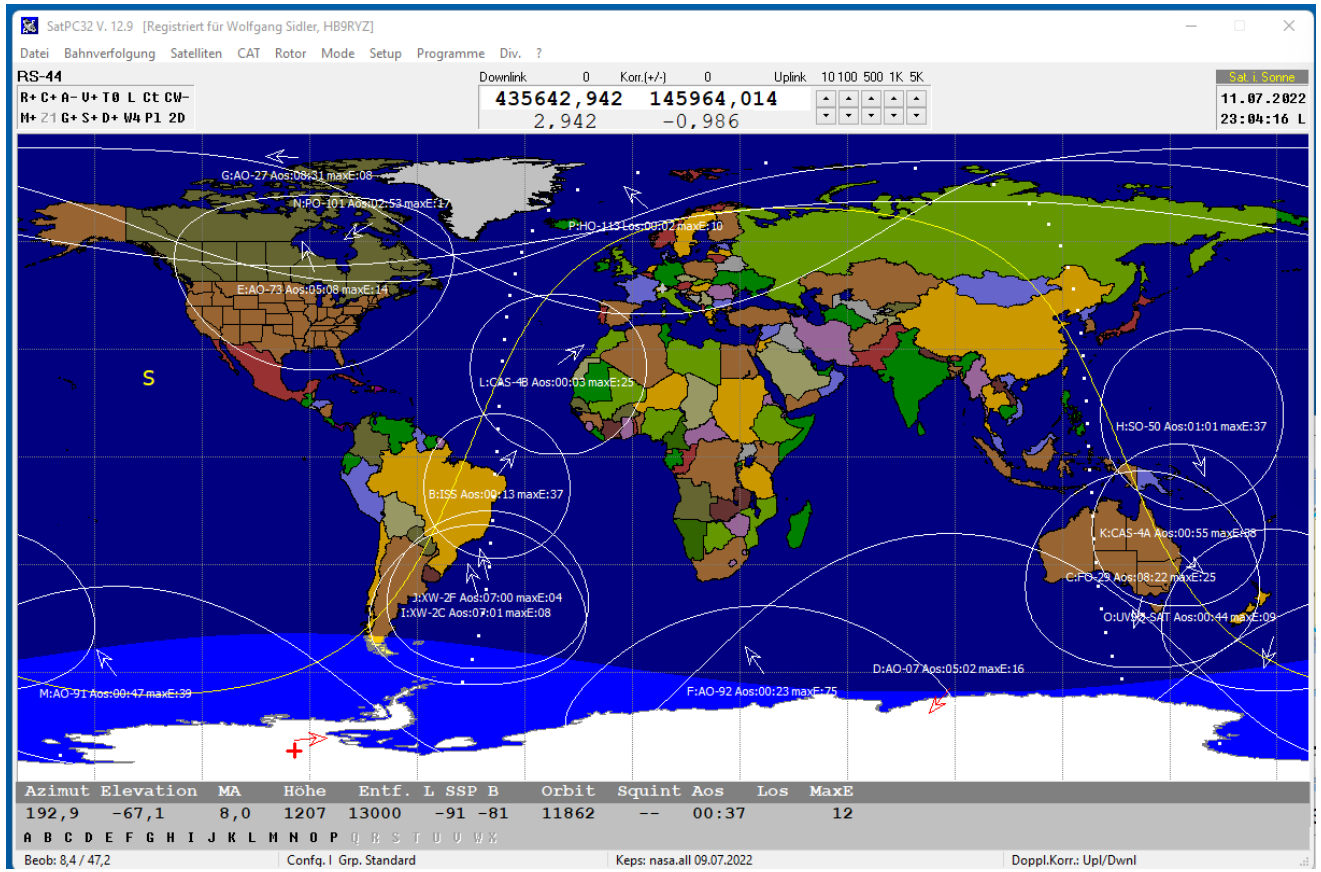
The Rotators are controllled via the Virtual Serial Port COM 19 (ARSVCOM).



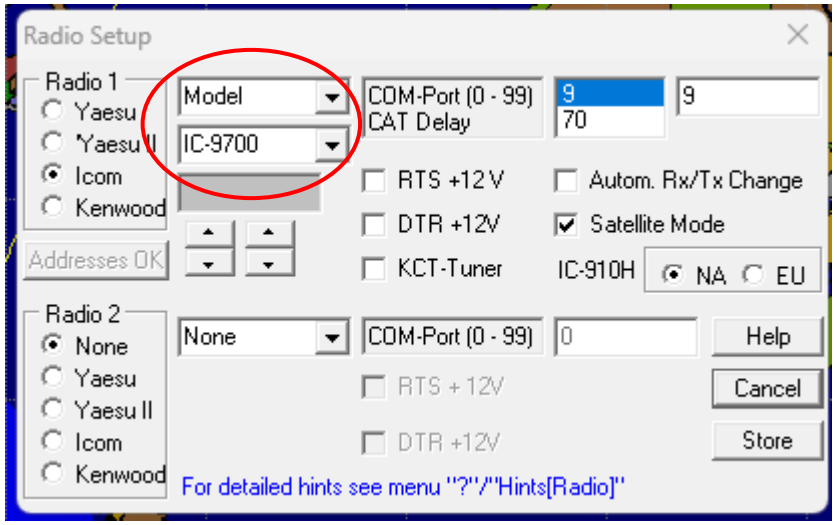


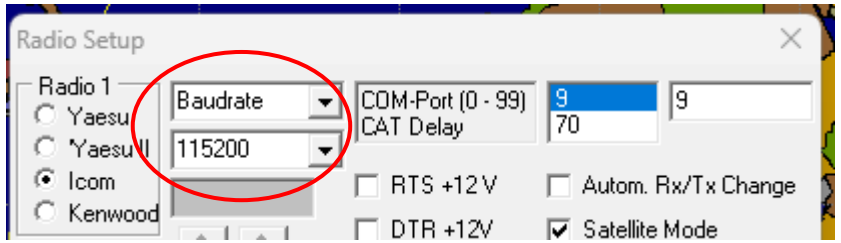
SATPC32 Setup with ICOM IC-9700

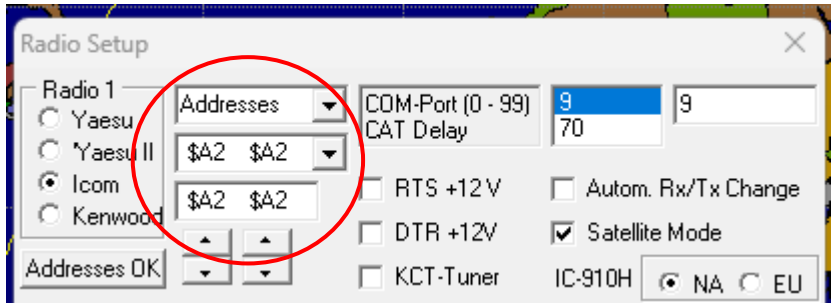
SATPC32 v12.10



Setup – Radio Setup

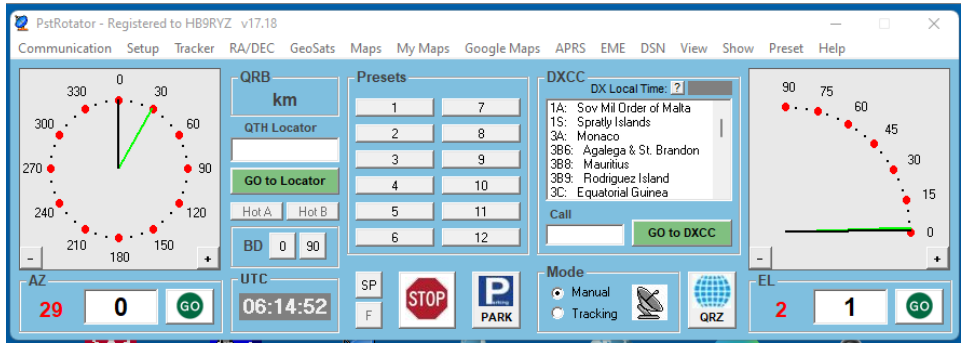






PSTRotator Setup

PSTRotator

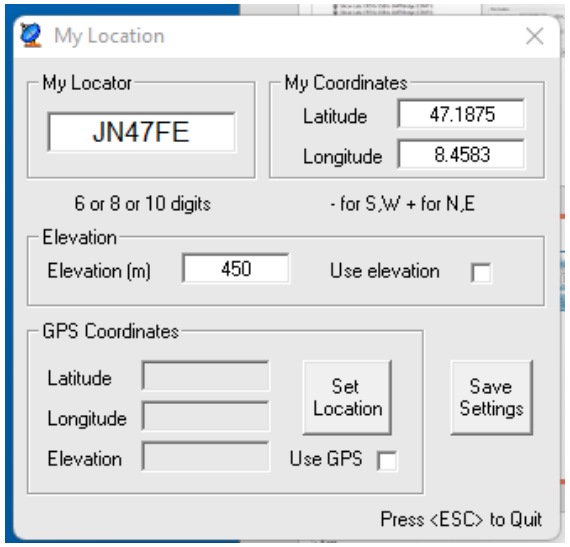


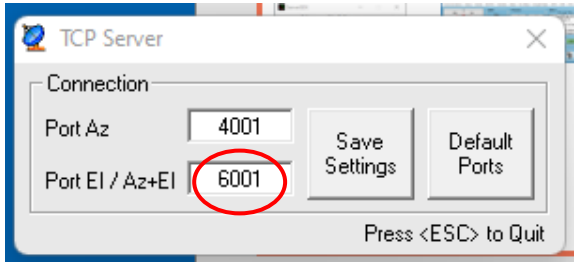
Communications
TCP Client = ON
EL / AZ+EL COM Port = NONE

Setup
Start as TCP Client

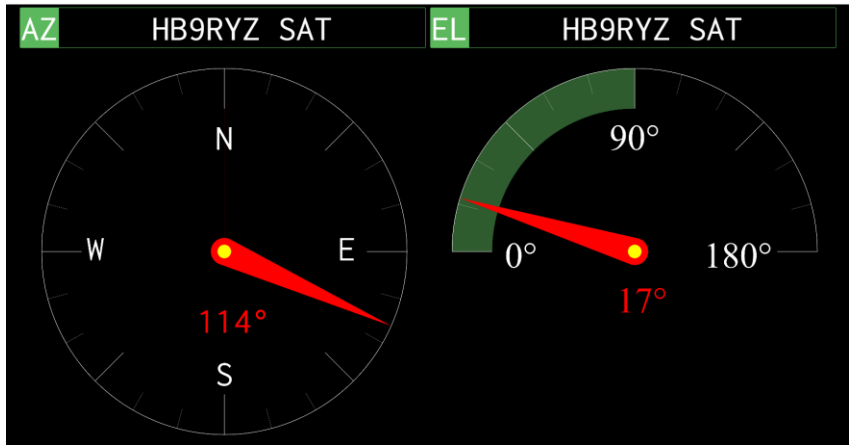
Tracker
SAT = SatPC32 / SatPC32ISS

My Location



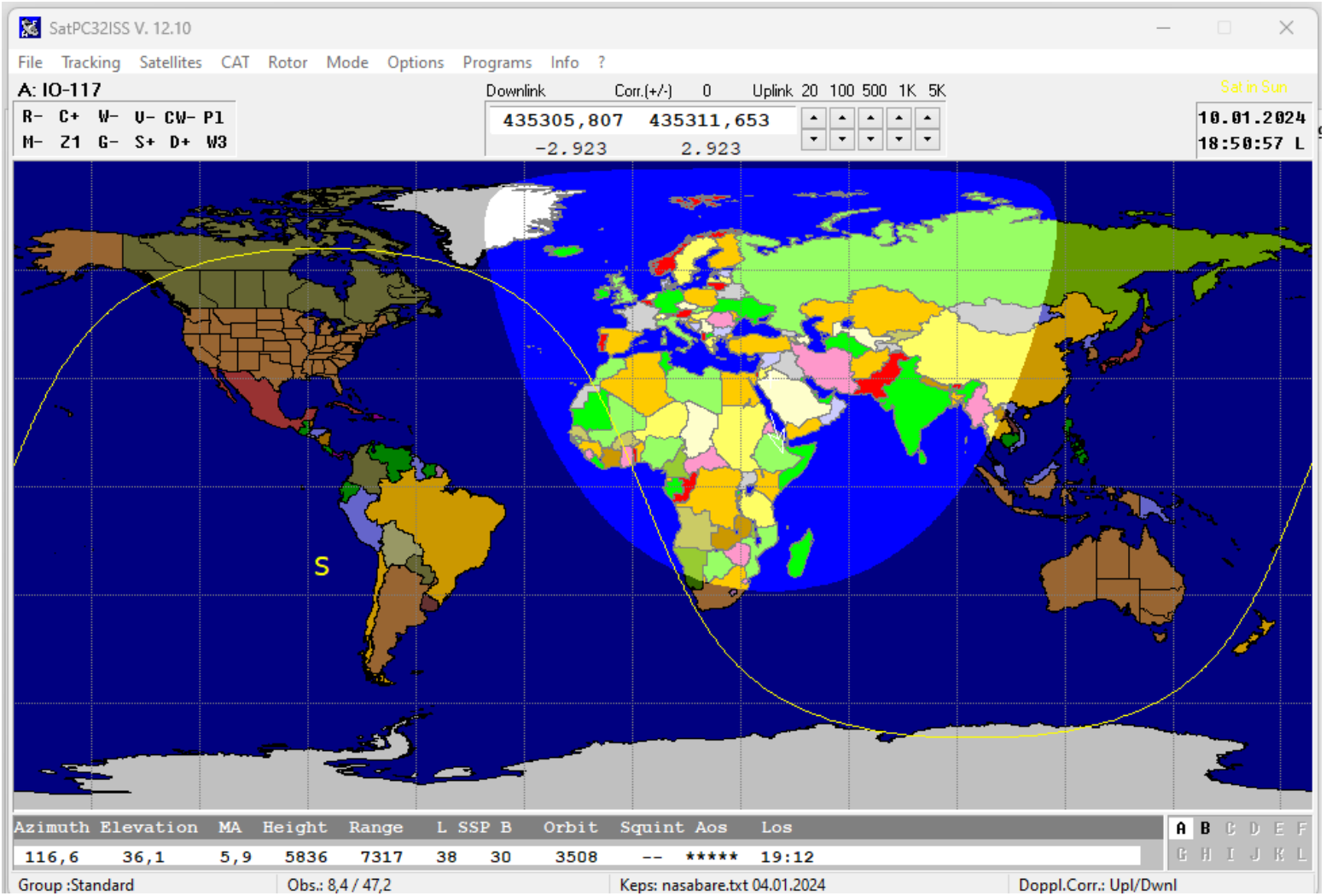


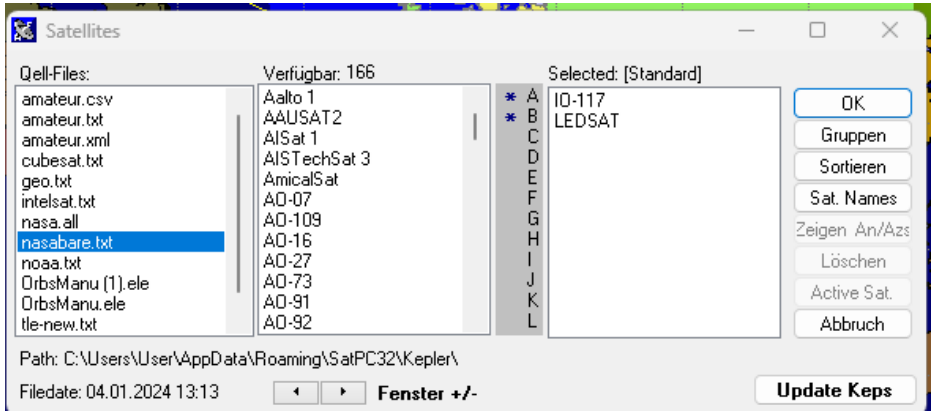
RemoteRotator Web-GUI from DH1TW running on a Raspberry Pi

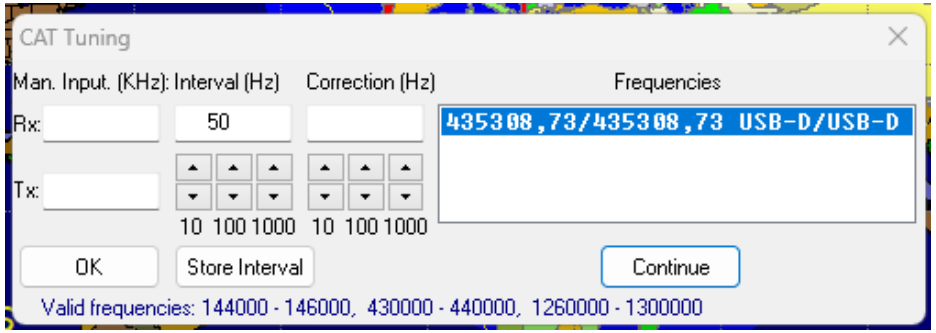


http://192.168.1.180:7071/

GreenCube (IO-117) MEO Satellite Setup mit SatPC32ISS

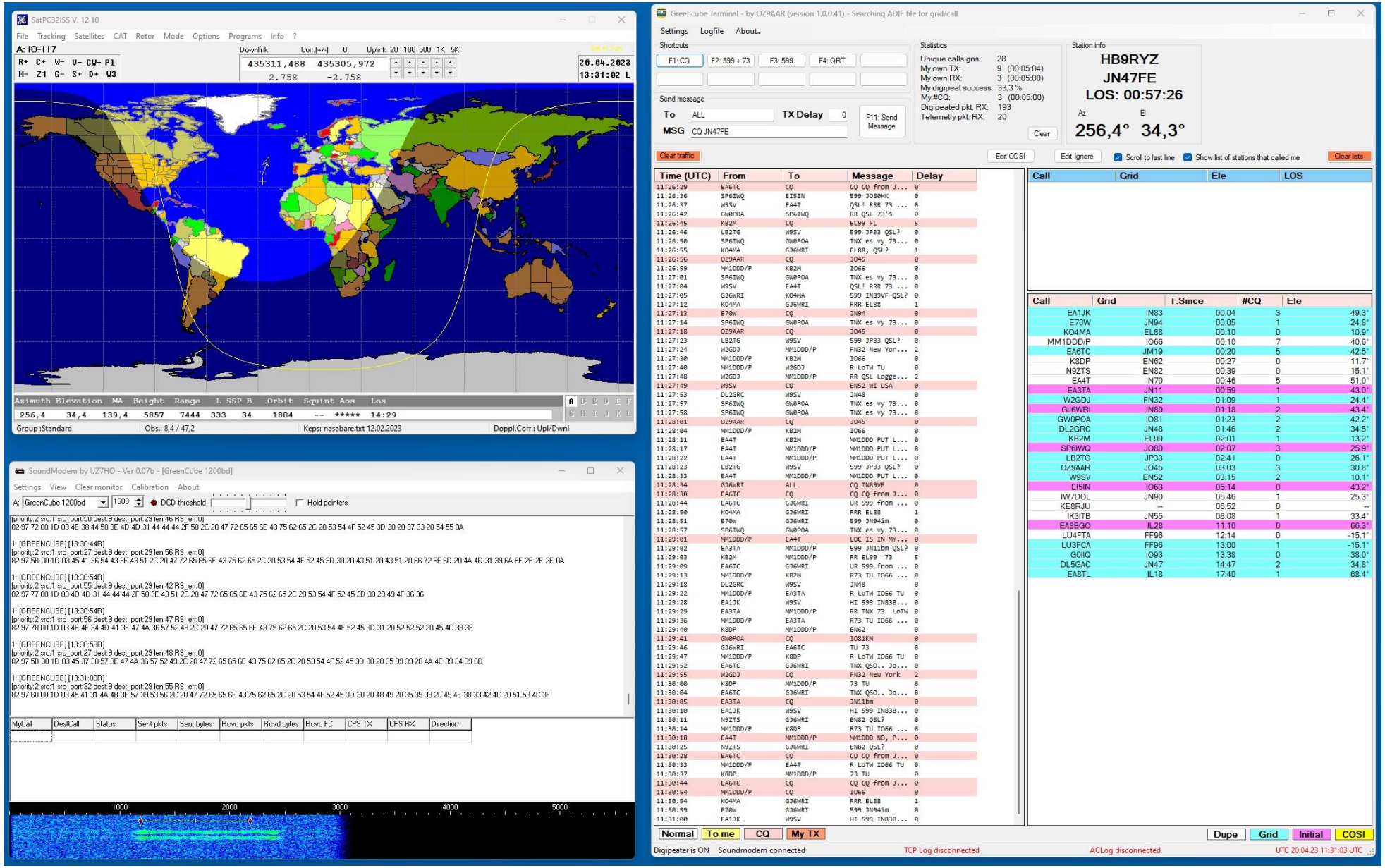






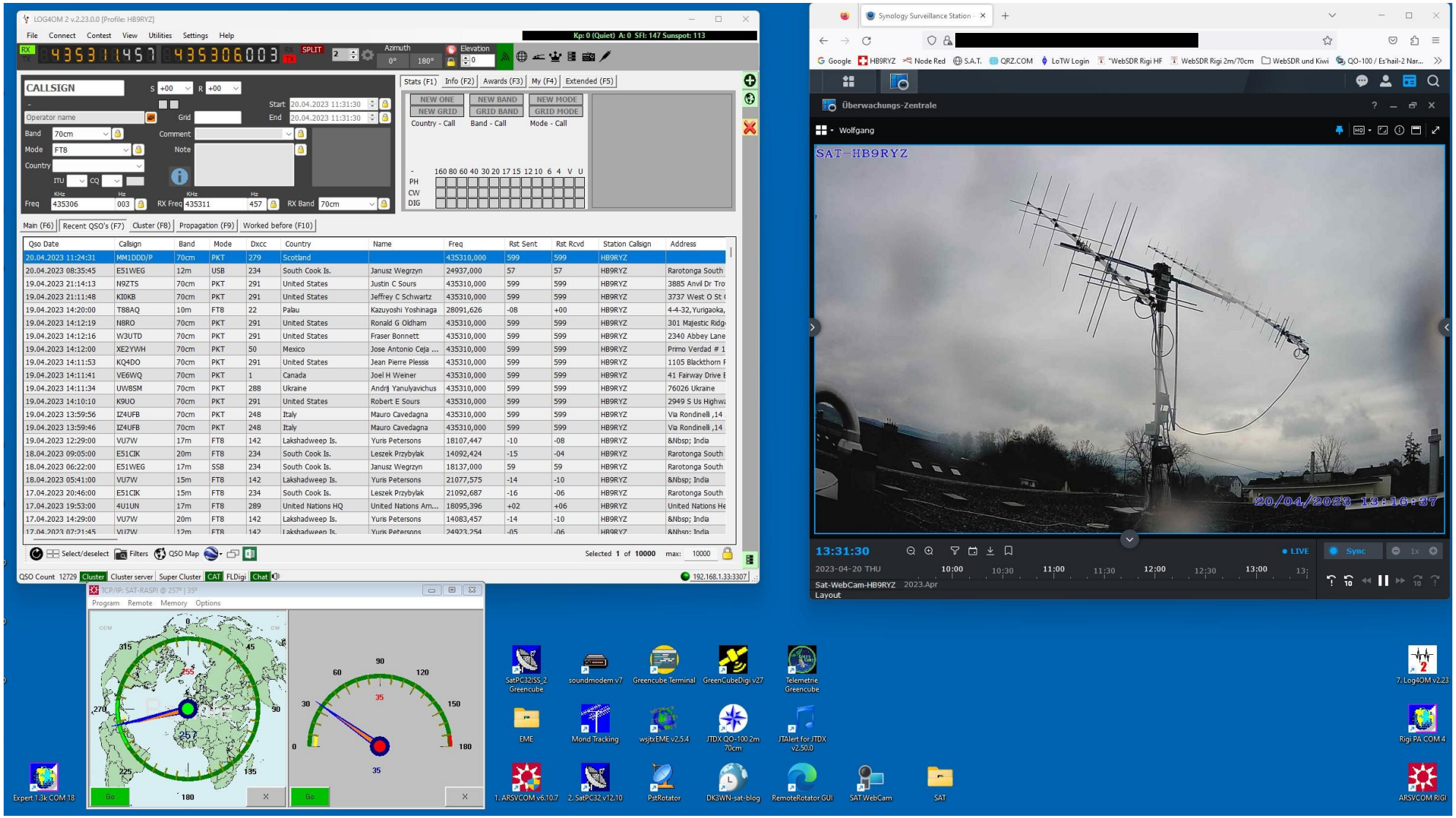
GreenCube (IO-117) MEO Satellite Setup mit SatPC32ISS

GreenCube Application from OZ9AAK: https://moonbounce.dk/hamradio/greencube-terminal-program.html

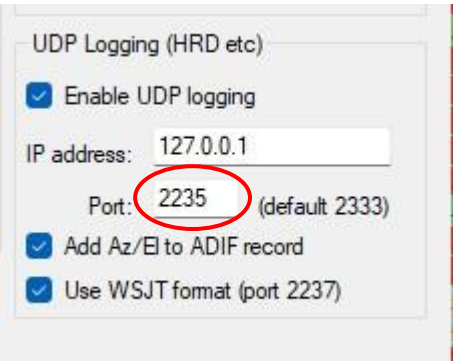


GreenCube (IO-117) MEO Satellite Setup mit Log4OM

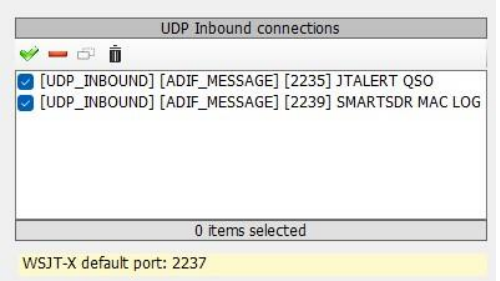
GreenCube Application from OZ9AAK sends the LOG direct to my Log4OM Log-Program



Settings in GreenCube Application from OZ9AAK

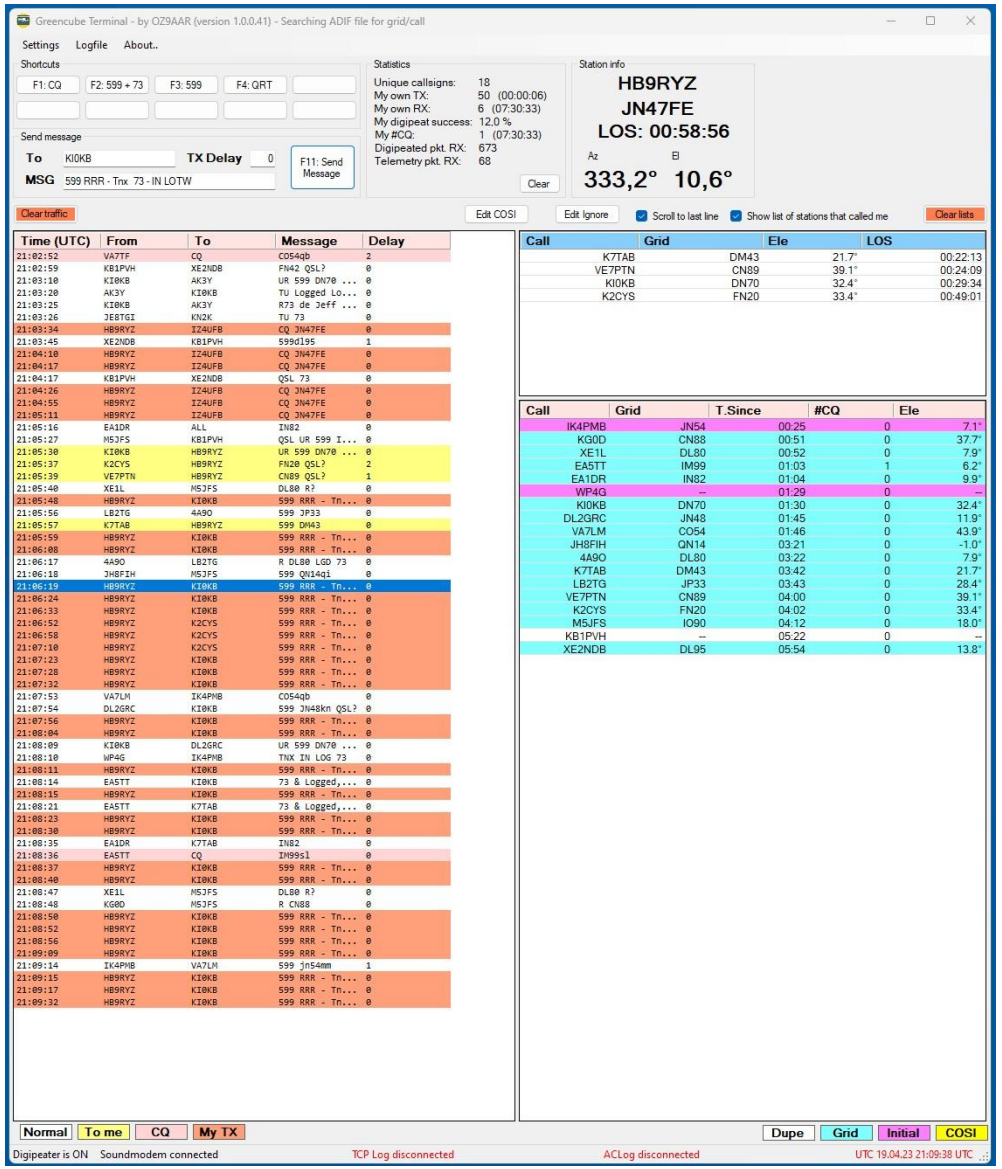


Settings in Log4OM

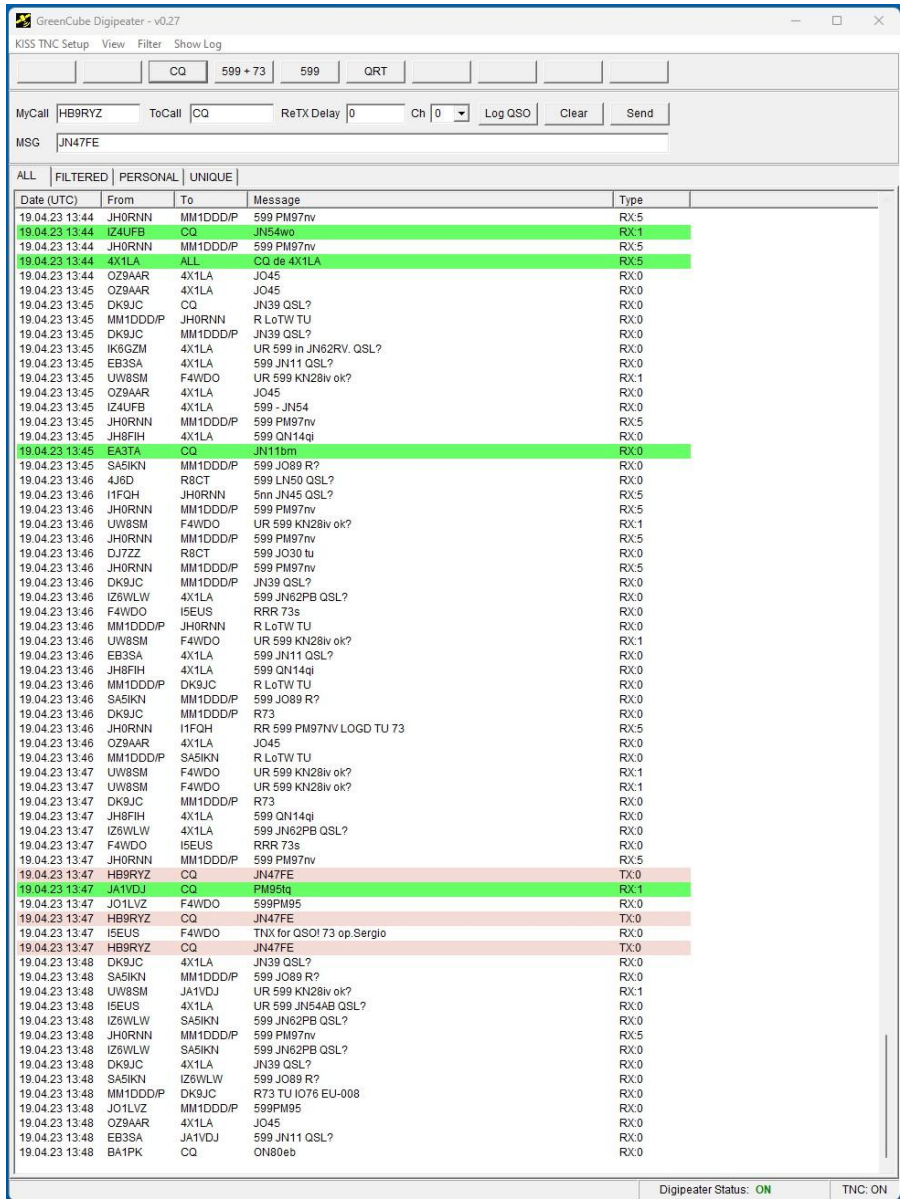


GreenCube (IO-117) MEO Satellite Setup

GreenCube Application from OZ9AAK:
https://moonbounce.dk/hamradio/greencube-terminal-program.html



GreenCube Digipeater v0.27 (the original Software)
https://www.s5lab.space/index.php/digipeater



ICOM IC-9700 Settings for Satellite Communication incl. GreenCube (IO-117) Digipeater

The following **IC-9700** settings are very important:
AGC = OFF
Mode = USB-D

Connectors > External Speaker Separate **"Mix"**
Connectors > ACC AF/IF Output > AF/SQL Output Select **"MAIN"**
Connectors > ACC AF/IF Output > Output Select **"AF"**
Connectors > ACC AF/IF Output > AF Output Level **"50%"**
Connectors > ACC AF/IF Output > AF SQL **"OFF (Open)"**
Connectors > ACC AF/IF Output > IF Output Level **"50%"**

Connectors > USB AF/IF Output > Output Select **"AF"**
Connectors > USB AF/IF Output > AF Output Level **"50%"**
Connectors > USB AF/IF Output > AF Output Level **"50%"**
Connectors > USB AF/IF Output > AF SQL **"OFF (Open)"**
Connectors > USB AF/IF Output > IF Output Level **"50%"**

Connectors > USB SEND/Keying > USB SEND: **"USB (B) DTR"**

Connectors > CI-V > CI-V Baud Rate **"19200"**
Connectors > CI-V > CI-V Transceiver **"OFF"**
Connectors > CI-V > CI-V USB Port **"Link to [REMOTE]"**
Connectors > CI-V > CI-V DATA Baud Rate **"19200"**
Connectors > CI-V > CI-V DATA Echo Back **"on"**

PTT Port Function **"PTT Input + SEND Output"**

Switch AGC to OFF
To switch it off, hold down the AGC button in the Function menu.

Then select on of your AGC options and with the tuning wheel you can now turn it down until it shows OFF.

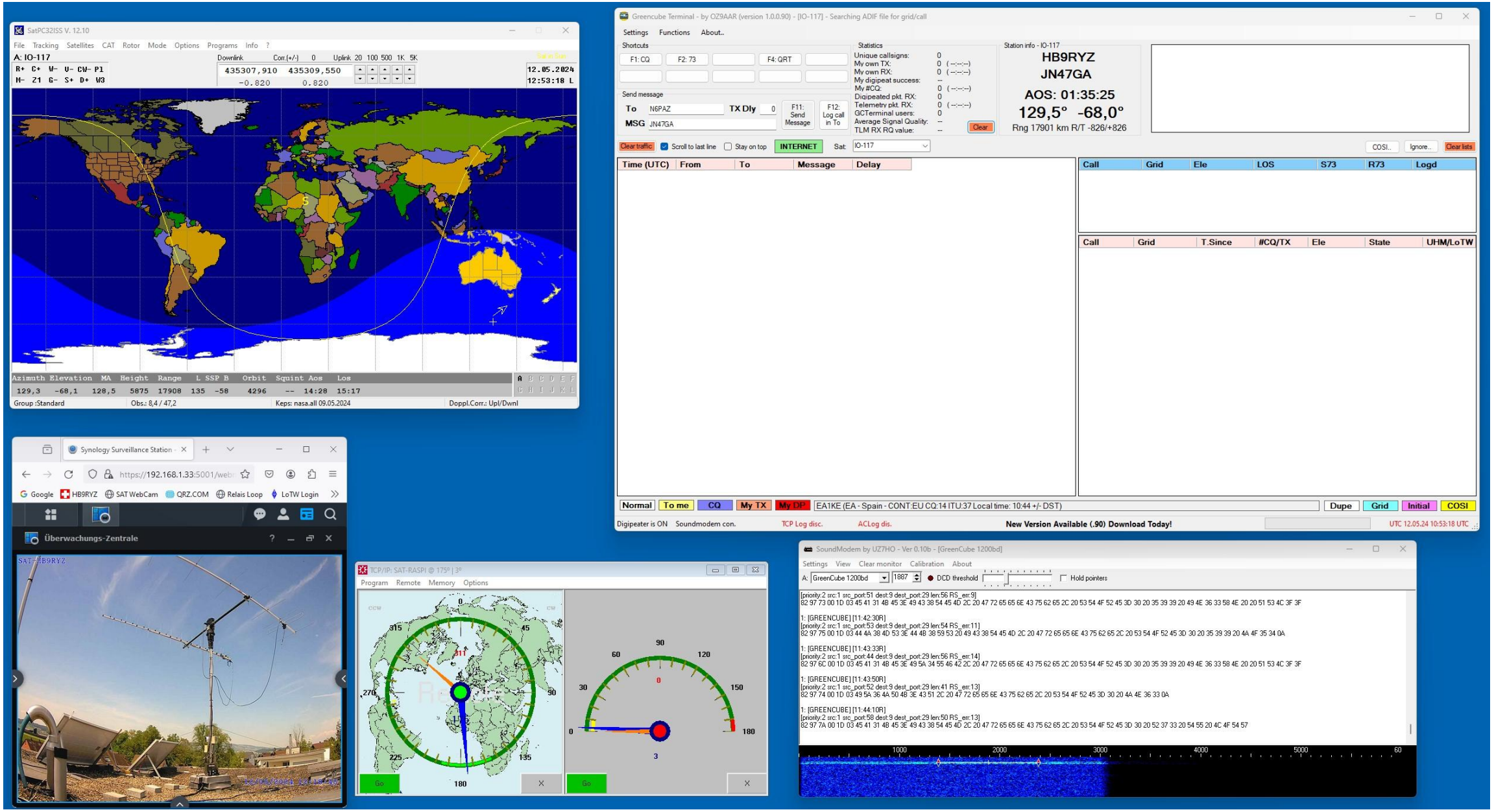
IO-117 Settings

Greencube MEO Satellite

Soundmodem: https://uz7.ho.ua/packetradio.htm

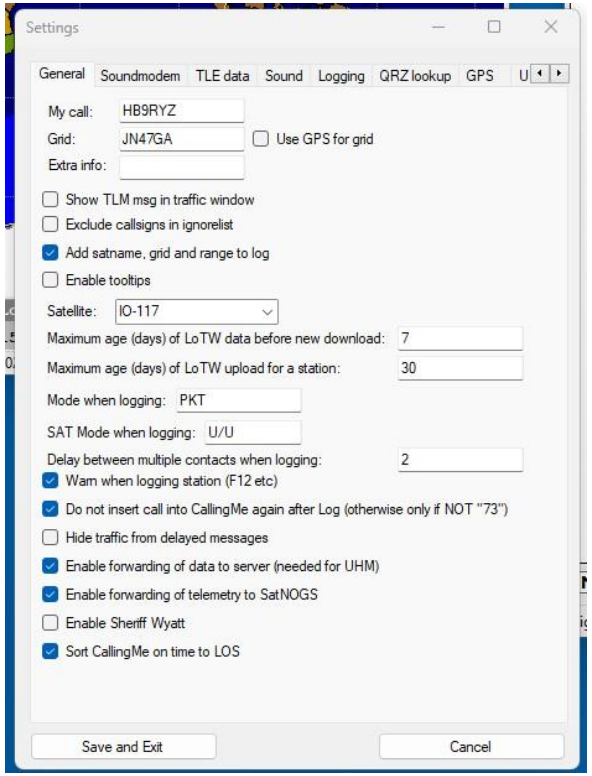
Terminal OZ9AAR: https://moonbounce.dk/hamradio/greencube-terminal-program.html

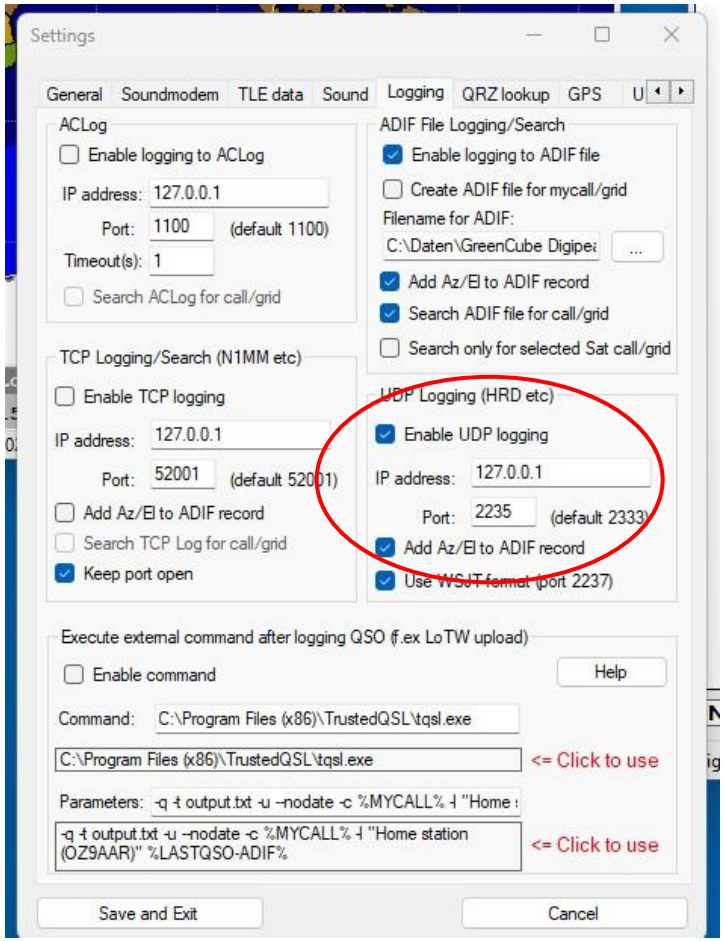
GreenCube (IO-117) MEO Satellite Setup

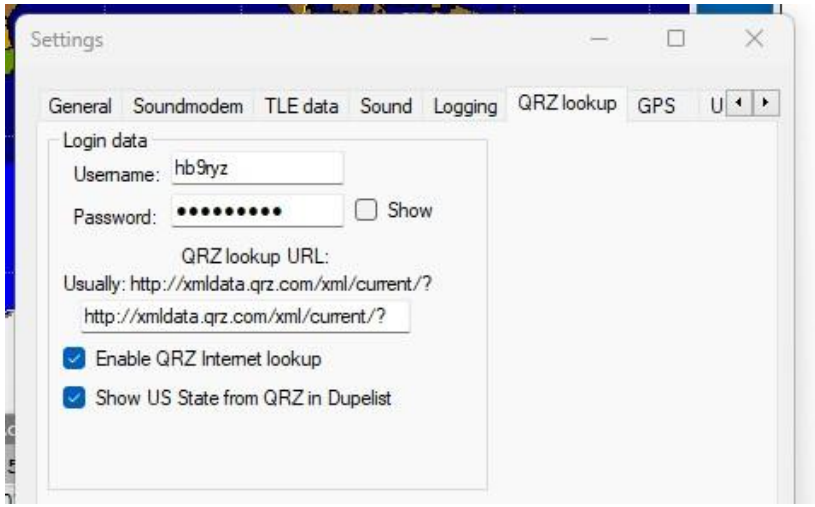


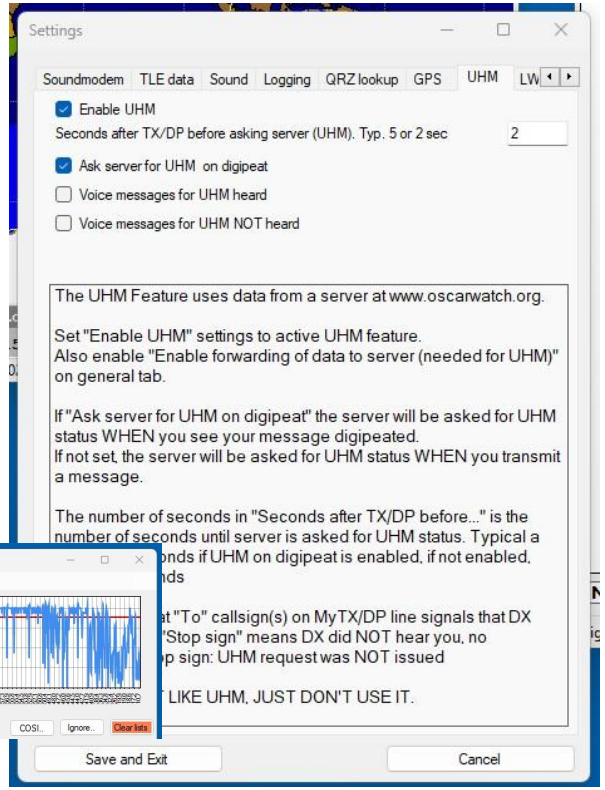
GreenCube (IO-117) MEO Satellite Setup

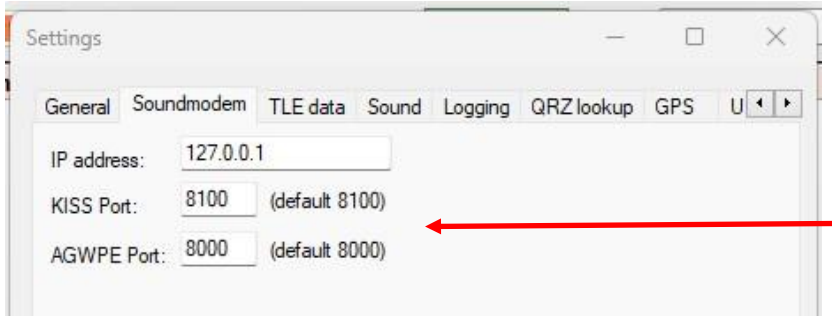
GreenCube Application from OZ9AAK:
https://moonbounce.dk/hamradio/greencube-terminal-program.html

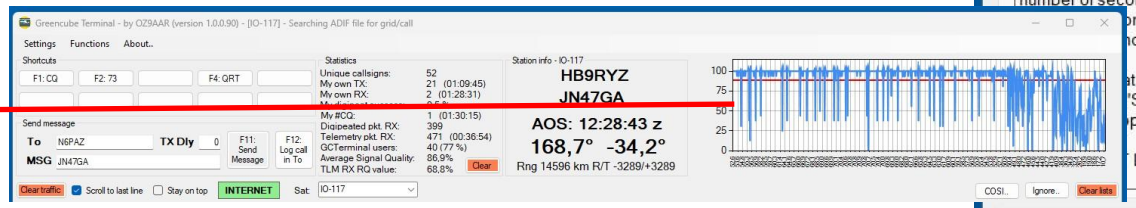












GreenCube (IO-117) MEO Satellite Setup

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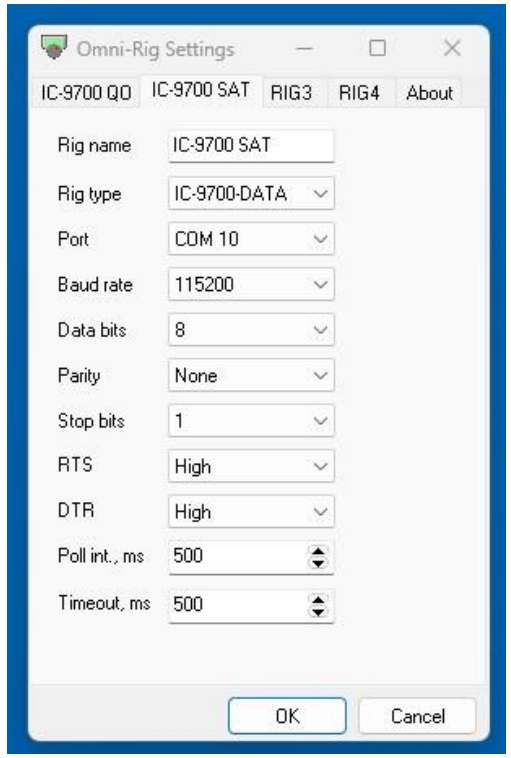
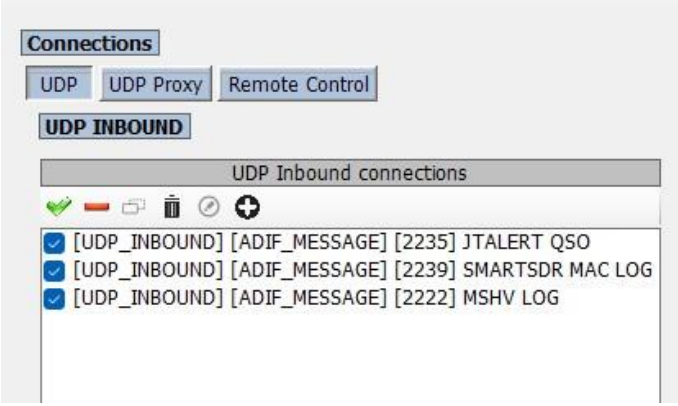
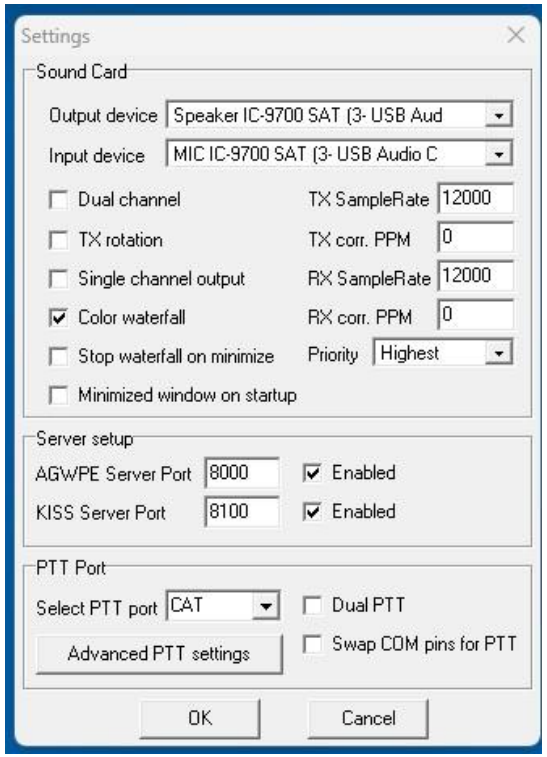
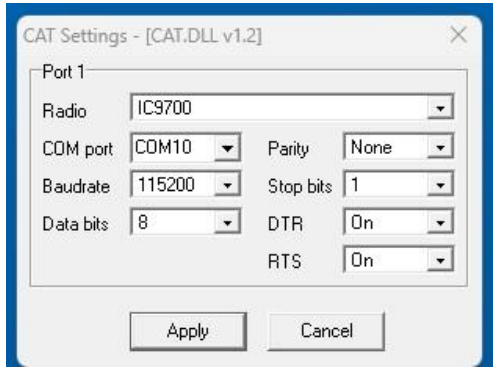
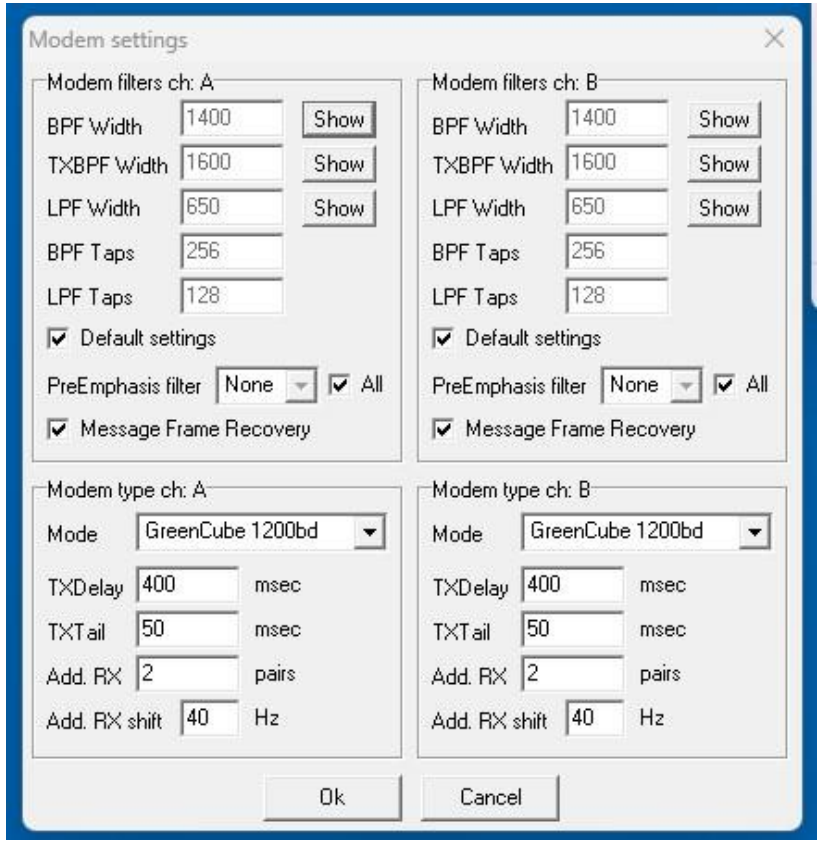


Log4OM



Soundmodem