NEWSLETTER-AMSAT-EA

11/2021 NOVEMBER

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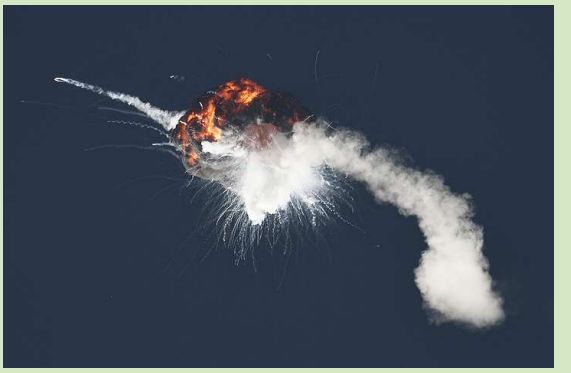
New Genesis satellites



A few weeks ago we knew about a new opportunity to launch and we will give you more information as soon as possible. The only problem, as usual, it´s that we were given very little time to deliver something. Fortunately we had quite a few leftover pieces from the previous projects and we have been able to build two new GENESIS satellites which actually start from the platform that we used for Hades.

Therefore, they are the most advanced we have. We also had time to update the software,so the functionalities they are going to offer are: FM voice repeater, FSK non-regenerative repeater up to 2400 bps, FSK regenerative repeater up to 50 bps, CW, pre-recorded digitized voice in FM and of course FSK telemetry.

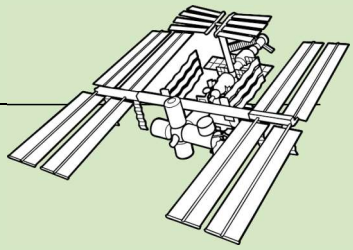
In the laboratory we have seen that AX25 / APRS frames repeat well over FM at 1200 bps, although you will need antennas with enough gain, but the functionality is there. These new satellites will be called GENESISG /ASTROLAND-1 and GENESIS-J / ASTROLAND-2. The reason for the double name it´s to thank Astroland Planetary Agency for supporting the project:

https://www.astrolandagency.com/es/inicio-es/

Also on this occasion we carry two thrusters, although they are not the ones from AIS since there has not been time to have them, but from IENAI Space. Unlike the previous ones, these use a liquid fuel. It will only be functional the one in GENESIS-J . The GENESIS-G will carry the electronics but without fuel.

Thank you very much to those of you who are supporting the project. More news, soon!.

ISS SSTV December 1-2 145.800 MHz FM



Russian cosmonauts on the International Space Station (ISS) plan to broadcast SSTV images on 145,800 MHz FM using the SSTV PD-120 mode.

The transmissions are part of the SSTV experiment of the Institute of Moscow Aviation (MAI-75) and will be carried out from the ham station RS0ISS in the service module of the Russian ISS (Zvezda)using a Kenwood TM-D710 transceiver.

- 12/1/2021 from 12:10 GMT to 19:10 UTC
- 12/2/2021 from 11:40 UTC to 17:20 UTC

Remember that dates and times may change. If your equipment has selectable FM filters, try the widest filter for 25 kHz channel spacing. You can get predictions for ISS passing times at:

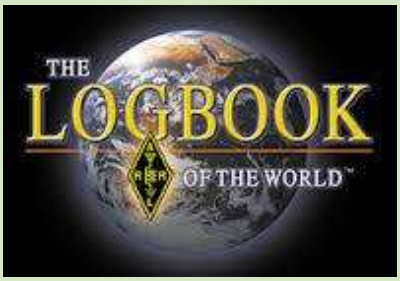
https://www.amsat.org/track/

ARISS SSTV Blog:

https://ariss-sstv.blogspot.com/

CONFIRMING SATELLITE QSOs IN LOTW

EA4M - Rick



I've been observing for some time that many radio amateurs worldwide who make QSO's via satellite upload their contacts to LoTW but in many cases the matches that the ARRL requires for a QSO are not valid for the LOTW system.

I will briefly explain which fields are essential and which are recommended to upload a sat QSO correctly to coincidence with that of the other station (assuming the other station uploaded it correctly). Necessary fields to confirm a QSO via sat: CALL SIGN,QSO DATE, QSO TIME, BAND (The Uplink band), MODE, MODE OF PROPAGATION (Always SAT), NAME OF THE SATELLITE

- CALLSIGN: This field has no mystery, here you must put the callsign of the station you made the QSO with. REQUIRED

- DATE OF THE QSO: Another of the fields without mystery, the day of the QSO. REQUIRED

- TIME OF THE QSO: Important !!!! The time in UTC !!! never in local time- REQUIRED

- BAND: Here you can put the uplink band to the transponder, for example in RS-44 we would put 2M. in the AO-07 we would put 70CM . RECOMMENDED

- MODE: FM, SSB, CW, DIGI whatever corresponds in each case. RECOMMENDED

- PROPAGATION MODE: The propagation mode is the sub-mode that LOTW recognizes to know that it is a satellite contact, so this it is MANDATORY, always SAT.

- SATELLITE NAME: This is one of the fields that most controversy generates, here LOTW is very strict with the nomenclature of each of the satellites, I leave you a link so that you can check which is the correct one in each case. This is another MANDATORY field

List of satellites supported by LOTW:

https://lotw.arrl.org/lotw-help/frequently-asked-questions/?lang=en#sats

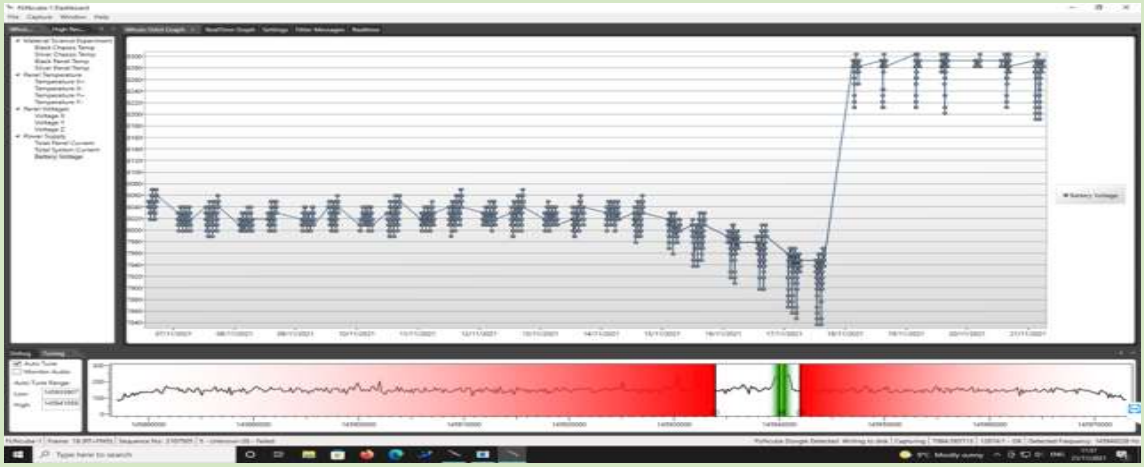
This is what a QSO exported in ADIF should look like in order to upload it to LOTW:

<CALL:6>WA6DIR, <QSO_DATE:8>20080710, <TIME_ON:6>151200, <BAND:4>70CM, <MODE:3>SSB, <PROP_MODE:3>SAT, <SAT_NAME:4>AO-7 <EOR>

I hope it helps. 73's.

FUNcube-1 (AO73) Celebrating eight years in orbit!

AMSAT-UK



November 21, 2021, marks the eighth birthday of the FUNcube-1 CubeSat. Remarkably the tiny spacecraft, launched from Russia on November 21, 2013, continues to work well having travelled more than a billion kilometres in space.

During the past couple of months, the spacecraft's orbits have been running just along the edge of the terminator. Initially we had effectively full sun with no eclipses but at the beginning of this month it appears that the solar panels were not receiving enough solar radiation to keep the battery fully charged.

FUNcube-1 was transmitting continuous high-power telemetry and was therefore consuming maximum power. The screenshot above is from the AMSAT-UK/BATC groundstation at Goonhilly Earth Station. The FUNcube Dashboard shows the rapid decline in the bus voltage from an already below normal 8.0V down to 7.8V. The spacecraft was switched to "safe" mode on the afternoon of November 18th. This reduced to total power consumption by almost 50% and, as can been seen, the spacecraft is again in a happy "power positive" situation.

Although safe mode provides less than 20mW of downlink RF, it is remarkable how many stations are still receiving and decoding the 1k2 BPSK telemetry. This is a good point at which to say a massive thank you to the many many stations around the world who, even after eight years, are continuing to submit their data to the FUNcube Data Warehouse. It really is valuable to the team and has really helped us to understand what is going on up there!

We will continue to monitor the telemetry over the next few weeks and plan to return FUNcube-1 to nominal autonomous operation, with the transponder on when the spacecraft is in eclipse, as soon as possible.

Interestingly, it appears that we will not be having any more "full sunlight" periods for the foreseeable future., however those that we have experienced have provided some good data on how hot a 1U CubeSat can become in such circumstances!

NanoVNA

EA5WA - Juan Carlos

The NanoVNA is a highly recommended device for hams. Since for little money you can do very interesting measurements, and practice what we have learned reading theory.

There are out there many information about the NanoVNA and many images available on the internet, but my intention is to explain the simplest way you can do the most frequent and useful measurements.

The NanoVNA has two SMA connectors. In addition to being labeled on the front of the device, within the NanoVNA menu, these two connectors receive the names: CH0 and CH1 . CH0 allows the measurement of parameter S11 (measurements based on the reflection coefficient), while CH1 allows to measure the parameter S21 (measurements based on the transmission coefficient). Therefore, depending on the connector or connectors that we use we can make among other things ...

What can we use the NanoVNA for?

Using the CH0 connector (measurements S11):

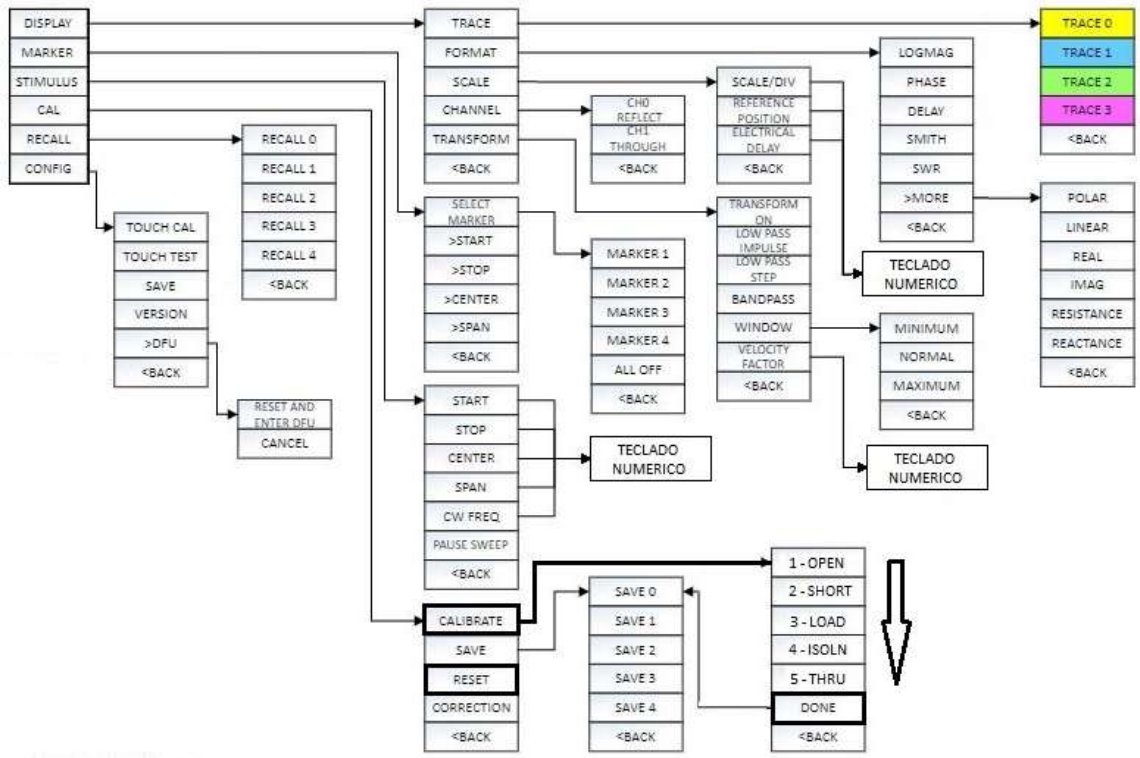
- Measure SWR
- Measure the Length of the coaxial cable.
- Find out the speed factor (FV) of a certain coaxial.
- Perform a 1/4 wave or 1/2 wave STUB
- Make a phase shift line.

Using the two connectors CH0 and CH1 (measurements S21):

- Measure the response curve of a filter.
- Measure the gain curve of an RF preamplifier.
- Measure the attenuation of a section of coaxial cable

To perform any measurement with the NanoVNA it is necessary (following this order)to specify the range of frequencies we want to measure and perform the calibration. It is important to follow this order, because if after performing the calibration we expand the band that we had selected, we will have to repeat calibration.

VNA menu structure



NanoVNA calibration

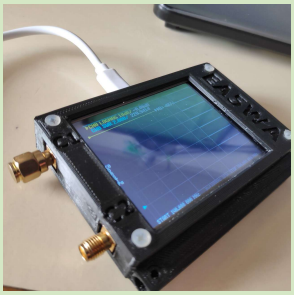
Calibration consists of 3 or 5 steps that we will have to do depending on the type of measurement that we are going to carry out:

For S11 or reflection-based measurements (Ch0 only): OPEN - SHORT – LOAD

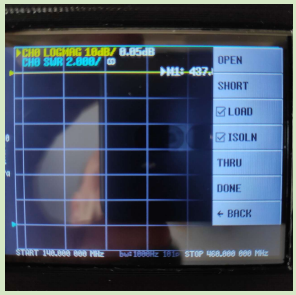
That is, if we are going to use the CH0 connector we will have to perform the calibration with the calibration kit that comes with the NanoVNA which consists of an OPEN connector (the gold connector that does NOT have a center or active pin), and the connector with the golden connector that DOES have a central pin and the LOAD of 50 Ohms (silver colored connector).

It is advisable to erase the calibration that may exist in memory, to Do it, just click on the RESET option in the CALIBRATE menu.

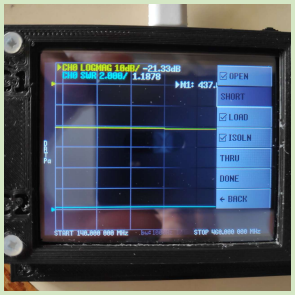
Identify the OPEN



Plug it into CH0

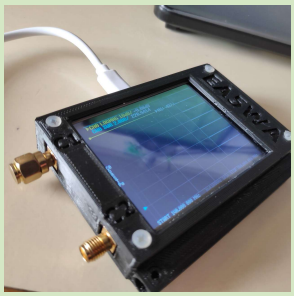


Open the CALIBRATE menu pressing CAL of the initial menu

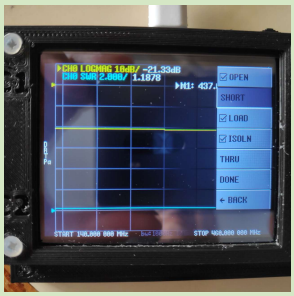


Click on OPEN. The NanoVNA positions itself on SHORT to indicate that we can proceed with the next step.

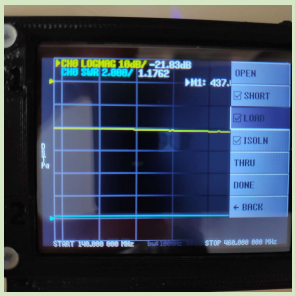
Identify the SHORT



Replace OPEN with SHORT in Ch0

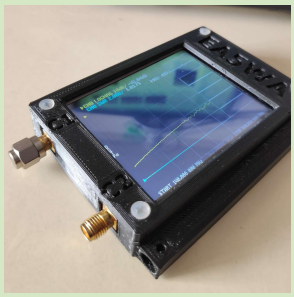


Click on SHORT

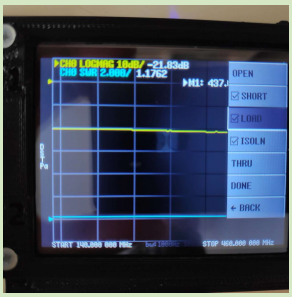


The NanoVNA tells us that we can proceed with LOAD

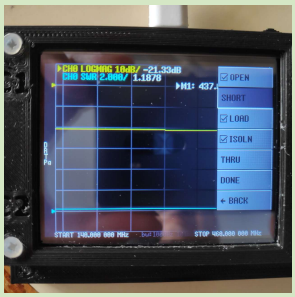
Identify the load (LOAD)



Remove the SHORT and put the load in Ch0



Click on LOAD



Done

If we are only going to perform S11 measurements we can finish the calibration clicking on DONE.

The SAVE menu opens to save the calibration that we have just perform, in one of the five memories available in the NanoVNA. We press on one of them and it would be saved to retrieve it whenever we need with the RECALL option from the Start menu.

For S21 or transmission-based measurements (between CH0 and Ch1): OPEN - SHORT - LOAD - ISOLN- THRU

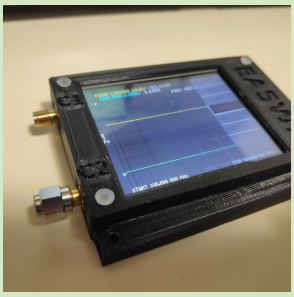
If we are going to make S21 measurements using the two connectors CH0 and CH1,we will have to carry out the entire process (5 steps). Once the three steps that we have seen in the previous paragraph are done, we will have to do ISOLATION (50 ohm load on CH1) and THROUGH (connect a coaxial cable from CH0 to CH1 that is a bridge between the two). Really when we do S21 measurements using the connector CH0 is emitted and received by CH1, therefore when joining them using THROUGH establishes the 0dB reference line.

Once the three previous steps have been carried out, we will have the cursor positioned on the ISOLN option in the CALIBRATE menu.

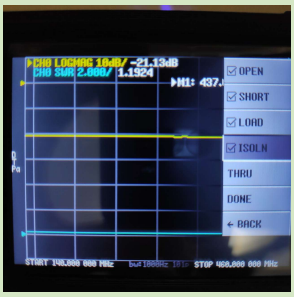
We screw the 50 ohm load on the CH1 connector and press on ISOLN. The NanoVNA is positioned on THRU indicating that we can proceed to the next step.

We remove the load and connect CH0 and CH1 between them, that is, with a coaxial cable with two SMAs at its ends and click on THRU.

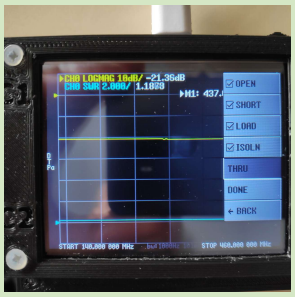
By clicking on DONE we will have finished the calibration and we can save it in one of the five memories available in the NanoVNA.



Remove the load from CH0 and connect it to Ch1

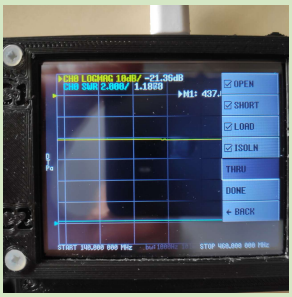


Click on ISOLN



The NanoVNA is positioned on THRU indicating that we can proceed to the next step

We remove the load from Ch1 and we connect a cable between CH0 and Ch1



Click on THRU

Finished

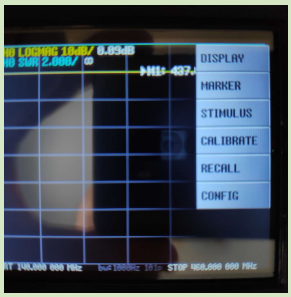
Clicking on DONE opens the SAVE menu to save the calibration in one of the five memories.

If we are going to use co axial jumpers to connect the NanoVNA to the device to be checked, these cables must be taken into account in the calibration and therefore we will have to place the OPEN-SHORT-LOAD at the opposite end of the coaxial.

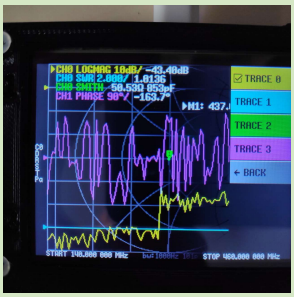
For example, when measuring the SWR of an antenna, if we want to know the values at the antenna feed point, we will have to calibrate taking into account the coaxial cable that we have, that is, we will have to go up to the antenna feed point to place the OPEN-SHORT-LOAD during calibration. On the other hand, if you want to know what we have down at the end of the cable (at the point where it connects to our radio equipment),we will perform the calibration on the NanoVNA connectors, regardless of the coaxial.

First steps with the NanoVNA

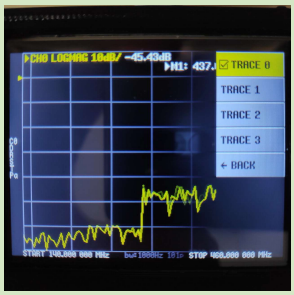
Once our NanoVNA is calibrated, I recommend disabling some of the lines to focus on just one. To do this, from the Initial menu pressing on DISPLAY and TRACE a menu is shown with the color of the four traces available. From this menu, by clicking on the different options,we can enable or disable each of them. When they are colorless they are disabled.



We click on DISPLAY and then on TRACE



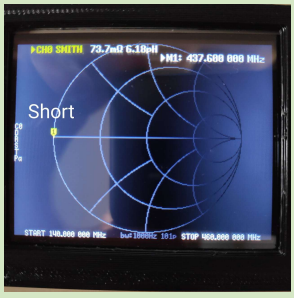
Clicking on each one of the traces in the menu, We can activate or deactivate them.



It is recommended to start with a single trace

One way to check that we have correctly performed the calibration and begin to understand the Smith Chart, consists of presenting the three OPEN-SHORT-LOAD values on the Smith Diagram. To do it we choose SMITH for one of the traces using DISPLAY - TRACE – FORMAT making sure that we are measuring over Ch0.

Connecting in CH0 each one of the three devices that are part of the calibration kit, we will have the followingdisplays:



SHORT = Zero Resistance

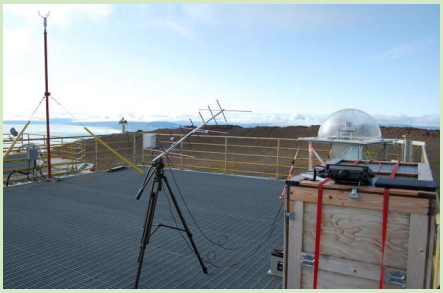
LOAD = Center of the Chart

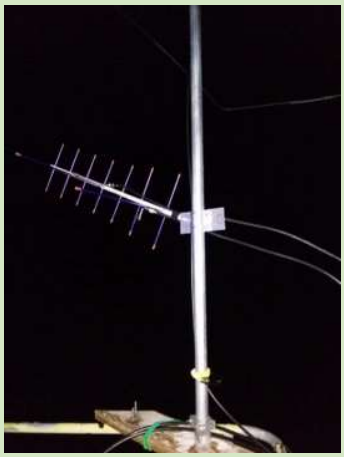
OPEN = Infinite Resistance

The center point represents the perfect adaptation to the system impedance (50 Ohms in our case)

Juan Carlos
www.ea5wa.com

PORTABLE STATION OF THE MONTH (VY0ERC- Eureka ARC)





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