



# NEWSLETTER-AMSAT-EA

05/2019  
MAY

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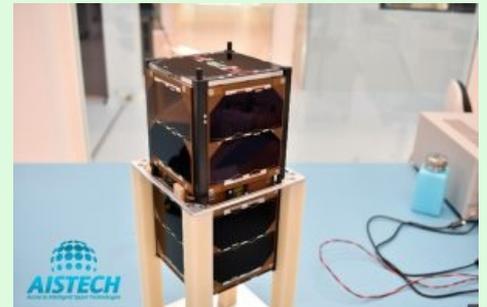
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Translation by Fernando EC1AME

## AISTECH TELEMETRY AVAILABLE

The spanish Company Aistech Space has put in orbit its second satellite at 7.40am ,local time, on april 1. It was launched from the Satish Dhawan Space Center (SDSC) in India, using a Polar Satellite Launch Vehicle, PSLV-C45 carrying onboard the Danu-Pathfinder (AistechSat-3).

Its polar orbit is at some 500 kms from the earth. In this launch, along with the spanish satellite Aistech Space another payloads were included from countries like USA, India, Switzerland and Lithuania. The satellite Danu-Pathfinder (AistechSat-3) is the next step in the deployment of a group of sats with capabilities to control the air traffic that the company offers to its clients.



On the other hand, this adds value to companies with assets scattered around the world providing them with a system that allows its optimization and control.

The Danu Pathfinder(Aistechsat-3) polar orbit allows a complete turn around of the earth in just 90 minutes at a speed of 27.000 km/h (16.000 Miles/h)

This is the second satellite in orbit after AistechSat-2 which was launched on december 2018 from California using a SpaceX rocket.

AISTECH Space has given us the Danu-Pathfinder(Aistechsat-3) telemetry to share it with all the amateur radio community. It's available to download in our content section(Contentidos) or following this link .

[https://www.amsat-ea.org/app/download/11302778/Aistechsat3+TLM+codes%2C+modulation+and+format+v1.0\\_AMSAT\\_EA.pdf](https://www.amsat-ea.org/app/download/11302778/Aistechsat3+TLM+codes%2C+modulation+and+format+v1.0_AMSAT_EA.pdf)

## LUME-1 SAT NOW COORDINATED BY IARU

IARU's frequencies coordination branch has coordinated the University of Vigo satellite LUME on april 10, taking in consideration that this satellite meets all the conditions to it. One of the factors to consider it was the fact that its AX25 repeater will be available to all ham radio ops. From AMSAT-EA we are collaborating with the LUME-1 group in the configuration of this repeater, which is now in the testing period down on earth. Once validated, the updated software will be uploaded to the satellite to test it in space before making it available to all the amateur radio community



## Coming Activities

**N7AGF**, Alex will be activating some weird grids from his rover . Look for him from april 29 to 4 or 5 of may (or more, conditions depending). Alex flown to Minneapolis and to CN88, activating grids like Enx8, ENx7, DNx8 and DNx7

**Central and Northern Maine** (FN53, FN54, FN55, FN56, FN57, FN65, FN66, Fn67 - POSTPONED There will also be spare activations along the route....like: FN53 - 54 - 55 - 56 - 57 - 65 -66 - 67. A special effort will be made to activate some grid intersections like FN56-57-66-67 north of Caribu. A detailed Schedule of these operations will be announced asap.

**AD0HJ**, Mitch, is heading to Grand Forks, ND Hamfest on may 4th . Plans are to work EN17 / 18 on may 2, EN07 / 08 on may 3, EN17 / 18 again on may 4th(hamfest day), and then, EN06 / 16 on may 5.

**KE2QI**, Robert, activating FN14 / 24 may 3 at night

**NS3L**, Steve, will activate the grid line FN11 / FN21 from the morning hours to the evening on may 5. He may also go to FN12 later. He will work FM and SSB sats. And only weather permit. If bad weather in the area, he will reschedule this activations.



Adam, K0FFY from SOTA W0C/FR-063 in DM79



KM4LAO, Ruth



AL6D, Gabe as CK6NJH from CO39

**K2MTS**, Michael will be in FN13 / 14, may 11 and 12 , holiday style.

**W9TWJ**, Tanner will be back to FN00 may13-15 , if someone still needs those grids. Maybe also from EN90 on may 15. Look for him on night passes on FM sats.

**W5PFG**, Clayton will be active from DN83 in all FM/SSB sats May 19 to 23. He is available to handle scheds with Europe. Days after he will be in DN91, DN74, DN71 and DN70

**AI6DO**, Ryan will be active during his bizz trip. Plans are: EM13 5/20 and 5/21, grid line EM22 / 23  
0000-0300 5/20 and 5/22 UTC (5/19 y 5 / 21 local).

**KM4LAO**, Ruth, will be traveling to the north to activate the Point Pelee National Park in Ontario, EN81, on Saturday may 25. Ruth can also be doing one or two passes from EN82 time permit.

**KI7UNJ**, Casey will be on from CN83 / 84 on Friday may 31, CN85 on june 1 and CN76 / 86 on Sunday june 2.

**K0FFY**, Adam will be with his family ( and radio stuff) in Island. The provisional calendar is: HP95 on july 13, IP13 and IP15 on july 14-15, IP25 on july 16, IP03 or HP93 july 17-18 and HP94 on july 19.



Douglas, N6UA

## Past Activities

**EA4NF**, Philippe was active from HB0 / Lichtenstein. Philippe used the call HB0 / EA4NF from Leichtenstein and HB9 / EA4NF from Switzerland (JN47, on FM sats and SSB) QSL via LoTW.

**EB1AO**, Jose was active from IN73 and cross IN63/73 from April 17 to 21.

**DL6AP**, Andy was active from the DEN-010 Lighthouse on april 30 using the callsign OZ/DL6AP from JO54.



EA4NF, Phillipe from HB0

## **TALKS @ J. RAMÓN JIMENEZ SCHOOL IN LAS PALMAS OF GRAN CANARY ISLANDS**

Interesting event on april 23 in the new Juan Ramón Jimenez school in Las Palmas de Gran Canaria.

Amateur radio stations from the Canary Islands like EA8RM Juan, EA8AFM José Moreno ( URL president and treasurer) and EA8DHC Alberto, explained about amateur radio to some 200 students (divided in 4 groups). The main idea was to link what they study to what ham radio can do as a support tool in the learning process.



Some of the issues they talked about, included: ham radio as a tool to practice or learn any idiom, computing, electronics, propagation, collaboration in emergencies, meteorology and the way to treat images received from the NOAA satellites. And, of course, they also talked about amateur radio satellites with a demostration of a QSO thru AO91 with a QSO with Victor, EA1GAR.(Thanks Victor for your patience)

We must remember that this school was also, a few months ago, host of a day that is on its way to becoming an anual event, baptized as “Satélites en el JRJ”



After that, this school filled the ARISS docs to become one of the schools to host a contact of the students with the ISS..let´s cross fingers.

**PD: Let me remember the faces of amazement of the faculty of Sciences, Physics, Mathematics and Geography teachers. (for the NOAA sats experience) and the possibilities of ham radio as a teaching resource tool.**

## GETTING INVOLVED IN THE QO-100 SATELLITE

EA5TT, Manolo

It has not been an easy road, I have fallen several times, but I have always found someone willing to lend a hand and help me get up again and continue, they know well who they are and I thank you from the hear. These lines go for you, FRIENDS:

Since the launch of the new geostationary satellite, my intention was always to be there with the tools I had available, recycling old 60cm dishes, forgotten DTV hubs in drawers , modifying a TV splitter to feed the LNB...



Look for a good advice before buying the LNB , it has to have a good stability. I had something clear, the upconverter should be from SG-Labs for several reasons:

.It's a transverter , it can be configured to work in the band of 2,3 GHz for tropo contacts... well, it's the right for me. I had to wait almost a month as the manufactured was overflowed by demand, but I assure you I'm enjoyin it a lot. I have the 23cm version and works great



.I have no tools to adjust antennas on 2,4 Ghz and the rig has SWR meter

I'm using GQRX as the receiving software running in an old Mac computer in which I'm doing all the tests. I have to manually correct deviaton, but being used to work this on LEO sats, this is not a big problem, and to tell you the truth, when the LNB is working for several minutes (I ordered an Avenger, by the way) frequency almost had no variation

Let me highlight that mine is a temporary set up in a balcony, so each time I have to beam the dish( I already know where the bird is) and connect rigs and cables. At first attemps I received with the dish and transmitted with a helix antenna with 12 turns and hooked it up to the balcony railing using a few clothespins.

My signal was weak for SSB, in CW sure I could have done a bit better but the general authorization in Spain didn't allow that on 2.4 Ghz( not even digi modes).

Even with that problem I could achieve two very good contacts with my weak signal . My CQ was answered by HS0AJ, longest distance so far, and ZS6TW Both being new countries for me in satellites.

But I was not completely satisfied with my uplink set up so I decided to add a helix antenna to the dish....another stumble , I noticed I gained almost nothing. The problem was that the helix had too many turns and didn't feed the 60cm dish completely. Once shorten to 3 turns I noticed a good improvement, I heard my return stronger.. I tested several configurations, but finally I decided to try a recommendation from a good friend of mine in France...the helix antenna in the focus and the LNB slightly moved aside. The signal from the satellite is so strong that you won't feel degradation.



On Thursday (easter holidays) I tried something even more difficult... bad weather, rain, wind and overcast...so I decided to mount everything inside my home, in the living room, to see what could happen.

Well, of course I noticed a drop in the uplink signal , the downlink was still very strong. Even though, I could complete 16 contacts and they gave me signals as 53 or 55.. I could barely hear myself in the downlink

Well, little by little I'm acquiring practice, QSOs here are longer than in LEO sats. We normally exchange the name of the city and working conditions, something very important to compare signals and get a better installation.

When my antenna goes to the tower , the transverter will remain in my shack and outside I will put a 5w WIFI amplifier to compensate the losses.

Summarizing, as I'm writing these lines, I have completed 53 contacts thru this satellite since march 31. Most of them done during the easter holidays.

Ooops, I forgot telling you that what I've spent in all this set up didn't exceed 250 euros.. I think this money was my best investment in this hobby..All what I'm learning, experiencing and all the fun is priceless!

THANKS TO ALL!  
73, EA5TT, Manolo



## ICOM IC-9700

**Descuento de 150€ para los socios de AMSAT**  
(descuento no acumulable con otras promociones)

**Llámanos y te informaremos sobre esta promoción**  
**953886155**



By the time AO-85 launched there were very few FM satellites. It was the first time in a while that a new FMU/v satellite was put into orbit, and had everyone excited about it. But an increased difficulty came up: there was a reception issue on the satellite. Because of that QSOs were possible but requires somewhat good setups, especially a good antenna. Some months ago when AO-91 and AO-92 launched, that changed dramatically. These are exceptionally easy to access by a simple handheld radio, as announced for the entire FOX satellites series, and a rather simple antenna. How simple? Well, that is what this article is all about.



First things first. I really recommend that before attempting any satellite contact, FM or SSB, you should read AMSAT's recommended practices. The document itself is a set of guidelines that will help you not only get into the satellite, to hear it, but most important to allow others a chance to complete a QSO with you. Along with the common sense cordiality and patience that this hobby requires I want to emphasize two key elements. Listen. Take time to listen those passes and see how things go. Get used to the "standard" QSO structure and the pace those are completed. Go to YouTube and check videos of people working those satellites, as you will actually see how they handle the equipment. Take a look at K G 4 A K V John's Space Comms channel (<https://www.youtube.com/channel/UCJDdMdjxwFsjdzhXQFHVvk2g>) or Patrick's WD9EWK videos (<https://www.youtube.com/user/va7ewk>).

The number of passes you should listen only really depends on you. If you transmit and do not get replies after several attempts then something's up. You might be getting into the uplink and inadvertently interfering with someone else QSO. That takes me to my second advice: get a full-duplex setup. It can be two radios with a cross polarity dual band yagi, it can be one full-duplex radio and a dual band antenna, and it can be two radios and one dual band antenna like the Elk and a diplexer. There are many options, but I guarantee that once you tried full-duplex you will never want to go back. Even if so, practice that listening, and if still you do not hear yourself, it does not mean you are not getting into the satellite. Work to rule out the possible problem and try again.



So, back to the main topic. Operating those FM birds with a simple handheld gear. Myself, I use a Wouxun KG-UV9D. In fact, I have two of them. Those more experienced know, and are thinking right now, that this radio is not full duplex in V/u mode for satellites. Given that there are only a few of them up there it was the most cost effective choice for me at the time. After a while, you tend to know the satellite spin velocity by monitoring the polarization and take that to your advantage, allowing you to aim your antenna correctly and maximize the odds of getting into the uplink. I'm not saying you should only work satellites when

full-duplex capable; I'm just mentioning that it will make yours and everyone's pass a lot easier.

How simple can those antennas be? I have been taking advantage of AO-91 orbit at lunchtime passes, and took several ones to test different setups. Those covered in this article are the stock Wouxun duckies, the Nagoya RH-770S, Nagoya R3, Nagoya RH770, Pryme AL-800, homemade open sleeve short Moxon and the Alaskan Arrow II.

## Stock duckies

Wouxun KG-UV9D is provided with two duckies. These small antennas are perfect for carrying your radio around but given such a small far away object as a satellite the greatness is not true anymore. AMSAT made an outstanding job building the FOX series that even with such antennas you will complete some QSOs. My findings were that when using a duckie you will only start to hear the downlink around 20 degrees elevation, and the uplink will pick you up around 40. In fact, my very first AO-91 QSO was with one of those duckies. Good for overhead passes and low noise environments. I have worked AO-91 from IO91 right next to London's Heathrow Airport, UK, which is a nest of QRM. Also done it on SO-50 with a Baofeng and its stock antenna.



## Nagoya NL-770S

This antenna is intended for your car, but found to be very strict to the ham bands, tuned to specific frequencies. It is ok for 432 with 1:1.2 but terrible at 435 where SWR stands at 1:1.8. Same for 144 band. Even so, you will pick up signals around 15 degrees but the uplink is only possible above 40 which is about the same as the duckies. Some improvement, but I never completed a QSO with it. Moved right away to the next one.

## Nagoya R3

Also a car antenna, very flexible, and measures 49cm, that is longer than the RH-770S. Signals will be picked up around 7 degrees and the uplink around 25. That is better, but not good enough for me. Besides, this is the antenna I have on the car so had to remove it for every pass. I wanted better. Occasionally I worked while driving and could not stop to take it out. Due to the satellite rotation, and the antenna being vertical, the fade pace is noticeable, so I just need to wait until the signal gets back. Nevertheless, look at this video where I complete a QSO, mobile to mobile, with F4DXV <https://www.youtube.com/watch?v=518KO687G-o>.

## Nagoya RH-770

Telescopic, perfect to store in your glove compartment or your laptop suitcase. I have been taking it on short notice business trips. Usually I get signals around 7 degrees but can get in roughly around 10. Five DXCCs activated with it so not a bad option. While in the Gulf of Mexico at the 2016 AMSAT Symposium, I completed two QSOs on AO-85.

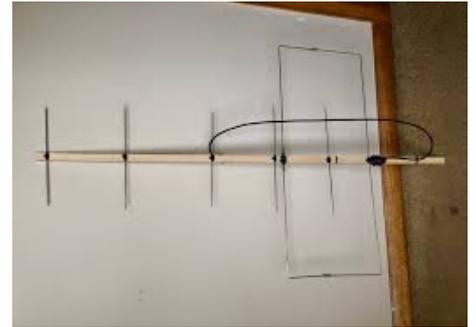
## Pryme AL-800

Not sure I have an actual Pryme or a close version of it. Very similar to the RH-770 but about ½ inch shorter. Results were virtually the same. I compared it on distant repeaters both 145 and 438 without any difference. The down side is the construction material they use. While the RH-770 is durable, I had the Pryme split it two times because the clamps gave up holding sections together while extending. I heard someone had one on a motorcycle and it did not take long before it was gone.

The next ones are classified as yagis. They take a lot more space and even if disassembled can still be hard to carry around. While I'm aiming at easy setups on this article, this falls a bit off topic, but nevertheless, it is worth the try. You will understand why in a bit.

## Open Sleeve Short Moxon

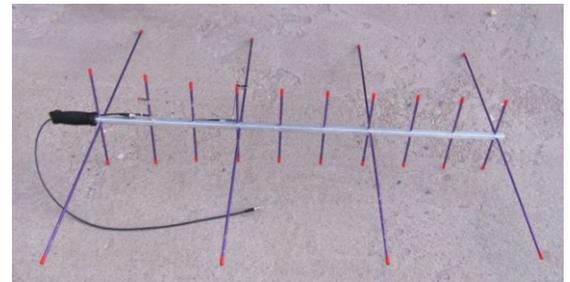
This one is in my car's trunk. It is my workhorse at both work and planned business trips. It can complete QSOs down to -1.5 degrees. At the standard test location (see note below) picks the downlink at 4 degrees and the uplink is perfect around 6. I used it in 6 different DXCC activations and still very happy with it. It was home built and the design has the VHF driven and reflector elements folded shorter which is perfect to carry inside a backpack (original version here



[http://www.arsatc.org/images/moxonreduzida\\_peq.jpg](http://www.arsatc.org/images/moxonreduzida_peq.jpg)). I was using it when one of my past personal QRB record on AO-91 was established. Some years ago I built an open sleeve long antenna based on DK7ZB design with very good results.

## Alaskan Arrow II

Is this really necessary? Perfect signals at -1.5, both ways. I use it at home, mountain hikes and well-planned DXCC activations. At the 3+8 configuration I can get AO-7 around 1 degree from my QTH balcony and still complete QSOs. As far as I know current QRB records for AO-7 and FO-29 were accomplished using Arrows. Get the BP versions and off you go to anywhere. You can use it with two radios or just one by adding a diplexer.



All of the omni antennas require extra effort waving your radio around to find the correct downlink polarity, which might not be the same for the uplink. Practice that waving around and you will eventually find the correct angle offset from the maximum downlink signal that allows you to get in the uplink.

With time and practice I bet you will end up figuring out the satellite rotation, if any, its pace and direction, either by using an omni or a yagi. That is a very different article, and I leave it to those more knowledgeable.

## Other setups

I have used from home a Nagoya NL-770R and NL-770H, but because it is on a mast, the signal fades from time to time just like in the car. Amazingly enough, I have never tried to measure from what angle I can hear it or get in. Then comes the Diamond X300 – also on a mast, same principle applies regarding signal fading. Back in 2015, I used only this one even for linears, which performs as expected. The XWs are loud and it performs well but for others you just have the extra gain from it when compared to the 770R and H. I have never seen the S meter move around while using it.

Other small antennas include the famous Diamond RH771, or its equivalent from Nagoya NA771, and these will perform somewhere between a stock duckie and a telescopic. There's the Elk antenna too, which taking advantage of being a log-periodic that can be worked by a single radio.

Jerôme, F4DXV, sometimes uses a RH660 telescopic. We had a QSO once while he was hiking and he states you can work AO-91 just like if he was using a Rh770.

KB2YSI uses an Arrow setup with a diplexer, but two radios. The diplexer there acts as a filter to minimize desense and interference problems. Check his page at <https://t.co/NGGgBz5lgh> for details and schematics. The Arrow itself is a very good and I find myself adding features, just like Don. You will never be disappointed at an Arrow, and his setup makes a huge difference. In fact, I'm seeing that setup more and more everywhere.

## Recommendations

It really depends on lots of factors. Natural environment, radio, connectors, coaxial, local interference. I keep one RH-770 and the short moxon in the car. If a very last second pass is coming up then the RH-770. Something with at least a couple of minutes, then the moxon. Ideal, the Arrow II. Bottom line is the stock duckie will get the job done. Barely, but done. I'm tempted to say that any "decent" duckie will do it. So get out there and listen, then listen some more. Then give it a try. You will feel the excitement, for sure.

## Note

Most of these tests were outside my workplace – a tech plaza with all kinds of IT companies, and that means more Wi-Fi than you actually need. No cell phone towers in the vicinity nor power lines. Trees limit the south view at about 2 degrees and north at 4. Other selected spots had clear ocean horizon down to the ocean.

*73, Pedro CU2ZG*

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