

9X0T & 9X0Y – Another adventure of the Italian Dxpedition Team to be told !



This one was a new experience for the Italian Dxpedition members. In fact, we tested for the first time the new FT8 digital mode, a somewhat mysterious procedure, at least for us.

Before departure, we received encouraging signals of approval for this choice, along with unavoidable dissent from FT8 opponents. When in Rwanda, we had some exchanges on this subject with different hams, but the ensuing controversies led us to avoid this argument on social networks. We then decided to attach an Appendix to this article, written by Stefano IK2HKT, for those interested in this new digital mode.

As usual, all started with email exchanges between Silvano I2YSB and Stefano IK2HKT, always searching the atlas for suitable countries to activate. At the beginning of August 2017, our attention focused on Rwanda, a small country in Eastern Africa bordering the Democratic Republic of Congo on the West, Uganda on the North, Tanzania on the East and Burundi on the South. It is a Presidential Republic, subject in the 90's to aggressive racial confrontations between the Tutsi and Hutu tribes, with the country falling into into a ferocious civil war and a deep crisis. This situation lasted until 2003, when improvements slowly began to emerge. At our arrival, we were positively surprised, to say the least, to find a modern country, with a population abiding by the rules and striving to forget genocides and atrocities of a recent past.

Just as an example, be mindful that if you arrive at the airport with plastic bags in your luggage, they will be taken away and you will be fined, since no polluting items can be imported into the country! As another example, we drove 100 km from the airport to our destination Muhazi, on a perfectly smooth road, immaculate clean with no garbage laying on the ground, not even a piece of paper or a cigarette butt !

At variance with other African countries, it was like a mirage. On our arrival at the lake, we were overwhelmed by tranquillity, silence and wide open space offered by the Muhazi Beach Resort to its guests. Broad stretches of lawn available for mounting our antennas, far away from the city noise, no power lines and a water surface stretching to the north ... ham paradise.



Our good friend Fabrizio, IN3ZNR, had informed us that Rwanda is a really spectacular destination: he was right. We contacted Fabrizio since he had visited the country with his Spanish friends of the Tifariti Dx Gang in 2008. Given the many changes in the country situation over the last ten years, we had to address new managers of RURA (agency issuing licences) in order to get

licences and find a suitable location. Special thanks to 9X9PJ for his precious help in easing this process ... thanks Peter!

We arrived at the Muhazi lake on 25 September in the evening, after a 2-hour trip from the airport to the small lake in the northeastern part of the country. We were relaxed, since all went fine, particularly through customs in Kigali (the Capital city of Rwanda), thanks to our preparations of all customs documentation before departure.

None of us slept through the first night, and at sunrise the stations setup began: Marcello (IK2DIA) and Silvano (I2YSB) busy with the Spiderbeams, Alfeo (I1HJT) and Angelo (IK2CKR) with the 40/80 vertical,; Stefano (IK2HKT) and Vinicio (IK2CIO) with stations setup and LAN network, and finally Gino (IK2RZP) struggling with the multiband Yagi for the digital modes. The IDT approach is by now proven and reliable, and on the early afternoon we were ready with 2 stations, followed by 2 more so as to be on the air with 4 stations in 24 hours since our arrival. On the following day we mounted the last antenna, the 160 vertical with capacitive hat, followed by other receiving antennas for the lower bands.

Needless to say, the pileup was immediately thick (whoever heard us did not find bored operators calling CQ in vain as in our previous Dxpedition to Cameroun in March). During the day the most productive bands were 20, 17 and 15 meters; on 12 and 10 we only had sporadic openings at random hours, which called for frequent band changes to chase the best conditions available. In the evening, on the contrary, we had superb conditions on 30 and 40 meters, including 80m, but we had

to pay a heavy toll to the transequatorial noise, although 9X0T logged almost 1400 CW QSO on the top band.

From the weather standpoint this period was not ideal, and we suffered daily from thunderstorm noise, which at times forced us to stop operations for 20/30 minutes in wait for static to decrease.



The unexpected was obviously on duty, and a faulty seal in a network cable connection created a short in the 5 Ghz Access Point for the CW station, which severed this part of the network from the rest. We were forced to remedy with an old 2.4 GHz Access Point, whose intermittent behaviour blocked at times the updating of our real-time Online Log

in order to realign the various stations. Quite a stressful situation, but we managed to keep the system alive throughout the Dxpedition, with maximum delays of about 5 minutes.

For the first time we had a good internet connection, a 4G link payed a hefty price but of high quality. It allowed us to video-call some friends during operations, sharing with them the real-time thrill of the pileups.

Another trouble arose after the first weekend. Silvano (I2YSB) had carried along a semi-professional drone bought years ago, which he had tested at length but never fully used. On the first time, in Guinea Bissau, our location was near an unused airport, which was however still on the official aeronautical charts and, as such, identified as “no flight zone” by the internal database of the copter. Which plainly refused to work. On our Dxpedition to Cameroun the machine was left home, since we had no room in the crates and we did not want to pay an additional fee for it. So this was the right moment to try it: enough room in our luggage, a location far from the city, no airports nearby: the perfect chance. Unfortunately, the Muhazi Beach Resort is just next the villa of the Rwanda President. After the first (and only) flight, some bodyguards of the presidential security probably thought of dangerous or espionage activity on our side. As a consequence, on the following morning RURA officials showed up asking us for a list of authorizations for the drone. We had not envisaged any such authorizations, by the Civil Aviation agency for flying the drone and by RURA itself for using the 2.4 GHz band (for drone remote control). The paperwork delay for such authorizations was estimated at 2 weeks, so – once again – the drone use was out. We tried to convince them, but the drone was confiscated

and returned to us at the moment of our departure for Italy. At least we avoided a fine, and a few seconds of filming on the first day were recovered.



Back to our radio activities: after the first week the 40k QSO target had been reached. The arrival of Mac (JA3USA) brought some relief to the SSB operators, leaving them some extra time for the digital modes.

The team members achieved remarkable performances, with Gino (IK2RZP) on CW for the first time, monitored by Angelo (IK2CKR) who, at the same time, was working the pile with a microscopic bug key, to the wonder of us all. Also, Marcello (IK2DIA) mastered ceaselessly the SSB operation (was it past abstinence from pileup?). No doubt, having ample room for antennas, which were mounted far apart from each other, helped in maximizing our performance. At times we had up to three stations (CW, SSB and RTTY) on the same band without any interference! Only the FT8 station suffered from interference, because of the radio used: for the first 10 days we used the KX3 by Elecraft (our “car radio”). It works well by itself, but next to other stations with strong signals it had decoding difficulties. During the last days we reconfigured our RTTY K3 for FT8 use, which allowed us to deal with strong pileups.

We obtained another improvement by displacing all the lower band antennas closer to the lake border. The already strong signals became even stronger near the water, treating us with unforgettable pileups, such as one with Japan, at nighttime on 80m SSB. Stefano and Gino will remember it for years! On the following day Gino celebrated this superb experience turned into a cook and prepared for us all a mega Italian pasta

UTC	dB	DT	Freq	Message
063030				Tx1 JF1LMB 9X0Y -07
063045	-16	0.2	302 ~	9X0Y JF1LMB R-10
063100				Tx1 JF1LMB RR73; VK3GA <9X0Y> -22
063115	-24	0.2	301 ~	9X0Y VK3GA R-11
063130				Tx1 VK3GA RR73; VK2CA <9X0Y> -19
063200				Tx1 VK2CA 9X0Y -19
063230				Tx1 VK2CA 9X0Y -19
063300				Tx1 UR5EH 9X0Y +00

(our DVD documents his exceptional performance!).

On the same spirit of celebrations, we realized a short video interview with Mac JA3USA, since this one was his tenth Dxpedition with the Italian Dxpedition Team. A remarkable feat for Mac and a great honor for us (interview visible on the DVD).

Further on, we also celebrated the first amplifier which could match the reliability of the famous KPA500 by Elecraft. So far, we always used this latter type of linears, connected to a power combiner for a total output of 1 kW. On the last 6 Dxpeditions we tested other types of amplifiers, none of which, however, passing - for various reasons - the "IDT Test". After days or even hours of intensive use, in fact, all of them developed problems or quit altogether. Now we have an amplifier which passed our "stress test" by working continuously, 24 hours a day for 15 days, at max power (almost 1200W, something more on the lower bands). This resulted in 30k QSO on CW!

This amplifier is a compact and lightweight rig, with all necessary features. It is a HAL 1200 Atlantic MK2 by GB Hardware & Software (www.gbhs.it) whose owner,



Giordano (IW2ANU), asked us to test it under real field conditions. In spite of our initial skepticism, driven by 6 prior failures with amplifiers of different makes, we can guarantee that this PA is a really superb piece of equipment which will sit on the operating desks in our future Dxpeditions. Bravo Giordano ! ... Well done (and an excellent example of "Made in Italy")!!!

During our stay at lake Muhazi we were subjected to critical situations, such as discovering that the RTTY K3 had a malfunctioning audio board. The solution was to swap the CW and RTTY radios: the modularity and flexibility of our setup proved once again to be a precious asset. Or also hearing a strange noise from inside the SSB K3, and discovering that a toroid of a band filter got disconnected, probably because of shocks during transportation. Also in this case all was fine after an immediate repair.

Moreover, what to say about a power supply fan producing the noise of a scooter, or observing the guy wires of the CW Spiderbeam getting loose from their pickets, with the antenna collapsing and



breaking two spreaders (replaced by two tree branches found nearby). Basically, the normal situations of a normal Dxpedition: the unexpected happens, and the expected never does!

In the end, however, the scores were in our favor and the difficulties which we experienced in Rwanda vanished away. You can find below the totals for our two calls, 9X0T and 9X0Y, followed by a detailed report by Stefano IK2HKT about our FT8 operations.



Where shall we go next? We do not know yet, not even when. We have a couple of destinations on which we are working ... Stay tuned!

The Italian DXpedition Team

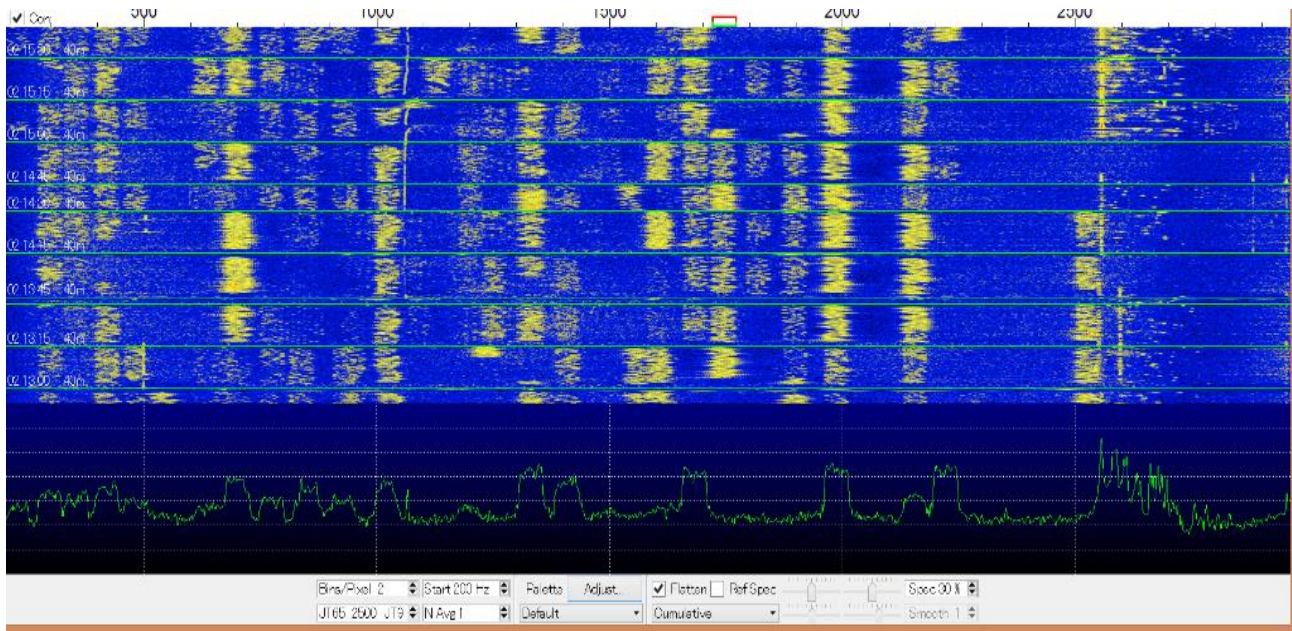
9X0T and 9X0Y TOTALS QSO

9X0T Rwanda DXpedition - Date of the last QSO imported is October 10, 2018 05:06:39 UTC															
ALL	SSB	CW	RTTY	FT8	CALL	160m	80m	40m	30m	20m	17m	15m	12m	10m	6m
57468	24809	30533	2126	0	19064	1374	2770	6156	4528	15432	11382	10747	3202	1877	0

9X0Y Rwanda DXpedition - Date of the last QSO imported is October 09, 2018 18:04:00 UTC															
ALL	SSB	CW	RTTY	FT8	CALL	160m	80m	40m	30m	20m	17m	15m	12m	10m	6m
10054	0	0	0	10054	4133	135	699	1743	1869	2025	1523	1287	338	435	0

TOTAL QSO MERGED														
TOT. QSO	SSB	CW	TTY	FT8	CALL	160	80	40	30	20	17	15	12	10
67522	24809	30533	2126	10054	20080	1509	3469	7899	6397	17457	12905	12034	3540	2312

FT8 ... NOT AS EASY AS PEOPLE THINK !



The title of this Addendum to the account of our Dxpedition to Rwanda refers to some comments of Mac JA3USA, after he was witnessing the QSO procedures on a FT8 pileup. Contrary to common belief, this type of QSO is not a communication between two machines, but it requires also some human intervention in the proper settings. A necessary preamble, since up to a few months before departure I had no experience with FT8. It was Gino who stimulated my interest through a phone call: “what about a FT8 test? It is becoming popular and we must understand it”.

In one go, I downloaded the WSJT-X software, configured a few parameters, tuned the audio In/Out levels and within minutes I was on the air for my first QSO on this mode. Many more followed, some of little interest, others plainly astonishing (working JAs from Italy on 40m with a multiband vertical, 2 radials and 5W is quite a feat!).

With the passing of time, also Silvano I2YSB got interested, and the best live test was offered by the KH1 Dxpedition. Together with Gino and Silvano we monitored the Dxpedition, coming to the conclusion that it was the moment for us to try it out.

Thanks to the help of friends from the Sezione ARI of Albino, we simulated a Dxpedition with *Fox* and *Hound* stations. This test was most useful for understanding the software in detail and its potential problems, particularly with the station in the *Fox* mode. Honestly, we had problems and the help of Alberto IZ2XAF guided us through the solutions. The only issue remaining was that of double, triple or even quadruple confirmations of the QSO. A few words of explanation are in order: in *Fox* mode the QSO ends when the Fox station sends a RR73 string, which causes the QSO to be logged. If the RR73 is not decoded by the correspondent (because of QSB, QRM or noise), the station sends its signal report a

Date	Time	Call	Grid	Sent	Rcvd	Band
2018-10-02	11:57	ON4GPE	JO21	-24	-17	12m
2018-10-02	11:58	F6GCP	JN18	-24	-14	12m
2018-10-02	11:59	F6GCP	JN18	-24	-14	12m
2018-10-02	12:00	F6GCP	JN18	-24	-14	12m
2018-10-02	12:02	US5CCO	KN59	-02	+00	12m

Callers: 6 In progress: 2 Logged: 177 Rate: 18

WSJT-X v1.9.1 by K1JT

second time. The Fox gets the second report and resends RR73 to finish the QSO. At this point the Fox logs the contact a second time, which can repeat up to four times.

I realized this bug in the proximity of our departure to 9X0Y, too late

for requesting Joe K1JT for a patch. But Alberto IZ2XAF came to rescue with a routine which analyses the entire log and deletes the duplicates before uploading to our Online Log. The price to pay was a delay in log transfer to the server, which was then updated each 3 minutes instead of 1; still an adequate solution. With this routine our log is really clean of dupes and our statistics are real. Our log is therefore DUPE FREE. If you are interested, without this routine we would have had 14k QSO in our log!

I discussed this matter with Joe K1JT, and we considered possible solutions to be implemented in a future update of WSJT-X. We are surprised that our friends of the KH1 Dxpediton did not raise this issue, which requires immediate action since it would severely distort any statistics.

For the rest, all was fine. Whoever will watch our DVD, will be impressed by the decoding accuracy of weak signals, even in the presence of strong ones and the ease of working DX stations.

I still remember Alfeo's (I1HJT) expression when, after 12 days on 160m CW, I proposed a test in FT8 on the Top Band. I have no experience on this band, which would have made for a real test under real conditions and without specific knowledge of this rather special environment.

The test was carried out on one evening, around 19 local (17Z) times, with a lot of skepticism. By sheer chance, I chose the most unfavourable conditions, with maximal QRM and QRN (almost impossible to do on purpose!). This, however, made for a most fascinating test. After a few calls without replies, I started to see a special expression on Alfeo's face, who was clearly thinking "you see, no way on 160m even with FT8". However, in spite of S-9 QRM, first SP3DOI appeared on the screen, followed by many other Europeans who were on alert (our intentions were known via our HamRadioWeb official forum). Through several hours, in just one evening and under almost absurd receiving conditions, I logged 135 QSO, of which 11 US stations (5 of them worked us in FT8 only). This was a real success for this mode, since these 5 stations had a chance on 160m only via this mode. Pity for the JA,

tough. Mac, over the phone with a friend, told us that our signal was copied in Japan, but we could not decode any signal. There were a couple of station with really BIG power on 160, (imagine how much!), but no signal reached us. Next time

we shall use the 160m RX antenna also for FT8, promised!

On this mode, the software plays a major role, but the operator is also very important. One must set carefully all available options and execute a thorough calibration of the sound blaster audio board. Quite a number of stations could not be copied because of totally

inadequate settings! In FT8 the compressor is detrimental, the ALC must be kept within limits and excessive power is not of help when the signals can be decoded. Typically, I gave priority to weaker signals; if a station is +10 db and another -21 db, it is better to work the weaker signal first, whereas on CW or SSB the reverse is true, in order to minimize interference to the weaker stations. In FT8, this choice is made by software (with specific settings in Fox mode) or by the operator.

Analyzing the statistics of the FT8 log, and comparing them with the overall (9X0T plus 9X0Y) log, it appears clearly that more than 1000 QSO were FT8 only, most of which from Japan, USA and Europe. As Mac explained to us at Friedrichshafen, FT8 is very popular in Japan, also owing to their difficulties with English and/or CW. This, along with possible poor operating conditions, leads many Japanese hams to working DX only on FT8.

The whole 9X0Y log shows that the majority of stations worked is from the USA (2168), followed by Italians (1573) and Japanese (1129).

Some interesting numbers are given below.

MOST ACTIVE COUNTRY IN FT8

COUNTRY	QSOs
U.S.A.	2168
ITALY	1573
JAPAN	1129
GERMANY	807
EU RUSSIA	610
OTHERS	3771
TOTAL	10058

MOST ACTIVE BAND IN FT8

BAND	QSOs
14 Mhz	2027
10 Mhz	1869
7 Mhz	1743
18 Mhz	1523
21 Mhz	1288
3,5 Mhz	699
28 Mhz	435
24 Mhz	339
1,8 Mhz	135
TOTAL	10058



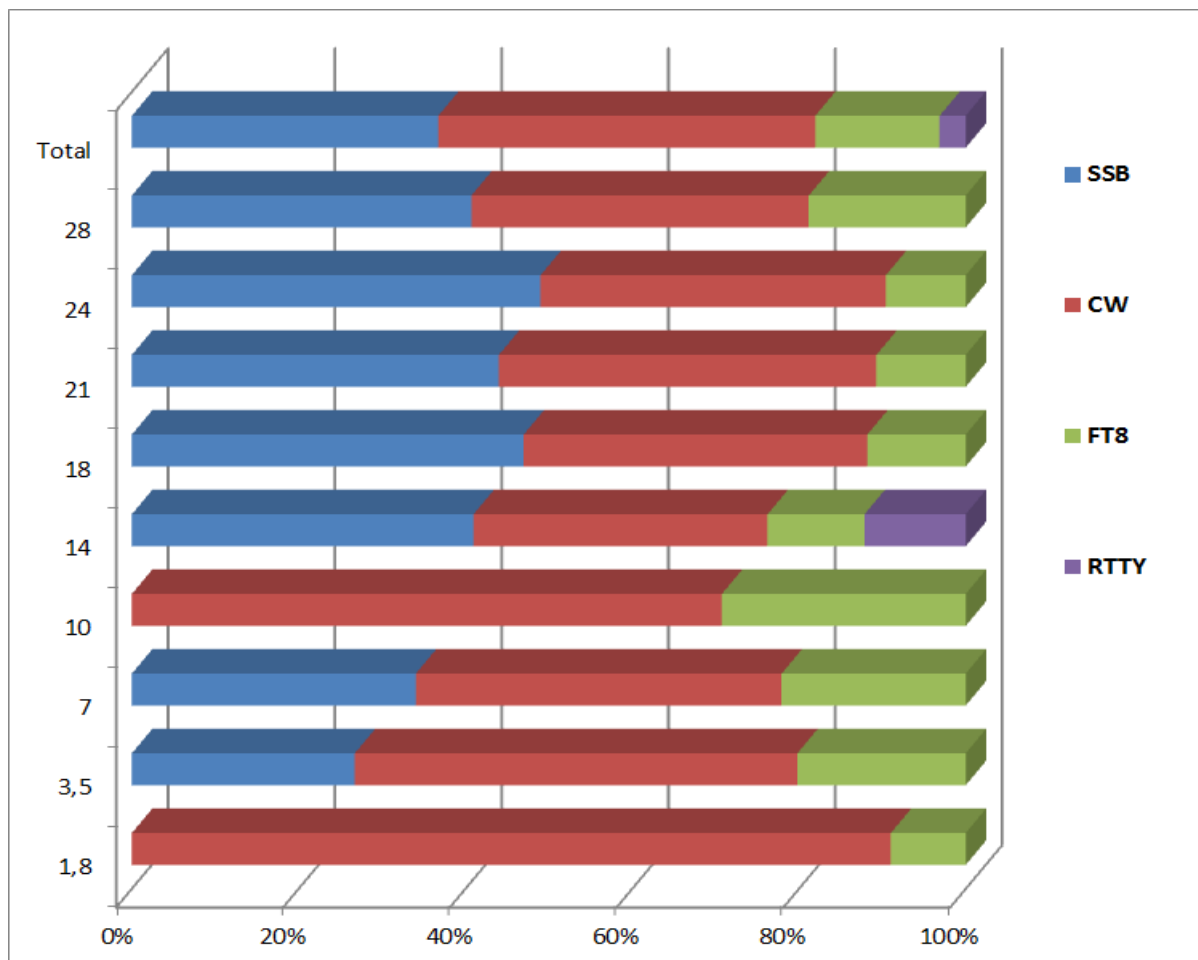
Also, we analyzed the numbers of US and JA stations across the various bands and modes (CW, SSB, RTTY and FT8), as if they were a single country. About 65% of them worked us in different bands and modes; the remaining 35% worked us on 15, 17 and 20m in different modes whereas they have FT8-only QSOs on 40 and 80m. This means that 35% of those who worked us easily on the higher bands would have had no chance on 40/80m if we had not used FT8. Interesting, don't you think ?

I can conclude, just 5 days after the completion of our Dxpedition, that we shall definitely use FT8 in our next expeditions, since the demand is high and this mode is unique in offering a chance to many "little pistols". Clearly, the greatest part is played by the computer, the human intervention being somewhat limited to fine tuning the settings, deciding what calls should be put on lower priority and choosing the relevant criteria for this choice. But these elements are very important: bad or good settings, the performance of the antenna system, the ability to choose the right moment for using FT8 as compared to the more productive CW and SSB mode, all these factors brought about by the human operators will determine how big the numbers in your log will be!

Let me finish with a few questions brought forward by some OMs over the last few days, which could be of interest:

1) ***Will FT8 be the death of CW ?***

Absolutely not. Watch our logs, nobody is dying.



2) Same for RTTY ?

RTTY will not disappear, it will be outclassed by FT8 only on Dxpeditions. It will remain for contests and normal QSOs. However, since FT8 is assimilated to RTTY for DXCC, it will be preferred to the conventional RTTY.

3) What is the pleasure in making FT8 QSO ?

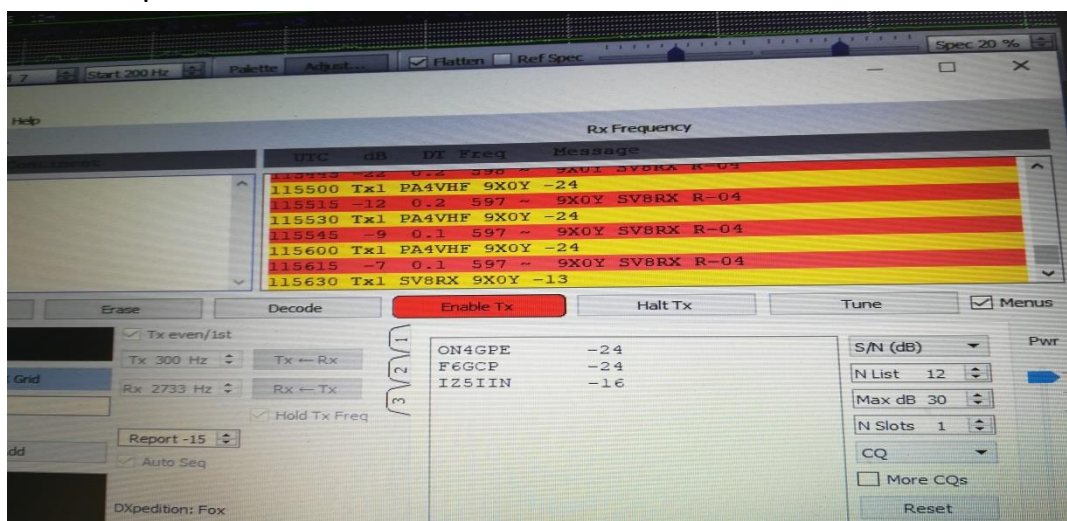
Well, what is the pleasure in other modes, such as DSTAR, DMR or C4FM? Or via EME on PSK? Or even on RTTY, since this, too, it is a conversation between two machines?

4) In the end, what is the satisfaction?

It relies on our ability to decode by far the weakest signals below the ionosphere (and even above!). The satisfaction of a QSO under extreme conditions, maximizing the performance of our PC, or our limited power. This is fascinating, too!

5) Do you really make contacts with signals -24db with respect to noise?

Yes, I can confirm it, we all can in our team. Check our logs, or - if do not believe it - watch the picture below!



6) Were the stations worked ready for the Dxpedition mode?

The answer is mostly yes. Having added, on our website, a short manual in Italian, English and Japanese helped teaching the operators to tune their systems correctly. Some OM, however, applied wrong Fox/Hound settings by transmitting their locators on frequencies lower than 1000 Hz, or even on our own transmitting frequency. Regretfully, they did not manage to work us, we could not help. Others were calling endlessly, without decoding our reply. One night on 160m, an Italian station called continuously for 5 hours, but each time I replied he did not send his report: either he could not copy me, or some settings were wrong. Others had a wrong setting of their clocks and were transmitting out of sync. Please read the manual !

7) Why use WSJT-X and not other software with better performance?

I believe that using WSJT-X is a discreet way to thank those who put their efforts in developing this system. Without prejudice to other software, I found this one 100% reliable and very easy to use since the very beginning (no glitch in 15 days of operation!). The only problem, that of multiple confirmations, will be addressed by the developers, just wait for a few more weeks.

8) You have in your log some calls which are clearly fakes. Why did the operator log them?

Often, I had to manage the FT8 station while handling a SSB pileup at the same time. Think of a US pile at a rate of 300 QSO/hour: under these conditions, you log the calls but cannot really read them across two different operations in parallel. Probably, someone played a joke on us, I hope this was good for him.

1. A least question: do you have suggestions to offer for those trying out this Dx mode?

Before leaving I met a number of amateurs, both in informal gatherings or on more official meetings, such as the San Remo Meeting on September 1st 2018. On that occasion I described the use of this software in the Fox/Hound mode and the importance of monitoring the range between 1000 and 4000 Hz. This is the space of the Hound stations calling the Fox. A random choice of frequency may overlap other stations calling, making decoding difficult. In order to avoid this pitfall, watch the waterfall display of WSJT-X as a guide for your choice of frequency. This will maximize your chances of being decoded by the Fox station. Also, in order to avoid very long waiting queues, my advice is to call only after having decoded the CQ string of the Fox station. If everybody calls continuously, the waiting list becomes very long, at times reaching 10 minutes or more!

This is all. We collected a huge amount of statistics, not reported here. Our conclusion is that FT8 will definitely be used on our next Dxpediton with a dedicated station, which, if possible, could be joined by two more stations during the periods of low propagation. Anyway, the CW and SSB modes will retain the highest priority !

Good FT8 to all!

Stefano IK2HKT