

# **(Non Technical) Lessons to be learned from the PSK31 Phenomena**

Eduardo Jacob, EA2BAJ  
ETSII e IT, Bilbao  
Dpto. Elect. y Telecom. – Ingenieria Telematica  
Alda Urquijo S/N  
48013 Bilbao SPAIN  
jtpjatae@bi.ehu.es

## **Abstract**

The new PSK3 I mode has raised much attention from both the technical press and the hams. We can get on the air from many operating systems using different hardware. We can read about it in many languages, ranging from English to Czech. There have been tests on satellites and on high frequencies. Many contests now include PSK3 1 as a valid mode. Yet, PSK3 1 has much more to offer. I believe that we can learn from the experience in benefit of new ham projects for the future.

## **Introduction**

As some of you may know I spend some of my ham time maintaining the PSK3 1 **WWW** Page on the Internet [ 1]. For that reason, I have followed the **PSK31** evolution from the early days of a unique version for DOS on the Motorola 56002 EVMDSP up to this days when there are many versions for different hardware and software platforms. For many reasons, it has really been a fun time that I will probably not forget easily.

I believe that, independently of the final status and impact of PSK3 1 within the Ham community, there are many lessons that can be learned and put in practice in other projects. This paper will leave out technical details, for there are already many papers, articles and pages on the Internet about this.

## **Who did the job?**

As you may know PSK3 1 is the brainchild of Peter Martinez **G3PLX**. He alone has designed and coded, the first implementation of the mode. I think that this has been possible not only because of the great amount of time that he has been able to put into it, but more notoriously because of his own capacity.

Today we can see big pieces of **successful** free software being the result of the cooperative work of many individuals either conducted by a person (as Linus Torvald with the Linux Operating System) or by a team (as in the Apache **WWW** server or **FreeBSD** Operating System). In this context, some people may argue that the approach taken here is by no means democratic at all; in my opinion I think this is a simplistic reduction of reality. First of all, the work (if for free) must be done in accordance to one's own likings as it's the only way to get results. In second place, design issues have been clearly explained in documents given away together with the program, thus provoking feedback between potential users and the author who has been receptive to suggestions and opinions, although retaining the right to consider them or not. In some way this means that decisions tend to be public and shared in

every stage of the design. This takes out “magic” based decisions. In third place the project by itself still fits in the work a person can undertake by himself, as we can see in other PSK3 1 implementations that are seeing the light lately. This shows us that this approach hasn’t been a brake for the PSK3 1 mode. A small team (less than 3 or 4) could also probably use the same approach even if the entropy clearly increases. It could be a solution if less time is to be dedicated to the project by components.

The conclusion is; *The one-person approach is suitable to produce public consumption results if some care is taken to share design decisions with a mind open to suggestions, and if the work fits in one’s person’s capacity.*

How do we validate this work? The answer is with an appropriate group of testers (in other circles alpha/beta/gamma/release candidate/gold/xxx testers). In PSK3 I the tests conducted have been very important in the definition of both performance and usability results. The very early tests were conducted using a (at that time) not very deployed platform (the Motorola 56002 EVMDSP). The people who were using it at that time were of the kind that can concentrate on testing the mode instead of wasting time with setup or cabling problems. So although the testing of the early versions was open, the public addressed was at least limited, so the final result was that a small, active and qualified group did the testing. I don’t remember the exact number but I don’t think there were more than 15 persons involved in it. It’s important to say that testing is more than just installing and trying once a program. If you find something wrong, you must try to locate the bug (if there is one), and how to reproduce it. It’s a hard work.

Although I initially setup the WWW site and it’s mailing list for supporting tests, curiously enough the major part of the feedback was sent back to Peter using direct email or PSK3 1 QSO’s in the 80 meters evening roundtables we had. This is clearly opposed to the experience I have had in other tester lists. The list was mainly used for announcing new versions that could be downloaded from the site. This was probably caused by the fact that almost all the testers were located geographically near and could attend the roundtables.

To sum up: *A small, active and qualified group of testers is needed to conduct on the air and usability tests. The natural selection (due to the hardware needed) that we had at that time, should be probably substituted by an artificial selection. The Internet proved to be interesting to propagate new versions, and the feeling is that had the test been conducted in a wider area it would have been interesting also as feedback channel.*

### **Design issues.**

Peter designed the mode with some clear objectives in mind as described in [2]. Later he expanded the initial design to include another modulation and a broader set of characters. It’s important to note that all the improvements were made in a compatible way so the initial design showed to be expandable. The design description was included in the package. The need to have this description available as a document was detected and as a result a page was added on the WWW site giving detailed technical information about it,

He also proposed and produced a free working implementation reference. This has proved to be of capital importance. First there is a free reference that can be used to test the design of other programs,

free or commercial. Second, it gives people the opportunity to test at, no cost, which are the requirements, the operation, and the feeling of the mode.

The code for the algorithm although not freely available has been supplied to third parties that were interested in including this mode in freeware only packages.

The program was not in any case intended to be the “Ultimate PSK31 auto-bragging-contesting machine”. This took some time to be understood by people and is still a subject that resurfaces periodically in the list.

Perhaps the fact that the implementation reference was free pushed volunteers to translate the help files to different languages. I am not sure of this because we can see that there are shareware and commercial programs that also have translations made by volunteers. In any case, this has been very important to the propagation of the mode.

The conclusion is: *A good, detailed and expandable design, freely available, along with a free implementation reference have been instrumental to the springing of the new breed of PSK31 hardware and software and to the **diffusion of the mode**.*

### **The hardware and software platform elected for the implementation reference**

Early in the testing, it was clear that the first hardware platform selected was not going to be the definite one, because of the price and complex setup. Later Peter produced the Windows © and **SoundBlaster** © version. This meant that the price was not anymore a problem, because the computing power needed was very small and the soundboard required was very common and cheap. The issue of not being using a **free** operating system didn't stop the propagation, but at least caused a Linux with soundboard version to appear.

The hardware needed to link the soundboard to the rig is very simple, there are kits available that offer more than the needed **functionalities**, and it is incidentally the same one that is used for other **SB**-based applications as RTTY and SSTV.

The application itself should not be considered as a state of the art Windows program that uses all the resources available for GUI design, but a proof-of-concept instead. This also led to some comments. The only problem that has appeared is related to compatibility issues with “**SoundBlaster** compatible boards”.

I think we should not forget to mention the solution given to one of the difficulties of the mode: tuning/frequency accuracy. Before Peter added **AFC** and the waterfall display, it was very difficult to hook up with somebody. This very technical approach to the problem and its solution made possible, even for the uninitiated, to participate. This clearly made of PSK3 1 SBW a “killer app.”

In a few words: *The wide base of users PSK31 has got is mainly due to the selection of a low cost and widely available platform, (windows and © **SoundBlaster** ©) along with a very usable **program** that concealed inherent **mode difficulties**.*

**A place in the band**

One of the points (if not the only) that caused frictions was the election of the calling frequencies. Initially, Peter proposed more than 3 years ago to concentrate activity starting from the bottom edge of the IARU RTTY bandplan, expanding upwards as activity increased. The exception is in the 10mts band, in order to give non-full privileges ham an opportunity to meet. It was defined as 150 Hz above it in order to sit between existing Pactor mailboxes. This approach is not new as it was used when AMTOR appeared and proved to work. In IARU zone 2, other frequencies were selected leading to both confusion and eager comments.

The problem could be explained, by alleging that there is no official room in the bandplan for experimentation. The truth is that perhaps nowadays there are not sufficient experiments to justify it. Also, this wouldn't solve the problem of how do we add a new (no experimental) mode to the bandplan. Indeed, our experience is that we almost hadn't problems during the test, and that these appeared with the general utilization of the mode.

Almost every user is jealously watching and protecting the slice of the band he is using and takes it as a personal affaire to enforce the "right" use of it. So, we have seen carriers of many types going up and down to iron PSK3 1 signals. This doesn't mean that PSK3 1 carriers have never irrputed on other type of established QSO's. I think this truly reflects the problems we are already aware of in other modes, with the novelty that perhaps on the first times, the "warbling" wasn't associated with a proper mode.

In zone 1, on 20 meters (the more problematic band), the approach of explaining to Pactor mailboxes operators the problem and asking them to move a little up in the band, has been very successful, and is the recommended way to pursue a common "PSK3 I-land".

I have personally missed some expression of interests from the official organizations, at least in EA-land.

The conclusion I extract here is: *When a new mode appears, much care has to be taken in order to define the calling frequencies. The approach used (1.50 Hz above bottom edge of IARU RTTY bandplan) as been very successful, at least in Zone 1. In any case, different parties proposing different frequencies only lead to confusion and sterile discussion. Facing the problem and speaking about it with involved parties is certainly the way to go.*

### **Diffusion of the mode**

I dare to speak about the Internet, for many the end of the Ham activity. I think that we can talk about it many hours, most of them for nothing productive. In the PSK3 1 case, the Internet has been very important for the diffusion both of binaries and information.

The Web Page has been the original point of distribution of several programs including the reference version by Peter. Much care has been taken in order to give as much information as possible about the mode, including pointers to other software or hardware platforms, articles, and other related resources.

The mailing list that was initially created for testing purposes was later recycled as a general use mailing list. Several features have been added later at users request, as digest-mode, mandatory use of

text only messages, searchable message database, etc. Other mailing lists have appeared in many places around the world.

The fact that I administer the servers where everything is located allows me to give other kind of information. Overall, the feeling is that the resource can be employed better. There is an archive of old messages, which is not very used. Many people ask questions that are already answered. The same thing happens with the **WWW** site when they search information about versions, etc.

Many users still don't understand what is behind the nice Internet interface modern operating systems offer. There are many problems with subscribing, unsubscribing and using multiple **aliased email** addresses. The "free **email** address of the week", which is free just that week, or that only allows a few kilobytes in the mail pool also is the root of many problems.

Other media, as magazines, or local reunions have also helped the diffusion of the mode, especially for "unplugged" hams. They have also been instrumental to bring attention on PSK3 1 and to put the seed for the Internet access to resources. The effect of the article that appeared in May'99 QST caused an explosive use of the mailing list and WWW server.

As I previously said before, there are translations of the **helpfile** and many articles in different languages. I think it would be interesting if authors ask permission to editors to republish the article some time later in the Web.

In another order of things, many users don't read the documentation at all. Peter explained once that a -great- amount of effort had gone to produce a good help file and people seemed to be ignoring it. There is a bad habit of using the Internet (asking in the mailing list, or directly) instead of personal reading or studying. Many users don't realize that it is not ethical to ask others to spend more time and effort answering them than the one they have used searching and asking.

For example, the problem of overdriving is clearly explained everywhere in the **helpfile** and there are many messages about it in the list. Still, many people don't pay attention to it and follow the approach of "don't touch it if it works" even if they are kindly told to correct it.

The lesson here is: *The Internet has been very valuable for the **diffusion** of PSK31 as a point of distribution of both binaries and information. We still have to increase our skills and knowledge to **fully take advantage** of the power of this medium. Other media as magazines and local reunions, **have still an important place as vectors for pointing information to both connected and unconnected people. Users have to fight against their laziness, and culture experimentation even if now it involves only ready-made software.***

### Conclusion

PSK31 is probably one of the biggest events of the last times. I have presented some not technical lessons extracted from the process that brought us this mode. I think that they can be useful if other individuals or small group of persons face another project of this kind. These points can also be detected in other successful projects we find around. Finally the **PSK31** phenomena fits the charter of amateur radio well, i.e., the means and ability to use the hobby for personal education, and it complies also to the open software philosophy that is becoming the way to do these things.

## Reference

- [1] The PSK3 1 WWW Homepage <http://aintel.bi.ehu.es/psk3 I .html>
- [2] Peter **G3PLX**, PSK3 1: A new radio-teletype mode with a traditional philosophy. Radcom Magazine, December 1998 and January 1999, available at <http://det.bi.ehu.es/~jtpjatae/pdf/p3 1g3plx.pdf>