HOW TO USE VERY LARGE DISHES ON MICROWAVES

By Guy GERVAIS – F2CT

ABSTRACT

- I should like to share with you my own experience with ORPB SOCIETY Pleumeur Bodou , using the PB8 13 m CASSEGRAIN dish

A.1 / HISTORICAL CLUES

- **July 1962**

  The first satellite TV transmission between France (Pleumeur-Bodou/ Brittany) & USA

  (Andover) on C BAND (4-6 GHz), is achieved using TELSTAR Satellite.

  It was the starting point for satellite communications.

  Very large dishes up to 32 m (PB3) were erected on Pleumeur-Bodou CTS Center (SPACE TELECOM CENTER)

PB3 …. 32m

photo Corine/YL-F2CT

A.2 / Historical clues

- **2000**

  France Telecom and french gouverment

  decided to close the historical center and move activities to Bercenay ,east ’s France between Paris & Reims .

  Many big dishes were dismanteled .

A.3 / Historical clues

- **2009**

  Some technicians and engineers retired from France Telecom Company decided to create ORPB Society with Radio Astronomy Activities

A.4 / Historical clues

- **2012**

  ORPB staff should wish to participate to the 50th Anniversary of the First TV transmission via Telstar Satellite . They contacted me to know if I should be able to help them in order to modify PB8 13 m dish and try to use it for EME Communications .

  Challenge was hard but with ORPB members and Jean-Marc /F1HDI's help, TM8PB was off the moon on July 9th 2012 , sending and receiving big signal on 5760. 108 MHz

B / THE TM8PB CHALLENGE

- During these first tests, unfortunately, we didn’t know that between the WR 137 wave guide and quadplexer, there was a WR137 switch guide .
- This switch inverted RHCP and LHCP ; so the signals received by EME station were not as loud as expected .
- On 11th July on the morning , I received a phone call from Philippe F2TU and Willi LX1DB telling me : « Guy, you’re probably on wrong polarization » . I went imediatly to the technical plenum just under the dish and switch to get good one .

B.2 / TM8PB challenge …

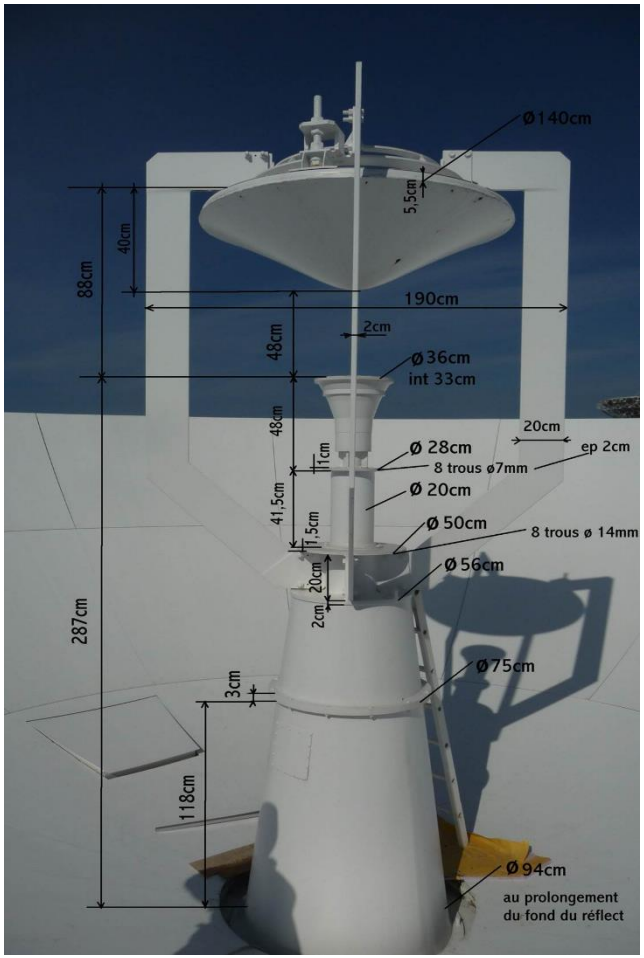
- During this event we worked around 40 differents stations with some nice SSB QSO and small equipment (8W / 60 cm dish) .
- After that succes I suggested to ORPB's staff to make a lot of improvements on tracking system and modify feed support in order to use PB8 on 10 & 24 GHz ; this project became possible with my friend Jean Pierre BLOT 's help (FT / ORANGE Labs) who worked during more 30 years on large dishes project .

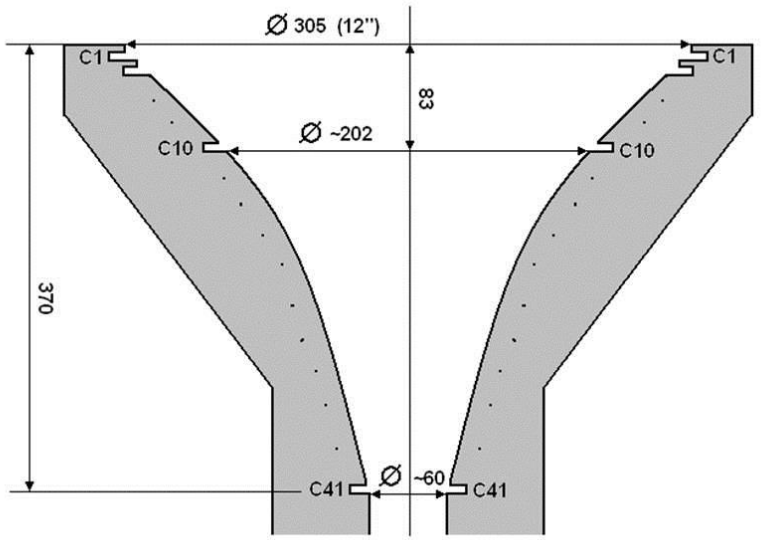
C / IMPROVEMENTS

- During 1 year , after several participations in REF-DUBUS , ARRL EME Contest on 6cm , we were able to use PB8 firstly in may 2014 on 10 GHz and october 2015 on 24GHz .
- Feeds were calculated with SRSR software .
- PB8 technical datas (following slide)

C 1 / PB8 EME IMPROVEMENTS :

5,7GHz





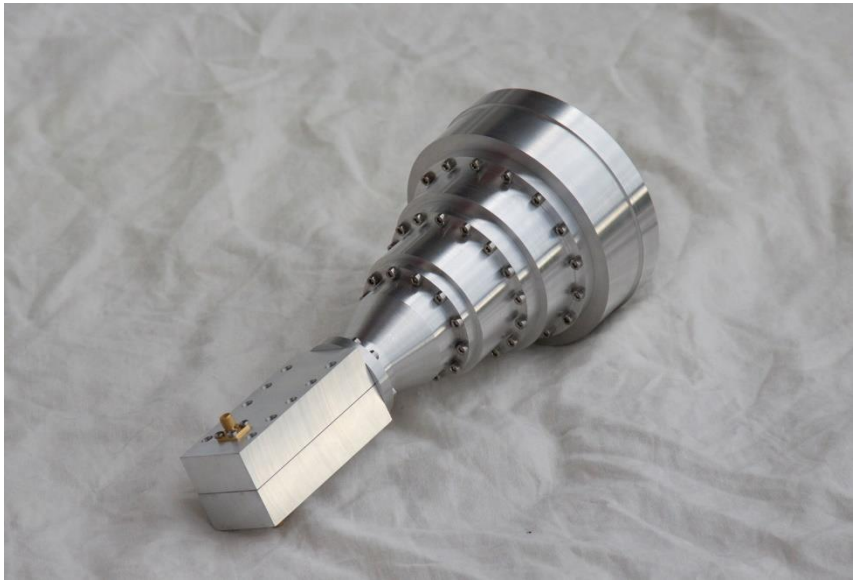
C1 ... C41: corrugations
dimensions approximatives

PB8 - coupe du cornet bande C d'origine
Cotes en mm - valeurs approximatives
Relevé LM - AG 18/05/2014

C.2 / PB8 EME IMPROVEMENTS :

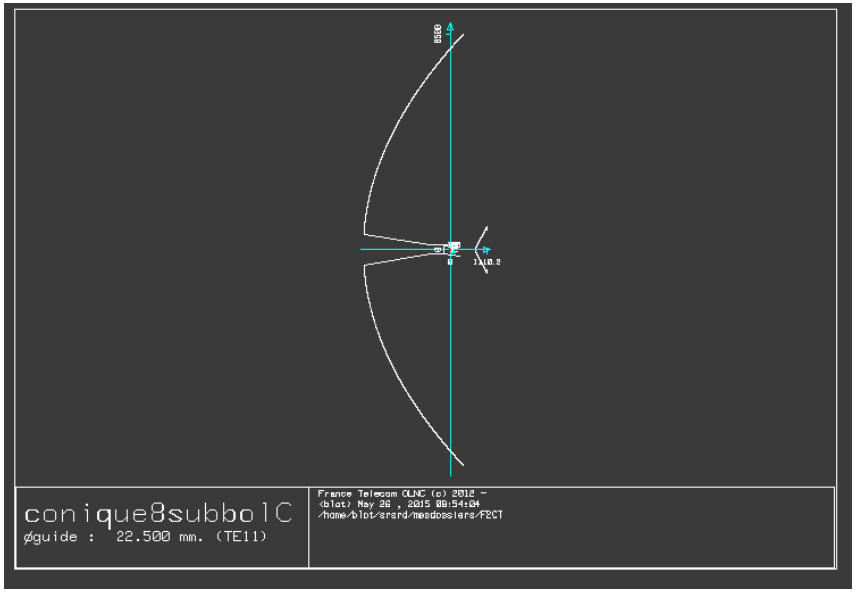
10 GHz

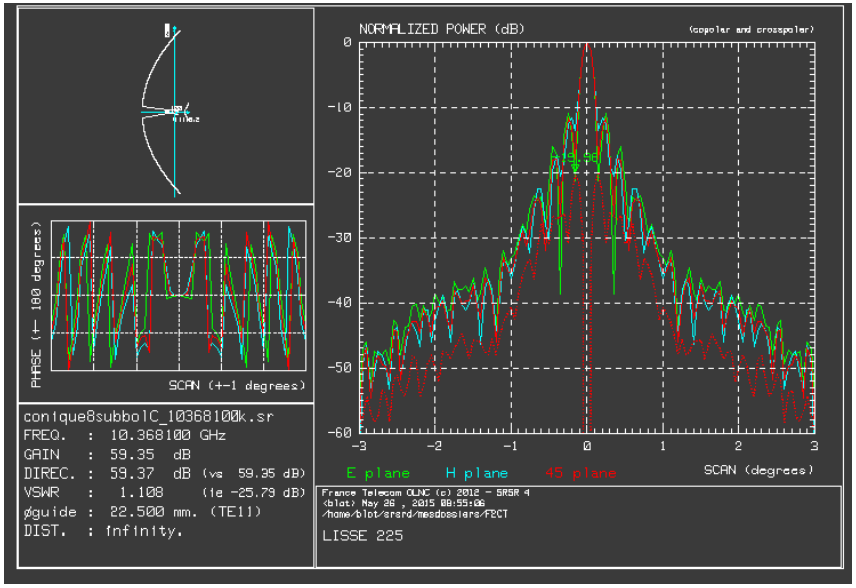
Septum feed OM6AA PE1RKI



Septum feed OM6AA PE1RKI

10 GHz

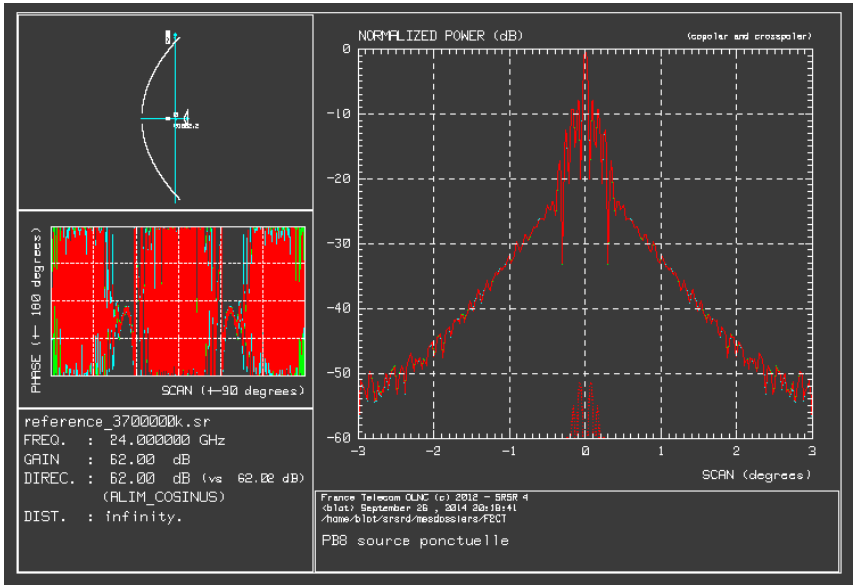

coniqueBsubbolC
øguide : 22.500 mm. (TE11)
France Telecom CLNC (c) 2012 -
/home/blot/srsrd/mesdossiers/FECT


PHASE (+- 180 degrees)
SCAN (+-1 degrees)
coniqueBsubbolC_10368100k.sr
FREQ. : 10.368100 GHz
GAIN : 59.35 dB
DIREC. : 59.37 dB (vs 59.35 dB)
VSWR : 1.108 (le -25.79 dB)
øguide : 22.500 mm. (TE11)
DIST. : infinity.
NORMALIZED POWER (dB)
(copolar and crosspolar)
0
-10
-20
-30
-40
-50
-60
-3
-2
-1
0
1
2
3
E plane
H plane
45 plane
SCAN (degrees)
France Telecom CLNC (c) 2012 - SRSR 4
/home/blot/srsrd/mesdossiers/FECT
LISSE 225

C.3 / PB8 EME IMPROVEMENTS :

24 GHz

SRSR simulations by JP Blot



24 GHz feedhorn by PE1RKI

C.4 / DATAS

Main reflector is in aluminium alloy panels backed by strentghtening frame structure , diameter 13m, weight 6t

FREQ	5,7 GHz	10GHz	24GHz
GAIN (dB)	57	59	62
Beamwidth (°)	0,235	0,137	0,075
F/D = 0,27			

D /PB8 EME records : 5,7 GHz

ECHOS

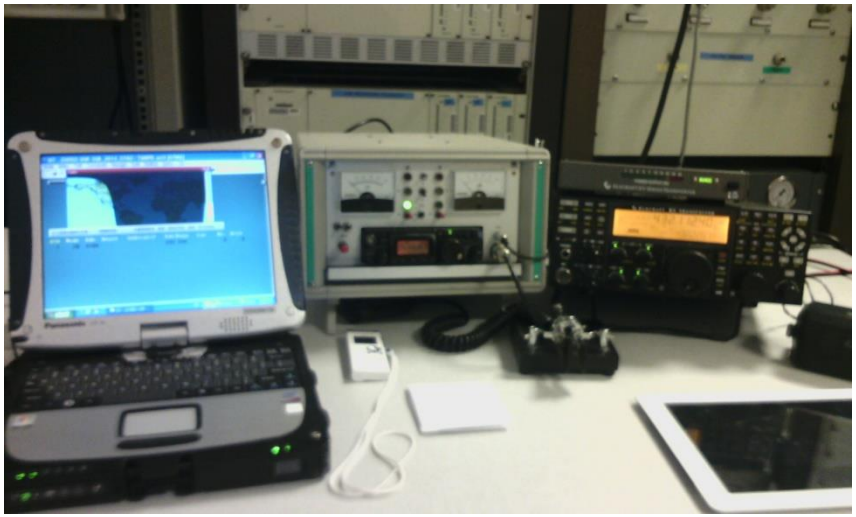
K1JT CW

LX1DB

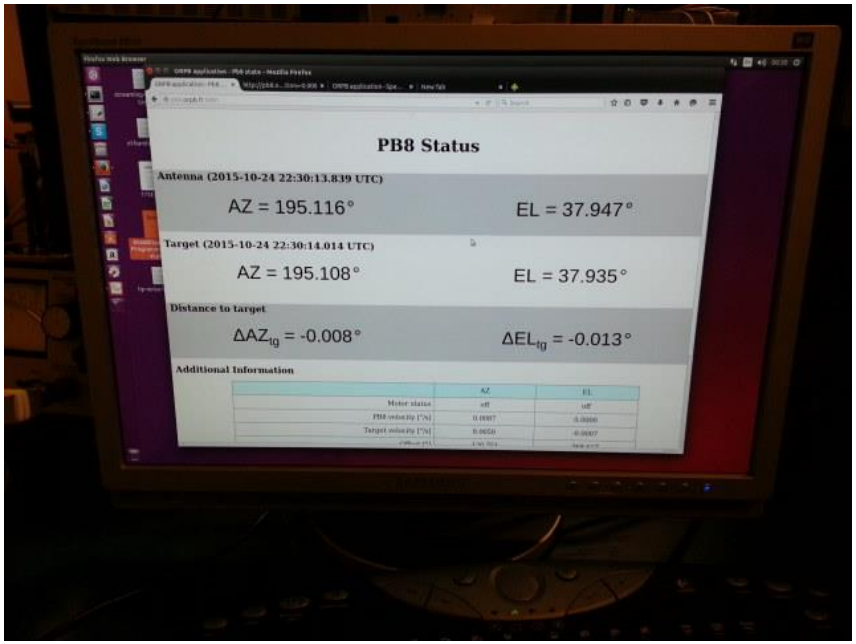
K5GW

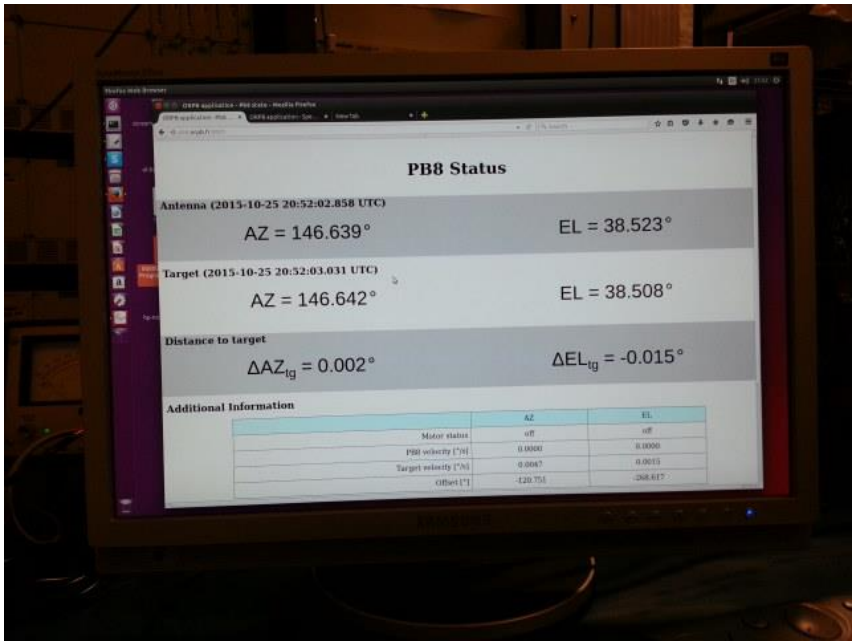
K2UYH

PICTURES : SHACK



TRACKING SCREEN





PB8 & PLENUM


EME 2014
EME 2014
EME 2014
ALLO LA TERRE, ICI LA LUNE
PB8
Observation Radio Pleumeur Bodou

CONCLUSION

- We spend more than 5 years with lot of time and money in order to use PB8 for EME communications on 5,7 , 10 and 24GHz.
- Two EME beacons , one on 5760,188 MHz and the second on 10368,188MHz will start soon with F4KJM/B call sign.
- Next step is the PB5 restauration, a Cassegrain 16,50m polar mount dish.