Creating an approach for FMS, from a VPT (Visual with Prescribed Track) coding, to help like a RNAV Visual approach)

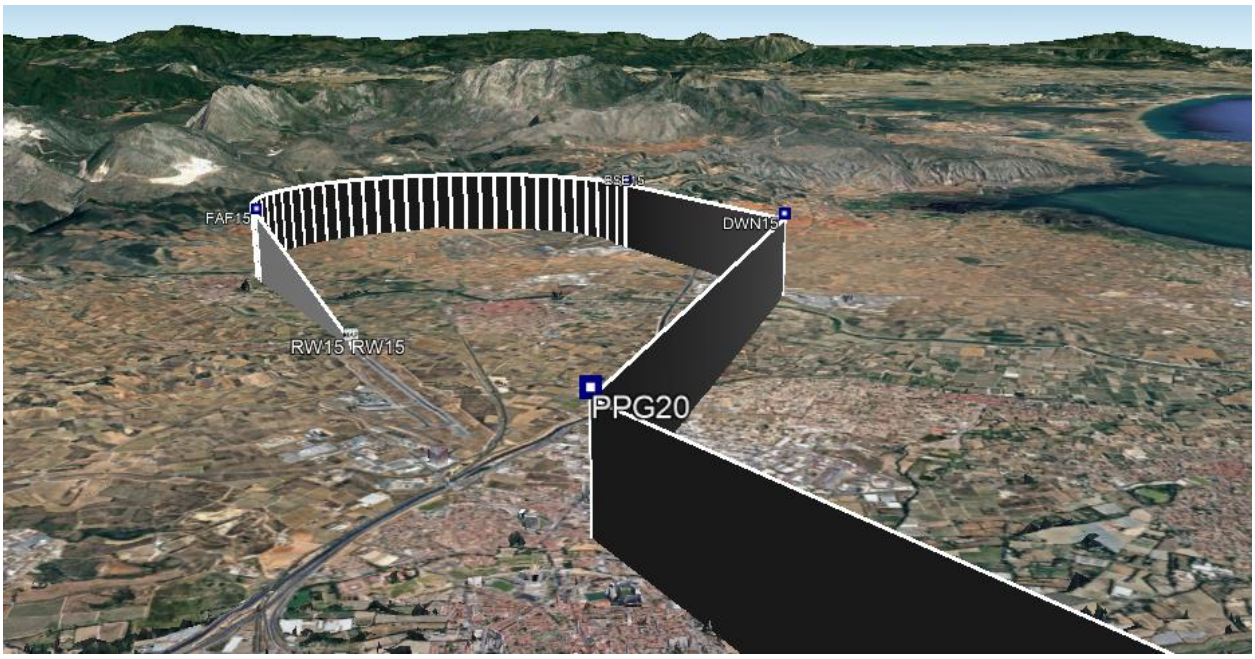


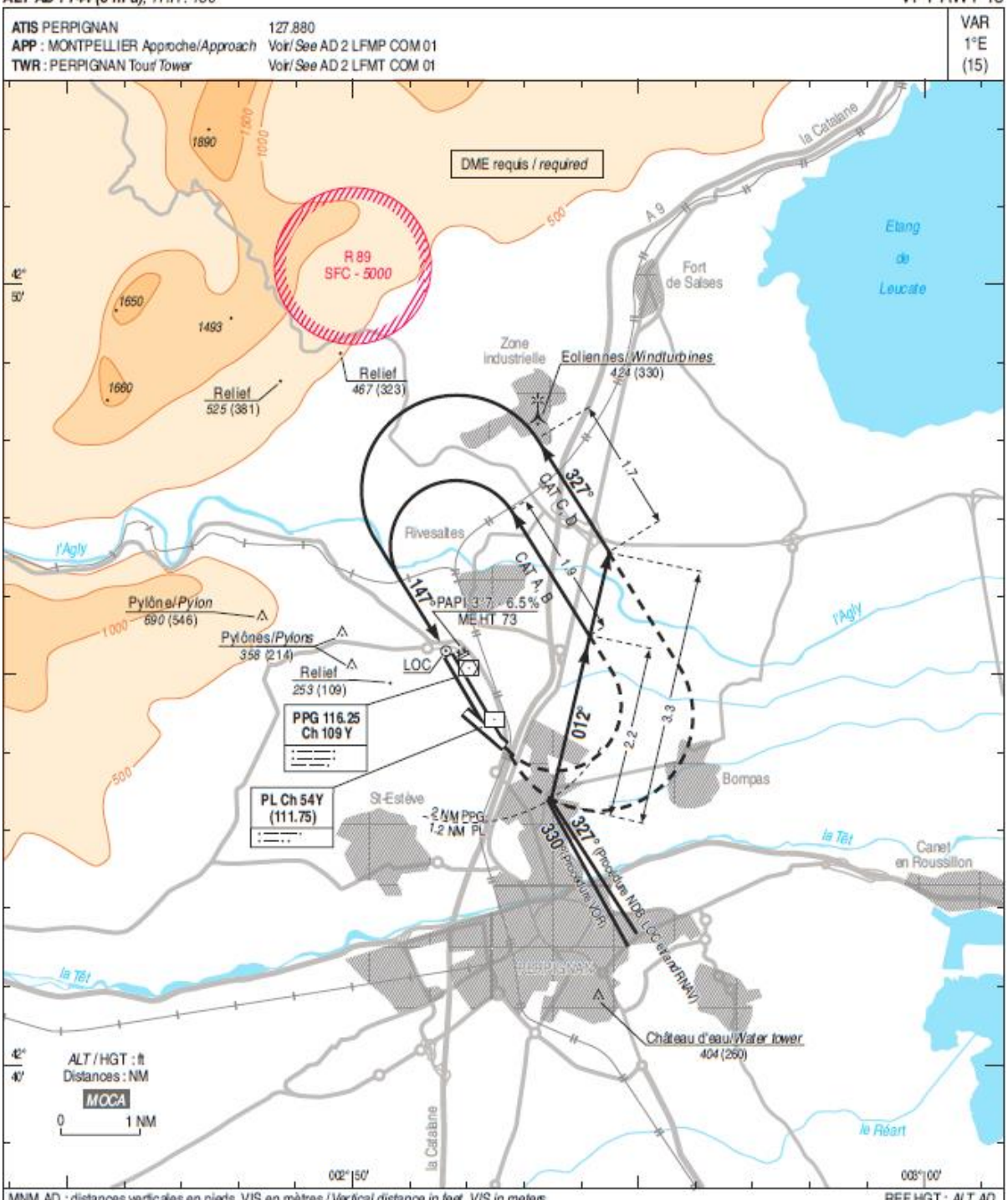
Table des matières

You need to help pilots to fly this procedure… easy with a coding and Arinc Decoder :

APPROCHE AUX INSTRUMENTS
Instrument approach
CAT A B C D
***ALT AD : 144 (6 hPa)**, THR : 130*

PERPIGNAN RIVESALTES

VPT RWY 15



MNM AD : distances verticales en pieds, VIS en mètres./ *Vertical distance in feet, VIS in meters* — REF HGT : *ALT AD*

CAT	VPT	
	MDA (H)	VIS
A	***620*** (470)	1500
B	***650*** (500)	1600
C	***920*** (780)	2400
D	***970*** (830)	3600

Observations/*Remarks* : NIL.

For runway 33 there's a coded and official approach RNAV, we will take 2 first fixes and then fly the circling.

When at 2 PPG you “open” to the right hdg 012°for 3.3 Nm (cat C coding) then heading 327 for 1.7 Nm then U turn left to the final.

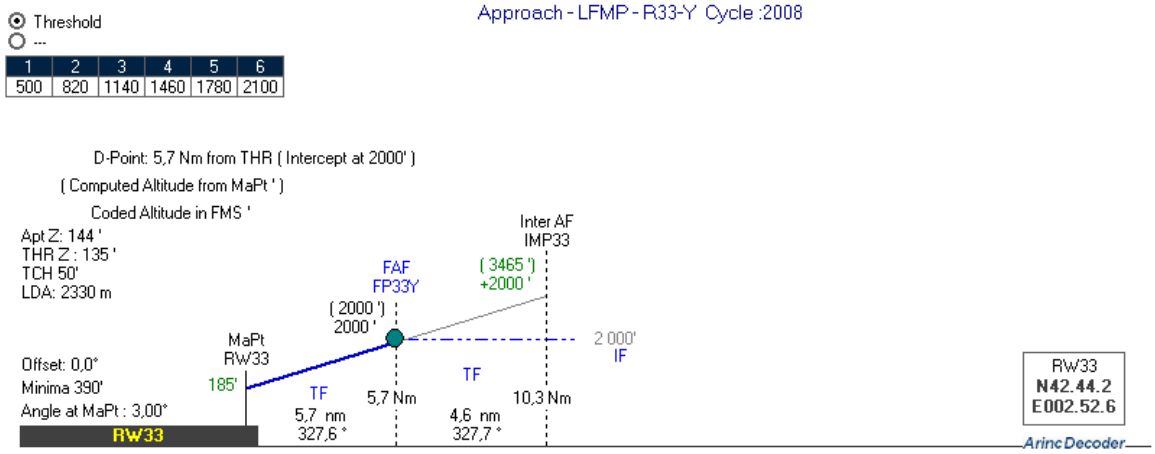
We will code a RF, but 2 TF could be OK for olds aircrafts that don’t fly RFs….

Visual approach so no missed approach coded.

I start with the existing FACF and FAF of the RNAV 33 –Y (Z is a LPV approach)

Approach - LFMP - R33-Y **Perpignan / Rivesaltes** **Mag Var : 01.0° E** **Cycle :2008**

Via	Seq	Pt	Fix	Typ	TD F/O	TD	Mag Crs		Alt 1	Alt 2	Vert Angle	RNP	Speed Limit	Distance Time	Coordinates Fix	Rec Navaid		Updte
LANET	10	IF	LANET	IAF Hold				Btwn	FL070	3000			220 Kts		N42.42.2 E003.06.4		Transition	2001
LANET	20	TF	MP400				174°	+	2000			1	220 Kts	6,3 Nm	N42.35.9 E003.07.2		Transition	1905
LANET	30	TF	IMP33	Inter AF			263,8°	+	2000			1	185 Kts	5,4 Nm	N42.35.4 E002.59.9		Transition	1801
	10	IF	IMP33	Inter AF				+	2000				185 Kts		N42.35.4 E002.59.9			2001
	20	TF	FP33Y	FAF			327,3°		2000			1		4,6 Nm	N42.39.3 E002.56.7			2001
	30	TF	RW33	MaPt	FO		327,3°		185		-3,00°	0,3		5,7 Nm	N42.44.2 E002.52.6			2001
	40	CA		Go.Arr			328°	+	480			1	185 Kts					2001
	50	CF	BAMGO				43°	-	3000			1	185 Kts	7 Nm	N42.52.9 E003.02.4	PPG		2007
	60	TF	MP411		FO		133,1°	-	3000			1	205 Kts	3 Nm	N42.50.8 E003.05.3			2001
	70	DF	LANET					-	3000			1	220 Kts		N42.42.2 E003.06.4			2001
	80	HM	LANET			R	174°					1	220 Kts	1 Min	N42.42.2 E003.06.4			2001



IMP33 +2000 and FP33Y at 2000.

Then I have to find the waypoint on the final at 2Nm PPG (Step 1)

Then I have to compute from this point 3.3 Nm the waypoint in the 012° (Step 2)

Same, 1.7Nm in the 327, another wpt at the end of the downwind leg. (Step 3)

Left turn to final, with RF, need to determine the Runway axis and the Final Fix perfectly aligned (Step 4).

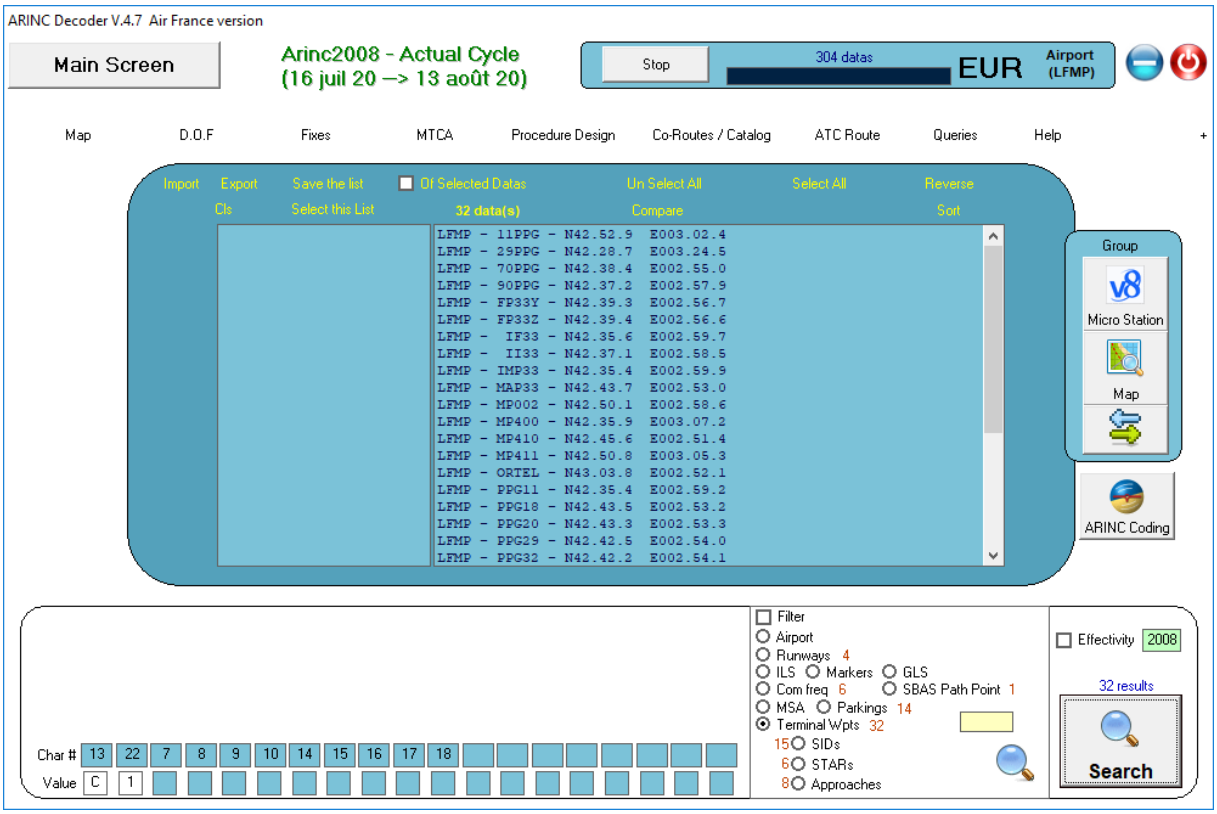
Prepare the coding (Step 5)

Determinate where has to be the RF center fix (Step 6)

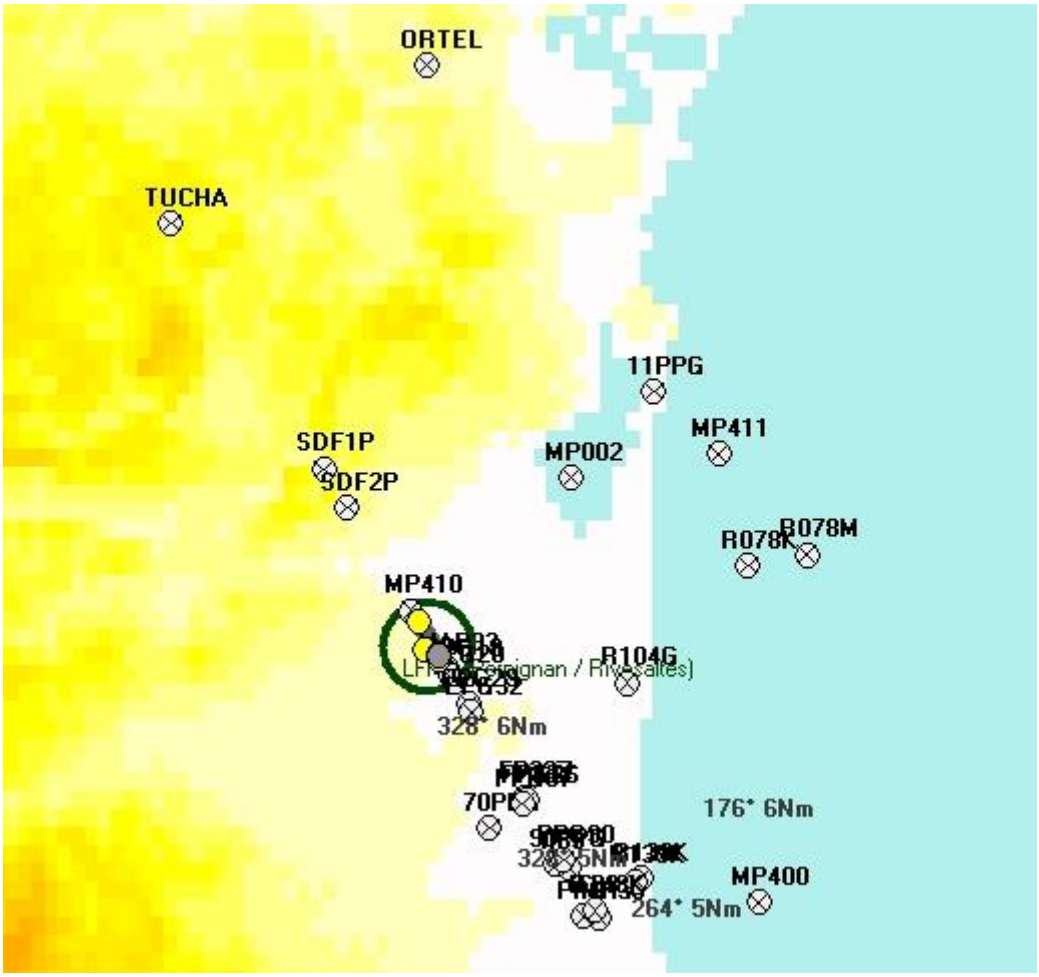
Determine the vertical profile. (Step 7)

Step 1, determine if the waypoint PPG 2 exists in our A424 file:

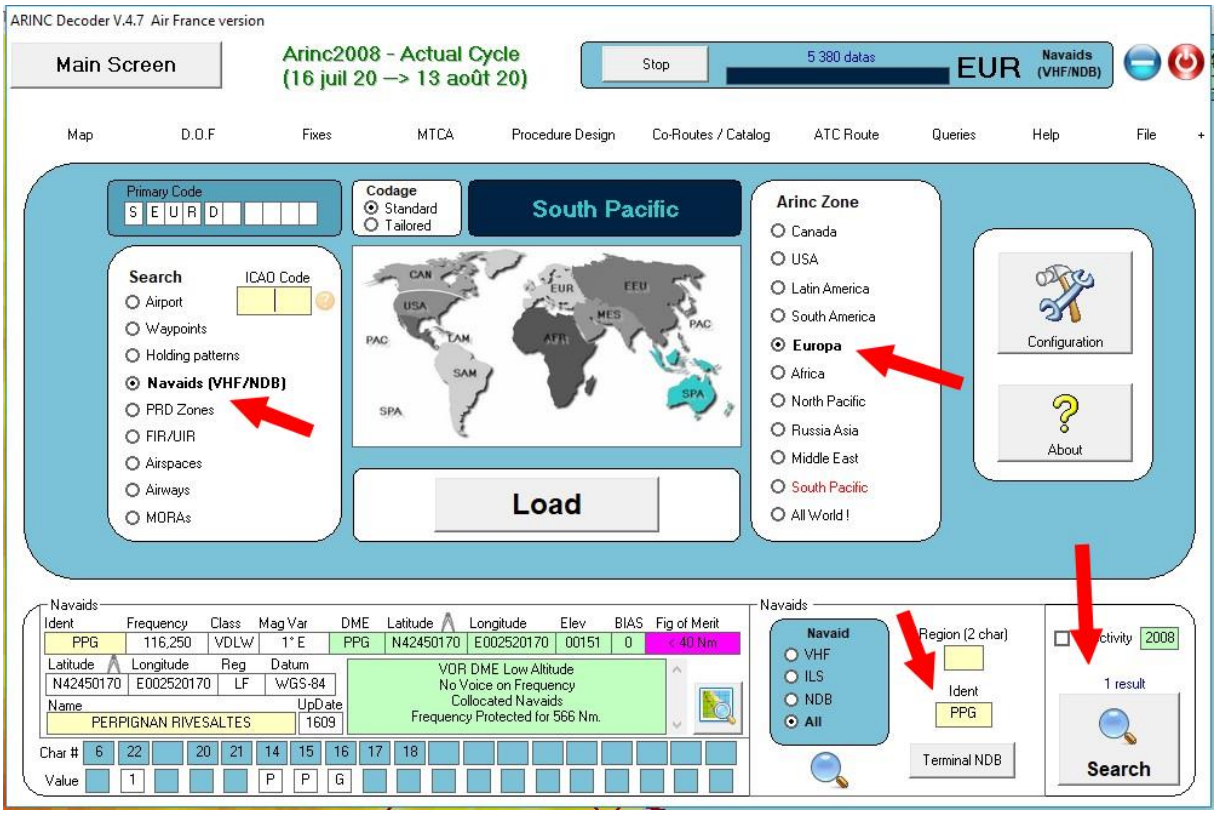
Plot all the terminal waypoints of LFMP.

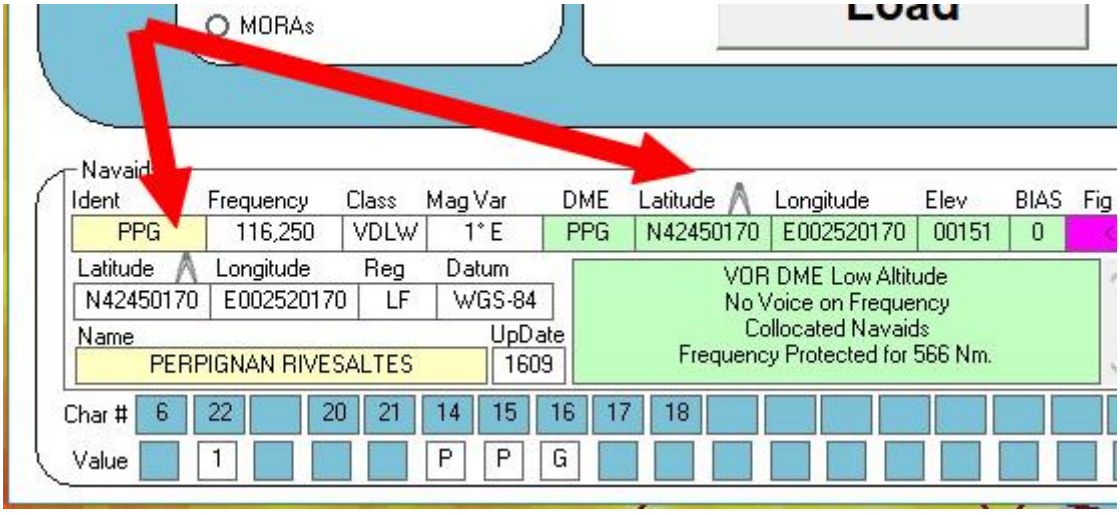


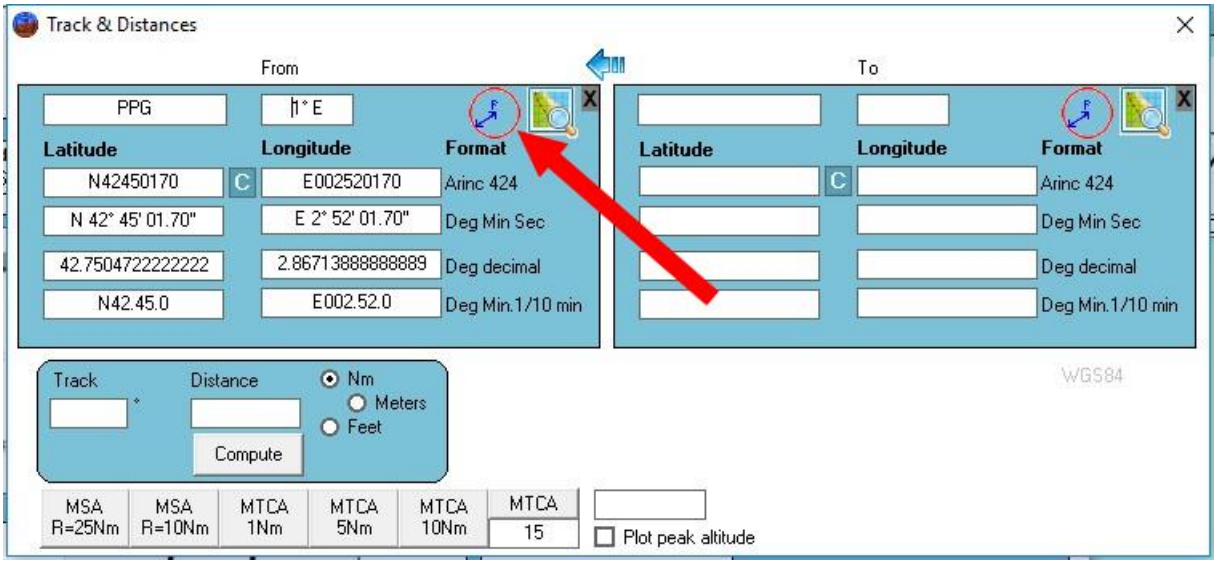
And

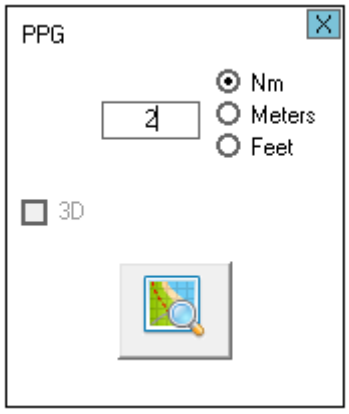


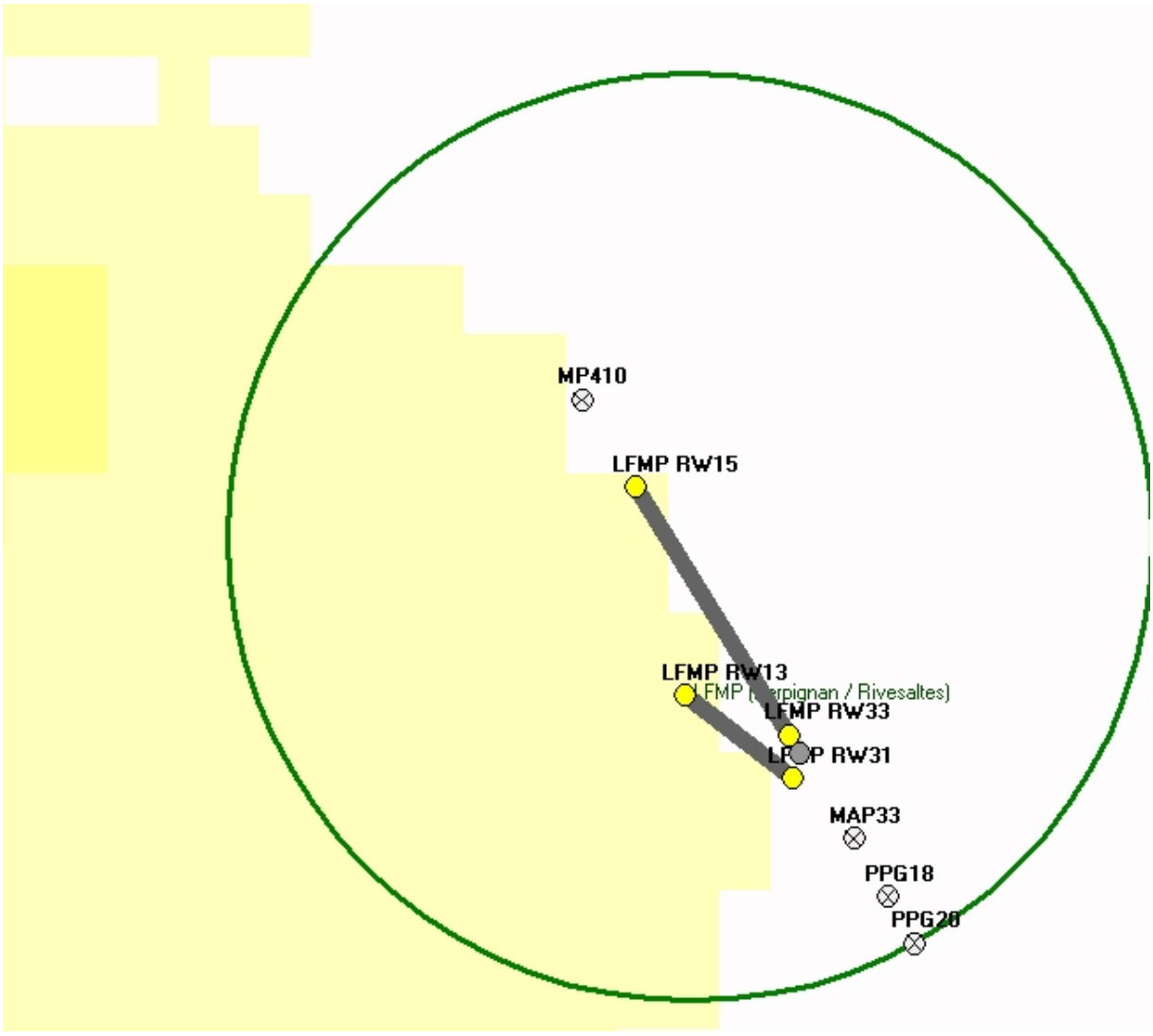
Plot PPG and create a circle of 2Nm around


ARINC Decoder V.4.7 Air France version
Main Screen
Arinc2008 - Actual Cycle
(16 juil 20 –> 13 août 20)
Stop
5 380 datas
EUR
Navaids (VHF/NDB)
Map
D.O.F
Fixes
MTCA
Procedure Design
Co-Routes / Catalog
ATC Route
Queries
Help
File
Primary Code
S E U R D
Codage
Standard
Tailored
South Pacific
Search
ICAO Code
Airport
Waypoints
Holding patterns
Navaids (VHF/NDB)
PRD Zones
FIR/UIR
Airspaces
Airways
MORAs
Arinc Zone
Canada
USA
Latin America
South America
Europa
Africa
North Pacific
Russia Asia
Middle East
South Pacific
All World !
Configuration
About
Load
Navaids
Ident Frequency Class Mag Var DME Latitude Longitude Elev BIAS Fig of Merit
PPG 116,250 VDLW 1° E PPG N42450170 E002520170 00151 0 < 40 Nm
Latitude Longitude Reg Datum
N42450170 E002520170 LF WGS-84
Name UpDate
PERPIGNAN RIVESALTES 1609
VOR DME Low Altitude
No Voice on Frequency
Collocated Navaids
Frequency Protected for 566 Nm.
Char # 6 22 20 21 14 15 16 17 18
Value 1 P P G
Navaid
VHF
ILS
NDB
All
Region (2 char)
Ident
PPG
Terminal NDB
2008
1 result
Search


MORAs
Load
Navaid
Ident Frequency Class Mag Var DME Latitude Longitude Elev BIAS Fig
PPG 116,250 VDLW 1° E PPG N42450170 E002520170 00151 0
Latitude Longitude Reg Datum
N42450170 E002520170 LF WGS-84
Name UpDate
PERPIGNAN RIVESALTES 1609
VOR DME Low Altitude
No Voice on Frequency
Collocated Navaids
Frequency Protected for 566 Nm.
Char # 6 22 20 21 14 15 16 17 18
Value 1 P P G

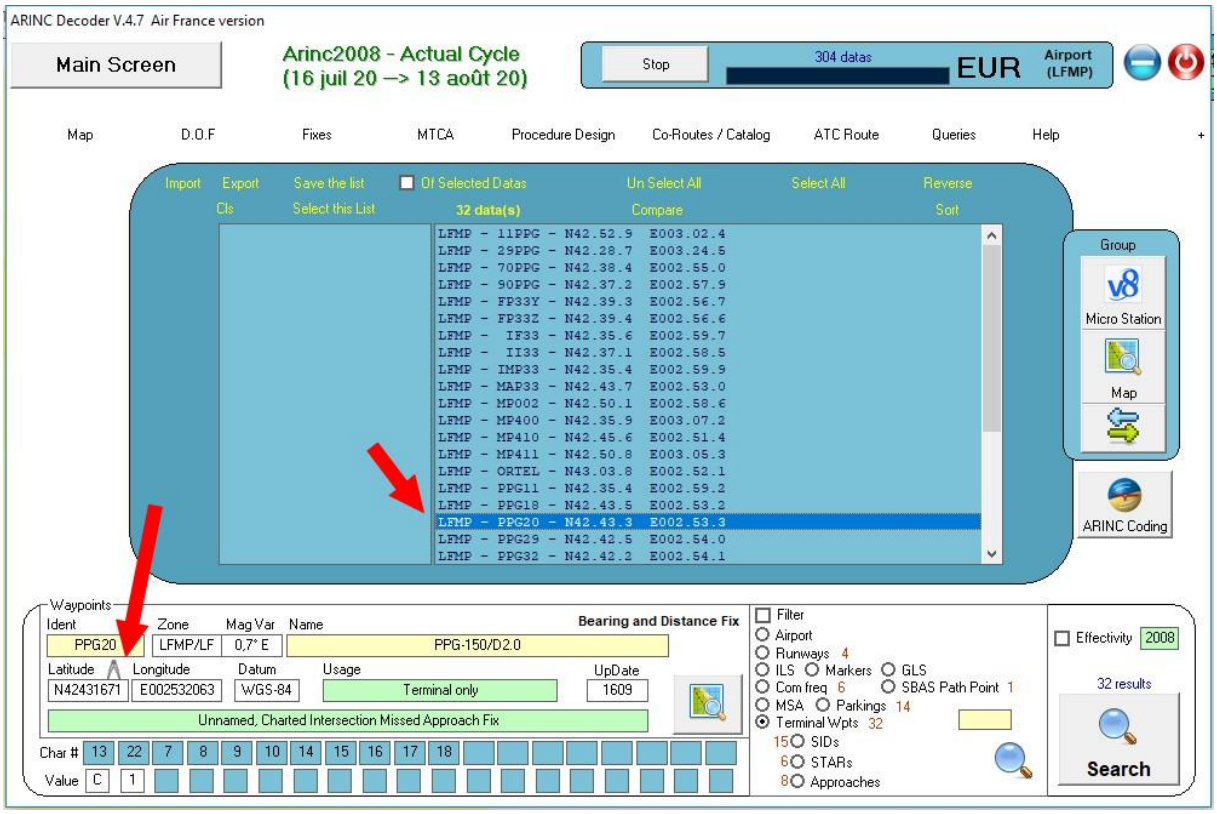

Track & Distances
From
To
PPG
1° E
Latitude
Longitude
Format
N42450170
E002520170
Arinc 424
N 42° 45' 01.70"
E 2° 52' 01.70"
Deg Min Sec
42.7504722222222
2.86713888888889
Deg decimal
N42.45.0
E002.52.0
Deg Min.1/10 min
WGS84
Track
Distance
Nm
Meters
Feet
Compute
MSA R=25Nm
MSA R=10Nm
MTCA 1Nm
MTCA 5Nm
MTCA 10Nm
MTCA
15
Plot peak altitude





YES !!!! 2PPG already exists in runway axis and its name is easy to remember… PPG20

Find it, and same, select it’s compass.

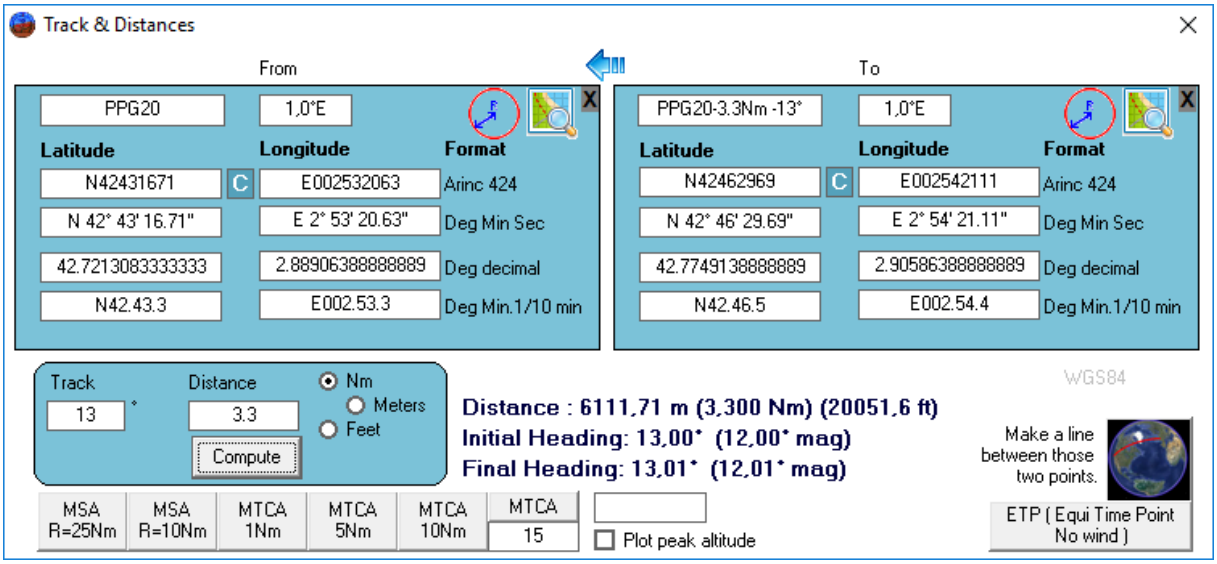


The fix is plotted in the left square.

Step 2: From there we want to compute a waypoint 3.3 Nm in the mag12°

First, find the good magvar, the one coded in the waypoint is never updated, so if the waypoint is 20 years old… MagVar is wrong…

The airport magvar is 1°E. We can change this value.



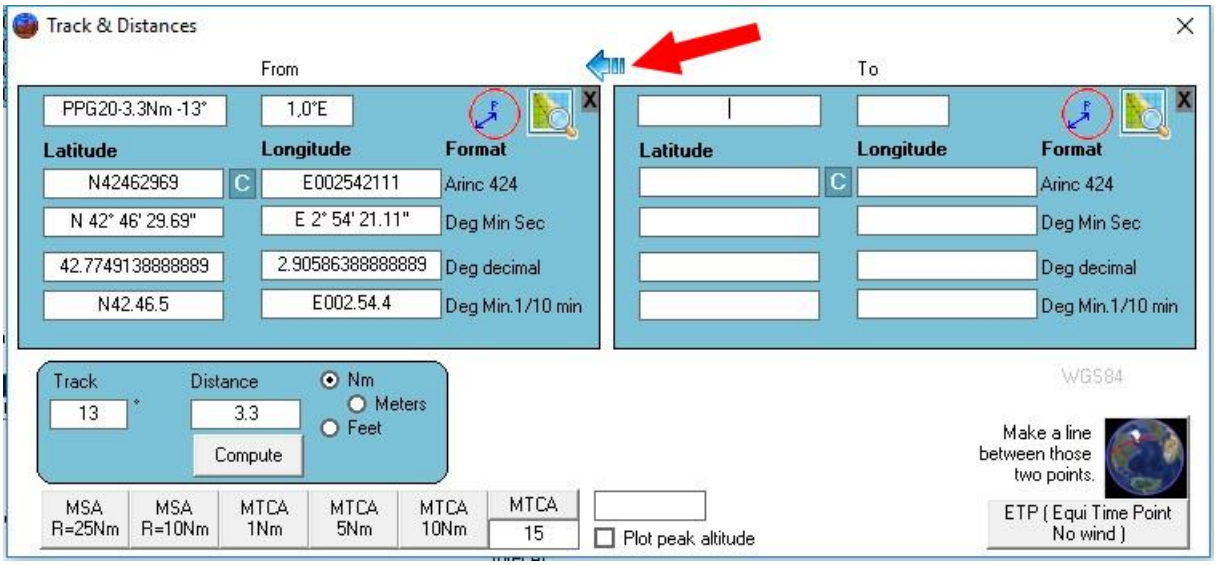
So enter 13° track, 3.3Nm distance and press “compute”. The waypoint will be in the right box.

Press on the “C” between Lat and Lon; to copy somewhere those coordinates we will use later.

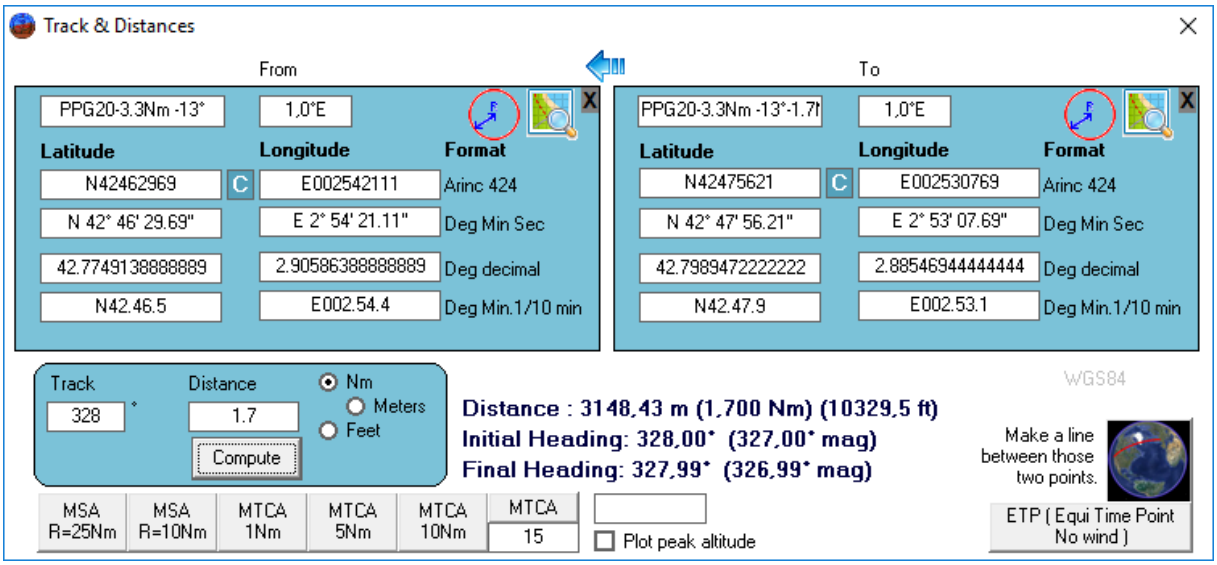
DW15 :N42462969E002542111

Step 3… from this point, in the 327 for 1.7 Nm, create a new Waypoint.

Press on the arrow in the middle of the form, to put this last point in the left box.



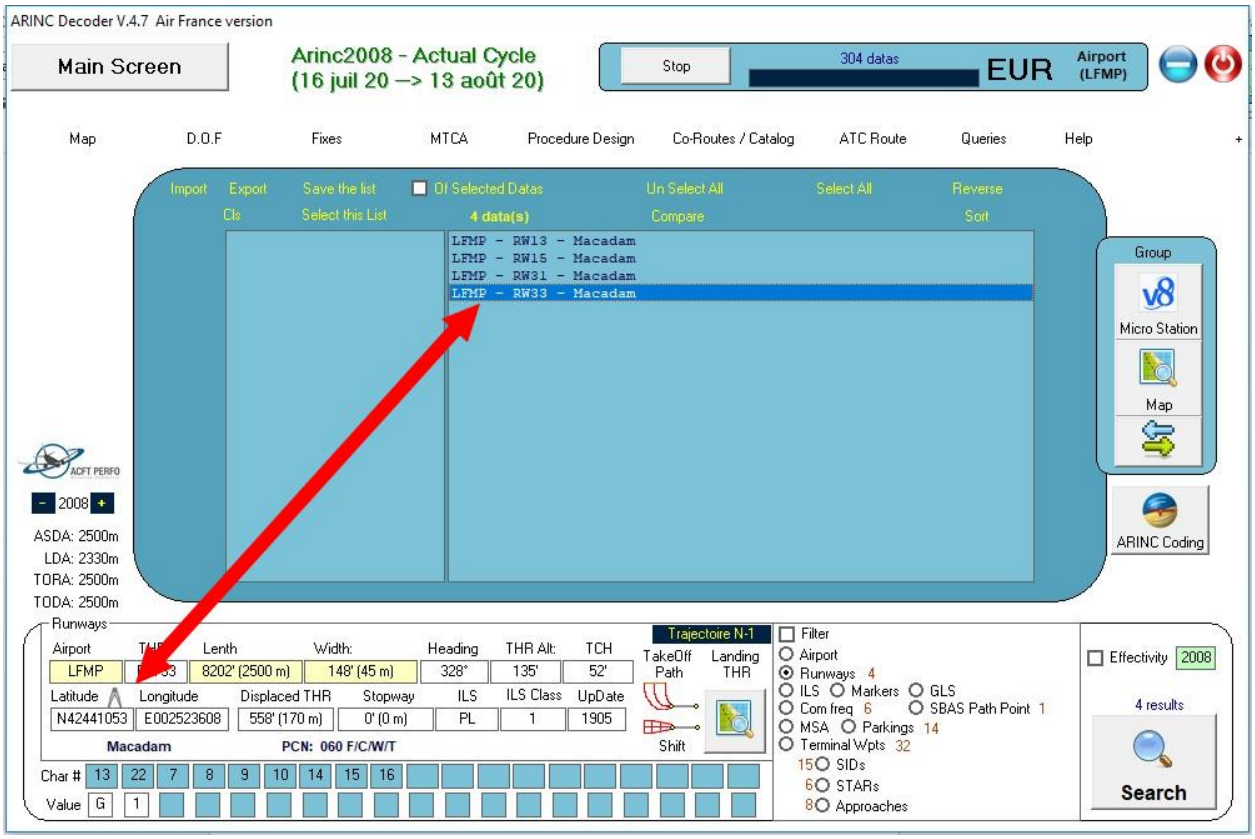
And again, insert 1.7, in the 328 (327+1) compute and you can copy (by pressing "C") the coordinates in your working file.



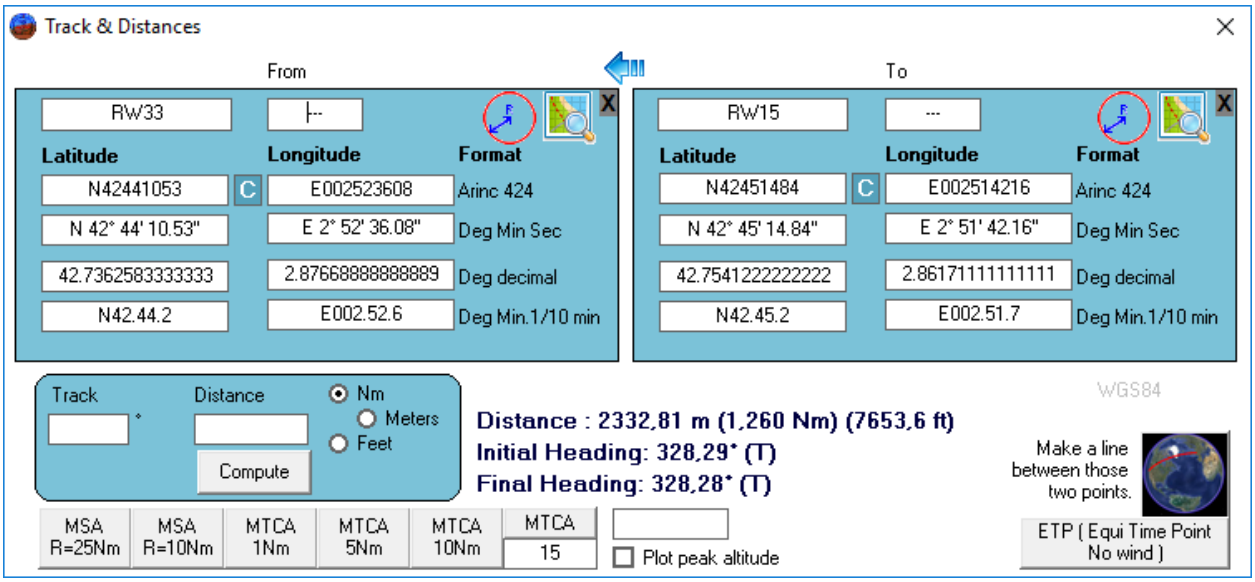
BL15: N42475621E002530769

Step 4: The final has to be in the runway axis.

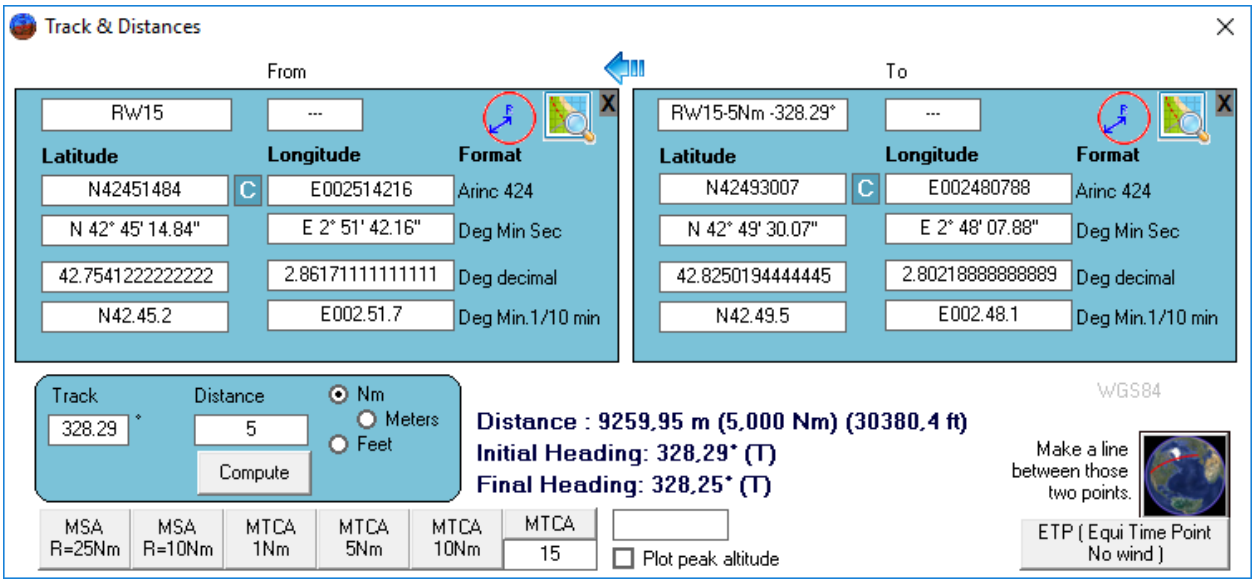
Open the runways of LFMP and click in the compass RW33 then RW12 to have the initial heading.



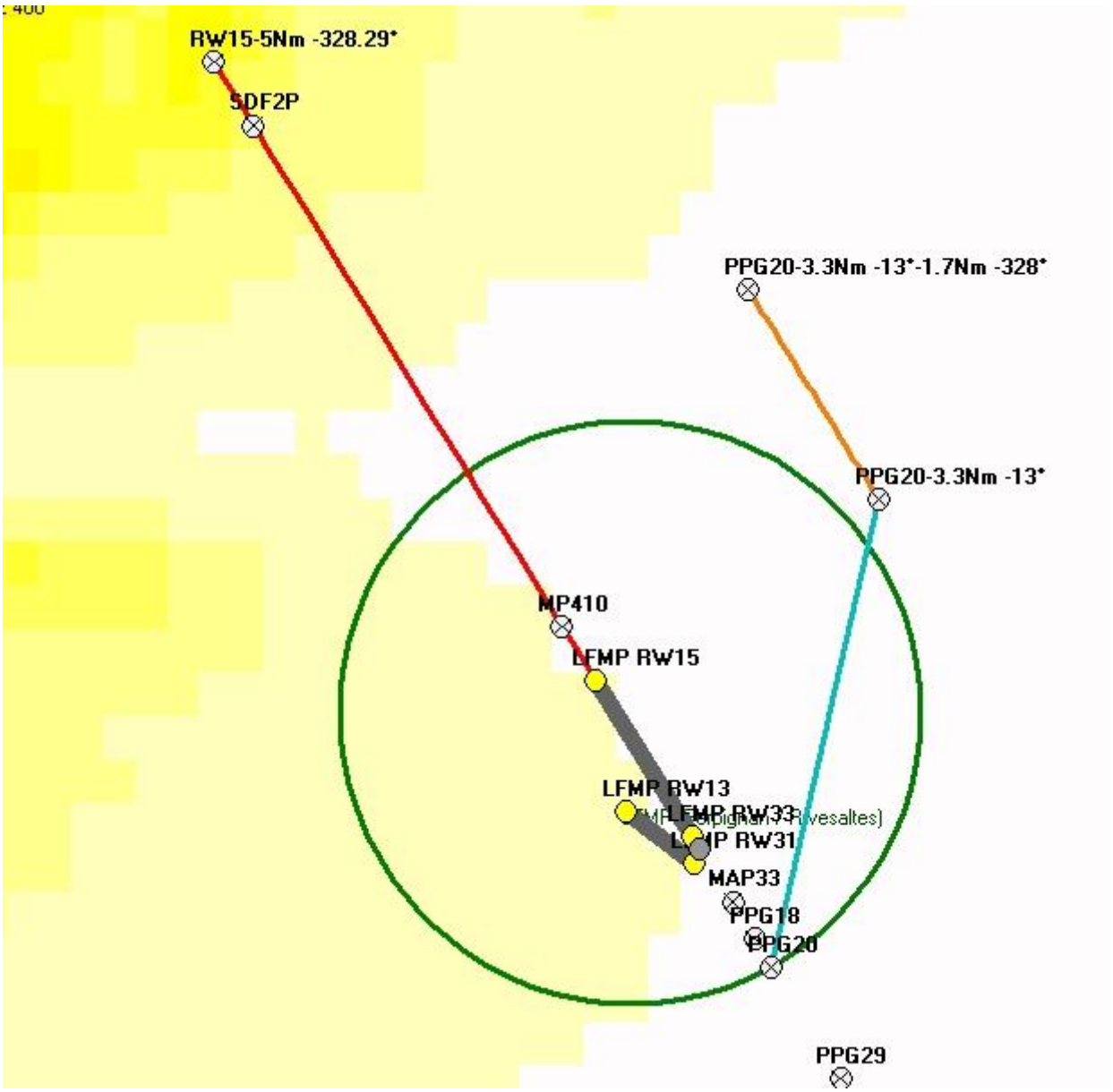
The Track & distance module will show this:



Put RW15 on the left (middle top blue arrow)



Track 328.29, distance 5 (example first) + Compute + Plot. Then button make a line between those 2 points.



N42493007E002480788 = 5Nm Final.

So… we now need to find the RF between the DWN leg and the Final Leg.

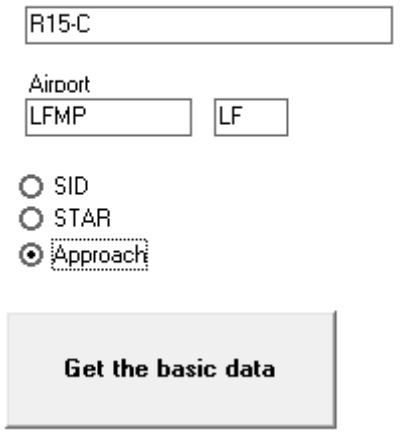
Easy….

We have enough material to start the coding.

Step 5: Prepare the coding.

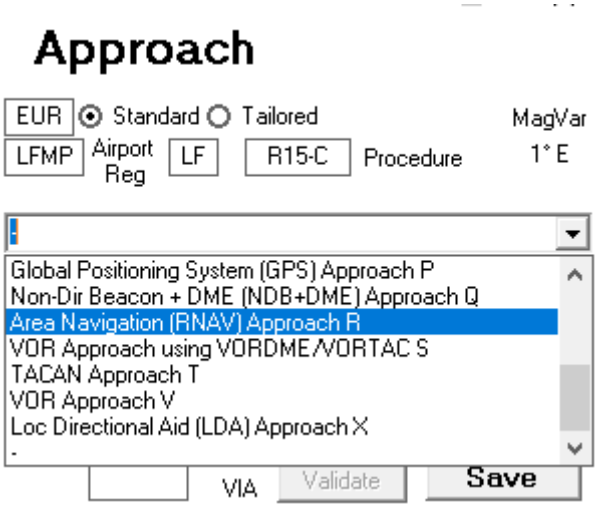
Open “Procedure Design”

Create a new procedure…. Enter LFMP and give a name… R15-C for Circling 15.

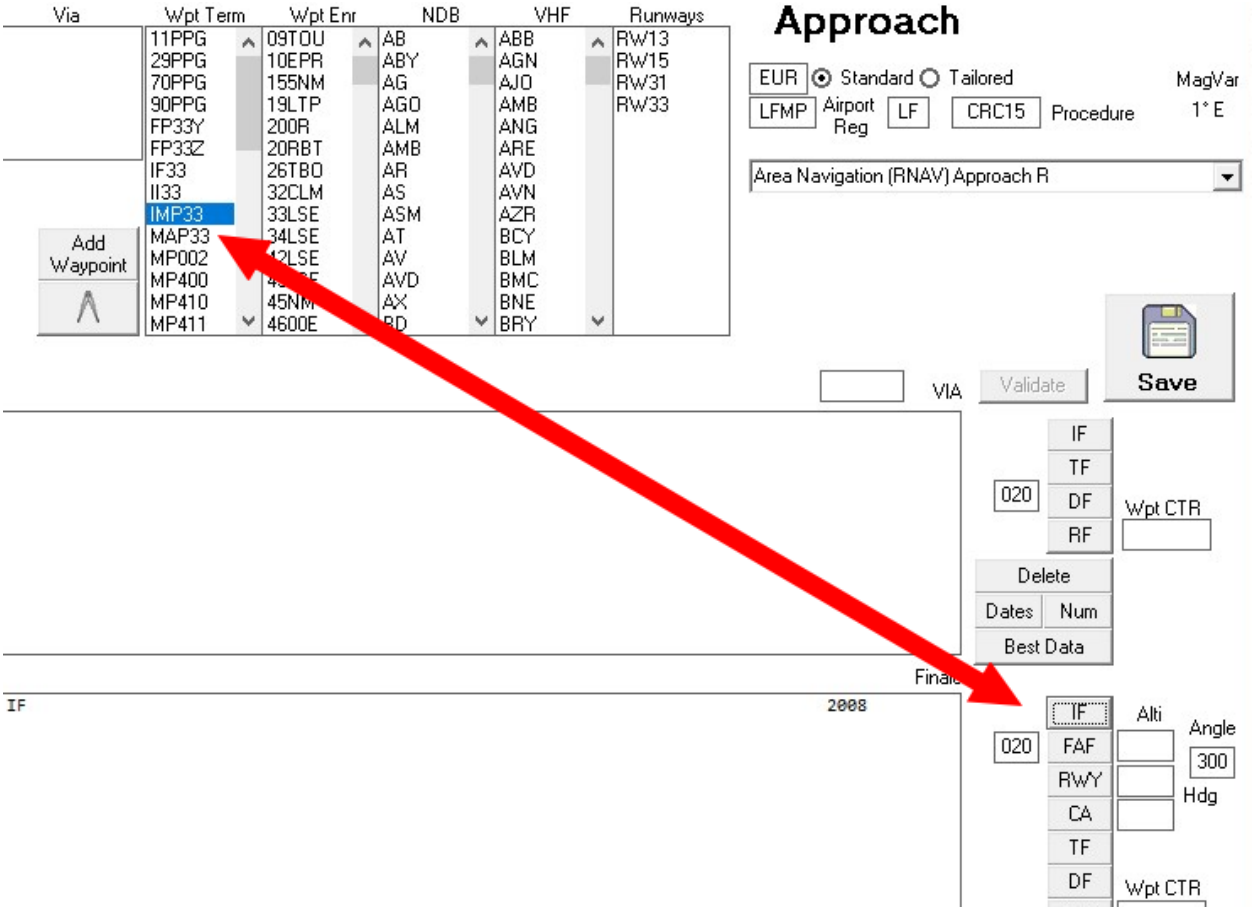


Press “Get the basic data”

Save it and select its type:



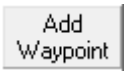
We can select IMP33 for first point, (IF)

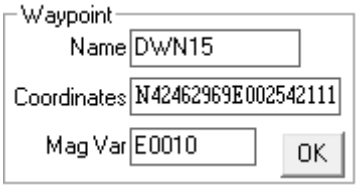


And then save it.

Then PPG20. Select it and press “TF”

The points after are custom and have been created in the steps before…

Press  to save their coordinates:



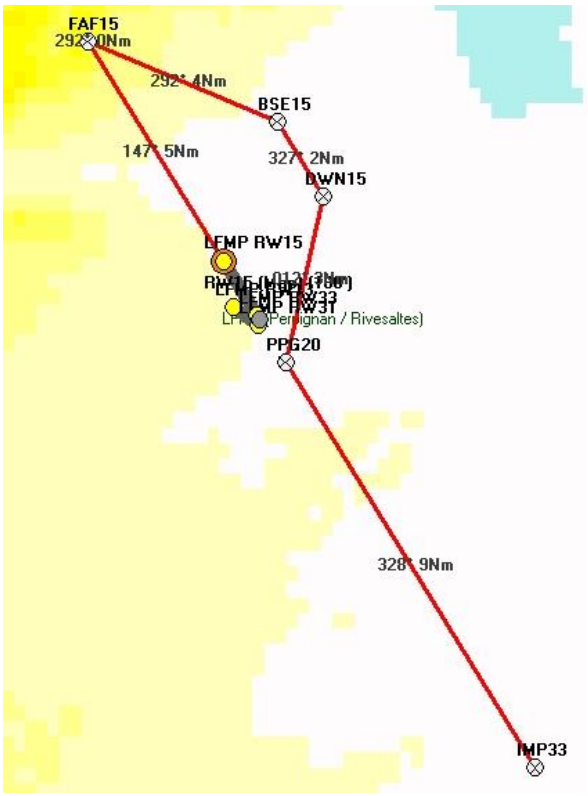
copy/paste datas then press OK.

Going on with the point 5Nm from runway, call it FAF, it will obviously be displaced later.

And finish with the runway 15. (press RWY , let the angle at 3°, we’ll change it after) The altitude will be by default 50’ above runway threshold.

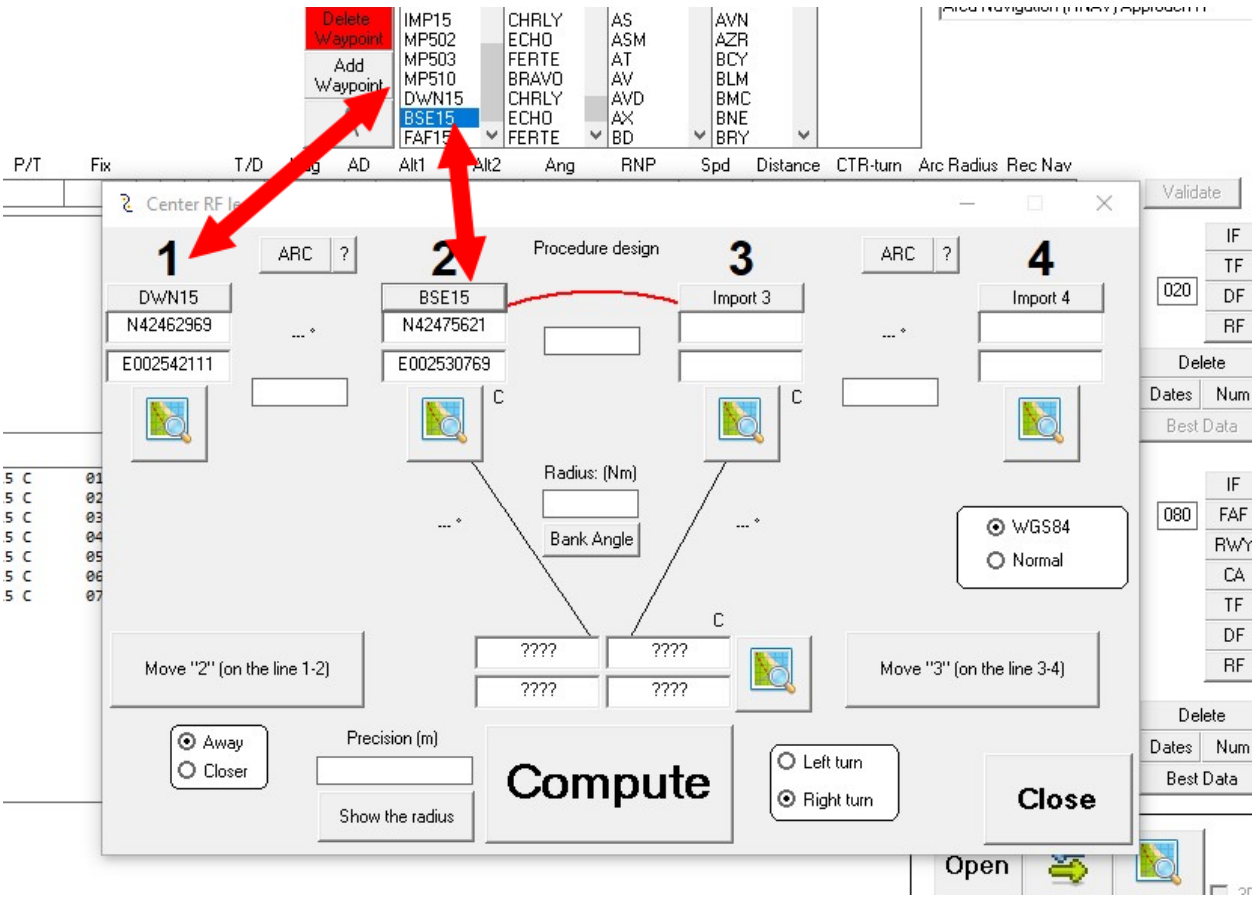
Save.

If you plot it… this will be shown… it’s not finish at all.



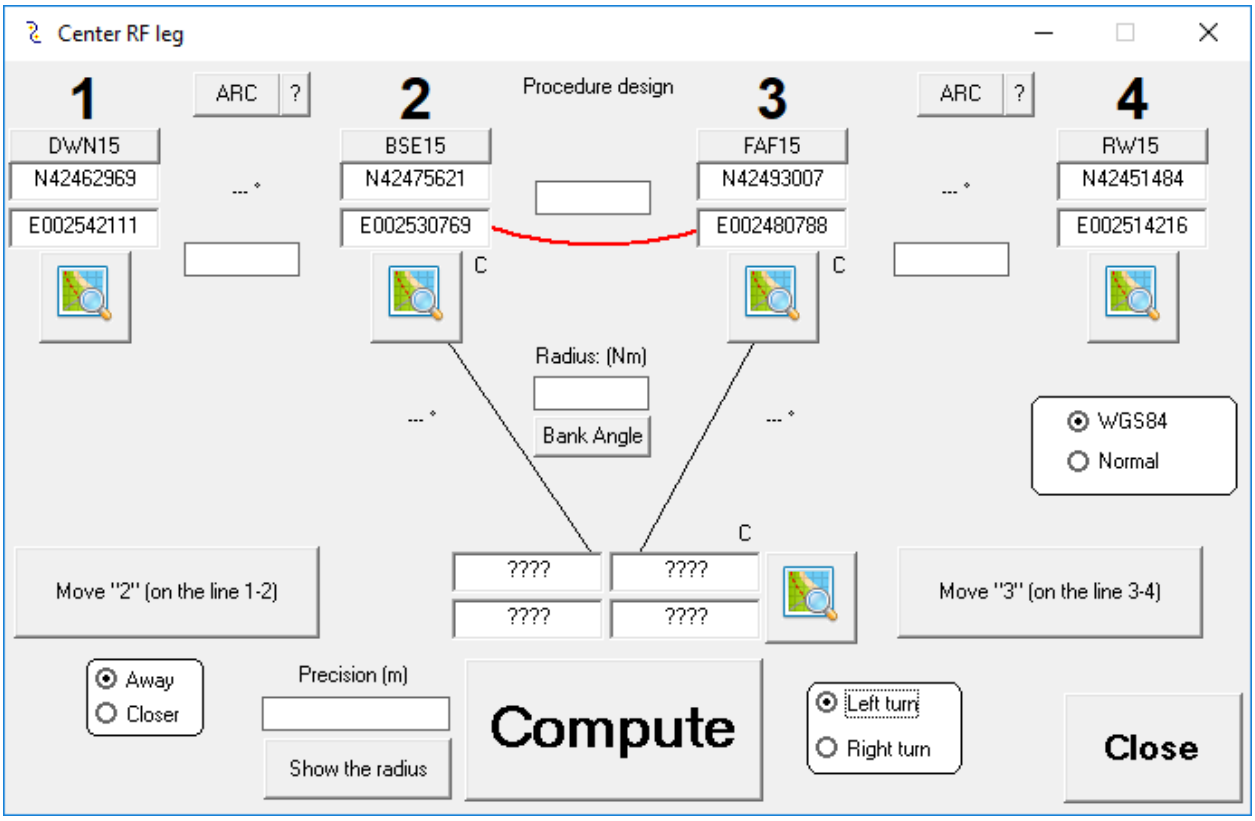
Step 6: code a RF leg between downwind leg to finale leg.

In the same module, click on 

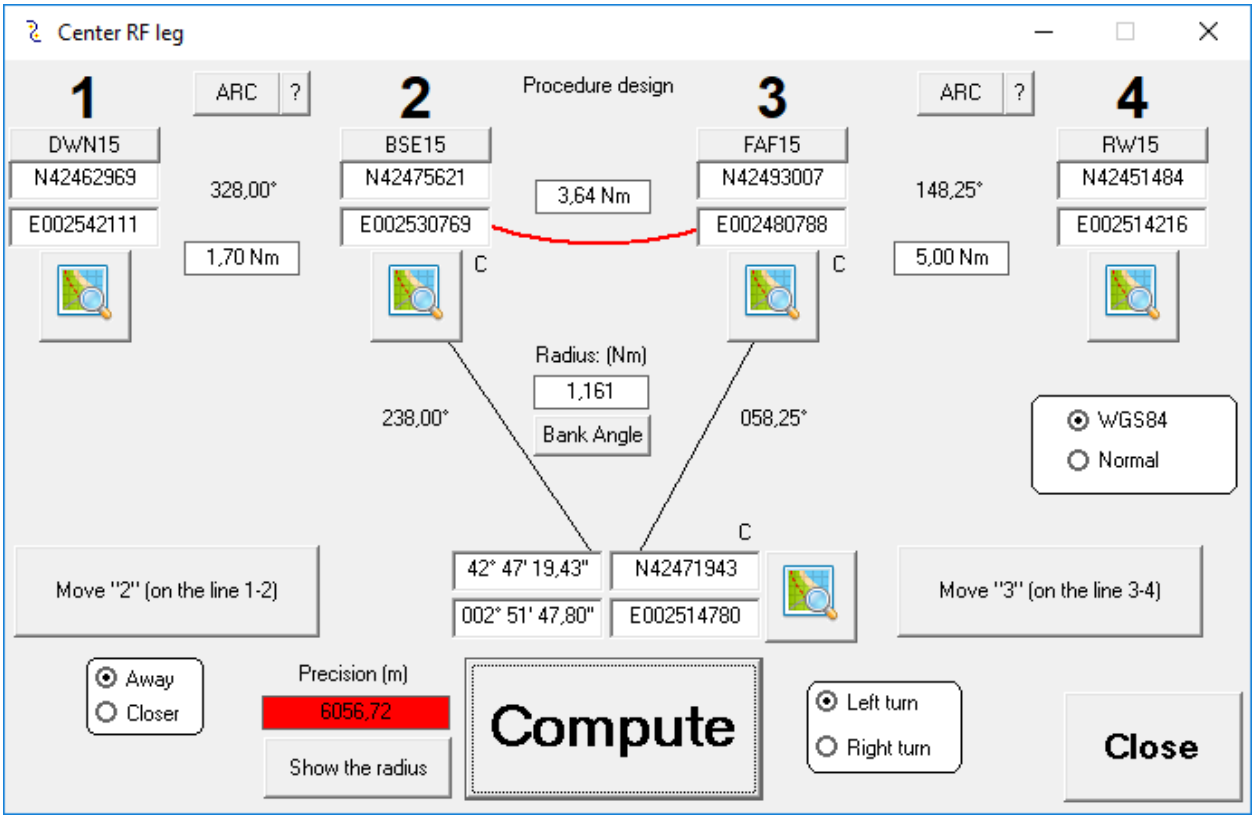


Select each waypoint and import them by clicking on the “import” buttons.

Do that for 4 points, this to join the 2 lines. 1-2-3-4 will be DWN15-BSE15- FAF15-RWY15, like this:

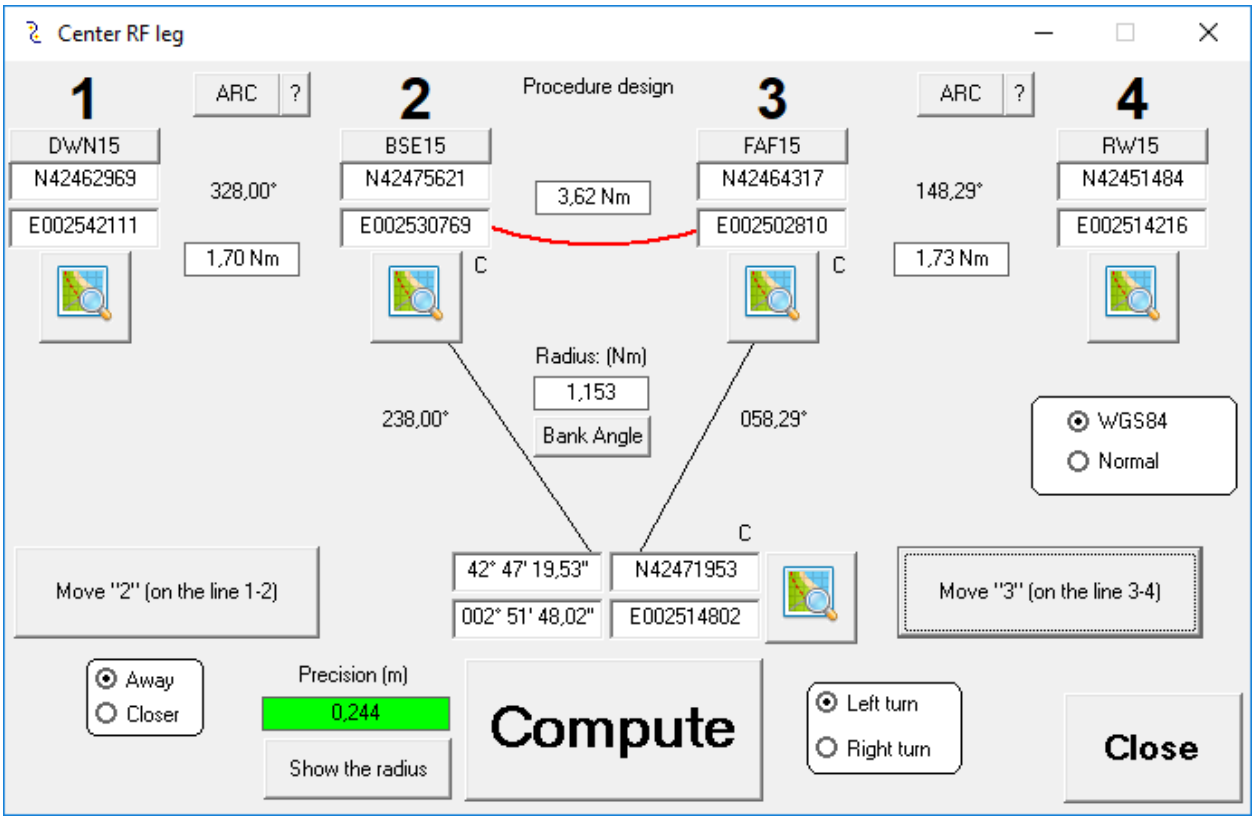


Indicate it's a left turn and click on "Compute"



It doesn't work and it's normal, we know that the FAF15 is not at the right place… (We only place it on the runway axis, the 5Nm distance had no sense)

So we can redo the computation by moving "3" on the line 3-4 (If it's going worse, change the "Away" or "Closer") and when it's going better, do it until the "Precision" value doesn't change and the precision is enough…



Now the precision is of 24 centimetres (we can't get better with A424 coordinates in 1/100 seconds)

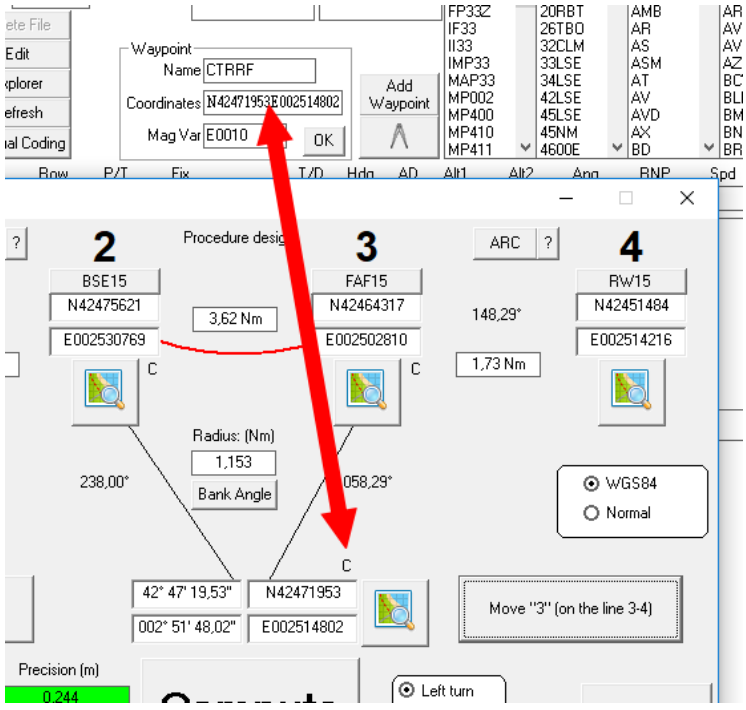
We have the new position of the FAF and the Center Fix of the RF leg.

Press the little "C" bellow FAF coordinates, which will put them in the clipboard.

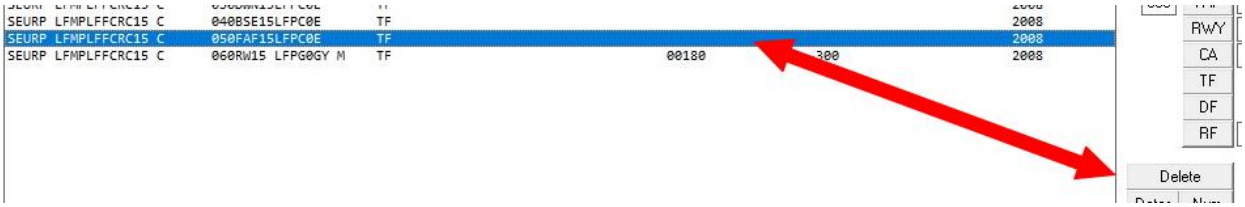
In the Procedure design module, select the FAF15 waypoint, press on delete, then do a new FAF15 with coordinates pasted.

Create a new waypoint for the RF center…

"Add Waypoint", name it CTRRF (example of course) and paste the coordinates you copy when clicking in the "C" above center coordinates…



In our coding, remove the line with the TF FAF15

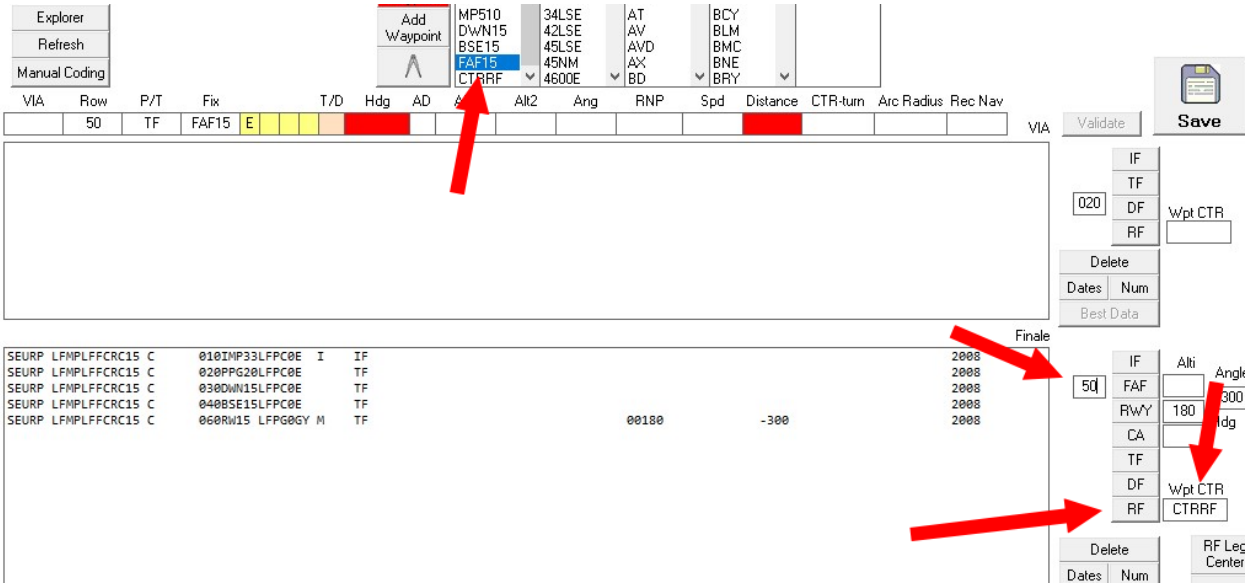


Then,

Give the number 50 for the line we will put (the same than the line we removed)

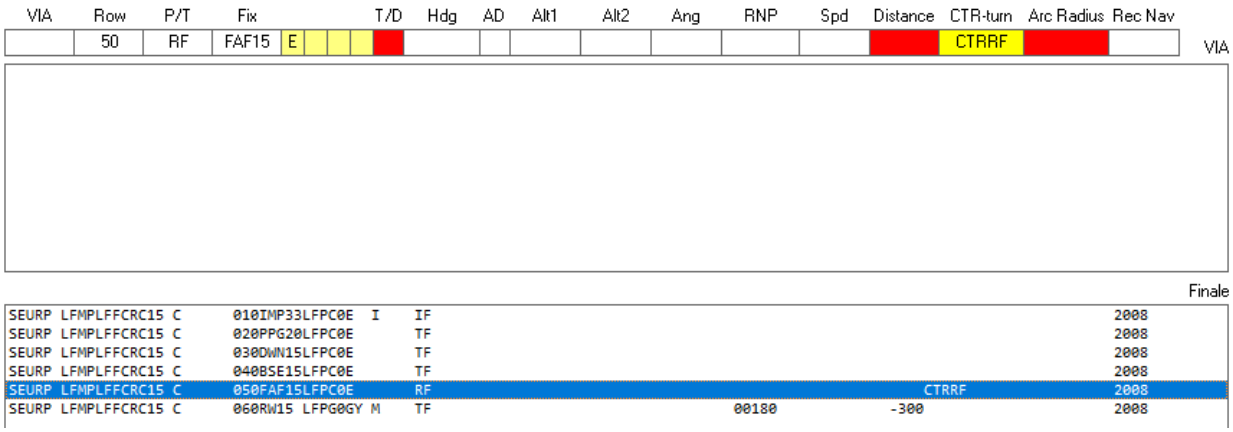
Indicate the CTR will be CTRRF

Select the FAF15 waypoint to go to.



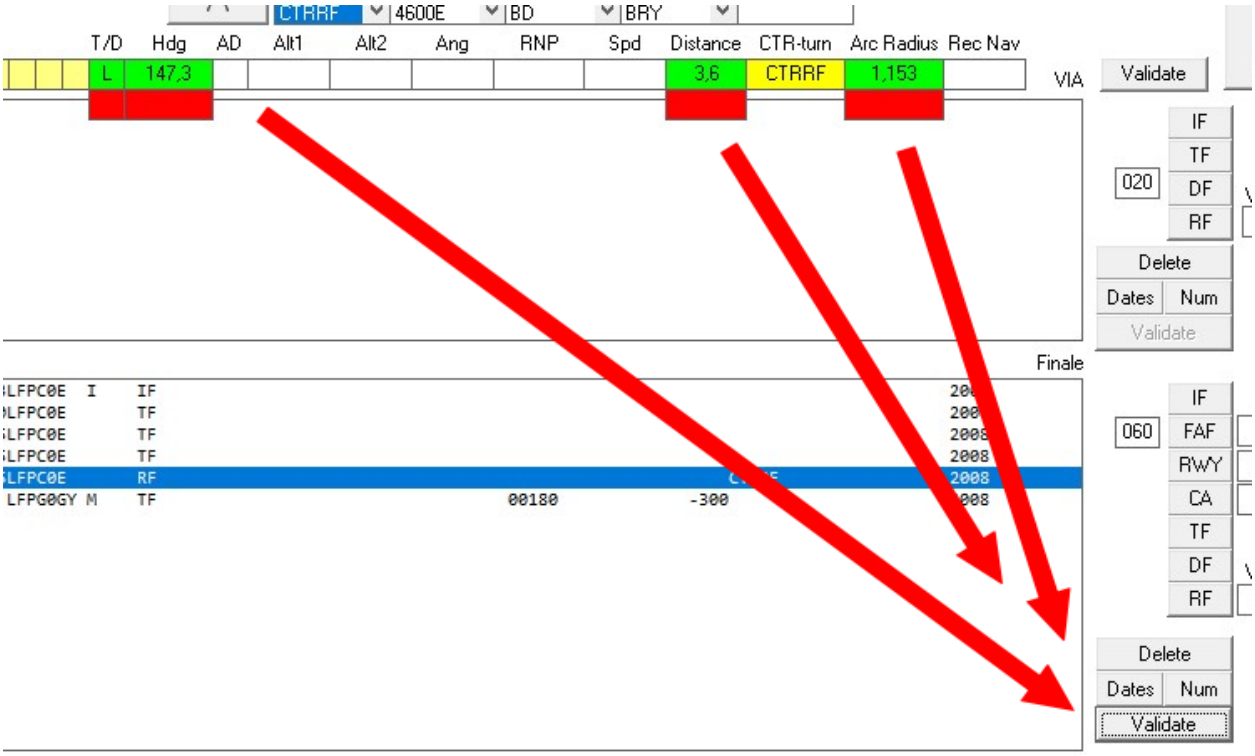
Finally, Press “RF”

The line will be inserted… but things are missing…

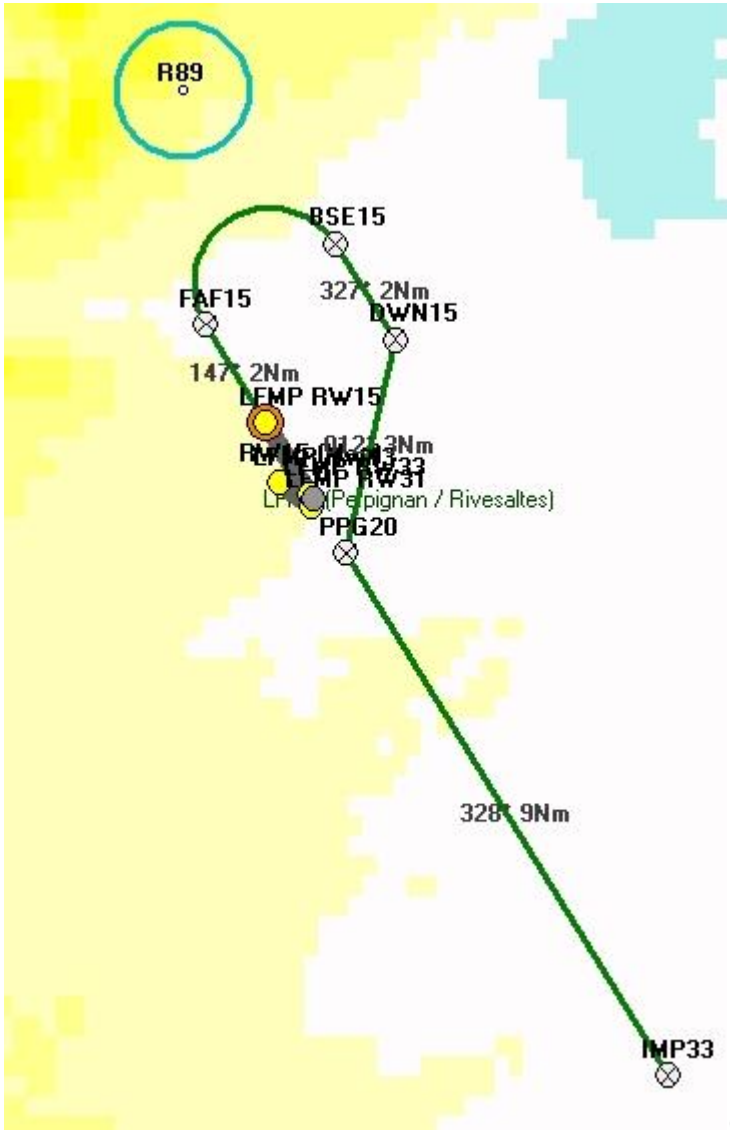


If you select the line, red boxes indicate that turn direction is mandatory and is missing, distance + arc radius are also missing.

Press on “Best data” and data will be calculated and inserted when you press on “validate”



You can save and test it.

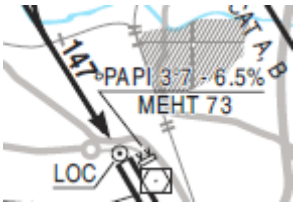


(it's still OK with the PRD zone R89)

Laterally, it's working. Now we have to work on the vertical profile.

Step 7, vertical coding:

We see a glide path constraint in this approach, there's a PAPI and it is at 3.7°



Click on the last segment, in the Angle Box, modify the value by 3.7°

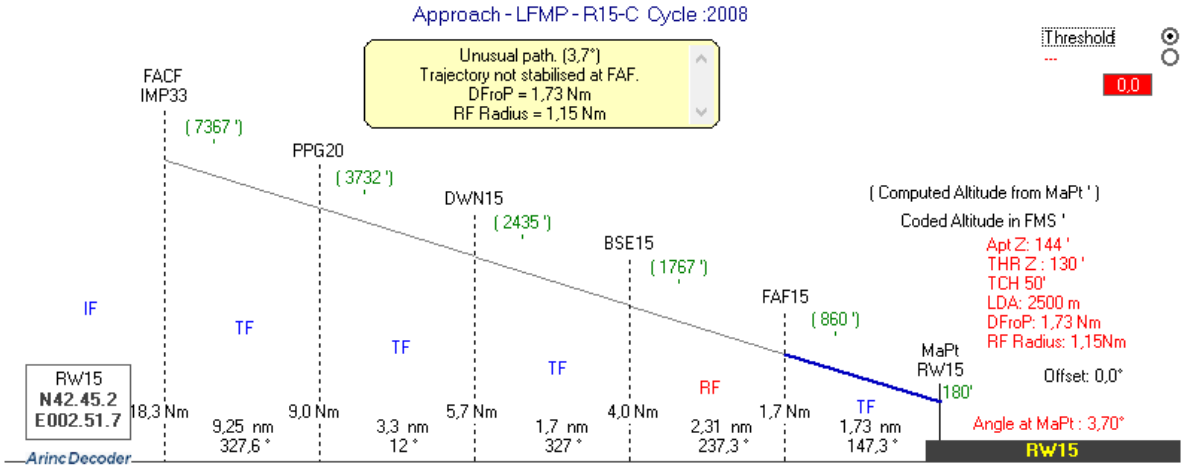
VIA	Row	P/T	Fix					T/D	Hdg	AD	Alt1	Alt2	Ang	RNP	Spd	Distance	CTR-turn	Arc Radius	Rec Nav	
	60	TF	RW15	G	Y		M				180		-3,70							VIA

Finale

```
SEURP LFMPLFFR15-C C     010IMP33LFPC0E  I    IF                                                    2008
SEURP LFMPLFFR15-C C     020PPG20LFPC0E       TF                                                    2008
SEURP LFMPLFFR15-C C     030DWN15LFPC0E       TF                                                    2008
SEURP LFMPLFFR15-C C     040BSE15LFPC0E       TF                                                    2008
SEURP LFMPLFFR15-C C     050FAF15LFPC0E  L    RF       001153       14730036                CTRRF   2008
SEURP LFMPLFFR15-C C     060RW15 LFPG0GY M    TF                                 00180       -370    2008
```

Validate and Save.

Make a test…



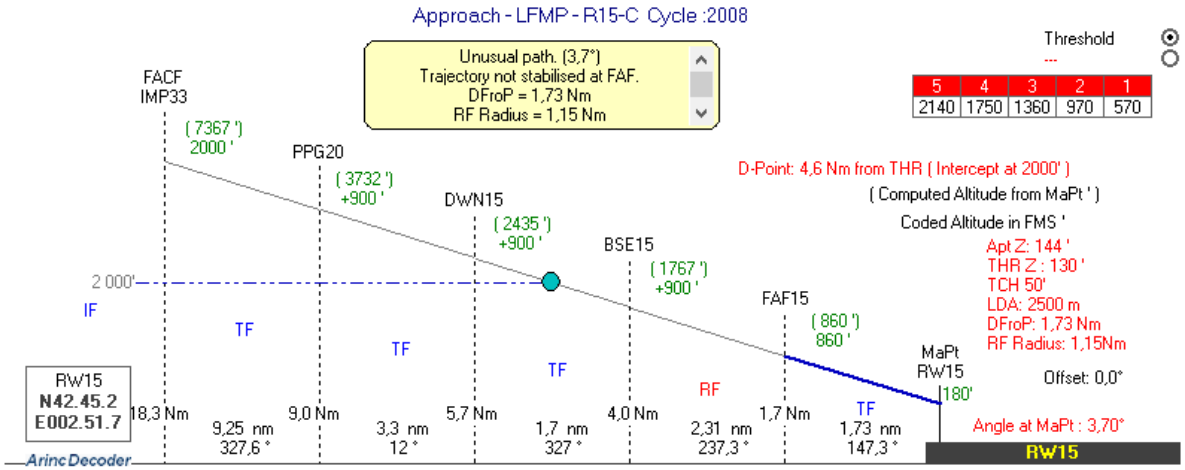
The FAF is now at 860 feet, with the minima at 920 feet, it has good sense.

We can code IMP33 like it is on 33 approach, at 2000'

PPG20 + DWN15 + BSE15 coded 900 or above.

FAF15 at 860'.

And vertical profile can be this one… to be tested in flight simulator…



Mandatory values can be added with each time the best data value.

Approach - LFMP - R15-C **Perpignan / Rivesaltes** **Mag Var : 01.0° E (Apt)** **Cycle :2008**

Via	Seq	Pt	Fix	Typ	TD F/O		Mag Crs		Alt 1	Alt 2	Vert Angle	RNP	Speed Limit	Distance Time		CTR RF Leg	Radius (Nm)		Updte
	10	IF	IMP33	FACF					2000										2008
	20	TF	PPG20				327,3°	+	900					9,2 Nm					2008
	30	TF	DWN15				12°	+	900					3,3 Nm					2008
	40	TF	BSE15				327°	+	900					1,7 Nm					2008
	50	RF	FAF15			L	147,3°		860					3,6 Nm		CTRRF	1,2		2008
	60	TF	RW15	MaPt	FO				180		-3,70°								2008