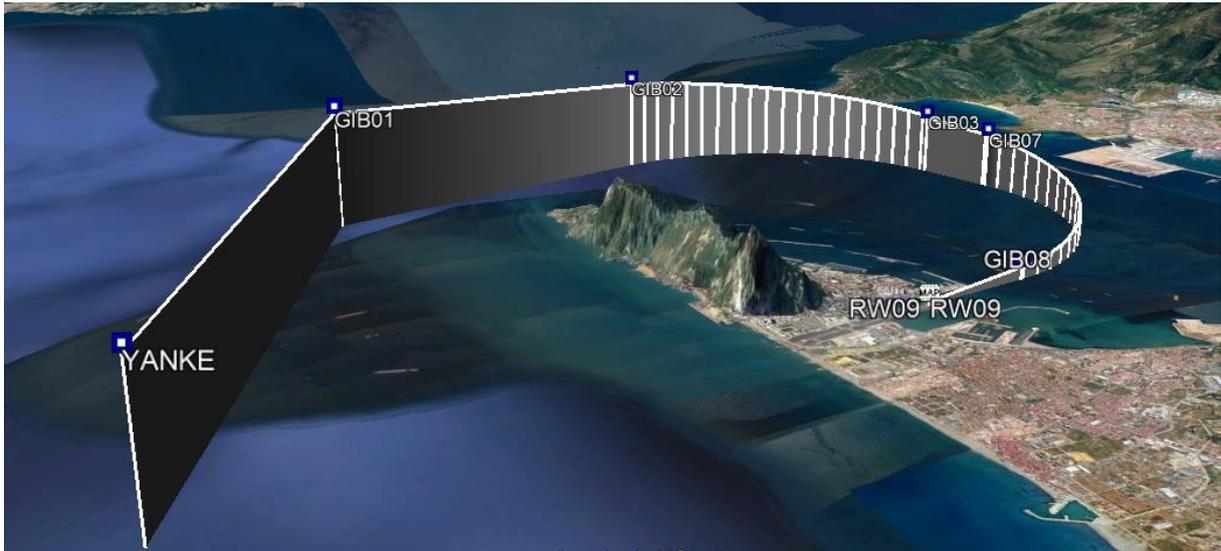


## Design of a complex procedure with RF legs.



Design of a complex procedure with RF legs. ....	1
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For a RNAV Visual...

I want to land runway 09 at GIB (Gibraltar, LXGB) coming from the north...

Difficult because of the rock...

I plot the runway, and one of the actual terminal waypoints:



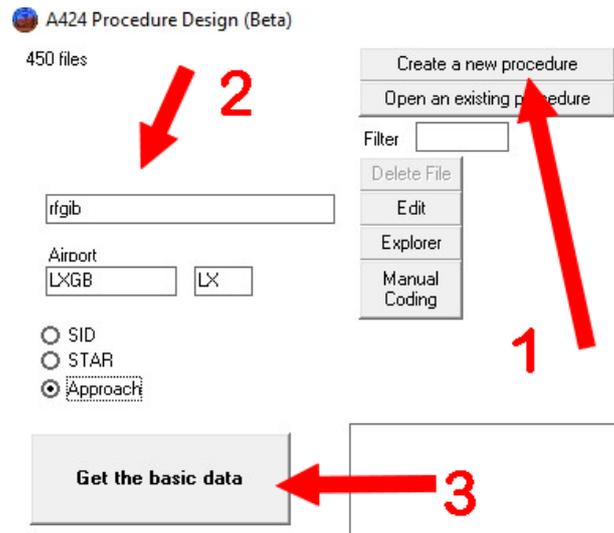
I will arrive via “YANKE” turning right and rolling in the middle of the bay to the final.

First, we show the module “Procedure Design” (button in the “Manual coding” module) and we ask for a new procedure named RFGIB at LXGB.

With no via and starting at YANKE.

Starting by creating the file:

First, we create the file.... By filling the airport name and the procedure type you want...



Then...

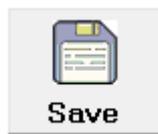
- Put a name in the module (RFGIB, in my example)
- Select Yanke waypoint in the Term waypoint list (if this point was not existing it was possible to create one (button “Add Waypoint” or to select an enroute wpt, or a navaid.)
- Select “IF” in the finale zone.

The screenshot shows the 'Approach' software interface. On the left, a table lists waypoints:

Wpt Term	Wpt Enr	NDB	VHF	Runways
GB513			GBR	RW09
GBM02				RW27
GBM03				
GBM04				
GBM05				
GBM06				
KUXX				
ODLUK				
RIPRA				
UNBUT				
UPMUP				
VIC05				
XRAY				
<b>YANKE</b>				

The right pane shows the 'Approach' configuration for 'LXGB'. It includes options for 'EUR', 'Standard' (selected), and 'Tailored'. Below, there are fields for 'Airport Reg' (LX), 'Procedure' (rfgib), and '1,2° W'. A dropdown menu is empty. At the bottom right, there are buttons for 'Validate', 'Save', and various approach parameters like 'IF', 'TF', 'DF', 'RF', 'Wpt CTR', 'Delete', 'Dates', 'Num', 'Best Data', 'Alti', 'Angle', 'Rwy', 'CA', 'TF', 'DF', 'RF', 'Wpt CTR', 'Delete', and 'RF Leq'.

The first line is done, you can Save it.

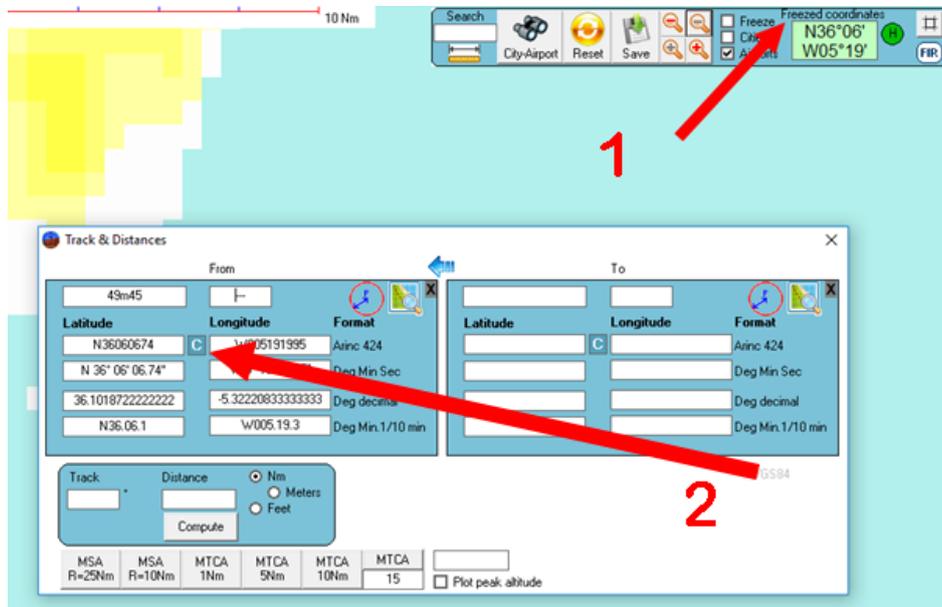


Many ways to create or re use your waypoints, I will create them roughly, it will be easy after to relocate them.

So I imagine my waypoints, plotting with the mouse, when I see a good place I press "Maj" or "Caps" and still pressing I go to the menu with the coordinates of my point:



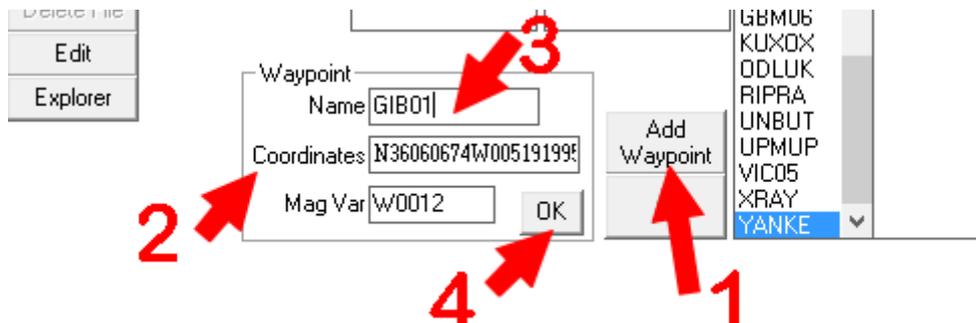
Because Caps is down, the coordinates are locked, I click on the label and this module will show:



This waypoint can be stored in our A424 module....

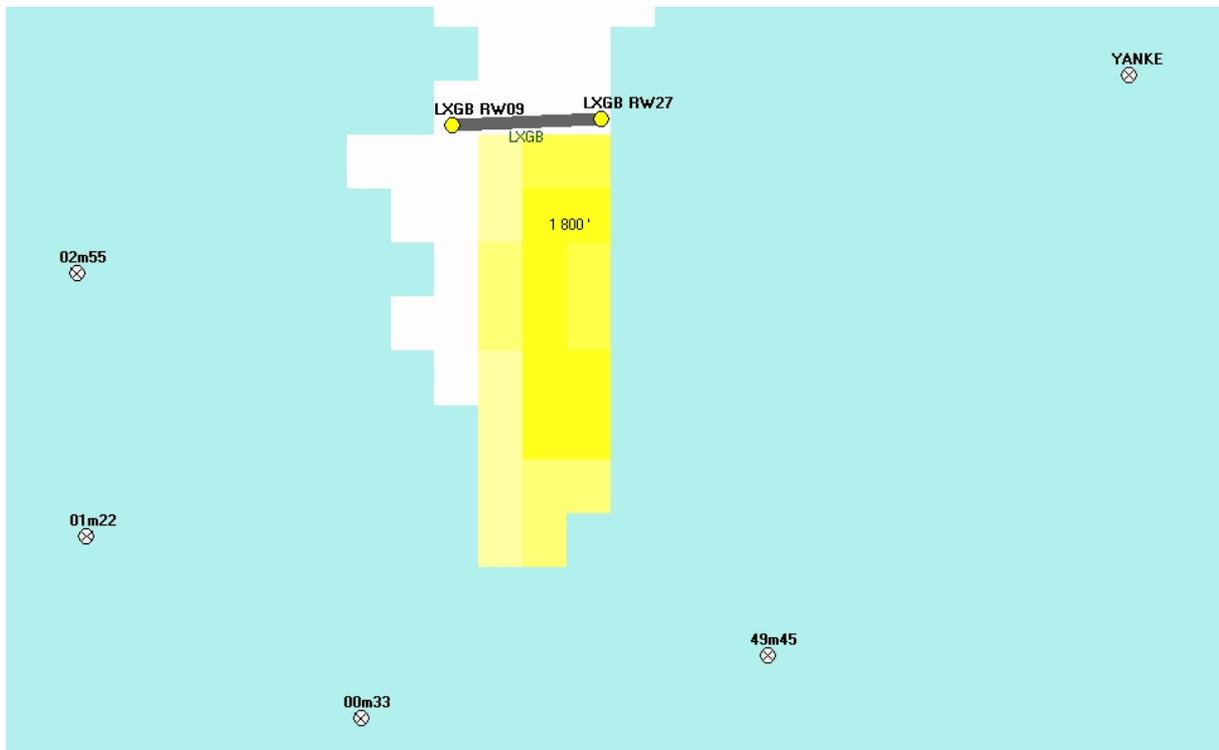
Press on the "C" in the middle of the coordinates in the previous module.

And on "Add Waypoint" in the procedure design module...



GIB01 will be in your file (when saved), ready to be use for what any !

I'm going on with other waypoints... GIB02/03/04...



(the module give a temporary name to the points with minutes and seconds of time you create them, that help to put them in the correct order after...)

The last point will be in the runway axis, at 1Nm

Easy with the module after selecting THR27 then THR09, switching the THR 09 with the blue arrow and ask a computation in the same axis of 1Nm:

**Track & Distances** ✕

From ← To

From			To		
Latitude	Longitude	Format	Latitude	Longitude	Format
Rw09	1,2° W		Rw09 -1Nm -267.55°	1,2° W	
N36090318	W005212917	Arinc 424	N36090061	W005224319	Arinc 424
N 36° 09' 03.18"	W 5° 21' 29.17"	Deg Min Sec	N 36° 09' 00.61"	W 5° 22' 43.19"	Deg Min Sec
36.1508833333333	-5.35810277777778	Deg decimal	36.1501694444444	-5.37866388888889	Deg decimal
N36.09.1	W005.21.5	Deg Min. 1/10 min	N36.09.0	W005.22.7	Deg Min. 1/10 min

Track:  °

Distance:  
 Nm  
 Meters  
 Feet

**Distance : 1852,03 m (1,000 Nm) (6076,2 ft)**  
**Initial Heading: 267,55° (268,75° mag)**  
**Final Heading: 267,54° (268,74° mag)**

MSA R=25Nm    MSA R=10Nm    MTCA 1Nm    MTCA 5Nm    MTCA 10Nm    MTCA 15

Plot peak altitude

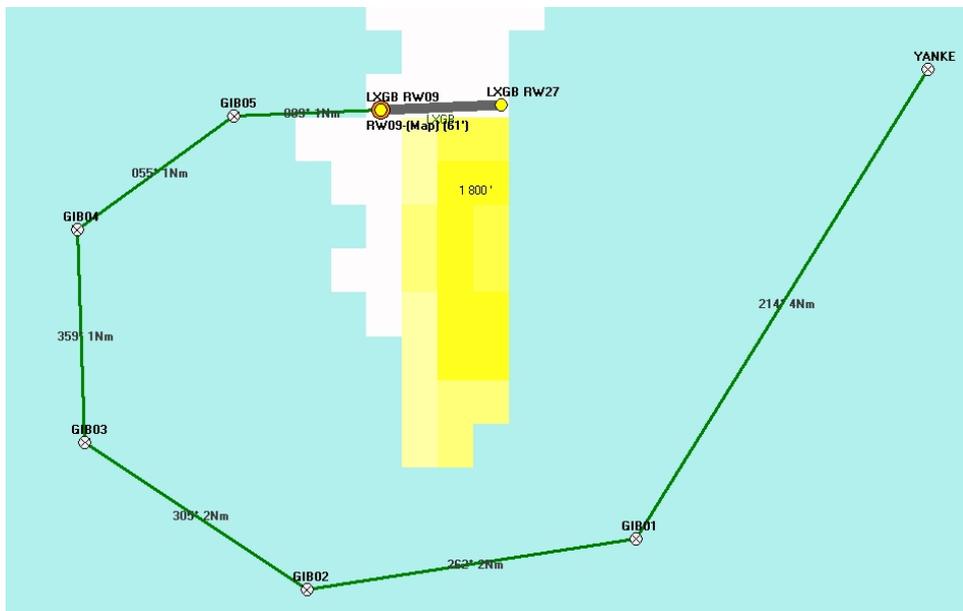
WGS84

Make a line between those two points.

ETP ( Equi Time Point  
No wind )



We can see the trajectory by linking all waypoints together with simple TF legs:



(Select GIB01, then TF, GIB02, then TF, GIB03, etc.)

SEURP	LXGBLXFR09-V	R	010YANKE	LXPC0E	I	IF			2003	
SEURP	LXGBLXFR09-V	R	020GIB01	LXPC0E		TF			2003	
SEURP	LXGBLXFR09-V	R	030GIB02	LXPC0E		TF			2003	
SEURP	LXGBLXFR09-V	R	040GIB03	LXPC0E		TF			2003	
SEURP	LXGBLXFR09-V	R	050GIB04	LXPC0E		TF			2003	
SEURP	LXGBLXFR09-V	R	060GIB05	LXPC0E		TF			2003	
SEURP	LXGBLXFR09-V	R	070RW09	LXP0GY	M	TF	00061	-300	2003	

020	IF
	DF
	RF
Replace dates	

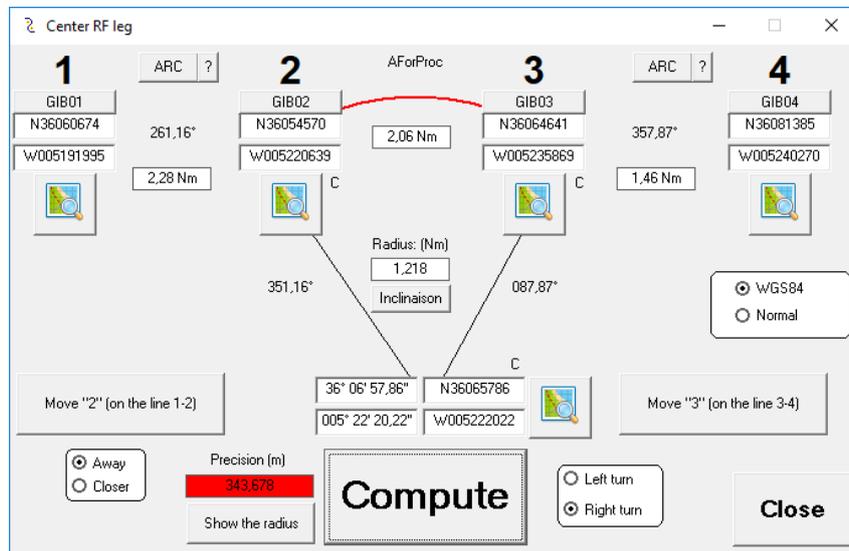
080	IF	Delet
BD	FAF	
	RWY	61
	CA	
	TF	
	DF	
Replace dates		

We see that we should code 2 RF legs, between GIB02 and GIB03 then GIB04 and GIB05...

Let's use the module for RF legs center determination.

### RF leg addition

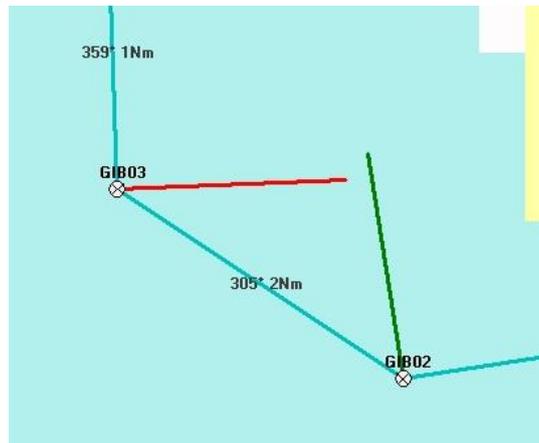
You select all the waypoints one by one and click on import 1, import 2, import3 and import 4.



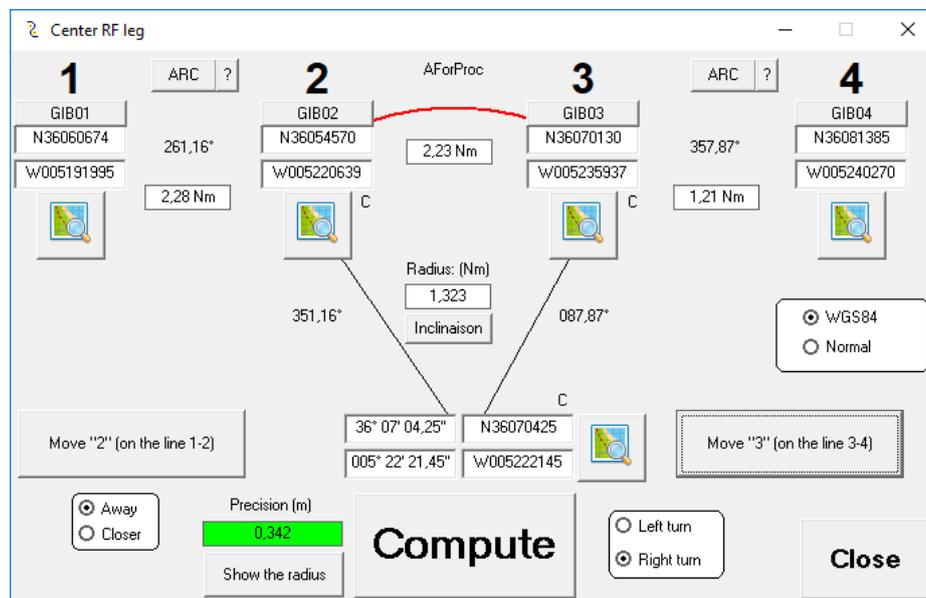
When done you confirm the turn direction (to the right) and click “Compute”

The precision is too poor, 343m, we will adjust this.

Click on “show the radius” and we see that we can move GIB03 to the north, or GIB02 to the west. To keep the higher radius I will prefer move GIB03 to the north:

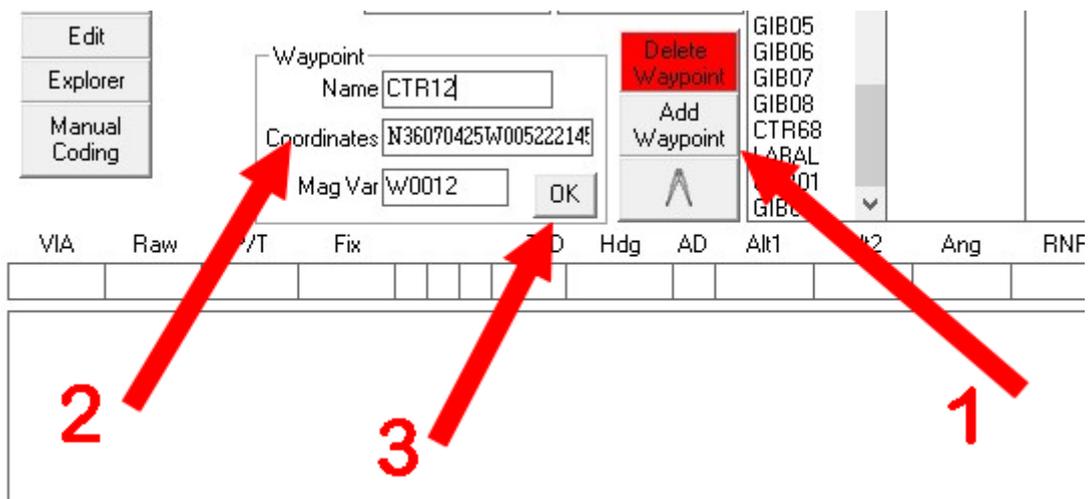


Click on “Move 3 on the line 3-4” until nothing moves and the label is green, and the error of only 34 centimeters (A424 coordinates cannot give better precision with 1/100 seconds in the coordinates)



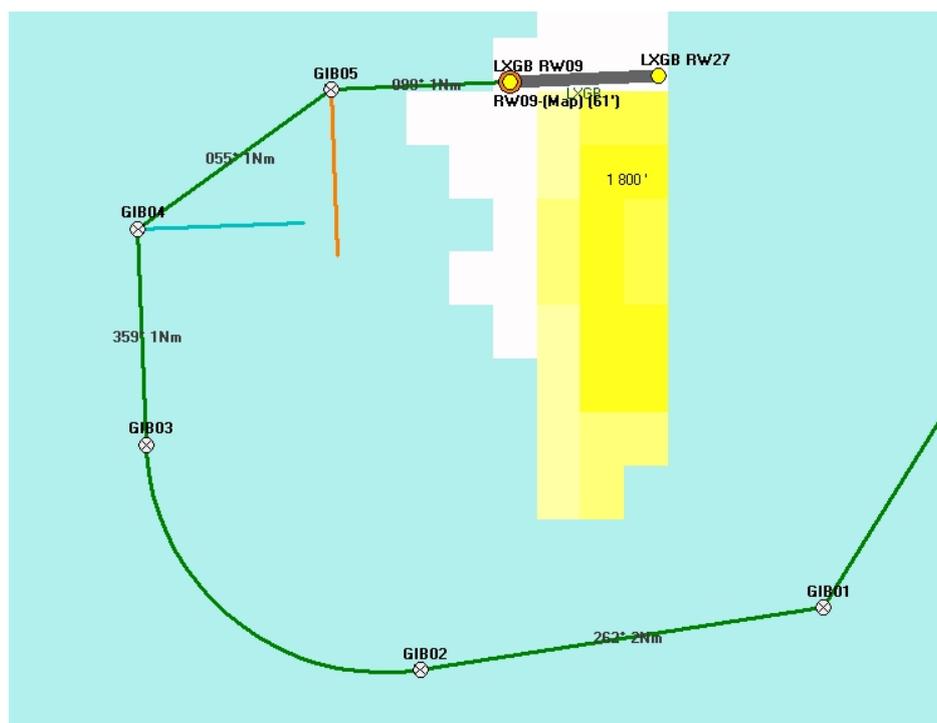
So we have our RF leg center, with “C” we copy its coordinates.

Then we create the waypoint of this RF center.



And because we moved GIB03, you have to copy new coordinates and delete + create a new GIB03, or you can create some other temporary waypoints for your tests.

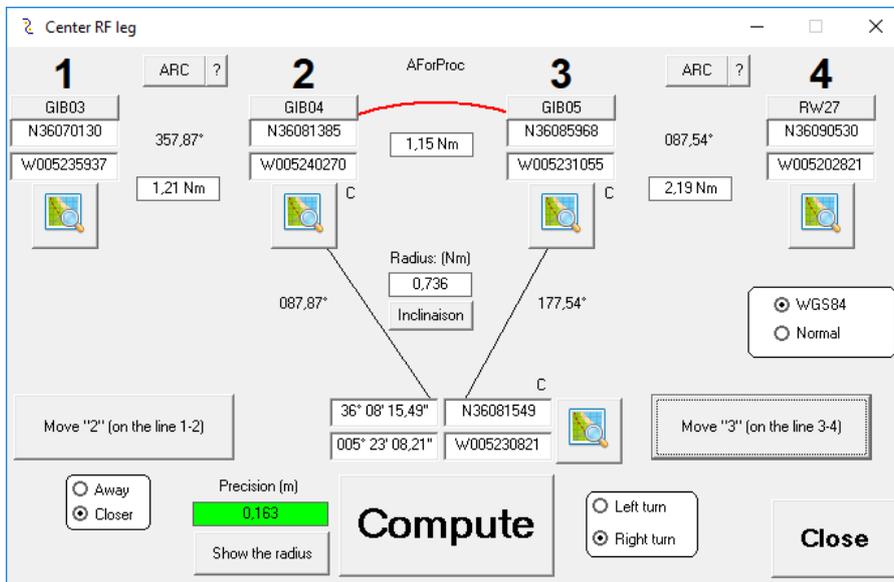
Same action to do for the last RF leg



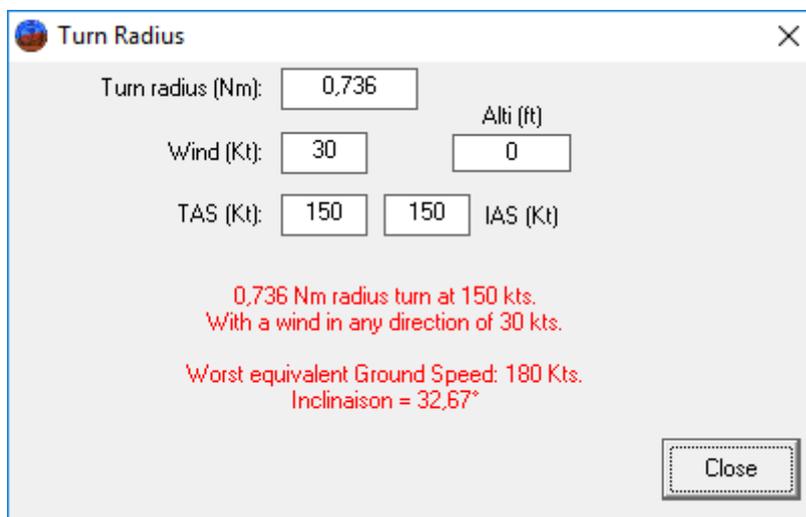
Here we see that we can move GIB05 to the west, or GIB04 to the south... that's the solution which enlarge the radius, but GIB05 to the west will give some length to the DFR0P (Distance to final approach roll-out point)

### Adjustments

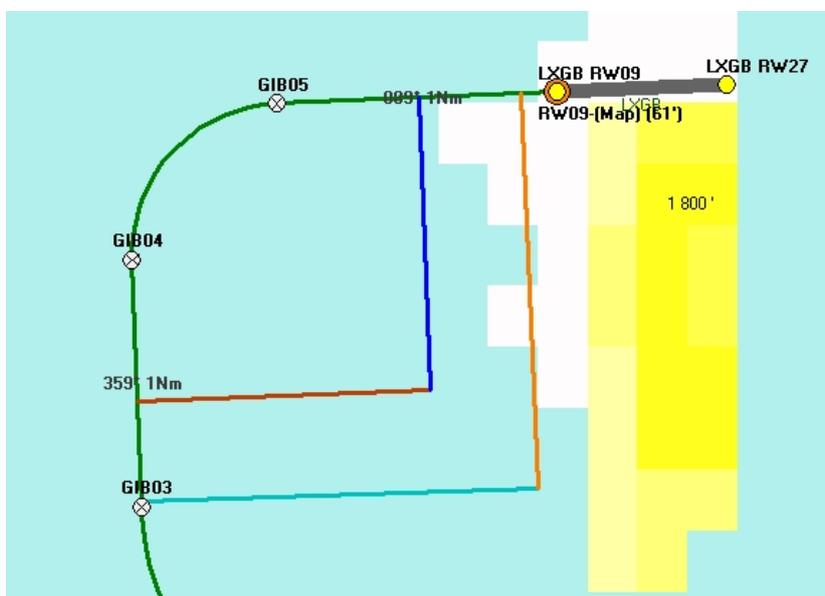
I prefer a longer finale to stabilize...



The finale is now 2.19 nm long.... but the radius is only 0.736 Nm, we can check the inclination .... Certainly too sharp:



We retry by only moving GIB04 to the south, the turn is wide but the final too short, so we make a mix and we check with the button "show the radius"



Like this should be OK,

## Making the coding, and testing it.

Starting back from our first IF:

Select the next fixe (in any list) and press TF (or any other path terminator)

The screenshot shows the 'Approach' software interface. At the top, there are columns for 'Via', 'Wpt Term', 'Wpt Enr', 'NDB', 'VHF', and 'Runways'. The 'Wpt Term' column contains a list of waypoints: YANKE, GIB04, CTR12, GIB03, CTR34, GIB05, GIB06, GIB07, GIB08, CTR68, LABAL, CTR01, and GIB01. A red arrow labeled '1' points to 'GIB01' in this list. Below the list is a table with columns: D, Hdg, AD, Alt1, Alt2, Ang, RNP, Spd, Distance, CTR-turn, Arc Radius, Rec Nav. The 'VIA' section on the right has buttons for IF, TF, DF, and RF. A red arrow labeled '2' points to the 'TF' button. Below the table is a 'Finale' section with fields for IF and TF, and a 'Save' button.

Next line is the TF leg to the FAF GIB02. Select GIB02 and push on “FAF” (you can insert at this moment the intercept altitude at the FAF, here = 1700’)

The screenshot shows the 'Approach' software interface after the first step. The 'Wpt Term' list now has 'GIB02' selected, indicated by a red arrow labeled '1'. In the 'VIA' section, the 'FAF' button is highlighted with a red arrow labeled '2'. In the 'Finale' section, the 'Alt' field now contains the value '1700', indicated by a red arrow labeled '3'. The 'Wpt CTR' field now contains 'ctr12'.

Next is the first RF leg, from GIB02 to GIB03, The center is the fix CTR12.

Put CTR12 in the text box, select the fix GIB03 and click on “RF”

**Approach**

EUR  Standard  Tailored  
 LXGB Airport Reg  LX RFGIB Procedure 1.2° W  
 Area Navigation (RNAV) Approach R

YANKE  
 GIB04  
 GIB02  
 CTR12  
 GIB03  
 GIB05  
 GIB06  
 GIB07  
 GIB08  
 CTR68  
 LABAL  
 CTR01  
 GIB01

CTP34  
 RW09  
 RW27

T/D Hdg AD Alt1 Alt2 Ang RNP Spd Distance CTR-turn Arc Radius Rec Nav

VIA Validate Save

IF  
 TF  
 020 DF Wpt CTR  
 RF

Delete  
 Dates Num  
 Best Data

IF Alt Angle  
 050 FAF 1700 300  
 RWY 61 Hdg  
 CA  
 TF  
 DF Wpt CTR  
 RF ckt12

Delete  
 Dates Num  
 Best data

RF Leg Center  
 Fixes

Finale

I	IF	Alt	Angle
F	TF	01700	-300
F	RF	01700	-300CTR12

Continue in the same way until the threshold.

SEURP	LXGBLXFRFGIB	R	010YANKELXPC0E	I	IF											2003
SEURP	LXGBLXFRFGIB	R	020GIB01LXPC0E		TF											2003
SEURP	LXGBLXFRFGIB	R	030GIB02LXPC0E	F	TF					01700		-300			2003	
SEURP	LXGBLXFRFGIB	R	040GIB03LXPC0E	F	RF					01700		-300CTR12			2003	
SEURP	LXGBLXFRFGIB	R	050GIB06LXPC0E		TF							-300			2003	
SEURP	LXGBLXFRFGIB	R	060GIB08LXPC0E	F	RF					01700		-300CTR68			2003	
SEURP	LXGBLXFRFGIB	R	070RW09 LXPG0GY	M	TF					00061		-300			2003	

### Auto completion of mandatory datas

When you select a line, it can happen that a box above turn red...

VIA	Raw	P/T	Fix	T/D	Hdg	AD	Alt1	Alt2	Ang	RNP	Spd	Distance	CTR-turn	Arc Radius	Rec Nav	VIA
	20	TF	GIB01	E												

Finale

SEURP	LXGBLXFRFGIB	R	010YANKELXPC0E	I	IF											2003
SEURP	LXGBLXFRFGIB	R	020GIB01LXPC0E		TF											2003
SEURP	LXGBLXFRFGIB	R	030GIB02LXPC0E	F	TF					01700		-300			2003	

That mean that some mandatory data are false or missing.

Click simply on the button "Best data" near the list

T/D	Hdg	AD	Alt1	Alt2	Ang	RNP	Spd	Distance	CTR-turn	Arc Radius	Rec Nav
		211.7						3.7			

VIA Validate Save

IF TF DF RF Wpt CTR 020

Delete Dates Num Best Data

Finale

IF	Alt1	Angle	Alt2	Hdg
080	1700	300		
FAF	61			
RWY				
CA				
TF				
DF				
RF	ctr34			

Delete Dates Num Best data RF Leg Center Fixes

And after validation, click on "Validate"

And so on for each lines.

Things can be adjusted for each data in every lines.

Speed limit, path angle, RNP, etc.

Here I want to add an altitude at the IAF (YANKE)

Delete Waypoint Add Waypoint

GB09F GB270 GB272 GB276 GB27F GB403 GB409 GB501 GB509

Fix	T/D	Hdg	AD	Alt1	Alt2	Ang
3 YANKE	E	I		+ 2000		

1 2 3

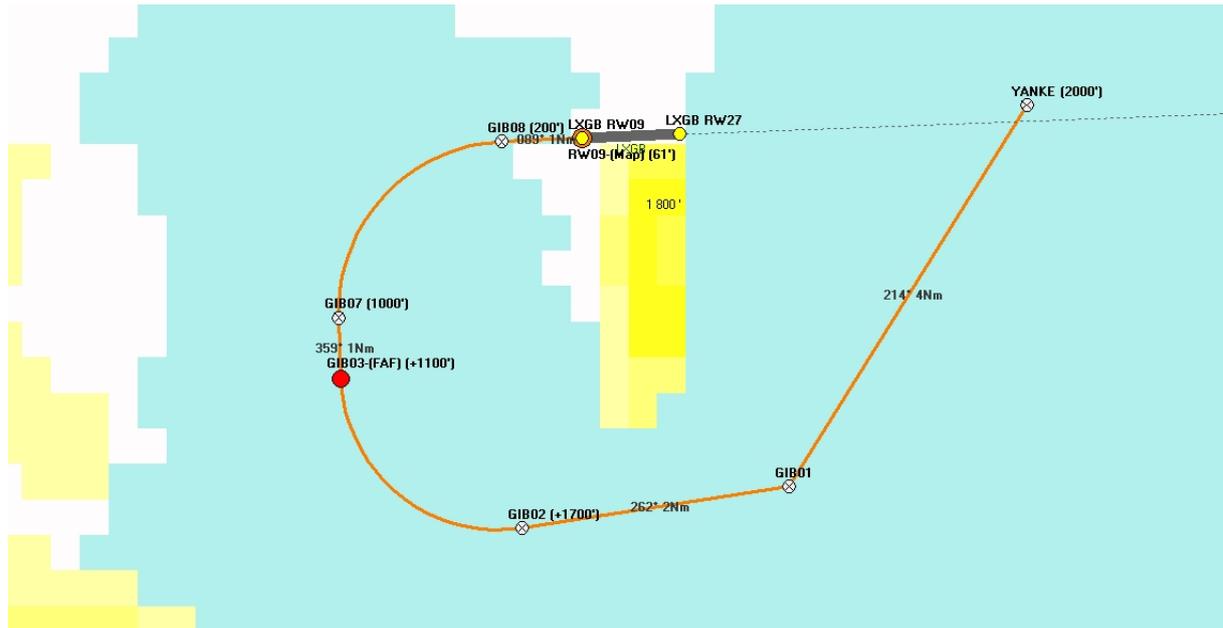
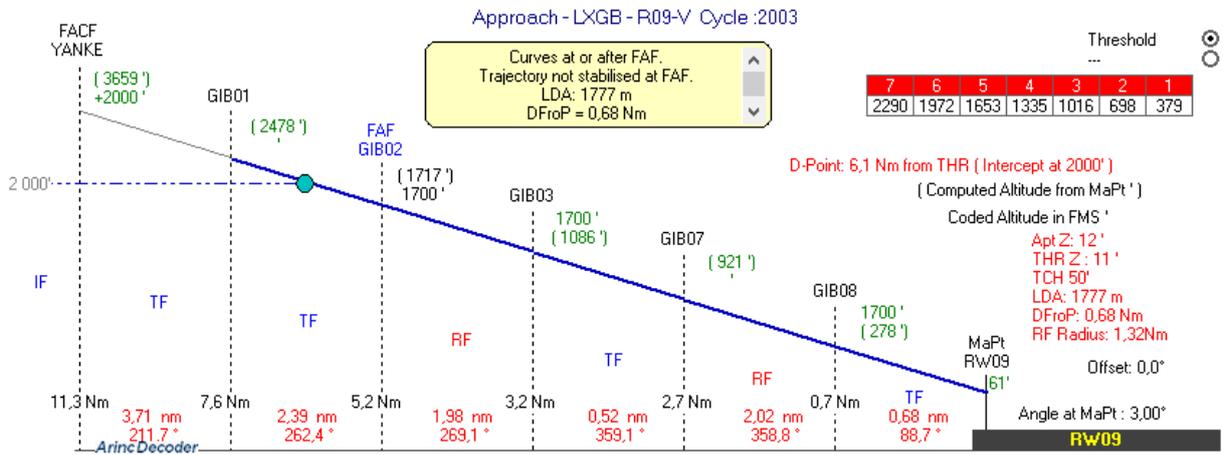
R	010YANKELXPC0E	I	IF			
R	020GIB01LXPC0E		TF		21170037	
R	030GIB02LXPC0E	F	TF		26240024	
R	040GIB03LXPC0E	R	RF	001323	35910022	
R	050GIB07LXPC0E		TF		04370027	
R	060GIB08LXPC0E	R	RF	001432	08880022	
R	070RW09 LXPG0GY	M	TF		08870007	

When the data requested is a code, clicking in the box will show a list, where you can choose. (here in Altitude description, I select "+")

The box turn in green until you validate your change, with the button  on the right.

To finalize our job, just insert a missed approach...





Should be awesome to fly it in real:

