

FLIGHT MANUEL

MD312 FLAMANT II V1.2



For XPLANE 9.41

NOTA :

As my english is quite poor, it may often look and sound weird.

I hope you'll be able to understand this manual anyway.

This is not a novel but a flight manual !

The quality of my english should be of no importance.

See « know issues »

NOTA 2 :

To date (20 jan 2010), the V1.2 plane is NOT released yet.

This manual is ok for use with the current version of the plane,
for pilots who are not fluent in french.

MD312 V1.2

COSMETIQUE :

- Refonte complète du Panel pour passer en 2000px de large et passer chaque cadran de 90 à 115px de large
- Amélioration des textures intérieures

SYSTEMES :

- Refonte du vide-vite, qui vide maintenant les réservoirs en quelques secondes, comme en vrai.
- Ajout de boutons animés "drapeau forcé".
- La mise en drapeau d'une hélice ne ferme plus les étouffoirs
- La mise en drapeau d'une hélice ne cale plus nécessairement le moteur. (si PA suffisante)
- Ajout de l'indicateur de charge batterie avion
- Ajout du crossfeed fuel.
- corrections mineures des consommations électriques
- corrections importantes des systèmes de distributions électriques

ATTENTION : Pour obtenir l'affichage idéal du cockpit 2D, la résolution de l'écran doit être comprise entre 1152x865 et 1280x960. Voir « problèmes connus » en fin de documents.

CAUTION :

This plane does not intend to be a perfect replica of the 319-CG. There are very few flying 312 left and all are quite different, specially as for the panel. From 1954 on, the planes were modified, improved, repaired. It was necessary to find the best equilibrium between gaming and historical reality.

Capabilities and processes are nonetheless similar for all planes (see tables at the end of the document). And these are VERY exactly reproduced in the game. For instance, autonomy, which may vary a lot with speed and altitude, can go from 350 to 550 nm. Care with your flight préparation and fuel calculations !

Please note that the model of flight is ABSOLUTELY exact to the real one – that's agreed by the crew members of the real plane.

Please note :

**if you like this plane, if you fly with it,
that's only possible because of the main help of the association
« MONTBELIARD DASSAULT 312 » (<http://montbeliard-dassault312.fr/>)
who cares with and make fly a real MD312,
the N°226 code 319-CG to be exact.**

**Yet, make this plane airborne is REALLY expensive.
The plane can only be kept alive with the funds found during meetings
and the selling of related products.**

**Go and see the 319-CG whenever it's possible ; meet the crew, meet the plane,
buy a T-shirt or a sticker, that's the best way to make your virtual hobby a
consistent support to keep this wonderful craft flying.**

STANDARD RULES OF FLIGHT

Main rules are the following :

- **changes** are to be achieved in « **auto** » mode of props..
- **cruse** is to be conducted in « **manual** » mode of props.

AUTO MODE IS INTENDED FOR :

- Take-off
- Climbing
- Entering the landing pattern
- Landing

Note that with automatic pitch of props, a lowering of manifold of 30pz leads to a standard rate of descent. For instance, if you cruse PA=110pz, lowering to 80pz will induce a 3% descent, thus 500ft/mn for 100kt IAS.

MANUAL PITCH OF PROP IS INTENDED FOR :

- CRUSE (3 settings recommended : fuel saving, standard, fast)
- CHANGING FLIGHT LEVEL DOWNWARDS

Caution, descent in manual mode, with very low rpm, can over-cool the engine. It's strongly adviced not to let the cylinders heads go under 20°C. When in long descent with low rpm, one MUST turn the fuel pumps on.

If you fly in one-engine configuration, the auto mode MUST be choosen..

Cruse, thus in manual pitch of prop, should be set so :

	Manifold Pressure	Engine RPM	CIAS
Fuel saving	88	2550	120 kt
standard	118	2850	147kt
fast*	130	3100	165kt

*Fast cruse induce fuel over-consumption, so it's no adviced for long run..

Take off : see check-list. Caution : no longer than 3mn at full throttle, or the engine can fail. Gear up as soon as variometer is positive. Lower manifold to 160 at 50ft above ground.

Climbing : flaps and gear up, PA=145pz, RPM=3250, 120KIAS ; that should induce a climb of +1000ft/mn. 1000Ft to reaching the target altitude, engage manual pitch of props and select manifold 120pz, being ready to adjust pitch to not overspeed the engine.

Pitch of props and feathering :

One MUST think from displayed engine speeds and NOT from the position of the handles when setting the pitch. You must know the target values and go to them carefully.

As a matter of fact,

- if you go full coarse pitch when manifold pressure is not high enough, you may engage feathering of the prop, or worse, engage reverse mode. This will in the best case stop the engine, in the worst case over-speed the engine in reverse (which is a death sentence if the plane is airborne)
- if you go full fine pitch when airborne, you will likely over-speed then break the engine.

You have to be very carefull when switching to manual pitch of prop, and take care of : - not feather the props, -not over-speed the engine. The absolute maximum engine speed is 3550 RPM (when diving)

NOTE :

Fuel consumption is proportionnal with Manifold and RPM. With PA=88 RPM=2550, consumption gets around 75L/H. It goes up to 400L/H at full torque.

NB : To feather a prop, you first must switch to manuel pitch, then press the feather switch.

If Admission Pressure (« manifold ») is high enough (>120pz) the engine won't cut off. That the best way (engine running, feathered prop, PA115/120, 750RPM) not to induce drag with a loss of power. The prop will not give tracting power, but no drag.

About masses :

Max fuel is 2x 400liters.

Max useful charge is 3250lb.

CROSSWIND :

The plane is certified for take-off and landing with a maximum of 22kt wind at 90°. **In other words, the FLAMANT flies whatever the conditions.**

VALUES TO BE KNOWN BY HEART :

Climbing : auto, PA145, 3250RPM, 120kt
Stall : 78kt all up
Max speed with gear or flaps down : 125kt
Vne : 204kt
Cruse : mode manuel, PA118, 2850RPM, 147kt
PA180 : 3minutes maximum
Reversed props : full throttle 30 secondes maximum
Maw weight : 6450kg (14220 lb)
Maximum one-way travel lenght: 1350 km (see tables)
Engine over-speed : 3550 RPM
max acceleration : 2,3 G
best speed with both engine cut-off : all up 90kt.

FLYING WITH ONE ENGINE STOPPED:

(Note : CDMV stands for « Configuration Délibérée Minimale de Vol » that is « Flying on purpose with only one engine running and saving whatever energy you still have»)

In this configuration you may either take the plane back home with an engine failure, or go farer with the « fuel low » alarm on. Try never go CDMV on right engine (left cut-off). Avoid to try and climb in CDMV : the plane could do it quite easily, but at full throttle, with over-consumption of fuel.

To go CDMV one should :

- Cut off the RIGHT engine as described in check-list
- feather right prop.
- Set rudder trim half-way to the left
- transfert fuel to left, leaving 50 litres on the right side.
- Best climb settings now are : auto, PA160 3200RPM, KIAS=110kt
- Best cruse settings now are : auto, PA130 2950RPM, KIAS=110kt

INSTRUMENTS RULES FOR PILOTING

Après une longue réflexion, il a été décidé de placer UN instrument qui n'existe dans aucun Flamant : le pilote automatique (PA). Celui ci ne dispose que de deux fonctions : tenir le cap et la vitesse air, comme le ferait un copilote, pour finir. Tenir le cap ne permet pas de tenir une route, et tenir un IAS donné ne permet pas de tenir une altitude : l'appareil devra donc être soigneusement "trimé" avant d'engager le PA. Ce PA n'a pour but que de remplacer les deux paires de bras normalement indispensables à faire voler l'appareil et que Xplane ne permet pas de reproduire.

Engineer instruments and navigation displays are set on the copilot's side, including the Autopilot. So it's fundamental to be able to switch from pilot's side to copilot's side, specially if your screen is set to a width narrower than 1200 px.

COPILOT's SIDE

NB: This manual was being written as the cockpit was under work : some instruments may have a slightly different appearance in the game.



Several interesting displays and handles :

- **The « vide-vite ».** (*red handle just above the « attention... » markings*)

*Vide-vite means « fast empty ».

This emergency system is designed to empty the tanks in a very short time – less than 30 seconds. It's pressurized and leave only one or two liters in the tanks, so the engines run out of fuel in the following 30 to 45 seconds. This allows the plane to gain weight (thus flying as a glider for a longer distance) and/or not to take fire in an emergency landing.

NB : this system has no effect if the hydraulics are beneath 30pzi.

- **Autopilot** (*red switch that's not aligned with the others*)

It turns the servos on ; the little buttons just below it select heading mode and/or IAS.

In Real Life, no Flamant has an AutoPilot. Nonetheless, IRL there is a copilot. Activating the AP is quite the same than giving orders « keep this heading or this airspeed ». Heading is set on the yellow display in the upper center of the panel.(near RMI/ADF)

You may also turn the servos on without engaging a particular mode (neither heading nor ias). The plane will keep its current attitude (pitch and roll)

- **The emergency circuit for gear** (*red buttons on the left hand-side of the « attention... » markings*)

If the hydraulics are faulty, the gear is locked in the up position. Nonetheless it's possible to get it down with this circuit. To do so : first unlock the doors with the red flat handle in the very middle of the panel ; then press this button. The gear will be slowly released down because of its own weight.

NB : this button only acts if the hydraulics are at 0 pz.

NB2 : once the gear is down, there is **no way** to get it back up.

– **Emergency circuit for flaps.**

This is a secondary electric circuit to activate flaps in the case the main electrical bus fails. Caution : it only acts one-way, the flaps cannot be retracted. NB : if you have no electrical source left (neither generators nor battery), this handle has no effect.

– **Fuel transfert selector.**

As it is on STOP, the inter-communication valve between the tanks is OFF. When it is switched to G (=left) or D (=right), the valve is ON et the fuel pressure pump is turned on on the other tank, what induces the selected tank fulfills and the non-selected tank empties. In other words, if you select G, the left tanks fulfills with the content of the right tank. Transfert is proceeded at max pressure, that's around 100L/mn .

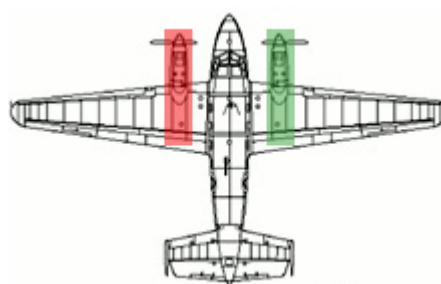
EMERGENCY PROCEDURES

NB : Along this paragraphe you'll note reference to the « vide-vite ».

CAUTION : Once it's engaged, there is no way to stop it : tanks WILL BE EMPTIED, and engines will shortly run out of fuel. (around 30 seconds)

There is something really important to know :

Although the majority of the systems are either electric-driven (flaps) or rope-driven (ailerons), **all automated systems are dependant to the hydraulics**. For instance, brakes, prop-pitch variator and gear are hydraulic-driven. And there's only ONE hydraulic pump on the Flamant, which is itself DIRECTLY connected to the left engine. In other words, a left engine failure is an absolute emergency, as if it fails, you won't be able to drive the props to the desired pitch, nor will you be able to lower the gear nor to brake once down onto the runway. A failure of the right engine is much less annoying.



PANNE= HYDRAULICS EMERGENCY
PANNE=One-engined flight configuration

As a matter of fact the plane is not symetrical as for its procedures.

Left engine failure :

What you must be aware of when piloting the Flamant : the weakness of the plane is the hydraulics. The pressure **MUST** be within a short range, 250 to 300 pz.

Xplane may get your hydraulics faulty at least on 3 occasions : left engine failure, hydraulics circuit failure, hydraulic pump failure. The left engine itself has several good reason not to work properly, from running out of fuel to spontaneous fire. In all cases, this is a severe emergency occurrence, as the pzH will immediately plummet, locking the gear up and locking the pitch of props, what will in turn induce over-speed of the engine and eventually, the total failure of it. Depending on the situation, the pzH can drop to 0 in as short as 10 seconds, 3mn in the best case. This means that, in the « less worse » case, the pilot has 3 mn to make a decision.

As the flight commands are rope-driven, the plane still can be flown without hydraulics. The gear may possibly be opened and down, but it induces a major drag, equivalent to a lower of the manifold of around 20pz – that's an equivalent in « dissipated power », if you

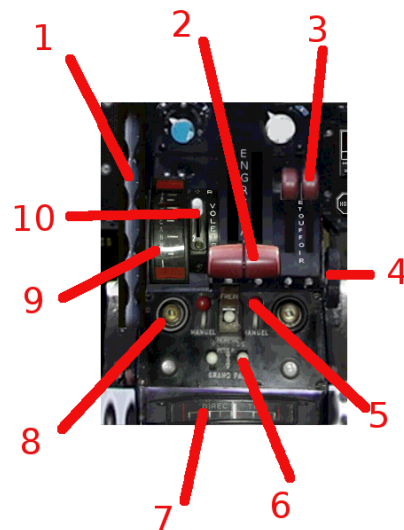
prefer.

Always in these logics, it may be interesting to feather the right engine on purpose, if you run out of fuel, for instance, as this allows to save fuel to preserve the left engine. The plane is designed to fly perfectly on one engine only, if the pilot proceeds carefully.

You may will to turn an engine ON when in flight. The electric starter is not powerfull enough to do so, so you'll have to use the aerodynamical pressure to start the engine :

- turn the plane battery ON
- check that mixture is cut OFF (=down)
- check that the running engine has its generator ON
- check that the cut off engine has its generator OFF
- open H&E valves and magneto for the engine you want to start.
- Switch its prop on « manuel pitch », pitch on half-course
- check its throttle is on half-course
- go descent to 135kt or so
- open mixture of this engine to « full rich »
- As soon as the engine runs over 1500rpm, switch it back to auto mode.
- Turn on its generator
- turn the plane battery OFF

1: pitch trim
2: throttle
3: mixture
4: ailerons trim
5: props mode auto/manuel
6: prop pitch
7: rudder trim
8: forced feathering
9: pitch trim indicator
10: flaps



In the event the engine does not start after 30 seconds, it's out of order. Cut it off properly as if it was runing, and consider routing to nearest airfield for a quick landing, even an emergency landing.

Dans Xplane, vous êtes seul pour piloter, ce qui signifie une très importante charge de travail ; il est donc grandement recommandé d'avoir bien préparé son plan de vol et de connaître ses détournements (comme cela devrait de toute façon être le cas à chaque fois que vous prenez les commandes d'un appareil qui est sensé se piloter à plusieurs PNT)

In Xplane you are the only one who pilots, with no copilot help ; so you must be prepared (flight plan, alternate airfields, fuel calculations and so on), as the flamant is NOT designed to be flown by a lonely pilot.

RIGHT ENGINE FAILURE:

Comme on l'a vu, bien qu'une panne moteur soit toujours quelque chose de très embêtant,

c'est beaucoup moins grave à droite qu'à gauche. En réalité, le MD vole parfaitement sur un seul moteur. La procédure reste la même :

As previously told, even though an engine failure is always a big deal, it's much less dangerous when it happens on the right engine than on the left one. Actually the plane flies just fine on the left engine alone.

Please note that one is not supposed to try and restart the right engine when airborne. The design of the plane make the manoeuvre more dangerous than the flight with one engine stopped.

In all cases, you'll have to apply all classical procedures, setting the transpondeur to 7700, contact atc and/or ground and so on.

LOOSE OF POWER WHEN TAKING OFF:

First of all, there is a big difference between a lose of power and an engine failure. When losing power, the engine still rotates but its power decreases as well as its RPM speed. There are numerous causes for this, from ice to bird strike.

Losing power, specially on a bi-prop plane, is not inherently dramatic. That said, this kind of incident generally occurs at the worst moment, when the engine is much asked for power – that's during take-off. At this moment the plane has a very low speed, a very high AOA and of course a very low altitude. When an engine loses power in these conditions, the plane tends to roll down on this side, and to turn to this side as well. Giving more power is always a bad idea, as it would only increase the difference in traction between the two sides of the plane, thus increasing the roll tendency, what eventually may lead to leathal dyssimetric stall.

The absolute rule is :

keep the wings horizontal.

The second absolute rule is :

keep a IAS over the stall limit,

that's 68kt for an empty plane and 78kt at max masse.

The third rule is about turning on one engine :

ALWAYS make your turn to the fonctionning engine, NEVER to the faulty one.

If you can keep the plane stability, put the faulty engine to idle, and turn back to the runway for immediate landing.

If the stability of the plane is not acquired, one must get the gear up, keep 115kt, and fly ahead for an impact zone on the current axis +/- 15° where you'll land gear up, flaps up. During this flight, activate the vide-vite 2 mn before impact and contact ground control. Stability may not be acquirable for instance because of the locking of the prop pitch and the drag that will occur.

EMERGENCY LANDING :

Any landing that's not standard is an emergency landing. That may be « plane emergency » or « ground emergency ».

GROUND EMERGENCY :

The plane may be led to land on zones that where not designed to welcome planes. If the Flamant is running just fine, that's no big deal, because the plane has the hability to land on very short runways, concrete, grass or earth, even with very strong crosswinds. Engage reverse full throttle as soon as the wheels touch the ground, it should be ok.

PLANE EMERGENCIES :

It's not possible to list ALL occurrences for that. Let's see the main procedures, that you'll adapt to the current situation.

– NO FUEL LEFT :

Should never happen ! Nonetheless, if it does happen : go CDMV. Your flight time left will increase by around 50%. If you are really totally running out of fuel, the best thickness is flaps and gear up, 90 kt (Thickness is around 17)

– GEAR FAILURE :

- ➔ If it occurs on main gear, try auxiliary circuit. If it doesn't work, prefer belly landing than landing with dissymetric gear down. Brace for impact and activate the vide-vite 90 seconds before impact.
- ➔ The gear is partially hard-locked down, cut the engine on this side, transfer fuel to the other side, trim the rudder $\frac{1}{4}$ on the opposite side (to the wing which gear is down) try and touch ground at stall speed $\times 1,1$ and push the stick hard to the noze wheel, rudder full to the gear that's down. The impact WILL be damageous, but yet can be safe for the crew.

– HYDRAULICS FAILURE : ABSOLUTE EMERGENCY.

In a matter of seconds, you'll lose the possibility to drive the props, to lower the gear and so on. The engine will over-speed then break etc etc.

What you can do :

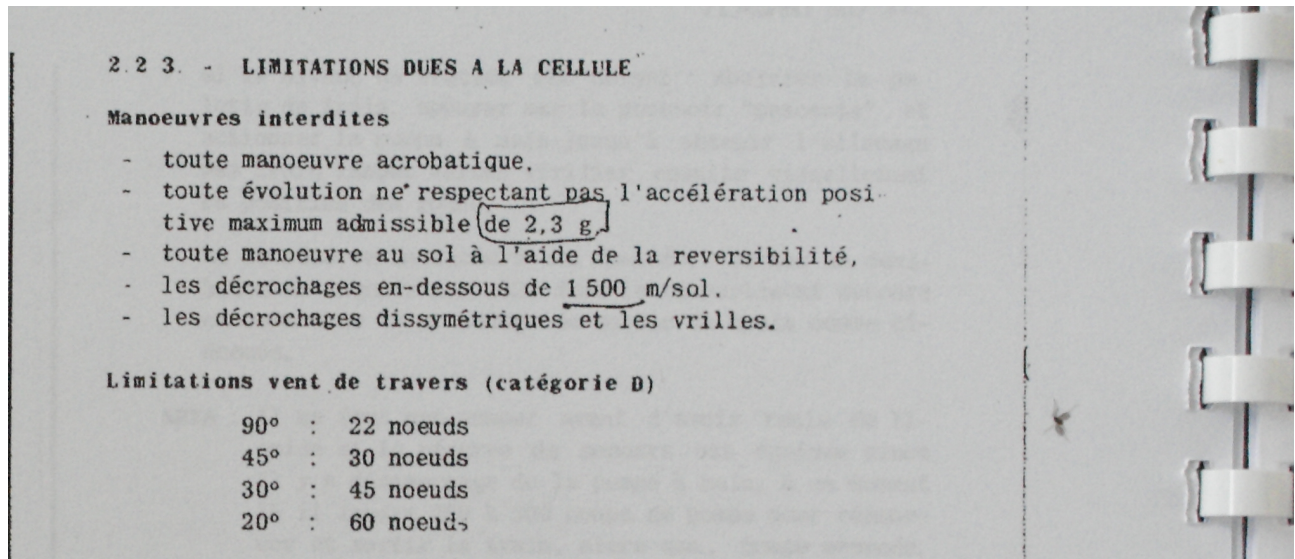
- ➔ switch to manual NOW and the pitch to half course.
 - ➔ Try and get 120kt max; lower the gear as soon as you can.
 - ➔ Activate the vide-vite
 - ➔ NB : if your altitude is not high enough for safe manoeuvring, simply feather the two props, activate the vide-vite, put 10° flaps, and belly land at around 85kt. Keep the wings horizontal whatever happens meanwhile.
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- ENGINE FIRE.**
 - ➔ Turn the fuel pump ON. **Do not turn it OFF!**
 - ➔ Turn off magnetos and H&E valves.
 - ➔ Turn mixture down.
 - ➔ Activate extincor. (red switch left of aviacs)
 - ➔ route to nearest airfield.
 - ➔ If it's left engine, see « hydraulics failure ».
 - ➔ If it's the right engine, route to nearest airfield and achieve emergency landing.

NB : An engine that took fire must not be restart.

NB : *An engine that took fire and was extinct CANNOT be restart.*

– **Unwanted lose of height and dives.**

The MD312 has a very narrow range of structural limits, around +/-2,5G .



If you engage an uncontrolled dive, you'll have to face two things at once :

- 1) Stop the dive as quickly as possible.
- 2) Not to overtake the structural limits of the plane.

As a consequence, the pilot must, in this order :

- Activate the ailerons to half-course in the direction that will align the plane onto the horizon.
- Put engine down to idle
- gently pull up, keeping an eye on the G-meter
- If there's a threat of ground proximity, the pilot may lower the gear to increase drag and reduce speed.
- In extreme case, the pilot may lower the flaps to reduce speed..

If one or the other of the last two actions is done, as soon as the plane's attitude is back to safe, the pilot must declare a mechanics emergency and route to nearest airfield.

NB : As you need to look at the G-meter, the best place to recover is the copilot seat..

→ ABAQUES :

(NB : Tables from the original flight manual and adapted to Xplane)

MASSE	Stall all up	stall flaps 30°
5500	72kt	64kt
6000	78kt	68kt
6450	84kt	72kt

MASSE	speed	Over tip of runway
5500	95kt	80kt
6000	100kt	85kt
6450	105kt	90kt

TAKE OFF

masse	0ft QNH	5000ft QNH	10000ft QNH	V1	VSR0
5500	480 m	640 m	820 m	82 kt	88 kt
6000	530 m	690 m	880 m	85 kt	93 kt
6450	640 m	790 m	930 m	88 kt	98 kt

LANDING

masse	0ft QNH	5000ft QNH	10000ft QNH	Vs	VSR0
5500	240 m	320 m	410 m	78 kt	82 kt
6000	270 m	340 m	440 m	82 kt	88 kt
6450	320 m	380 m	470 m	85 kt	93 kt

NB : la longueur de la piste doit être au minimum de 1,5x la longueur théorique

CRUISE AND RANGE

masse	régime	altitude	distance
5100-5500kg=x1	88x2550 - 120kt	12000	1350 km
		6000	1150 km
5501-6000kg=x0,9	118x2850 - 147kt	12000	1050 km
		6000	850 km
6001kg-6450kg=x0,8	133x3100 – 165 kt	12000	800 km
		6000	600 km

NB : Notez les écarts importants d'autonomie

- à 5400kg en croisière « éco » à 12000ft = >6Heures > 1300km
- à 6450kg en croisière « rapide » à 6000ft = < 2,5 heures <500 km

KNOWN ISSUES :

- **Central commands are difficult to access to, I have to switch between the seats to acces everything.**

V1 panel was designed for 1024x768 screen resolution. It's now 1152x865 to 1280x960. Get your desktop within this range and in xplane choose « run at full-screen ».

- **AutoPilot won't obey !**

Things happen ;-) Two possibilities : what's your IAS and attitude ? Tha AP runs properly only in standard flyings, that is : standard climb, cruse at normal speed, standard descent, and between 2000 and 12000 ft.

You fly so and the AP did not obey, then you crashed? The AP was out of order and you did not understand it quick enough :-D

- **GPU delivers power even though the plane is flying !**

I know... Kind of stupid. Ben and Austin were acknowledged of this but thez do not seem to consider this is a priority to fix. NB : not fixed in 9.42 nor 9.43.

- **Pin N°2 of the RMI doesn't work.**

Sure, that's no bug but reality : the RMI of the 319 is out of order. A switch was installed underneath the RMI display to switch the N°1 pin from radio-nav 1 to radio-nav 2. A samll led indicates when the pin N°1 is connected to radio-nav 2.

- **From outside the plane has major texture troubles !**



It doesn't : your graphic card has ! It can't handle such textures (2048*2048). Simpiest clue : open up the MD300_paint.png in any editor and resize it to 1024x1024, or even to 512x512 if the troubles keeps going on. Only occurs with very weak or old pc's.

- **3D cockpit view doesn't work !**

Let me think... That's probably because there is no 3D cockpit in this version ? This is considered for a will-be release ;-).

- **I can't catch a word of your messed english !**

Easy to solve. Learn French and read the french version of this manual. My French is quite good I guess. Not worse than your English, anyway.