

Westland Lysander

Pilot's Notes



A Flight Simulator X add-on product
dedicated to depicting the Westland Lysander,
its pilots
and the SOE operations in World War 2





WESTLAND LYSANDER III AND IIIA FSX PILOT'S NOTES

The Lysander Special Operations package is dedicated to the men and women who flew and serviced her and to the many who gave their lives during WW2 for the freedom we enjoy to this date.

I also dedicate it to Jun Kazama, aka Gallopinggoose, my long-time flightsim friend from Tokyo, Japan, who sadly passed away on December 3, just before the Lysander package was published.

Francois A. 'Navman' Dumas
The Netherlands, December 8th, 2009



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1. Copyright stuff

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Now let's get down to business.....



2. Introduction

Let me start this story with two or three words about myself, to place this project in context. I have been bitten by the aviation bug since 1957 or so, when I received a small metal aircraft model from an uncle of mine. I was 5 years old at the time. I already was a car freak, and the model peaked my interest and triggered my imagination. I wanted to be involved with airplanes!



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Later on I went to see airliners at Schiphol airport (Connie's!) with my dad, draw airplanes, build plastic kit models, build WW2 diorama's, build RC controlled models (that would invariably crash), play aeronautical war games, see US fighters at Soesterberg, collect books, magazines and just about anything else on the subject. And because I at some point joined the 'automation department' BECAUSE of a very simple flight simulation game I saw on one of the very first microcomputers, I became one of the first 'flightsimmers' ever, at least in this country!

Anything but fly REAL airplanes, actually, due to circumstances.

It wasn't until I became an employee of an American company back in 1985 that I would make my first (airliner) flight and only in 1988 or so would I sit at the stick of an ultralight, flying my first real aircraft myself.

My main interest, having been born not long after the war and learning so much about that era from my parents (my Mom's parental home had been occupied by a group of German soldiers, and my Dad was imprisoned as a conscript during the first weeks after Holland's surrender), was in WW2 aircraft. Spitfires, Messerschmitt's, of course, but also in the more 'special' airplanes of the time. That's how the Lysander at some point came into the picture.

So, the Lysander is in fact my 'pet project', which started way back in May 2003 when I first laid hands on the book 'We landed by moonlight', written by Hugh Verity. He was one of a group of brave young Westland Lysander pilots who landed these very special aircraft behind the enemy lines in France to ferry secret agents and resistance fighters back and forth to England.

Back in May 2003 I met my good friend Didier Keller on the Old Warden airfield, north of London, not far from the famous Duxford, to learn about the Shuttleworth Collection. I was in England on one of my many visits to Oxford, where the company I then still worked for was headquartered. I had heard of Old Warden, but never been there. It was a revelation to me. Here you have a tremendous collection of (extremely) old aircraft - AND cars, motorbikes and steam engines, for that matter - that are not only on permanent display, but that also STILL FLY !



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The collection ranges from VERY old wood, ropes, strings and linen airplanes going back right to the very first flying machines, through 1930 racers and WW2 veterans like the Spitfire, Hurricane and yes, Westland Lysander. The moment I laid eyes on the collection AND the cozy environment they are displayed in, I was sold.

Later on in the museum shop I bought this book about the Lysander. The plane itself was not there at that day, being away on display at one of the Duxford airshows I believe. There was an empty spot in the hanger with just some metal plates to catch the dripping oil, marking where it was usually parked. That was only a good reason to come back again, of course.

It was back then that the idea was born to make a model of the aircraft for Flight Simulator, INCLUDING some sort of adventure depicting the daredevil operations carried out during the war.

One or three things stopped me at the time.

For one, I was still employed as a very busy executive at a global marketing research company, responsible for large parts of its IT operations in over 20 countries. I did not have much time for Flight Simulator at the time.

And two, the Microsoft Flight Simulator in 2003, which was FS2004, was not entirely up to it yet.

Three, more important, although I was heavily involved with FS through my activities at Avsim as editor and forum assistant and later at simFlight as managing editor and forum administrator, I did not have my own add-on company and did not have aircraft designers.

All that changed a few years later when I was 'made redundant', like so many 50+ workers at the time, and decided to start my own company (companies now, actually). So Silver Cloud Publishing was born and one of the subsidiaries is FSAddon Publishing that quickly became known in the FS industry as one of the 'quality brands' for add-ons to MS Flight Simulator.

It still took me a lot of doing, some huge disappointments in humanity, a lot of my private money and spades of perseverance to get a quality Lysander actually flying in FSX. But we got there eventually.

Especially thanks to the great services of Chuck Jodry from Canada who managed to bring all the previous bits and pieces of the model together, repaired what was wrong, added what was missing and molded it into a working FSX model. Chuck also had the sounds made.

Thanks also goes to Rob Young who made the initial flight model, Milviz who designed the 3DSmodel and Ron Zambrano who did the initial transfer from 3DSMax to FSX.

And now it is down to me, the usual last man in line, to write this Pilot's Manual and the associated Secret Ops Manual before we get the package into your hands.

I am writing like a madman, so read on.....



3. What did you just buy?

Yes, a Westland Lysander for FSX.

No, let me rephrase that. **THE** Westland Lysander for FSX.

A replica of the model still flying in England, owned by the Shuttleworth Collection and based at the Old Warden airfield. Painted as one of the 161 Squadron aircraft that flew in the 2nd World War. There is only ONE other flying in the world.

But you got just a bit more, thanks to the welcome free additions of people like Jan Kees Blom, Chuck Jodry, Jaap van Hees, and myself.

Jaap added his version of **Tangmere Airbase 1942** and he also designed the Athlete mission and scenery.

Chuck not only corrected, expanded and implemented the original Lysander model I bought from Milviz in Canada, but also added an additional version for Jan Kees to paint.

And Jan Kees Blom added **5 paints**, 3 of which of a Lysander without the long range tank.

- P1901 Lysander Mk.II, of Escadrille 'Rennes' ,Groupe 'Bretagne' of the Free French Air Force, attached to Gen. Leclerc's forces in North Africa, 1941-1942
- P9193 Lysander Mk.II of No. 28 Squadron, based in Kohat, North West Frontier Province, India in the latter part of 1941.
- R1992 Lysander Mk.II of an unidentified unit in North Africa, used to transport Maj.Gen. Ginbachan Singh on troop visits
- V9297 Lysander Mk.III(SD). Special Duty Lysander in the factory fresh paint scheme, as applied at the Ilchester Dispersal Factory.
- V9289 Lysander Mk.III(SD) of 'C' flight (special) of No 357 (SD) Squadron, attached to the 14th Army, South East Asia Command.

Sources for the liveries:

Westland Lysander, by James Kightly, Mushroom Model Magazine Special, 2006.
The Westland Lysander, by Francis K. Mason, Profile publications no.159, 1967.

You ALSO bought a piece of history that you can dynamically re-live on your PC. The history of a remarkable British aircraft and of brave pilots flying them.

That history is contained in 5 'missions'. The research for them is based on Hugh Verity's book 'We landed by moonlight' and contained in the specially written '**Secret Operations Manual**', **complete with history, route description and maps!**



4. Installation

Let's get this thing installed onto your hard disk first, before I take you through the steps to get airborne. AND before telling you a little more about the Lysander, its pilots and their adventures.

To install Lysander Secret Operations, simply run the Installer (actually, you have probably already done that), which will put the programs and manuals in a folder of your choice (or the Flight Simulator folder if you have not indicated any other choice). It will also put shortcuts on your desktop to the manuals.

5. Uninstalling

I can't imagine you would want to uninstall what you just bought, but just in case you need to, here is how:

- Click on Start (bottom left of your windows screen)
- Click on Programs
- Find the FSAddon product title (you may have more)
- Find the appropriate 'Uninstall' and click on it

That's it.

6. Support

I don't envisage you will need much support for the installation as this is a fairly simple product with an automated install. But you may want to ask questions about the 'ins and outs' of the product.

Since SUPPORT is one of our famous hallmarks at FSAddon, we are here for you of course !!

You can freely READ our **Support Forums** and find information there. In case you have QUESTIONS you will NEED to REGISTER to our **SUPPORT FORUMS, which is THE ONLY PLACE we provide support for FSAddon Publishing products !!**

You can find the forum here:

<http://forums.fsaddon.eu/viewforum.php?f=42>

(For reasons of security you will **have to register** in order to post messages there. We also ask you to **put your ORDER NUMBER in your signature or message**, so we know you are one of our legitimate customers!)



7. Some history

You can of course skip this part and just hit **Control+E** and start flying. Maybe you are already aware of the Lysander's history, and especially that of its service for the SOE. If not, read on...

The history of the Westland Lysanders is told by *Hugh Verity in his book 'We landed by moonlight'*. The book I picked up at the Old Warden airfield in the museum gift shop there. And the book that is the basis for what you are about to load onto your hard disk.

The Lysander was designed just before the war as an army cooperation aircraft. Meant to land in the fields, near the army units, and meant to loiter over enemy positions and spy on what the other side was doing. And to throw bombs on them, where possible, from detachable racks that could be mounted on the wheel covers. Right in the beginning of the war it was already outdated by the rapidly modernizing aircraft of both sides. It was an easy prey for the German Messerschmitt's and other assorted baddies!

Although quite a few got destroyed in those early days, others survived and eventually turned out to have a life in WW2 after all. The ones I was interested in specifically are those used by (among others) the 161 Squadron of 'special duties'. These were used to ferry agents to and from occupied territories.

The one so prominently presented in this package is now based at Old Warden and part of the immensely interesting Shuttleworth Collection. Not only is it pretty much in the state it was back in 1942, it is also still flying! In fact, it is one of only two. The other flying aircraft is in Canada.

Because the Lysander was meant to take off and land from fields, it had some extraordinary STOL (Short Take Off and Landing) capabilities, allowing it to take off within a few hundred yards only... and even less if needed. It was also very special in that it had fully automated flaps and slats. These reacted on the flying speed and would deploy automatically (in steps) when reducing speed.

The FSX model copies that behavior as well as we could.

It also had a very finicky tail plane, needing special care when trimming the aircraft. How to do that is detailed in the 'operating chapter' further down this manual.

Already early on in the war the Lysanders were used to fly to occupied France and land on small fields, designated by specially instructed (and later trained) agents. Obviously the ground of the fields had to be firm enough to accommodate for these rather large aircraft, and free of trees in the landing path.

Because the Lysanders were pretty vulnerable and no match for any modern fighter, they could only fly at night. Not having modern equipment such as radars or GPS, and France being pitch dark, it meant they needed moonlight to fly and navigate by.



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HOW the pilots managed to FIND those fields, just using a radioed description and position, following the glistening rivers and railroad tracks in the light of the moon, and their compass and notes, is a miracle in itself.

It was my desire to try and capture that heroism and pilotage in our modern day flight simulator and try and provide an insight in the sheer skills these people had.

MS Flight Simulator is a 'civilian' simulator, so we don't have the tension included. Tension of flying through FLAK German anti-aircraft fire, of not knowing who would await on the field, of mechanical problems over enemy territory and of possibly being captured by ruthless Gestapo agents.

But even without all that I think flying the missions in your darkened office and NOT using the modern navigation tools that we have nowadays will give you quite a few hours of white-knuckle flying in your armchair!

For the actual history and heroic flying accounts I can only recommend Commander Verity's book. It is still available at the Old Warden (the BEST place to go and get it), or from our own website's (Amazon) bookstore: <http://fsaddon.eu/wpfsaddon/fsaddons-book-store/>.



8. Aircraft operation

Let me start with a word of warning: **THIS IS NOT EASY !**

There, I've said it.

And nonetheless I am CERTAIN that I will see a LOT of posts on the forums about the 'FSAddon Lizzie' not flying realistically. Well, I've been in this business for more than 3 decades now, so I know what to expect. I have a thick skin and will ignore it.

But JUST in case you read this and are willing to listen, let me explain:

During one of the very first demonstration flights of the Lysander, it crashed. It made a spectacular short take-off, maybe only 100 yards or even less, zoomed straight up in the air, stalled, and crashed back on the runway. That almost finished its manufacturing life before it started. There is a little string of film somewhere showing this. I may find it on YouTube for you.

Anyway, it went to show the extraordinary and special characteristics of the aircraft's STOL capabilities. It COULD take off within 50 yards, and land on almost ANY field and stop within 300 yards. However, to CONTROL that capability one needed to be astutely aware of the TRIM settings, among other things.

And that, my dear friends, is pretty much the same with our FSX model presented here.

In order to fly it as it was destined, and land it in the small agricultural fields in between trees and other obstacles, ***you need to know three things:***

1. It floats and floats and floats unless you have the (automatic!) flaps out
2. It takes off like a rocket, but you HAVE to TRIM unless you want to stall shortly after
3. Control it at low speeds with the THROTTLE ONLY and BE PREPARED for landing

When you take these three facts into account and bear them in mind at all times, you'll do well. I will further explain in the specific parts of the manual, and help you remind often!



8.1 Cockpit and Instruments

Here's an overview of the gauges and switches of the Lysander that we portrayed. Many of them will actually DO something in FSX. We have not modeled everything. Sometimes the switch in the real aircraft was put out of order (like all the bomb switches), sometimes we couldn't research what things were for, and sometimes FSX just would not let us do what we really wanted. And we maybe even ... gasp!... forgot one or two!

Also, there appear to have been many different lay-outs, and we only had real access to the one at Old Warden.

There's a larger version of the cockpit diagram to print in Appendix A.

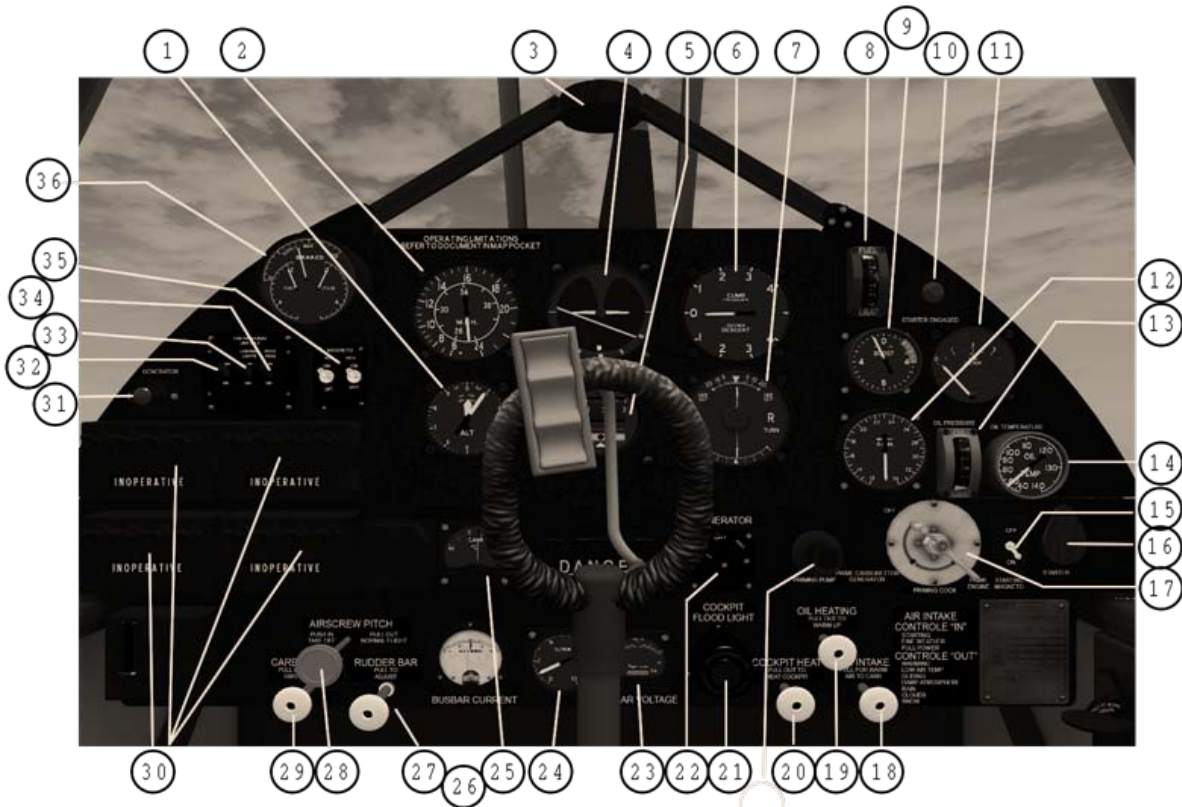


Figure 1 - Cockpit front panel

And in case you are wondering about the **compass**, it is hidden behind the stick, horizontally placed. The actual one must have had a separate light for it, but we haven't found that in the current Lizzie. #5 is also a compass, but a smaller one.

In FSX I usually have my heading displayed via **Shift+Z**... yes, I'm lazy. If not, you will have to 'lean forward' to read the compass!



Key to Figure 1.

1. Altimeter
2. Speedometer
3. Mount for gun sight
4. Artificial horizon
5. Compass
6. Climb/descent indicator
7. Turn and slip meter
8. Fuel pressure gauge
9. Boost gauge
10. Starter control light
11. Cylinder temperature gauge
12. Engine speed indicator (rpm)
13. Oil pressure gauge
14. Oil temperature gauge
15. Starting magneto switch
16. Engine starting pushbutton (with cover)
17. 3-way priming cock
18. Carburettor air-intake heat control knob
19. Oil heating control knob
20. Cockpit heating control knob
- 20A. (omitted) Fuel priming pump
21. Dimmer switch for cockpit floodlight
22. Generator knob
23. Busbar voltage gauge
24. Suction gauge
25. Air temperature gauge
26. Busbar Current gauge
27. Rudder bar control knob
28. Airscrew pitch control knob (propeller pitch)
29. Carburettor slow-running cut-out control knob
30. Inoperative - Bomb selector switches
31. Generator warning light
32. Left landing light switch
33. Right landing light switch
34. Pitot head heating switch
35. Left and Right magneto switches
36. Triple pressure gauge (brakes)



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You now have seen the most important gauges. Most of the items listed above are not of much interest when flying the Lysander in FSX. Interestingly in the REAL manual the main 6 instruments are referenced as 'blind flying instruments'. Well, yes, I guess you could call them that, although nowadays we'd want a few more, to be on the safe side!

For controlling the aircraft there's one more important part, and we find that on the left: the throttle and the trim wheel.



Figure 4. Trim and Throttle

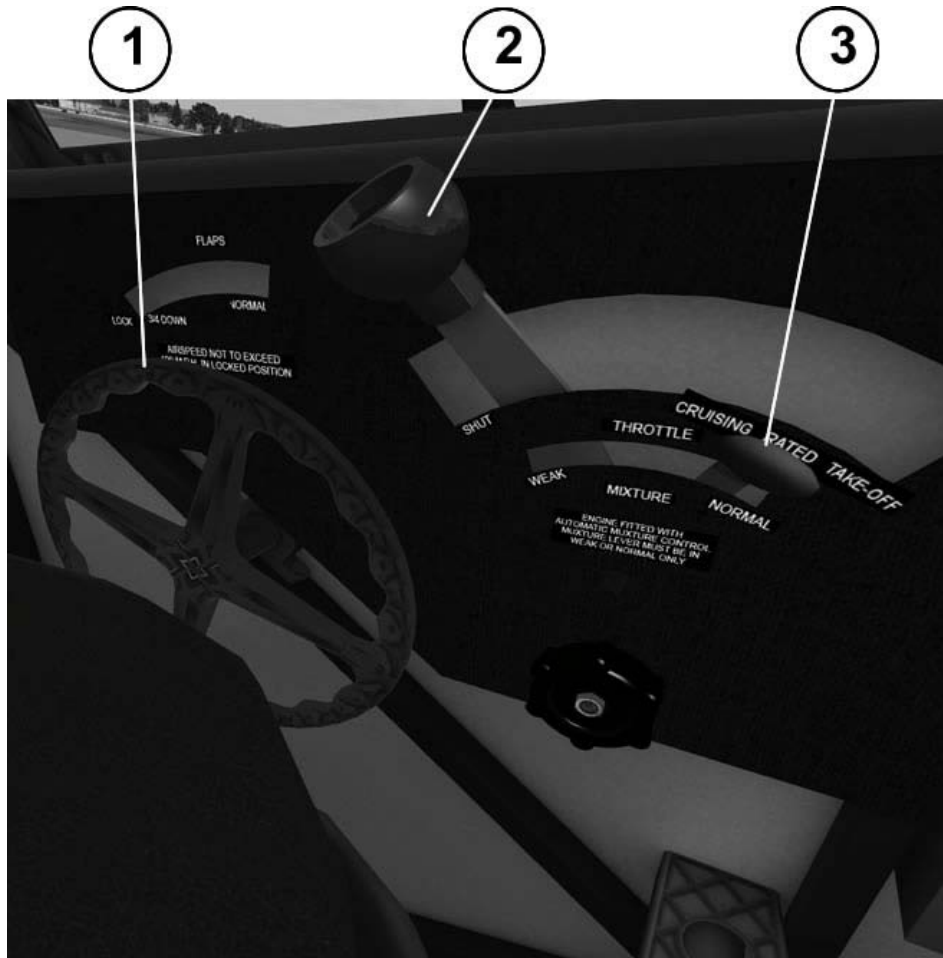


Figure 5. Trim on the model

Key to Figure 5:

1. Trim wheel
2. Throttle lever
3. Mixture lever

FSX:

I have all of the above functions programmed to my joysticks or yoke. Especially putting the trim on a convenient switch makes using it (quickly !) a lot easier.

By default they are linked to the default MS key settings of course.



Figure 6. Starboard side of the cockpit

Key to Figure 6.

1. Morse-code signal key and switches
2. Tail wheel lock (read notes about this !)
3. Gills lever (aka as cowl flaps lever)

In FSX:

The Morse code switches move, but don't do anything. We may want to revisit that in the future.

The tail wheel lock might actually not be a tail wheel lock (read the Whoopsydaisy chapter).

The cowl flaps open by 'grabbing' the lever (at the point of the white line in the picture) and moving outward.

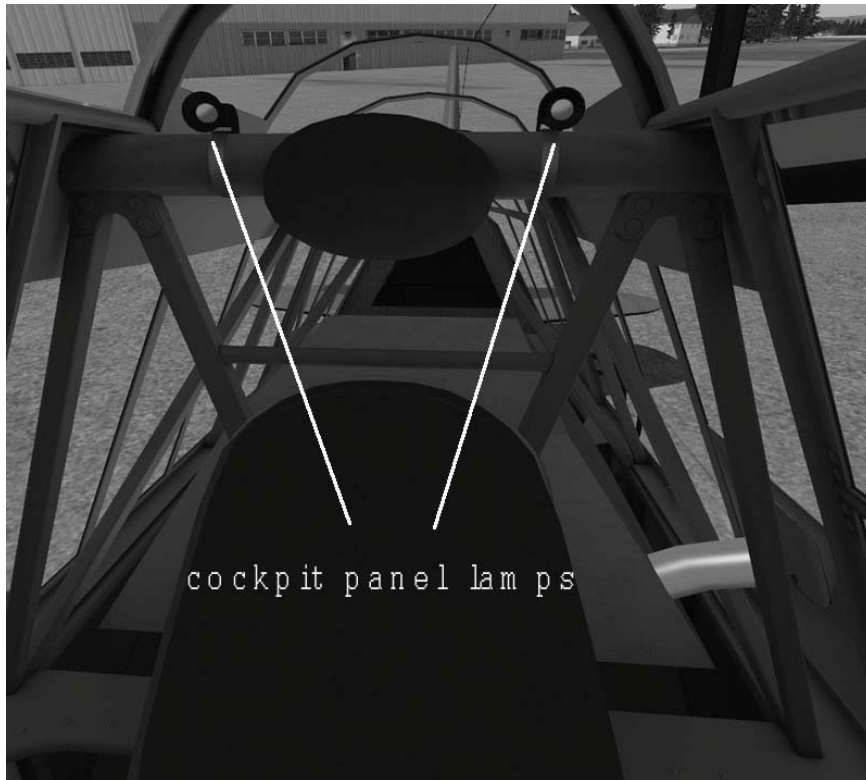


Figure 7. Pilot's headrest and lamps

The two red night light lamps can be turned on and dimmed by a single switch on the instrument panel. They are used to make the main instruments visible and also to read the map the pilot would have with him.

FSX Operation in this order:

Mouse-click left - turn it on.
Mouse-click right - increase intensity
Mouse-click right - decrease intensity
Mouse-click left - turn off

8.2 Starting the engine

Sure, you can press **Control+E** and she will start. Hey, why make life difficult, eh?

However, if you want to press buttons, turn cocks, flip switches and pull levers, then here's what you do.

First of all: **Shift+E** will open the left side and top of the front cockpit. How else would you get in!?

Oh, and in the event you actually FIND your field and passengers waiting, use **Shift+E+2** to open the REAR canopy!



Figure 8. Fuel cock.

Once you're in and adjusted your seating, here's what the original pilot's manual tells you:

Throttle	¼ inch open
Mixture control	Normal (there is only 'normal' or 'weak'!)
Airscrew pitch control	pull out for coarse pitch
Fuel cock	ON (RED cock on the left window edge)
Gills	fully OPEN, confirm visually
Carburettor air intake heat	Pushed in for COLD
Priming cock	Rotate to first position
Priming pump	Pump vigorously until fuel pressure 2 psi
Priming cock	Rotate to second position
Ignition switches	Confirm OFF
Priming pump	charge pump, pump 4 full shots, pull through engine, pump 3 shots
Ignition switches	ON
Boost coil	ON
Starter	PRESS

After engine runs evenly:

Boost coil	OFF
Oil heating	PULL oil heat knob to accelerate warming

Brake pressure should be 100 psi.

Airscrew pitch control	PUSH in for FINE
Oil heating knob	PUSH in
RPM	1800
Pitch control	PULL for coarse
	RPM should slowly fall to 1500 eventually
Pitch control	PUSH for fine again

MOST of the above can be done in the FSX version. It is however not mandatory.



Final take-off preparation 'drill':

T.M.P. Fuel and Gills

T - set pointer to T/O (elevator trim)

M - mixture control to NORMAL

P - Pitch - Push for fine pitch

Fuel - ON

Gills - OPEN

8.3 Take off without crashing

Remember when I told you about one of the first demo flights, where the pilot stalled the aircraft still over the runway, and crashed back onto it? That of course is no big deal in Flight Simulator. You'll live. But we want to SIMULATE flying the Lizzie, and then there are a few things to take care of.

First and foremost, make your mechanic check the trim settings at the tail. The front edge of the elevator should be at the T/O mark. No place else ! (Use the spot view to check it, since the internal indicator, sort of, uhh... went missing).

And yes, there is supposed to be an indicator of the trim setting inside, just above the trim wheel. We couldn't find it. In the real aircraft we only found an opening in the cardboard side (see Figure 2.)



Figure 9. Trim settings?

If you want to get things RIGHT, then switch to Spot Plane View now and have a look at your elevator trim indications (see Figure 10.). The leading edge of the elevator should be at the level of the T/O mark on the fuselage.



Figure 10.

Trim indicators on fuselage.

Shown here is the take-off position of the trim setting.

Slowly increase throttle. 'The engine fuel system will not tolerate slam accelerations or negative G and is prone to carburetor icing'. Aha !

The take-off is normal and there is little tendency to swing.
Do NOT lift the tail !!

Accelerate in ground effect and do not start to climb until safety speed of at least 80 mph, and preferably 110 mph, is reached.

BUT WAIT !!!!

What about FLAP SETTINGS?

Well, in case I hadn't told you yet... the Lysander has an automatic flap and leading edge spoiler (slats) system! VERY sophisticated. So that's what makes this a STOL plane and although it is a big and relatively heavy aircraft, it can perform almost 'helicopter-like' things, much like the German Fieseler Storch.

READ CAREFULLY:

Here's the trick with the **flaps and the trim**. If you don't get this right, you'll crash.

First of all, your trim is set at T/O, but you will quickly have to trim DOWN so as to not to climb too steeply and stall!

THEN the flaps and slats retract at about 80 mph and the Lysander will DIVE ! So TRIM UP again!!!

This is the most critical part of the flight. Once you master this (AND losing speed before landing) you can start your career of picking up agents from behind the enemy lines!



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The original papers add: 'A steep angle of climb can be obtained at 70 mph or even at 60 mph. This is an emergency operation and should only be performed if necessitated by operational considerations'.

So, if you see a large oak tree pop in view from the darkness of a French corn field, you know what to do!

8.4 In flight

The actual operation manual doesn't say much about flight itself. Just a few points that may be of interest for us simmers.

One thing to remember is that the Mercury engine mounted up front is VERY POWERFUL, especially compared to the relative small size of the aircraft (even if the Lizzie is HUGE when standing next to it).

So you quickly fly too fast, burning lots of fuel! And remember, you usually, on a typical mission, will need to go FAR!

For CLIMBING the best climbing speed is recommended to be 110 mph and the 'aeroplane must not climb continuously at less than this speed'. Well, okay.

But let me quote a few lines from the original pilot's notes and repeated in the modern day Shuttleworth pilot's notes that should be a warning to all: 'The controls are not well harmonized, the rudder being light, ailerons heavy, and elevator too heavy at or near maximum angle. The elevator trim is powerful, but slow acting and the elevator effectiveness is poor. Therefore, it is essential that the aircraft is trimmed longitudinally through all phases of flight to allow maximum control effectiveness. This is particularly so on landing, when the trim must be set fully back, and during takeoff, when it must be set to the take off position'....

And...

'The flying characteristics at very low speed are such that a foolhardy pilot might be tempted to take liberties to which no aeroplane can with safety be subjected. Particular reference in this respect is made to stalled takeoffs and climbs, stalled approaches to land, and low flying at too low an airspeed. The stall is delayed to an exceptionally large angle of attack, and can seldom be reached. But if this aeroplane does stall, a wing drops very sharply and control is entirely lost until speed is regained after loss of 1000 feet!'

In other words, yes, the Lysander can do exceptional things, and it invited a few pilots to abuse these capabilities and get themselves killed in the process!

Diving

When diving, the airscrew must always be in coarse pitch position. And, at high speeds the aircraft must not be subjected to sudden maneuvers or heavy loads.

Well, duh !

Oh, and the maximum diving speed allowed is 300 mph.



8.5 (Short Field) Landing

The Lizzie likes flying. Nay. She LOVES to fly. And she'll do so in continue, until you really FORCE her down. NOT by pushing the stick forward of course! But you knew that.

On your missions you will need to put the Lizzie down on small fields. Never mind they are bumpy and can be even downright muddy. They are usually SHORT. AND hard to find. AND they have trees around them more often than not.

On top of all that, there'd be 'Germans' all around, waiting to take pot shots at you.

Alright, so we can't simulate that (yet?) in FSX and you'll have to imagine those solders and Gestapo agents. But doing so, flying in your darkened office, will make the situation just that more tense.

So here's the part about landing, again taken from the official 1941 Pilot's Notes document. The FSX performance will vary a little, but we have tried to mimic it as closely as possible.

- Reduce speed to 120 mph and check brake pressure.
- Glide speed can vary from as high as is desired to about 70 mph ASIR (ASIR = Airspeed Indicator). At about this speed the aircraft has a high rate of descent, and only gentle turns may be attempted, care being taken not to stall. At about 80 mph the glide is much flatter and turns up to 45 degrees can be made with safety.
- On a straight glide when the speed drops to about 85 mph, the slats will start to open, and the flaps will start to deploy. As the speed drops further the slats will be fully deployed and the flaps fully extended. At 95 mph the flaps and slats will be retracted again.
- Carry out the drill of vital actions T.M.P.
- T -tail actuating gear (elevator trim). Wind back until the aircraft will fly hands-off at 75-80 mph.
- M -Mixture NORMAL
- P -Pitch - PUSH for FINE pitch

Well, good, but I feel I'd better add some 'FSX talk' here and show you how things are done (in addition to the above).

Assuming you have your navigation skills honed, you should somehow reach the area where the French agents have their torches set up. (In real they would only FLASH ONE light upon seeing the Lysander, who would then return the signal with a Morse code. Only THEN would the three torches indicating the flare path of the makeshift airstrip be turned on).

So you have to approach the field at some 1000-1500 feet to still have some overview and find the torches set up. Then make a pass along the downwind leg, losing altitude to about 500 feet and losing speed as indicated above.

When I am on final I usually drop the speed to 60-70 kts (!!) and keep the aircraft airborne BY THROTTLE inputs. You should be totally trimmed out by this time.



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Then clear the last threes and throttle back, sometimes raising the nose a little more to lose speed and altitude faster. BUT BEWARE! Once you get below 50 kts the Lizzie may 'sink' suddenly and then there is no point of return. You'll just go down like an elevator and if you're too high at that point, it means you'll crash!

If all goes well you'll make a nice three-pointer at almost 0 speed and use the brakes to stop well before reaching the two furthest lights. Turn around, taxi to the first light (the ' A ' light) and pick up your passengers.



9. Navigation and Missions

The main thing that attracted me to having the Lysander AND its operations in the second World War modeled was the fact that they flew these slow aircraft ONLY in the middle of the night, over enemy territory and WITHOUT any of our modern means of navigation. No satellites, no GPS's, no moving maps on an electronic flightboard, no nothing.

Just a bit of cut-and-pasted paper map on their lap, the compass and the Mark I Eyeball. And three torches waved by Resistance Fighters on the ground!

And still these men almost always found their minuscule landing strip in the middle of nowhere in the French countryside. And, indeed, sometimes in the middle of enemy troops at that!

When I came home after that Old Warden visit I just HAD to try it for myself, on FS2004. I set up a mission, planned it all with FSNavigator, picked one of my Cessna's and set out to fly by moonlight. It was a 'partial' success. It could be done, but not without some problems. And of course it wasn't very realistic, using a Cessna 172. I downloaded a freeware Lysander, but wasn't truly charmed. I wanted something more realistic, and it was nowhere to be found. So I had to MAKE it myself (or HAVE it made, since my last hands-on design for anything-FS was with FS 5.1).

And then FSX came along, with MUCH improved landscape graphics, better clouds, more moonlight... AND I found some people that promised me to build a true Lysander.

Here's how I design the missions:

I have two monitors... the main (widescreen) one is used for my FSX output, the other one for displaying the maps, my chat windows, notes etc. I turn down the lights in my office and I also turn down the brightness of the second monitor. Just like I turn down the brightness of my GPS in the car at night.

Now I have the proper ambience for night flying !

To make it really life-like you could opt to have a little RED light on your desk, for reading your printed maps. Just like the two little red cockpit lights in the Lizzie! Since I am lazy (and too ecological to print all this stuff) I use the second monitor to display the maps and flightplan on.

I use Tim Arnot's excellent **Plan-G** moving map program to help me. Not only to plot the course on, but initially also to 'see' what's on the way in terms of landmarks. Since it is based on Google maps, you can also switch to satellite view, which is real handy at times. Although Plan-G is still in 'beta', it served me well and already is an excellent program that has the potential to replace FSNavigator !

The REAL way of navigating of course is to just watch your compass headings and speed, count the times between the various waypoints, and compare the views out of your cockpit with the map segments in your lap. Of course with



Flight Simulator AND all of our modern day technology, we can cheat in various ways.

The easiest flying of course is using Plan-G moving map, or even your built-in FSX map.

A little bit less cheating is to add a GPS to the Lysander. Still cheating of course.

Oh, and if you feel like some of the flights are too long in real-time, you can start the longer ones from any Waypoint of course. Finding the ultimate Landing Zone will be a challenge in itself in most cases!

9.1 Missions included

I have included a number of missions in the base package. I would have loved to include more, but with all the delays this project has seen, I just could not afford to spend any more time on it and NOT release it. I have had plenty of emails to tell me so, too!

So, additional missions are still in the works and will be published on the website for download. Free, of course.

These are the ones included already:

Dec 23, 1942 - Operation Jaguar - flight to Cluny

Jan 26/27 1943 - Operation Prawn - flight to 'Courgette'

July 17/18 1943 - Operation Rénoir - flight to Bouillancy

July 19/20 1943 - Operation Athlète - flight to 'Grippe'

Aug/16/17 1943 - Operation Diplomat - flight to 'Torticolis'

9.2 How it was done

I don't know about the very first ones. Documentation was not 100% clear. But as soon as all this agent ferrying became official, the French agents on the ground got training from the pilots so they could choose the proper landing fields and set up the proper indications for landing.

In essence the agent would find a piece of land that was flat and hard enough to have the Lysander land on it, and free of trees around it. It also needed to be free of obstacles, obviously.

In practice, that did not always turn out to be the case!

The position of the landings zone would be radioed or otherwise communicated to the SOE. Sometimes they would make aerial photographs of the field (by day) to help the pilots 'recognize' the spot once over it.

Every 'field' had a code name, and a responsible 'reception officer', usually a member of the French resistance.



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Each mission also had a code name, although sometimes one flight was servicing multiple missions. In my documentation I use the FIRST code name of each mission for a flight.

Once the Lysander would be within visual range of the people on the ground, the responsible agent would flash a light signal to the pilot. The Lysander would return a pre-arranged signal, using his downward pointing Morse code lamp(s). (We haven't found these in the Shuttleworth model and don't know where they were).

Once everybody was satisfied, the people on the ground would light their torches or flash lights in a predetermined pattern. They would have set up the landing direction into the wind as much as possible.

The 'runway' was indicated by three lights, 'A', 'B' and 'C'. The 'A' light would be at the beginning of the landing area, on the left. It was also where the passengers would be dropped and picked up, and from where the Lysander would start his takeoff run again.

The two other lamps indicated the end of the runway.



10. The Shuttleworth Collection

Of course they have their own web site where you can find all information on the Collection, Opening Hours, and much more.

It is here: <http://www.shuttleworth.org/>

But let me briefly introduce you to the collection and to the Old Warden Airfield!

Old Warden Park is owned by the Richard Ormonde Shuttleworth Remembrance Trust. Richard Shuttleworth inherited the Old Warden Estate on his 23rd birthday and took a keen interest in farming and estate management as well as in motor racing and aviation.

He was killed flying in 1940 at the age of 31 and four years later his mother Dorothy Shuttleworth founded the Trust as a permanent memorial to him.

10.1 Planes and automobiles

That's the major (and to us, most interesting part of the Shuttleworth Collection. In a number of large hangars there's a wealth of history. Historical and classic cars, motorcycles, steam engines and, of course, aircraft.

The latter range from the early types of the time of the Wright Brothers and Blériot, all the way through to the second world war.

No jets, no fancy Cold War stuff, no modern fighters, just the good old prop variety of aircraft, the early ones strung together and covered with fabric. Our Lysander is one of the 'younger' ones I fact.

What makes Shuttleworth REALLY special is that all of these old planes are in FLYING CONDITION and actually are flown every once in a while! Check out the web site for some incredible pictures!

Shuttleworth is not only about airplanes. It consists of the current airfield Old Warden, of the museum housing a great number of fabulous aircraft, cars and motor cycles, of the Shuttleworth House, the Birds of Prey Center, the Swiss Garden and the Jubilee Play Center.

10.2 Shuttleworth House

Information about the house, which offers various services, from weddings and banquets to conference room renting, can be found on the separate web site here: <http://www.shuttleworthpark.co.uk/>

10.3 The Swiss Garden

The Swiss Garden, Old Warden Park, Bedfordshire, created in the 1820s by Lord Ongley, is a late Regency garden and an outstanding example of the Swiss picturesque. The Swiss Cottage provides the main element for this unusual and atmospheric garden. It provides the principal aspect for a number of contrived vistas which lead the eye towards this attractive



thatched structure. The unusually smooth hill on which it stands is suggestive of the work of the architect John Buonarotti Papworth (1775-1847) who lived nearby. He recommended the use of unpeeled bark for the rustic buildings in the Swiss manner and may have designed this cottage with its pillar and thatch and interior decoration of bark and fir-cones. The Shuttleworth family introduced a number of Victorian 'improvements' after buying Old Warden Park in the 1870s, most notably the extensive use of Pulhamite and the creation of a raised terrace on the garden's Western flank.

To discover more about Pulhamite visit www.pulham.org.uk.

Interesting things to see in the garden are, a grotto and fernery, a thatched tree shelter, an Indian Pavilion, two ponds and many fine specimens of shrubs and conifers, plus some remarkable trees.

10.4 Bird of Prey Centre

The English School of Falconry and Bird of Prey and Conservation Centre is a family run business with over 50 years experience in Falconry. With our collection of birds growing to almost 300, we decided that it was time to open a Centre for the benefit of the general public, which is what we had been working towards for many years. We believe that we have established one of the finest collection of birds of prey in the Country.

The Centre is based in Bedfordshire in the magnificent grounds of Shuttleworth in Old Warden Park. It has been carefully sited to create a woodland setting as near as possible to the birds natural surroundings. We are home to birds from all around the Globe including Falcons, Hawks, Owls, Eagles and Vultures. Some of the birds on site are part of the World Wide Breeding Programme of rare and endangered species.

The Centre is dedicated to helping in conservation and enabling everyone to have a chance of visiting and working with these magnificent creatures.

10.5 The Jubilee Play Centre

Imagine your favorite playground - only bigger!!

The Jubilee Play Centre was officially opened by HRH The Duke Of Edinburgh who is President of The National Playing Fields Association. The Shuttleworth Trust is home to one of the first Play Research & Resource Centres into Childrens Play of this type in the United Kingdom. Bedfordshire Playing Fields Association, in association with The Shuttleworth Trust, is delighted that this facility, when not in use for training or closed for a Shuttleworth event, can be enjoyed by by children visiting the venue. On the newly developed site at Shuttleworth are special "High Activity" units for older children. Much of the play equipment has been designed for "inclusive play" - to provide play opportunities for children whatever their physical abilities. Many different play equipment manufacturers are very pleased to be involved with this "best practice" project.

The Jubilee Play Centre offers endless fun for even the most energetic person in your family.



10.6 Where to find it

And after reading all this (and having flown the Lizzie on all its missions, of course) you are now ready to visit Old Warden. Maybe on one of these wonderful English warm summer evenings, when the staff and volunteers bring some of the old aircraft out and fly them off the grass strip. A great occasion to pack your picnic basket and have a leisurely 'tea' while waiting for the 'show' to start.

Or on a weekend, taking all day to stroll through all the hangars and other attractions. No matter when you decide to go, it will be more than worth it, I can guarantee you!

The Shuttleworth Collection
Shuttleworth (Old Warden) Aerodrome
Nr. Biggleswade,
Bedfordshire
SG18 9EP

Telephone: +44 (0)1767 627927

Fax: +44 (0)1767 627949

Email: collection@shuttleworth.org

1st April to 31st October 9.30am to 5pm
1st November to 31st March 9.30am to 4pm

Shuttleworth (Old Warden) Aerodrome is two miles due west of the A1 where it bypasses Biggleswade, approximately 30 miles from Junction 23 of the M25. Brown signs will direct you to the Collection entrance.



11. ACKNOWLEDGEMENTS

I wish to thank a number of people for their help in accomplishing my goals.

First of all my good friend **Didier Keller** from London. If he hadn't invited me to come and see the Shuttleworth Collection, I maybe would not have thought of having the Lysander built for FS. Didier also made the first set of photos, many of which were used to build the details on the FS model!

Secondly the **wonderful people at the Old Warden and the Shuttleworth collection**. They are as passionate, nay, even MORE passionate than I am about old airplanes, cars and motorcycles and many of them get paid to have a ball and do what they love doing best. They have been extremely helpful, courteous and forthcoming, even though we repeatedly bugged them and kept them from their work. **John Munn** allowed us to make all the close-up photos!

First and foremost **Chuck Jodry**, for ultimately building me the correctly functioning Westland Lysander and for providing the engine sounds. Chuck picked up all the unfinished work done by his predecessors and crafted it into the aircraft I had dreamt it to be!

Then there is **Rob Young** who made the initial flight model for our Lizzie. Unfortunately Ron was unable to finish his work for me, due to other commitments and real-life issues.

Then there is **Milviz**, who made me the second 3DSMax model after the first designer company let me down.

Then there is **Ron Zambrano** (Razbam) who made that 3DSMax model to actually port to FSX.

All my loyal beta testers for their many months of work should not go without mention. I have listed them separately.

Jaap van Hees is one of my closest testers and authors, and he has made one of the missions AND added some scenery.

Ian Pearson has been working on providing freeware versions of WW2 English airfields and did a lot (together with Jaap) to give us Tangmere as it must have looked like back in 1942.

And last but certainly not least **Jan Kees** who provided us with some excellent liveries of 'other' Lysanders than the one flying at Old Warden. Thanks to Jan Kees and Chuck we now even have a version without the long-range belly tank!

I will not name the English 3D design company that offered to build me FSX models and indeed provided a first 3DSMax model of the Lysander. They forgot to tell me they had no skills whatsoever of transferring it to FSX and wasted about 1 year of my precious time. They also forgot to contact me for more than half a year after the first few contacts and pictures. They still helped me, by teaching me NOT to trust just everybody in this 'hobby' anymore.



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Beta Testers for this project were (in no particular order): Jaap van Hees, Darryl Wightman, Bill Womack, Didier Keller, Dexter Thomas, Lars P Hammer, Nick Churchill, Jun Kazama, Phil Clayton, Ian Pearson, GaryGB, Rod Yallop, Mike Cameron, Brad Butler, Kevin Olson, Ted Freeman.



12. F.A.Q.

Here are some questions that have popped up a few times during the development of this project. If YOUR question is not here, then please do not hesitate to contact me on the support forums or via e-mail. I'll be happy to reply!

Q. Will the model run in Preview Mode?

A. It might, but it is certainly not specifically made for it. In my opinion this is a 'demo' function of FSX and not worthy of developing for, since it will not be made into a production feature by MS now. We needed FS11 for that, thankyouverymuch.

Q. Will there be an FS2004 version of the Lysander?

A. Maybe, we have thought about it. But it will depend on the sales of the FSX model and whether or not I can get at least the investment back, before committing yet another large sum of money to a new adventure.

Q. Will it fly using FSX SP1?

A. We design and build our products for the 'final production version' of FSX, and that's SP2 or Acceleration. So yes it will fly, but you may see some strange things. No support for that, sorry.

Q. Are all of the switches and dials functional?

A. Nope. We have made this model as realistic as possible within certain limits. We also want it to be FUN to fly and the emphasis is on a combination of realism and usefulness. After all, you'll have a hard time FINDING the landing zones, let alone getting her down onto them!

Q. Why are there no bomb racks?

A. Because I wanted to do the SPECIFIC Lysander as it flies today at Old Warden. It is equipped as the SOE models were back in 1942/43. They did not have bomb racks and machine guns... just a lot of fuel! Maybe, just maybe, in future we will add more models. (Actually, we already did, thanks to JanKees and Chuck)

Q. Why did you not build 'real' FSX missions (sorry Paul!)?

A. Because I am too clumsy for that, to be honest. ☺
But ALSO because I wanted to FORCE you to fly them as realistic as possible, without a voice telling you where to go, or a huge green pointer floating in the air ahead of you.
But if you feel compelled to build real missions (using Jim Keir's excellent FSX Mission Editor of course) then please feel free to do so... and let us know!

Q. Can the Lysander side slip?

A. I think it does, but some testers told me they thought not. Go figure.



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Q. I can't get the bloody plane to land. What do I do?

A. Yes, she is a bit of a handful. Please visit our support forum and we'll help you get back down to earth. It CAN be done, believe me!

Q. Are there any other missions planned?

A. Actually, YES! I have a lot more of them on the drawing board, but these things take time. I'll make more (and so may other simmers!) and will make them available FOR FREE on our website. Remember, this is MY hobby too, as much as yours!

Q. What about other expansions?

A. We have started on the Lockheed Hudson, which was also used by these same squadrons to ferry people and equipment. These are twin engine bombers that ALSO landed on farm fields in France!
Simon Smeiman will be the author of the Hudson, if all goes well.

Any other question?

Let me know !!!!



13. Whoopsydaisy

Yup, there's ALWAYS something that goes wrong, in any project. Not sure if many publishers will confess, but I thought I'd might as well. This chapter is a little bit like the 'bloopers' of a movie that you'll see afterwards. So have fun.

Here are a few things that I 'think' are not as they should be, but were too difficult to fix within the time (and money) limits available. Or rather NOT available.

We may correct them in future when we can... and when I can get confirmation of some of them.

13.1 The tail wheel lock

There's the Wheel Lock switch on the right window edge. That is, we always THOUGHT, or assumed, it was a tail wheel lock lever. Until I got to read some document recently from the Shuttleworth Collection, entitled 'Appendix to Pilot's Notes Lysander Aircraft G-AZWT'.

One of the first things it talks about is the fuse box on the starboard side of the rear cockpit. Well, that's gone. In fact, during switching from one designer to another and yet another, a few things that we had 'in' in the very first version, sort of disappeared later on, and were then forgotten.

I think this is one of those.

The other thing is said wheel lock.

I can't find it in the original papers. And then my eye was caught by this sentence in the (modern) pilot's notes appendix: '... Electrical Service Available. (a) Ground/Flight Switch selected to Ground and 12 V Trolley Acc. Connected and switched On'.

Oops.. our 'tail wheel lock switch' has those exact text on the labels. Ground and Flight.

Ummmm.... so maybe our tail wheel lock is an electrical master switch I reality !?

I'll get down to the bottom of this and we will correct it if it turns out to be the case!

13.2 The fuel gauge

Or rather, the lack of it!

I always thought I was looking at the fuel gauge during my test flights. Turns out it was the fuel PRESSURE gauge.

The thing is... on none of the photos we have is there any sign of a fuel gauge.

So I started re-reading all the documents once again. And sure enough, somewhere in them is mention of the fuel gauge being on the left and BEHIND



the pilot. Now there's a handy feature!
But we do not have it on any photo, have no idea what it really looks like...
and it even may not be IN the Shuttleworth Lizzie, because the underbelly
tank is a fake ! It is not connected and never used.

Alright, more research to do next year.
Meanwhile, use Ctl-Z for it!

13.3 The radio?

We searched and searched and re-searched. All we could come up with in old
documents was that the Lysander was equipped with a 'standard radio of the
era'.
Yeah right.

NOT in the Shuttleworth aircraft (although there is a modern one near the
pilot's left knee, that we did NOT put in!).
We found only a few old photos of old radios as were found in Spitfires and
the likes. But no idea where it had been installed. Some documents
mentioned it was in the REAR cockpit, with a 'remote control' for the pilot.

Not knowing what to actually model, we decided to leave it out instead of
putting in fantasy one of our own.

13.4 The Morse code key

We have it in the cockpit. You can even push it in the virtual cockpit,
click it and move the switch. But it doesn't DO anything else.
We KNOW there must have been lights shining up and DOWN ... somewhere. They
are mentioned in a document I have. But no clue what they looked like,
WHERE they were positioned, nor if they are really on the Shuttleworth
plane.

So don't look for them, they are omitted.

13.5 Mixture slider

Looking at pictures it all of a sudden dawned to me that somehow, at some
point, the mixture lever and labels had become inversed. Duh !

In a last-minute effort, we changed it back! But some of the pictures may
still show the previous situation. Sorry!!

I think that about covers it. If you find more things that are glaringly
wrong, let me know. I can at the very least add them to our Whoopsydaisy
chapter ;-).



14. About FSAddon Publishing



Since you've come this far, you must be a die-hard simmer, or at least an avid reader. Congratulations on your perseverance, not many people read manuals at all ;-). To reward you, let me tell you something about our companies then....

FSAddon Publishing is wholly owned by **Silver Cloud Publishing**, François Dumas's privately owned company.

FSAddon.com was founded by Miguel Blaufuks and François Dumas with the main purpose of designing and publishing add-ons for the Microsoft Flight Simulator range of products.

But not just any add-ons!

Our aim was and is to provide **additional immersion** for the simulation by providing high-quality, **complete packages or series** that do more than just add an airfield, a utility or an aircraft. We are aiming to provide 'reality kits' that are a combination of additional FS software AND other things such as a story line, navigational information and tools, or even community access via the Internet.

We are also convinced that most buyers of these flight simulators only scratch the tip of the proverbial iceberg and won't use more than perhaps 10% of its capabilities. Another goal of ours therefore is providing education and information geared towards better and more satisfying usage of what you have already bought!

The company is affiliated with the well-known company **simMarket.com**, which in turn is part of the associated **simFlight Network**. SimMarket is the world largest on-line distributor of flight simulator add-ons. But up to now all products have been sold under their own name and without any (or much) guidance from simMarket.

The simFlight Network consists of a multitude of flight simulator news sites, covering many languages and areas around the world, and also hosting a large number of flight simulator user communities via forums and other means.

The two organizations together form a very powerful base for the newly founded FSAddon.com, providing all the basic infrastructure, skills and contacts needed to design, develop and publish flight simulator add-ons.

The company's aim is 3-tiered

- 1) To substantially expand the possibilities for beginning simpilots to use their flight simulator
- 2) To provide high-quality, extensive add-ons to the more experienced simpilots
- 3) To lower the thresholds for communicating and flying together using flight simulators and the internet.

We hope you'll enjoy our products, and above all, the pleasure of sharing this hobby with us and the hundreds of thousands of like-minded enthusiasts



all over the world. If we can add just a little value to it, then we have achieved our goal.

Where to find us on the Internet:

Our main website is www.fsaddon.com (and the new version www.fsaddon.eu).
Our main support forums can be found
at: <http://forums.fsaddon.eu/portal.php>

At the time of writing we are changing our main website. It might already be moved to www.fsaddon.eu by the time you read this. Try both!

Silver Cloud Publishing is here: www.SilverCloudPublishing.com

14.1 Other FSAddon products

If you like this product, then you will want to visit FSAddon's website (www.fsaddon.com) from time to time, because we are working on a whole range of similar and other products, from very well-known authors and designers, but also from very talented new people in the flight simulator industry.



Just check out the 'Products' link to see everything we have made so far, and the 'News' link for regular info on what we are working on !

Already famous products released in the past include such 'classics' as **Misty Fjords, Tongass Fjords and VancouverPlus, FSCargo, and more recently VancouverPlus for FSX, Tongass Fjords X, FSX Mission Editor, FenceBuilder Pro and our Super Cub Collection for FSX.**

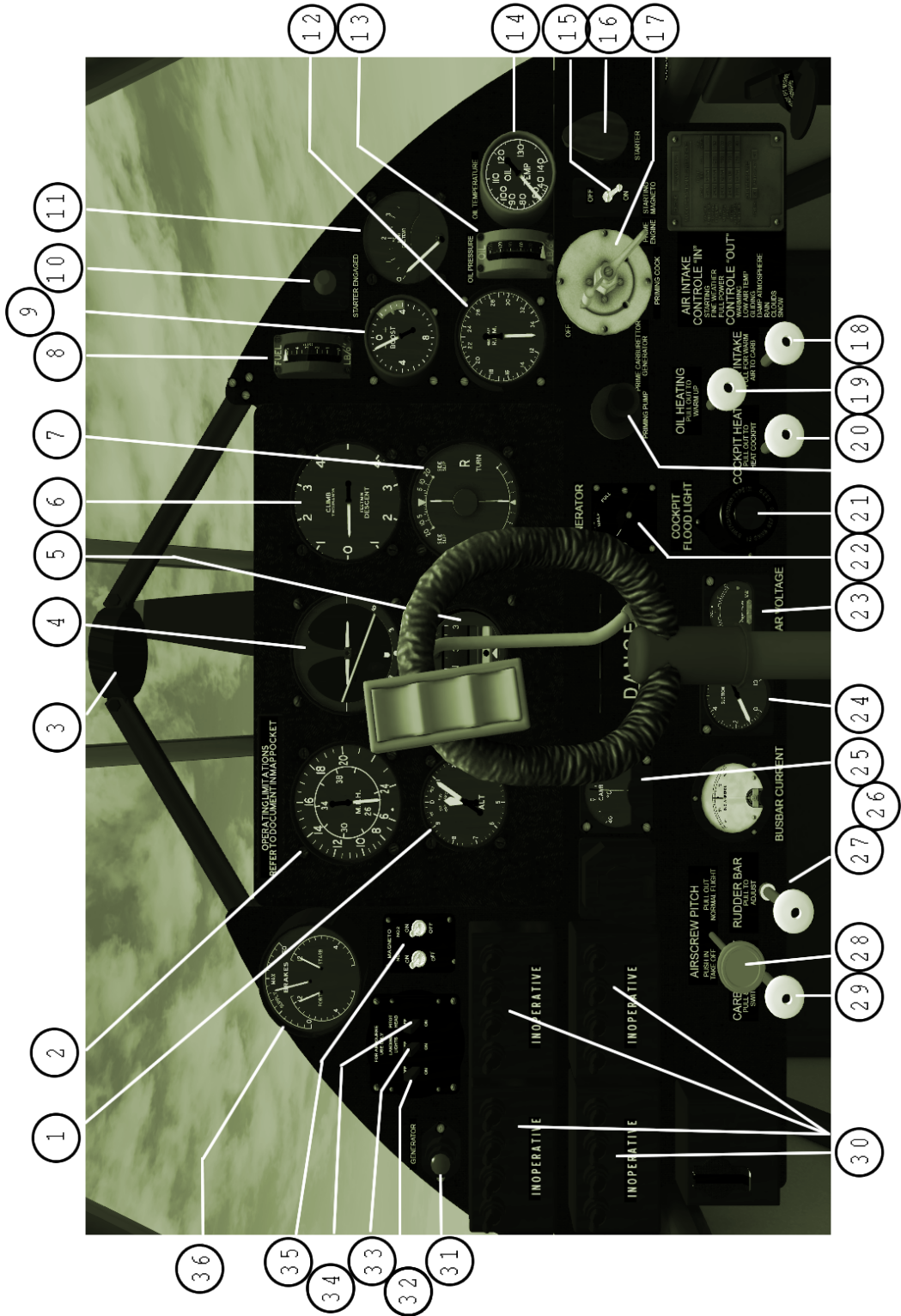
At the time of writing this we have a lot of new titles under development, including **Misty Fjords for FSX, Emma Field X, FSCargo X, Gloster Gladiator, Lockheed Hudson SOE, Jodel 140, Robin** and more.....

See you in the (virtual) skies !

**François A. 'Navman' Dumas
Publisher**



15. Apendix A - Cockpit diagram (large)





16. Appendix B - Video Links

No modern manual can exist anymore without a list of YouTube links on the subject. That's progress for ya. Well, I've found a considerable number of videos, many depicting the Old warden Lysander. Check these out !

Old film of new aircraft

http://www.youtube.com/watch?v=CRYCx_G25ro&feature=related

Lysander at Old Warden: <http://www.youtube.com/watch?v=kXR5ecqeA5I>

Canadian Heritage Lysander first

flight: <http://www.youtube.com/watch?v=QMeXckf7Tbo>

Strathallan Lysander on BBC: <http://www.youtube.com/watch?v=GsqvgPIgMlQ>

Lysander and Gladiator of Old Warden - 2009

<http://www.youtube.com/watch?v=V8udqWcXpy4>

<http://www.youtube.com/watch?v=IKD78IOYhU4>

Strange Lysander - P12: http://www.youtube.com/watch?v=_9p3yrRatHQ

The Canadian Lysander at Oshkosh - 2009:

<http://www.youtube.com/watch?v=qJ-npWxCL2c>

Old Warden Lysander June 2009: <http://www.youtube.com/watch?v=mKoux8sqcn0>

Canadian Lysander flypast: <http://www.youtube.com/watch?v=nM2R3VkJQ-Z0>

Belgian Lysander OO-SOT restored: <http://www.youtube.com/watch?v=PAdbN4BneB0>

Messerschmitt attack on Lizzie: <http://www.youtube.com/watch?v=zy0CV-Xltrs>

Lysander at Duxford 2009: <http://www.youtube.com/watch?v=vBqnlFyw6X8>

Canadian Lysander flight at

Ontario: <http://www.youtube.com/watch?v=cKIgoliD>



17. Appendix C. Documentation used

Documentation and Information used

Our main source of information when designing and describing the Lysander is a copy of the original 'pilot's notes' for the aircraft:

1941 Air Ministry Pilot's Notes 1582C for Lysander III and IIIA Aeroplanes and Mercury XX Engine, dated July 1941.

These have been used by **Andy Sephton**, Chief Pilot at the Shuttleworth Collection, June 1998, for a 'modernised' version, with the specific G-AZWT aircraft in mind.

Then there are the Shuttleworth Collection '**Appendix to Pilot's Notes**' for their Lysander, written by **W.T. Johns** in June 1999. Also provided to us courtesy of the people at Old Warden!

Of course the book by **Hugh Verity**, '**We landed by moonlight**', was used for much of the 'circumstantial evidence' about the flights made, the organization of the squadrons and all the other bits and pieces of history that I used to form the FSX product.

You can buy the book of Hugh Verity at the Old Warden's museum gift shop, or via our website (see the 'bookshop' link on the right at www.fsaddon.eu).