

The CIX VFR Club	Flight Training Notes	Exercise 13E
For Simulation Purposes only. Not to be used for real World flight	EMERGENCIES (ON TAKE OFF and LANDING)	Issue 1.0 04/08/12

1 INTRODUCTION

This series of tutorials for the **CIX** VFR Club are based on real world flight training. Each document focuses on a small part only of the necessary skills required to fly a light aircraft, and by echoing real world training, you will be a better Flight Simulator pilot and get more enjoyment out of the hobby as a result.

These tutorials are written specifically for the Flight Simulator Default Cessna 172. Some details will be different for other aircraft.

You should read Exercises 12 and 13 before continuing with this tutorial.

2 EMERGENCIES ON TAKEOFF

There are two emergencies on take off which the computer pilot should be prepared for.

- An aborted take off
- Engine failure after take off

2.1 Aborted Take Off

This situation will arise if the pilot decides, during the take off 'roll' (still on the ground) that he is unable to become airborne safely. This could be because of another aircraft on the runway; perhaps an engine or instrument problem; perhaps loss of control for whatever reason. When connected to VATSIM, occasionally another aircraft will "pop up" as another VATSIM member connects to the server with his aircraft on the runway. They shouldn't do this, but occasionally it does happen.

The action required is straightforward.

- Close the throttle fully
- Steer straight or as straight as possible along the runway
- Apply brakes. In Flight Simulator, braking is not progressive, but a fixed deceleration rate depending on mass, so skidding is not possible, not that you would want to skid.
- When under control, advise ATC "G-BAJD Aborting take off"
- Clear the runway as soon as possible.

2.2 Engine Failure After Take Off

This situation can only arise in Flight Simulator either if you deliberately set up the program to generate random system failures, or, when flying as a "student" in Instructor Mode (FS) or Shared Cockpit (FSX), your "Instructor" stops your engine. However, it is very good practice and a bit of a challenge to simulate an engine failure from time to time. One nice touch in Flight Simulator is that if you crash, the aircraft breaks up – it doesn't just bend a

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bit. So if you have to make a forced landing, your self esteem will make you want to get it right just as much, (well almost), as in real world flying.

If connected to VATSIM, however, because crash detection is turned off to avoid connection problems, your aircraft will behave rather oddley. It wil do one of three things: -

- either simply bounce around endlessly while remaining all in one piece until you exit FS, or
- it will bounce around but eventually come to a stop, or
- it will bounce back up into the air at about 1200 feet and start flying again.

This behaviour is a function of the terrain that FS thinks you have landed on, and you cannot always predict which it will do! The last one occurs if you try and land on water or ice. It would be best to carry out that perfect engine out landing then.

The two guiding principles of a forced landing at low level are: -

- a) Keep the aircraft flying at all costs. There is absolutely no way an aircraft will fly if it has not got flying speed, to state the obvious. A stall and crash is inevitable. IF you feel you will not reach the runway, however, there is a strong urge to raise the nose to keep the aircraft airborne, but this can easily result in a stall.
- b) Avoid turning if possible, because a lot of height is lost in a turn without power. If turning is necessary, do so with a maximum of 15° angle of bank, ensuring the balance ball is centred. Turning at slow airspeed with a high angle of bank can easily result in a stall and what passes in Flight Simulator for a spin. (Few aircraft spin properly in Flight Simulator).

The following action should be taken.

- Lower the nose immediately to maintain flying speed – specifically, you should fly the Best Glide Speed – 68 knots in the Cessna 172.
- Make a controlled descent and landing. If possible, select a landing area free of obstructions. This should ideally be within 30° either side of the runway heading.
- Once you have selected a landing site, flaps may be lowered once a landing is assured to further reduce speed.
- NEVER attempt to turn back to land back on the runway. However, if there is enough runway still ahead, then by all means land back on the runway.
- Make a Mayday call, however brief, if at all possible, so that the Controller can take appropriate action.
- Not crucial in flight Simulator, but if you wish to practice as realistically as possible, before landing turn off the fuel, pull the

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mixture to lean (to avoid an inadvertent restart by your sadistic Instructor in Instructor Mode) open the doors and turn off the master switch.

2.3 Autogen

Flight Simulator often placed automatically generated scenery ('Autogen') such as buildings or trees in inappropriate places, such as right at the end of a runway. You can choose to recognise these errors and fly to avoid hitting them, or, if you think it is simply ridiculous to place those trees just THERE, simply fly through them. You won't crash – and therefore, the presence of Autogen doesn't constitute an emergency for the purposes of this document!

3 LANDING EMERGENCIES

What if your engine has cut out on approach? This cannot happen "by accident" in Flight Simulator, only if you have set up some failure routines in the Menus, or if you have run out of fuel. However, Club Flying Instructors have been known to stop your engine in Shared Cockpit mode, so you need to know what to do. By the way, if you run out of fuel in the real world, you will be prosecuted for negligence. In the Simulator world, you can refuel in flight, but it's not at all realistic, and conscientious Club pilots would NEVER do that, would they?

So – how do you control the aircraft to make a successful landing?

3.1 The Optimum Approach Height

Most light aircraft have a glide ratio of about 9 : 1, or 700 feet per nautical mile. This means that without power, and without flaps, if set to fly at the "best glide speed" (68 knots in the C172SP) it will fly 9000 feet horizontally and descend 1000ft vertically. It follows that if you are at 1000ft, then the optimum approach position is 9000 feet, (1.5 nautical miles) from the touchdown point. This is much closer to the airfield than you will be accustomed to when making a powered approach from a circuit height of 1000ft. Powered approaches typically start at about 2.5 – 3nm from the touchdown point.

3.2 The Golden Rule

Without the engine you have no throttle, so the only control you have is the joystick (and pedals) so how do you reach the runway?

Pull back on the stick? – WRONG!!!

This increases the angle of attack, so yes it does initially increase the lift and you climb slightly, BUT it also increases the drag, which now extracts kinetic energy from the aeroplane – this gets converted from our store of "Gravitational Potential Energy" and so you will soon slow down and the lift

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will then be reduced. So even though you may stay airborne for a bit longer, the rate of descent will increase, and you probably won't reach the runway.

Deploy the Flaps? – WRONG!!!

Again, although this increases the lift a little, the main effect is to reduce the stalling speed, and greatly increase the drag. The glide angle becomes very much steeper, and there is no chance of getting to the runway!

Push forward on the stick? – WRONG!!!

This reduces the drag, makes the airframe more "slippery" through the air – you're moving faster, so the lift is increased. But having lowered the nose, the rate of descent will increase.

Maintain the Best Glide Speed and prepare to land in a field? CORRECT!!!

There is NEVER ANYTHING you can do to stretch the glide. Many have tried and all have failed because without power you cannot add any energy which the aircraft does not have. You only have the energy available due to your height. So the Golden Rule when the engine stops is MAINTAIN BEST GLIDE SPEED.

How to make a successful off-airfield landing is covered in Exercise 16.

3.3 You do have Control!

It isn't a case of "choose a field to land in; aim at it and hope". You do have control to a degree. If you deploy the flaps, again these increase the drag, and thus increase the descent rate. Flaps are in fact the best control available in an engine-out or "deadstick" landing, because they are a graduated response. Bit too high? Lower 1st stage of flap. Still a bit too high? Lower the next stage – and so on.

However, once lowered NEVER raise them again. If you lowered too much flap too soon – tough! If you raise the flaps in a deadstick approach, the loss of lift cannot be regained quickly enough (by lowering the nose – it's all you can do) to prevent a high rate of sink, and you will land in a field a lot nearer than the one you were originally aiming for – and it may not be such a flat one!

4 VATSIM EMERGENCIES

4.1 Rules of An Emergency

VATSIM will allow a pilot to declare an emergency and ask for assistance when receiving an ATC service from a controller. Of course if there is no Controller on duty in the area of your flight, declaring an emergency is pretty pointless! Who are you going to make the MAYDAY call to? Yourself?

The VATSIM Code of Conduct states that *a pilot shall not declare an emergency for the sole purpose of receiving priority handling in busy airspace.*

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It is also at the controller's discretion whether to allow the emergency or to require the pilot disconnect from the VATSIM network and continue on their own if they wish to play out the emergency. This is to prevent annoyance to other members who are flying normally. What gives you the right to spoil their fun, in other words?

The VATSIM Code of Conduct also states, IMPORTANTLY, that simulated hijackings, or other terrorist threats are prohibited on VATSIM, and if attempted, will result in the pilot being instantly disconnected from the network, with possible suspension or revocation of their VATSIM membership. If a pilot refuses to discontinue their "emergency" when requested, the Controller has the absolute right to contact a VATSIM Supervisor, let them know what's happening, and the Supervisor will do the rest.

If you wish to simulate an emergency, do not make your emergency radio call on the "guard" frequency, 121.50, which is reserved for emergencies in the real world, and is generally not permitted on VATSIM. For one thing, unlike the real world, no VATSIM ATS monitors 121.50. Secondly, if you decide to send your emergency call by text, then ALL stations will receive it, disrupting many members and making you no friends, so don't.

Okay, now that you know the ground rules, and you're willing to accept the emergency, here's a simple checklist you want to follow;

4.2 Conduct of an Emergency

You must provide the following information to a VATSIM Controller when declaring an emergency.

- Have you defined the extent of the emergency? – Learn the correct MAYDAY radio call.
- Can you maintain heading, altitude and airspeed? (e.g. If your engine has stopped – no you can't).
- Is there other traffic in the area? Will I spoil his fun if ATC diverts him to accommodate me?
- Do you need emergency equipment standing by? Of course on VATSIM there is no such thing as "emergency equipment" but in order to sound authentic, the controller can ask you if you wish to have the CFR team standing by. You can "pretend" you do – or not – your choice.
- Have you given the Controller the number of people on board, and remaining fuel? Again on the VATSIM world this information is pretty much useless unless you are about to run out of fuel.

4.3 ATC Dialogue

The radio calls for emergencies are defined in the CAA publication CAP 413. There are basically two types of call; the PAN call, and the MAYDAY call.

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A PAN call is a low priority “urgency” call used to signify there is a problem, but there is no immediate threat to life or the aircraft. It is most usually used to tell ATC that you are lost! PAN calls on VATSIM are made to the Air Traffic Service you are already working, if present. If no ATC is present in your vicinity, then as in section 4.1 above, don’t declare a PAN, as there is simply no point.

PAN PAN (pause 1 second) PAN PAN (pause 1 second) PAN PAN

Liverpool Approach Golf Bravo November Oscar Zulu: Cessna 152, Unsure of position. Last known position 5 miles east of Earles Colne Airfield 10 minutes ago. Heading 360 degrees. Request position.

A MAYDAY call is used for real emergencies where there is immediate danger to life or the continuance of the flight, including engine failure, medical emergency, major instrument failure, failure of retractable undercarriage to deploy, burst tyres and similar events which, real world, could end in a bent aeroplane at the very least.

MAYDAY, MAYDAY, MAYDAY (pause 1 second) MAYDAY, MAYDAY, MAYDAY

Liverpool Approach Golf Bravo November Oscar Zulu: Cessna 152: Engine failure: Intend immediate forced landing 5 miles south east of Welshpool: Passing 1500 feet heading 350: Student pilot: One POB.

MAYDAY calls on VATSIM are made to the Air Traffic Service you are already working, if present. If no ATC is present in your vicinity, then as in section 4.1 above, don’t declare a PAN, as there is simply no point.

4.4 Cix VFR Club

As a policy, the Club discourages members from declaring emergencies while connected to VATSIM, as they rarely provide enjoyment for others. New, younger, VATSIM members often do so because it seems exciting, but they are fairly rapidly discouraged. So – know what to do, but don’t do it is the overall Club rule on Emergencies, unless something genuinely and honestly goes wrong, such as wrongly estimating your fuel consumption with the result that your engine genuinely stops. If you really do want to practice emergencies, do so off line.