Welcome to our Piper PA-20 Pacer!

Our aim is to offer you a short tutorial, along with some key facts, to allow you to acquaint yourself with this classic aircraft. This tutorial is best used in conjunction with the first flight within Discover Europe, from Humberside Airport to Rotterdam.

The first thing that you will notice about the Pacer once you climb aboard is that forward visibility is quite poor. This is not a limitation of the simulation, rather it is part of the inherent design of the real aircraft. The Pacer is a "tail dragger", with the normal tricycle arrangement of wheels being reversed. There are two large wheels to the front of the aircraft and a small freewheeling castor at the tail. The net effect of this is that the aircraft stands very nose high, significantly impeding forward visibility. There are ways to work around this hindrance which we shall discuss shortly.

The other most striking feature of the aircraft is that the cockpit panel seems rather an eclectic mix of old and new instruments and gauges. The aircraft on which we based

our simulated Pacer was constructed in 1953 and has been through a number of owners. In common with many Pacers flying today the aircraft was retrofitted with a modern Bendix-King radio stack. It has also been retrofitted with a dual-axis Bendix King Autopilot which should prove useful for longer flights. In fact, many of the Pacer aircraft still flying today have had similar custom modifications to the point where each is very much unique and heavily modified from the original factory standard.

Throughout this tutorial please refer to the panel guide located at the top of this document. This image will highlight to you all of the instruments and switches of the Pacer for easy reference.

You will have noticed that the situation has started with a full fuel load and engines running. We have chosen to have the engines running to avoid a Microsoft simulator flaw where the aircraft battery drains extremely rapidly. We will discuss the manual start procedure below. If you wish to follow this please turn off the engine first. This can be achieved by closing the mixture handle which will bring the engine to a full stop. We have also set up the aircraft with full fuel tanks. Unlike other, heavier, aircraft it is absolutely fine to fly each flight with the tanks fully filled. We will not suffer any weight restrictions on take-off or landing. As such there is little point in flying the aircraft with reduced fuel and it is in fact good airmanship to keep the tanks topped up to provide for any emergency requirements or holding at an airport. Our Pacer has been designed for short-field performance, even with fully laden fuel tanks and requires very little runway to operate safely.

The Table below provides take-off and landing distances under various conditions

Take-Off Distance (In Feet)

		Outside Air Temperature					
	Alt. Ft.	*0°F*	*20°F*	*40°F*	*60°F*	*80°F*	*100°F*
Distance required to take-off and climb 50 feet Full Throttle at 68 M. P. H. T.I.A.S.	S. L.	1530	1655	1770	1910	2055	2200
	3000	2220	2430	2645	2905	3140	3420
	5000	3010	3340	3715	4090	4535	5090
	7000	4430	5075	5720	6615	7675	8865

Landing Distance (In Feet)

Distance required to land over 50 foot obstacle and stop. Approach at 68 M.P.H. T.I.A.S.	S. L.	1370	1395	1420	1440	1465	1490
	3000	1435	1460	1485	1510	1540	1565
	5000	1480	1510	1535	1565	1590	1620
	7000	1530	1565	1590	1625	1650	1680

We can see that for the flight
today, starting at close to sea level, we only need around 1600ft
of runway to take-off. We will need a little under 1400ft to come to a full stop on the runway in Rotterdam. Feel free to refer to this chart as you plan your flights with the aircraft. Zooming the simulator map can provide information on the available runway length and facilities available at each airport. We have, of course, ensured that for this journey around Europe, the aircraft is fully suited to all the airfields that we will visit.

Lets us now go ahead and start the engine following these few simple steps.

Ensure that the area around the aircraft is clear before starting the propeller during this sequence.

PARKING BRAKE - ON

AVIONICS MASTER SWITCH - OFF

It may seem strange to switch off the avionics at this point but the startup procedure can sometimes cause a power surge which can affect this delicate equipment.

MASTER BATTERY SWITCH - ON

CABIN AND EXTERNAL LIGHTS - AS REQUIRED

PRIMER - AS REQUIRED

Generally, the colder the weather the more priming is required.

FUEL BOOST SWITCH - ON

MIXTURE - FULLY RICH

THROTTLE - SLIGHTLY OPEN

We can now start the engine

MAGNETO/STARTER - ON

The propeller should now turn as the aircraft bursts into life.

PITOT HEAT - ON

CARB HEAT - AS REQUIRED

AVIONICS MASTER SWITCH - ON

TIP *The engine can also be started quickly with the CTRL-E keyboard combination*

The aircraft should now be ready to fly, but it is good practice to make a final confirmation of the fuel gauges to ensure that we have sufficient fuel. Also, confirm that there is a suitable electric current by quick reference to the ammeter.

We can also go ahead and set up the autopilot. If you wish to manually tune each VOR station for the duration of the flight, the GPS/NAV switch should be set to NAV. If you wish the autopilot to automatically follow the route in the GPS without having to manually tune and track each VOR station, set the switch to GPS.

You can open the GPS by pressing the SHIFT-3 keyboard combination at any time. The GPS can be dragged around the screen with the mouse and located where it is convenient for you.

Set an initial altitude of 3000ft on the autopilot. If you are using the default simulator ATC you will be given a further altitude clearance and this altitude can be adjusted based upon instructions. If you are flying without ATC you can make regular increments to the desired altitude in flight. It is always best to do this in steps, to ensure that the aircraft rate of climb is appropriate. Our classic Piper lacks the climb performance of a modern aircraft and airspeed vs climb should always be carefully monitored, lest the airspeed decay dangerously.

Here is the climb performance chart for the aircraft.

Normal Rate of Climb

(In Ft. per minute)
80 M.P.H. T.I.A.S.
Climbing Speed

S. L.	650	625	605	580	555	535
3000	495	470	445	420	400	380
5000	390	360	340	315	295	275
7000	285	260	240	210	190	170

Using the chart as a reference we should prime the autopilot for a 600ft per minute vertical speed. (Each column reflects the outside air temperatures denoted in the same column of the take-off chart)

If you are using Air Traffic Control, go right ahead and request taxi clearance. Here is where it gets interesting. Release the tail wheel lock.

TAIL WHEEL LOCK - RELEASED

PARKING BRAKE - OFF

The simplest way to taxi the aircraft is to use the spot view of the simulator. This requires the least fuss. A more realistic approach is to weave the aircraft in a series of S turns along the taxiway. This is an approved technique for tail-dragger aircraft. However, it does require practice and careful speed and position management to avoid clipping the edge of the taxiway!

It is also extremely useful to raise your seat for a better view of the outside world. The key combination SHIFT+ENTER raises your seat for an improved viewpoint and SHIFT+BACKSPACE will lower the seat.

Hopefully, with a bit of practice and experimentation you have found your way to the active runway without too much mishap! Don't worry, it becomes much easier with practice.

Line yourself up for take-off and engage the tail wheel lock to maintain the centreline

TAIL WHEEL LOCK - ENGAGED

Whilst maintaining pressure on the toe brakes slowly open the throttle to full power. Once full power has been achieved release the brakes for the take-off roll. Steer as necessary to maintain the runway centre line.

As the aircraft gain speed it will pitch forward allowing a much improved forward view. This is also a cue that the aircraft is gaining sufficient lift for take-off. Hold the stick slightly forward to keep the aircraft on the runway until 70 MPH. At that speed gently pull back on the stick and take to the air.

There was no requirement to deploy flaps for take-off, but on very short runways you may wish to deploy the first stage of flaps.

As you pass through 1000ft above the ground the autopilot can be engaged. Pressing the NAV and ALT buttons will manage both the vertical and lateral profiles of the flight. In fact, aside from following any ATC instruction and adjusting to final altitude you can actually relax for most of the cruise portion of the flight as we cross the North Sea!

For your reference, the aircraft has a range of around 600 miles at 3000ft or above. The service ceiling of the aircraft is 13,400ft.

Follow the ATC instructions (or if you are not using ATC descend when about 30 miles from Rotterdam) to be guided into your descent. Aim to descend at approximately 750 feet per minute. Use the autopilot for this if you wish. Monitor your airspeed and reduce power to prevent any tendency to over-speed.

As you are vectored for final approach slow the aircraft to 90 MPH and extend the

flaps. Turning to final approach fully extend the flaps and reduce airspeed to 75 MPH. You should aim to touch down at 70 MPH with full flaps.

The landing procedure may well be different from anything you are used to with a conventional tricycle aircraft. With a tail-dragger flaring for landing is a sure fire way to break your aircraft! We recommend a full "3 point landing" as being appropriate for the Pacer.

This is achieved by flying the aircraft almost parallel to the runway and reducing power to idle. If done gently it is possible to finesse the aircraft onto the runway with all 3 wheels making contact almost simultaneously, hence the term 3 point landing.

Once on the runway a slight backpressure on the yoke and gentle braking is required to bring the aircraft under control. Heavy braking is not advised as the aircraft can tip forward and cartwheel! Once speed has reduced to around 10 MPH it is safe to exit the runway. Ensure that you release the tail wheel lock for safe turning.

Head across to the parking area using the taxi method that we have discussed. Once parked, engage the parking brake and switch off the engine using the mixture control. Ensure that you turn off both the battery and avionics master switches.

A Note About Fuel

In the real aircraft the normal procedure during flight is to alternate the fuel usage between tanks, flipping between the left and right tanks before finally landing utilising fuel in the left tank. Unfortunately, Flight Simulator has an inherent issue with fuel tank imbalance that makes any aircraft very difficult to control should one tank have more than a very minor variation in fuel quantity to its opposite tank. This leads to adverse control issues and yawing and is significantly more pronounced than what is found in real aircraft.

To avoid this issue our Pacer will automatically utilise fuel from each tank, keeping both in balance. We believe that this compromise is the best solution to avoid the limitation of the host simulator and the issues that are caused.

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