

Introduction

About this Tutorial

Welcome to the Flight1 Cessna 441 Conquest Tutorial. This tutorial is designed to help you become familiar with the basic operation of the Conquest. This tutorial isn't, however, a substitute for the documentation that accompanies the product. Before using this tutorial, we suggest that you familiarize yourself with the basic operation of the aircraft as described in Section 7 of the User's Guide. You'll need to know how to operate the various systems within the simulator in order to complete this flight.

This tutorial will step you through only the steps that are needed to complete the flight. The 441's documentation includes complete checklists, which can be used once you are familiar with the basics of the aircraft, in order to enhance the realism of the simulation. You'll find several "Quick and dirty" checklists in this tutorial which outline the minimum steps needed to fly the plane.

About the Tutorial Flight

This flight will take us from Palm Springs, CA (KPSP) to Burbank, CA (KBUR), at FL200, in good weather. The flight is relatively short, and you'll only be at cruise altitude for a few minutes. But then again, the Conquest doesn't need much attention during cruise, so what you'll learn from this flight is what to do on the way up, and on the way down. During the flight you'll be passing through the Los Angeles basin, which is an extremely busy airspace. Expect to be handed off to quite a few controllers during this short flight. Near the end of the flight, you'll pass just west of Los Angeles International airport (KLAX), and if you have AI traffic turned on, you'll undoubtedly receive a few traffic advisories.

The flight begins at GA parking in Palm Springs, and will end at GA parking in Burbank. After landing, exit the runway to the left.

Using the Tutorial

You might find it useful to print this tutorial, and keep it next to you as you complete the flight. Whether you print it or view it electronically, we highly recommend that you read through the entire tutorial once before trying to fly it.

Getting Started

Loading the Tutorial

To begin the flight, select "441 Tutorial" under Select a Flight. This will load the Conquest and position you at KPSP. The flight starts "cold and dark" – meaning that all aircraft systems are off, just as they would be after a complete aircraft shutdown. Your flight plan has already been filed, and is loaded in the GPS.

The Flight

Getting to Know the Conquest

Before you continue, you may want to familiarize yourself with the cockpit layout. This is a good time to practice using the Conquest's Panel Manager feature to view the various sub-panels, and familiarize yourself with which controls are on which panels.

Preflight Checklists

Once in the aircraft, we're ready to start our preflight procedures. Here's a "quick and dirty" checklist::

Before Starting Engines

Parking Brake - SET
Throttles - FLIGHT IDLE
Condition levers - EMER CUT OFF
Battery Switches - ON
Fuel Gauges - CHECK QUANTITY
NAV lights - ON

Now we're ready to start the engines, using an Engine Start checklist: You should always start the left engine first in the Conquest.

Engine Start

Left condition lever - START AND TAXI
Left Start button - Press and hold till Left RPM rises
Left Generator - ON
Right condition lever - START AND TAXI
Right Start button - Press and hold till Right RPM rises
Right Generator - ON

After the engines are started, we can perform a Before Taxi checklist.

Before Taxi

Avionics - ON
Elevator Trim - SET IN TAKEOFF RANGE
Transponder - ON

Clearance

At this point, call Palm Springs Clearance, and request your IFR clearance. You'll be given your initial altitude, heading, and transponder code. Open the Avionics panel, and enter the assigned altitude into the autopilot using the knob at the far right. Enter 2000 as the initial vertical speed, using the UP and DOWN buttons. Your clearance read-back should have entered in your transponder code for you, but if not, enter that as well.

Taxi

Now call Palm Springs Ground, and request taxi clearance. You should be cleared to Runway 31R, which is plenty long enough for the Conquest. If you'd like the longer runway, you can ask the controller for 31L instead.

The Taxi checklist is simple:

Taxi

Parking Brake - RELEASE
Throttles - ADVANCE SLOWLY

To assist in maintaining your taxi speed, you might want to turn on the digital display on the airspeed indication, but clicking on the gauge. The RPM gauge should read between 65 – 75% during taxi.

Before Takeoff

At the hold short line, we'll complete a Before Takeoff checklist, and make some other flight preparations:

Before Takeoff

Trim - SET FOR TAKEOFF
Flaps - T.O. Position
Anti Coll Lights - ON
Landing Light - AS REQUIRED
Transponder - ALT
Pressurization - ON
Fuel Pumps - MAIN
Condition levers - TAKE OFF

Our clearance was to "fly runway heading" so we should move the heading bug to the runway heading (310) in preparation for engaging HDG mode on the autopilot.

Many pilots use a mental checklist that is pronounced "trimble-f", which is considered the informal "on and off runway" checklist, and consists of these items:

T – transponder
R – radios
M – mixture
B – boost pump (fuel pump)
L – lights
F – flaps

Not all items apply to all aircraft, but being consistent means that you probably won't forget any important items in any GA plane you fly. This checklist is just another check to make sure you're ready to go.

When you're ready to takeoff, call the Tower and request clearance. Taxi onto the runway, and come to a complete stop on the centerline.

Takeoff

Here's a takeoff checklist, which should be committed to memory:

Takeoff

Brakes - APPLY
Power Levers - SET TO FULL POWER
Brakes - RELEASE
Rotation - 98 KIAS
Obstacle Clearance Speed - 110 KIAS

After positive rate of climb:

Landing Gear - UP
Flaps - UP
Landing Light - OFF

When you're ready, apply the brakes, and advance the throttle to full power, and release the brakes.

Begin to rotate at 98 knots, and bring up the gear and flaps when you've established a positive rate of climb. Don't be in a hurry to get the gear up while there's still usable runway underneath you.

Once you're established in a climb on the runway heading, you can enable the autopilot. On the KAP140, click the HDG button twice to engage heading mode (first click will enable the autopilot master switch), and the ALT button to engage altitude mode.

Shortly after takeoff, you'll be instructed to contact Palm Springs Departure, and will be given a new heading. Simply move the heading bug to the new heading, and the plane will turn under the autopilot's control. You'll probably also be told to "continue on course" meaning that after you're established on the heading ATC gave you, you're then free to follow your filed flight plan.

Climb

The Conquest is designed to climb to cruise altitude at full power. The suggested climb rate for our flight is 140 KIAS up to FL200. You will control the airspeed by means of pitch, which is controlled by the Vertical Speed selected in the autopilot. So during the climb portion of the flight, you will need to keep a close eye on indicated airspeed, to make sure you are climbing at the proper rate. Depending on atmospheric conditions, you'll find that the Conquest is able to maintain proper airspeed at a vertical speed of over 2000 fpm.

Our flight plan will take us over the mountains bordering Palm Springs, and we also have a very short cruise portion. For both of these reasons, it's important to maintain full power and 140 KIAS to ensure we reach cruise altitude as soon as possible.

During the climb, ATC will clear you to higher and higher altitudes, up to our filed cruise altitude of FL200. Depending on how fast or busy the controllers are, you may find that you have to level off momentarily while until they issue you new clearances. Simply use the altitude knob on the KAP 140 to dial in each new altitude clearance, and double check that your vertical speed setting is correct to maintain proper airspeed.

During the climb, your primary responsibilities are to monitor the various aircraft systems, and keep up with ATC and new altitude clearances. The things to monitor are:

- Ensure EGT stays below the maximum of 450 degrees.
- Monitor the pressurization system.
- Monitor course to ensure you're on your filed flight plan.
- Monitor airspeed and adjust vertical speed as required to maintain 140 KIAS.

Cruise

Proper procedure in the real 441, when cruise altitude is reached, is:

1. Reduce throttles until EGT reduces 15 degrees.
2. Pull condition levers back to CRUISE (minimum RPM while airborne is 96%).
3. Obtain desired cruise EGT with throttles.

The Conquest is designed to run continuously at 100% RPM. The reduction to 96% is strictly for passenger comfort (less noise and vibration). Since passenger comfort isn't a big concern in the simulator, you either reduce the condition levers back to the CRUISE setting to get 96%, or just leave them forward and run the engines at 100%. Either way, RPM settings of less than 96% are not permitted while airborne.

During the cruise portion, here's a tip: as the autopilot follows the GPS waypoints, it's a good idea to always adjust the heading bug to the current heading. That way, when the need comes to change from NAV to HDG mode, you can simply engage HDG mode and be assured that you'll remain on your current course. This will give you a moment to make sure you make your course

adjustment on purpose, rather than engaging HDG mode and finding that the bug is in some unexpected place.

Descent

For the descent portion of the flight, we'll get acquainted with another method of controlling the autopilot – the Alt Alert control. This control is a fast, easy way to command a new altitude from the autopilot. When ATC gives you a stepped-down altitude, simply enter it into the Alt Alert, and press the ARM button on the right side of the instrument. The plane will assume a 1500 fpm descent, which is perfect for our flight. If need be, you can change the VS by opening the avionics panel and adjusting it as desired.

During descent, it's important to keep an eye on the airspeed, to avoid "tickling the barber pole" and producing an overspeed condition. Remember that as you get lower, the air gets denser, and the same power setting will produce higher and higher indicated airspeeds. So adjust power as needed to stay below the barber pole. Aim for 240 KIAS or less during descent. As you're descending into the Los Angeles area, there will be a lot of traffic. Try to keep your airspeed up, since the LA controllers don't need you doodling around in their airspace all day.

Follow ATC instructions for each altitude, and soon you'll be receiving your approach clearance into Burbank.

Approach

You'll be cleared for the ILS approach to runway 8 into Burbank, and be given a new heading as they vector you for the approach. Now is when you switch to HDG mode on the autopilot, and can also switch the GPS/NAV switch to NAV. We'll need NAV mode for the ILS approach.

You'll be flying a right-hand pattern, and you're already on the long downwind by the time you're passing LAX off of your left wing, probably on a heading of 260. Since you're making a long approach, keep your speed up during the downwind and base legs. Flying 220 KIAS on both downwind and base will still give you plenty of time to slow down in time for a proper approach. Depending on conditions, you'll find a torque setting of somewhere around 1200-1300 will yield close to 220 KIAS at 3100 feet.

As soon as you've switched to HDG mode, you can set up the NAV radio and HSI for the ILS approach. Tune NAV1 to 109.50, and set the course needle on the HSI to 077 degrees.

ATC will vector you directly over the coastline, ominously close to a large set of hills just inland from the Pacific. Don't worry; they'll turn you before it's too late!

You'll first get a vector to 315 degrees, 45 degrees off your downwind heading, and then another to 345 degrees, which is the base leg. Soon ATC will give you a vector to 045, and clear you down to 3000 feet. You'll also be instructed to remain at 3000 until established on the localizer, and they'll hand you off to Burbank tower. There's a lot going on right now, but don't forget to contact the tower! Enter 3000 into the Alt Alert, and press the ARM button.

Once you turn to 045, you're on an intercept course for the localizer, and you can now engage the autopilot's APR mode, and let it get you established. You'll notice at first that APR mode is armed, but not active, and you're still in heading mode. This is normal, since the autopilot hasn't yet taken over lateral navigation, but it will.

After engaging APR mode, begin slowing the plane down. You'll want to be at about 200 KIAS when you reach the SILEX fix. (You'll know exactly where you are if you leave the GPS window open for reference.) You may find the remainder of the approach can be flown at about 600 ft-lbs on the torque meter. This is a ballpark figure, but should get you close to the correct speeds.

At SILEX, you're established on the localizer, and APR mode is controlling your lateral navigation. You're on your way to the BUDDE fix, which is the FAF (final approach fix) for the ILS 8 approach, and you'll want to arrive at BUDDE at about 180 KIAS. This is where you'll intercept the glideslope, and you'll see the autopilot annunciator (just below the HSI) display "GS", meaning your vertical navigation is now being controlled by APR mode as well. (You can clearly see in this approach how APR mode is a dual-axis controlling mode. It first takes over for HDG mode when it captures the localizer, and then takes over for ALT mode when it captures the glideslope.) At BUDDE, as you intercept the localizer, lower the gear and one notch of flaps.

You should be cleared for landing somewhere along your final approach path.

When you're about 4 miles from touchdown, extend another notch of flaps, and you should end up at about 140 KIAS.

When you're at 1 mile, extend full flaps, and you should be slowing to about 100 (or less) knots, and aiming for 80 – 90 KIAS at touchdown.

Landing

Before landing, many pilots use an informal mental checklist, pronounced "gumps", which consists of these items:

- G – gas (fuel gauges, fuel tank selector)
- U – undercarriage (check gear down, three green)

M – mixture (rich for go-around)
P – prop (full forward/high RPM)
S – safety belts
S – switches (lights, etc)

The condition levers should be fully forward for landing.

If you're in the pattern, a good time to run this quick checklist in your head is when you're abeam the numbers on downwind, and getting configured for landing. Coming straight in like we are, you can run it when you're a few miles out.

You should hear the Decision Height warning at 300 feet. Make sure you've got all your ducks in a row at this point, and you're ready to put the plane down.

When you're comfortable (e.g. 100 feet left), disengage the master AP switch on the Main panel, and take control of the plane yourself. When you're sure you've got the runway made, pull the power levers back to idle, and flare when you get close to the ground. Radar altimeters like the one in the 441 are a great help to pulling off "greaser" landings. Remember that the radar altimeter scale actually goes *lower than zero*, so make sure you're looking at the right marks!

Hold the plane off the ground for as long as possible, but be careful you don't balloon.

Once you're on the ground, you can use brakes and reverse thrust to slow the plane down. Reverse is only recommended between 90 and 40 KIAS.

Taxi

Once you're off the runway (exit to your left), the tower will instruct you to contact ground. Come to a complete stop past the hold-short line, and quickly run the informal "on and off runway" (TRMBLF) checklist mentioned in the Before Takeoff section.

Verify you've completed everything with this quick After Landing checklist:

After Landing

Flaps – RETRACT
Landing/Taxi Lights – AS REQUIRED
Transponder – OFF

Now you can call Ground, and taxi to parking.

Shutdown

Here's a Shutdown checklist you can use once you've parked:

Shutdown

Throttle Levers - IDLE
Parking Brake - SET
Exterior Lighting Switches - OFF
Fuel Pumps - AUX
Avionics - OFF
Generators - OFF
Condition Levers - EMER CUT OFF
Batteries - OFF

Conclusion

Congratulations, you've completed your first flight in the exciting new Flight1 441 Conquest II!

As a reminder, please read the User's Guide for an in-depth look at the airplane's systems and operation, as well as the official checklists.

Where To Go From Here?

You should definitely try taking the Conquest on a "high and fast" flight. The Conquest is approved up to FL350. FL280 is a great altitude for this plane, and can often yield ground speeds in excess of 300 knots.

You should also try some "pure" flying, without the use of the autopilot. The Conquest handles extremely well, and is very pilot-friendly. To get a good feel for how the plane performs, try doing some standard flight maneuvers such as steep turns, power-on and power-off stalls, etc.

Printer-Friendly Checklists

The next page of this document contains all the "Quick and Dirty" checklists presented in this tutorial in a printer-friendly format, on a single page.

Flight1 Cessna 441 Conquest II

Quick and Dirty Checklists

Before Starting Engines

Parking Brake - SET
Throttles - FLIGHT IDLE
Condition levers - EMER CUT
OFF
Battery Switches - ON
Fuel Gauges - CHECK QUANTITY
NAV lights - ON

Engine Start

Left condition lever - START
AND TAXI
Left Start button - Press and
hold till Left RPM rises
Left Generator - ON
Right condition lever - START
AND TAXI
Right Start button - Press and
hold till Right RPM rises
Right Generator - ON

Before Taxi

Avionics - ON
Elevator Trim - SET IN TAKEOFF
RANGE
Transponder - ON

Taxi

Parking Brake - RELEASE
Throttles - ADVANCE SLOWLY

Before Takeoff

Trim - SET FOR TAKEOFF
Flaps - T.O. Position
Anti Coll Lights - ON
Landing Light - AS REQUIRED
Transponder - ALT
Pressurization - ON
Fuel Pumps - MAIN
Condition levers - TAKE OFF

Takeoff

Brakes - APPLY
Power Levers - SET TO FULL
POWER
Brakes - RELEASE
Rotation - 98 KIAS
Obstacle Clearance Speed - 110
KIAS

After positive rate of climb:

Landing Gear - UP
Flaps - UP
Landing Light - OFF

After Landing

Flaps - RETRACT
Landing/Taxi Lights - AS
REQUIRED
Transponder - OFF

Shutdown

Throttle Levers - IDLE
Parking Brake - SET
Exterior Lighting Switches -
OFF
Fuel Pumps - AUX
Avionics - OFF
Generators - OFF
Condition Levers - EMER CUT
OFF
Batteries - OFF