The following tutorial will guide you through the operation of the Shorts Regional Aircraft. We will use the original SD3-30 but the later SD3-60 is identical in operation. We will fly from Blackpool Airport EGNH To Belfast City Airport EGAC, where the Shorts aircraft were built, Regular destinations for these Shorts Regional Aircraft.

Note

This tutorial can be used with C23A and Sherpa Models

After you load The Simulator, go to the ACTIVITIES Menu. Scroll all the way to the Right and open the CUSTOM CONTENT Page FIG 1.0 below. Click on the Blackpool to Belfast image to load the Tutorial and once loaded, Press the FLY NOW Button at the bottom right of the screen as you would normally.

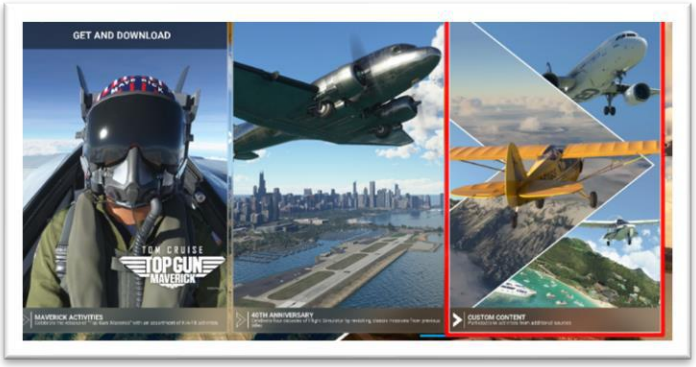

FIG 1.0

COLD AND DARK COCKPIT

When your flight has loaded you will find yourself on the ramp with the aircraft in a cold and dark state on a typical Rainy British day. You will of course need to ready the aircraft for flight so firstly let's get some electrical power.

Use the View shortcut keys (Left CTRL + 4) to view the electrical panel and switch on Both Batteries, A and B on FIG 1.1 Then select Internal Power on the ELECTRICAL MASTER Switch C with mouse wheel. We will switch to External power once we have a Ground Power Truck attached.

FIG 1.1

Whenever the aircraft has power applied it is generally the rule to switch on the beacon lights. You can do this by viewing the lighting panel on the First Officers overhead panel (Left CTRL + 0) then switch on your rotating beacons with the switch labelled D Fig 1.2

FIG 1.2

COLD AND DARK COCKPIT

Next, Switch on the AVIONICS MASTER Switch A on FIG 1.3. This will power up the Radios and other instruments allowing you to speak to ground services and get IFR Clearance for your flight.

FIG 1.3

By using the Top Menu, A on Fig 1.4, you can open the ATC Window and on here you need to press item 3, B on Fig 1.4, to contact ground.

FIG 1.4

Request a power truck from the Ground services menu and once it is connected you can select External power from the ELECTRICAL MASTER Switch C on Fig 1.1 this will prevent your batteries from flattening while preparing for flight and starting the engines. Now select BACK TO CLEARANCE From the ATC Menu and Request IFR Clearance from the menu. This will clear your flightplan for the intended flight.

PREPARATION FOR FLIGHT

ATC will give you the following information Fig 2.1, you can see that we will takeoff from Runway 28 and climb to 6000 Feet. The Altitude and Runway may vary due to other ATC Constraints. The squawk code will be entered automatically into the transponder.

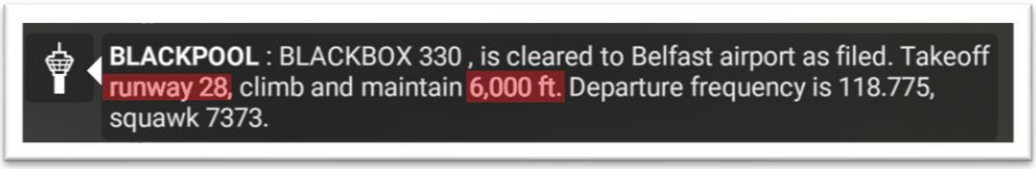

FIG 2.1

Set the required Altitude on the pre-selector Fig 2.2 to the assigned altitude. This may vary from ATC but in this case select 6000 ft. In a climb or descent, this preselector tells the Flight Director or Autopilot when to switch back to Altitude Hold.

Fig 2.2

At this point, to make life easier at this early stage, you can select the Flight Assistant (Your co pilot) Fig 2.3, A and have him operate the Radio Communication B for you. As well as turning on the Taxi Ribbon C If you wish.

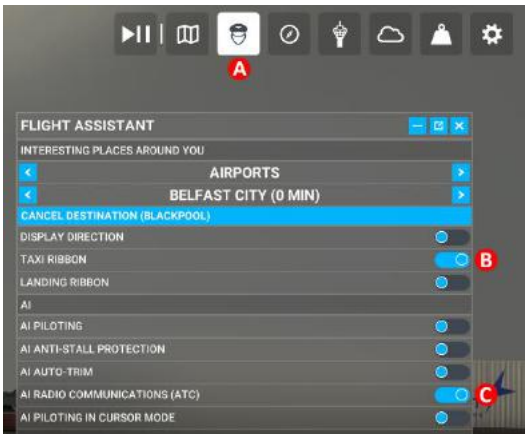

Fig 2.3

ENGINE START

IMPORTANT! Before starting the engines. You must secure the Aircraft by closing all exterior doors. A, B, C, D AND F. Do this by simply pressing the corresponding button on Panel 11 on the First Officers side Fig 3.1. To view this panel press Left CTRL + 8 and remember to stow the Airstairs D first, or they will prevent closing of the Main Pax Door E.

FIG 3.1

First of all you should “exercise” the Power Levers, A on Fig 3.2. Do this by pushing them both to Full power position, and then returning them to Flight Idle. Next the Prop levers B. Move these fully forward and then back to the stop, finally pushing them Through the stops to the Feathered position. Finally simply move the Fuel Levers C individually fully forward and then back to the CUT OFF position as illustrated.

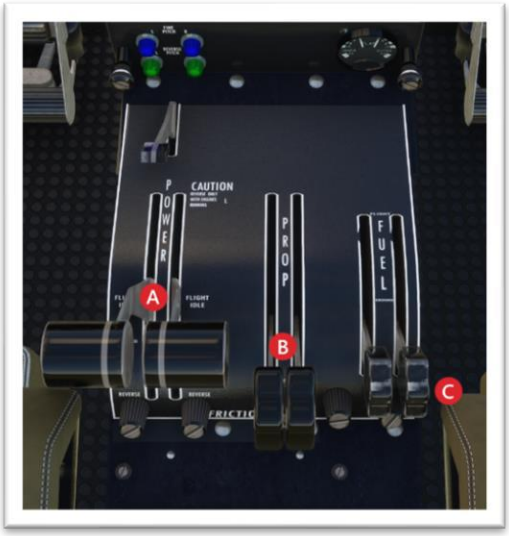

FIG 3.2

You may move these levers with an external Throttle Controller or via Dragging with the mouse, but The User must set these up and calibrate them as you would for any other aircraft.

ENGINE START

Referring to the overhead Fuel Services panel Fig 3.3, After checking Fuel contents are adequate A and B show just under 1000 lbs in each tank. Turn on both Left C, and Right D, Boost pumps.

FIG 3.3

The Amber lamps next to the fuel pumps should NOT Illuminate as they indicate that the Pump Filters are clogged.

Press the Start Master Switch F on Fig 3.4, downwards to the “Armed” position and familiarise yourself with the adjacent engine switches.

FIG 3.4

ENGINE START

It is time to start the engine, press the left engine starter H upwards, Fig 3.4. The green lamp above will illuminate and after a second or so the switch will return to centre.

When the start switch returns to centre, press corresponding ignition switch G, Upwards to the “ignition normal” position and focus on the Engine Gauges Fig 3.5 with Left CTRL + 2.

FIG 3.5

The GAS GENERATOR Gauge, Fig 3.5 L, will start to build up and when it reaches 20 Percent you should move the LEFT Fuel lever Fig 3.2 C, to the Idle (Mid) Position. This will introduce Fuel to the Left engine and the RPM Should continue to build. The ITT, Fig 3.5 M, will rise sharply to 700+ Degrees before falling back to approximately 450 as the RPM Builds and settles to Idle at around 65 or 70 %. Fuel Flow will also Peak. A quick check of Oil Pressure and Temperature needles in the green completes Engine #1 Start procedure.

The Starting of #2 Engine is a repeat of the above steps. When both engines are running normally you can move the prop levers forward out of Feather position to Ground or Fully coarse position.

PREPARATION FOR FLIGHT

With both engines now successfully warming up you can now go back to the electrical panel. Ensure Both generators are ON Fig 4.1, O and P. Check that the GEN Annunciators on the Glareshield are now OFF, Fig 4.1, Shows them ON.

Switch from External to Internal power, Fig 4.1, Q and tell the ground controller you are finished with the power Truck. It will disconnect and move away.

FIG 4.1

FIG 4.2

Shorts SD3-30 G-BDBS prototype Sitting on the Ramp at Belfast City.

PREPARATION FOR FLIGHT

For the sake of this tutorial we will be using GPS and Autopilot to help us fly the route, although in reality, few Aircraft were fitted with autopilots. The GPS can also of course be used just as a guide to drive the Flight Director for manual flight. So, firstly enable the GPS using the Toggle switch G on FIG 4.3 and press ENT, labelled H on the GPS Unit when prompted to do so as it starts up and initialises.

FIG 4.3

Pressing LEFT CTRL + 3 will zoom into the GPS FIG 4.4 so you can see the map more clearly and adjust the settings. The beginning of your flightplan along with the track and distance to your first Waypoint will be visible on the GPS Nav screens.

FIG 4.4

PREPARATION FOR FLIGHT

Turn both the HDG, A and COURSE, B knobs on the HSI Fig 4.5 To 275 degrees (our assigned Runway Heading) The Course will appear in the HSI "Course" window. Then go to the Flight Director control panel C. Press the HDG button D, and ALT SEL Button E. This will set up the flight director to help you steer the course manually, or you may decide to let the Autopilot fly the route. Either method will require the GPS DRIVES NAV1 Button, F to be pressed. This will turn the lamp to magenta, indicating that the autopilot is ready to accept commands from the GPS.

FIG 4.5

TAXI TO RUNWAY

On the ground radio we can now announce that we are ready to depart and get our taxi instructions prior to Takeoff. Fig 5.1

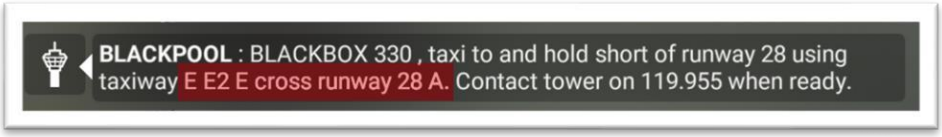

FIG 5.1

The TAXI RIBBON selected from the Flight Assistant Menu, will show you the directions for Taxiing to Takeoff. You will however notice that you are facing the wrong way so you can either choose to take a push back tug and instruct him to push you left or right. Or you can use the tight turning circle of the SD3-30 to spin around a 180 degree turn on the ramp. Release the parking brake and apply a small amount of power until you start moving forwards then turn fully right until your pointing towards the runways with the arrows in sight.

Follow the taxi arrows until the holding point of Runway 28 and stop. ATC will give you take off clearance, and the arrows will then continue onto the runway. Follow the arrows onto the runway, but notice they are going in the wrong direction so turn another 180 and line up on the centreline. Apply the brakes you're ready for takeoff.

PREPARE FOR TAKEOFF

IMPORTANT! Before takeoff you must set the engine Fuel Levers forward to the FLIGHT position Fig 6.1 A and Both Prop levers forward to FULLY FINE Fig 6.1 B position.

FIG 6.1

Set flaps Fig 6.2 A, down two notches to 8 degrees and apply about 20-25% nose up trim B (2 to 2.5 Degrees nose up) so the needle is at the lower end of the green marker.

FIG 6.2

Finally, release the Control Lock with the Lever at the rear of the centre console, extinguishing the Warning on the annunciator panel. This will also set the Ground / Flight Throttle lock to the flight position.

PREPARE FOR TAKEOFF

Because our Blackpool weather is pretty dismal it would be a good idea to setup the Weather Radar to see what you will be flying into. Using the main control and range knob Fig 6.3 A rotate firstly to standby position. The radar needs a little time to warm up so wait for the screen to indicate STDBY before switching to TEST Mode. Once The radar has done a full test screen you can select a range. We suggest 10 nm. All this is done with the Rotary Range knob A you will eventually see the current Weather situation on the screen B.

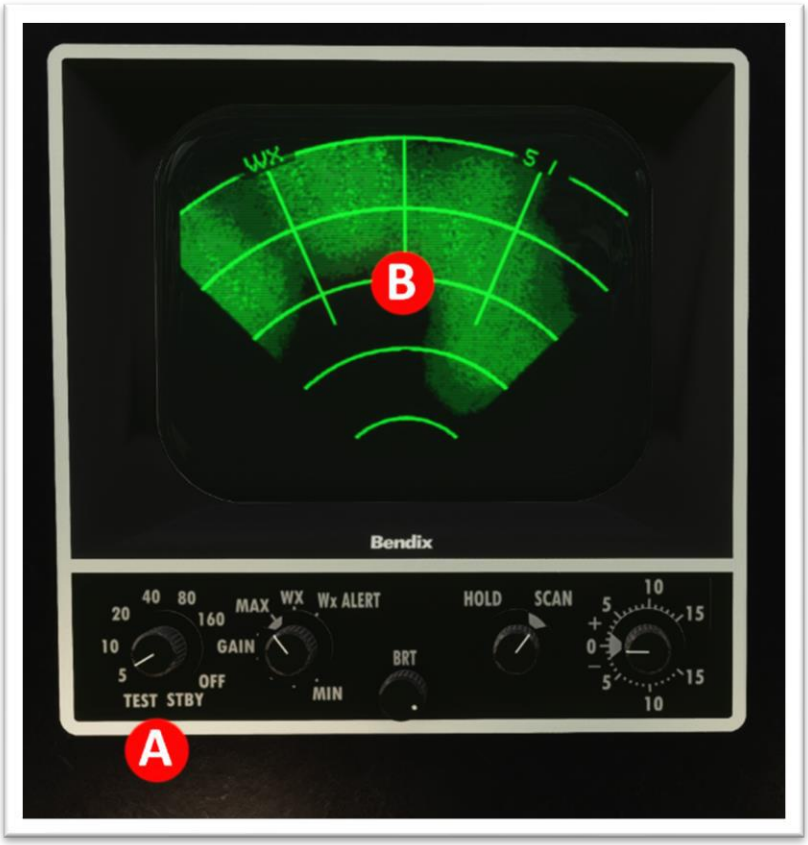

FIG 6.3

If this weather turns out to be very severe then the Radar will indicate this with very bright areas to the centre of the clouds. Be prepared to use some Ice Protection if required, especially if flying in cloud.

TAKEOFF AND INITIAL CLIMB

When you are comfortable and confident that all systems are as you expect, it's time to fly. Apply full power and release brakes. The Aircraft will quickly accelerate and probably require some small rudder inputs to remain on the centreline. When the Airspeed reaches 100 Kts gently pull back on the yoke to rotate and pull the nose up to approximately 5 degrees. As you climb through 50 feet and with a positive rate of climb, Raise the gear and continue to climb and accelerate. As your speed and altitude increases to around 130 knots and 500 feet, retract the Flaps. Stabilise the climb and gently release the back pressure as your speed increases. Aim for around 1000 – 1200 feet per minute.

Now pull the prop levers back a little to set Maximum 1650 RPM on the prop gauges Fig 7.1, A and reduce the power levers to achieve 3.7 on the Torque gauges Fig 7.1, B. Finally Press the Prop Synch Button Fig 7.1, C to equalise the RPMs. The white Auto Feather Lights come on Automatically above 88% Engine RPM.

FIG 7.1

AUTO FLIGHT

Engage the Autopilot by pressing “Z” on the keyboard or by pressing the AP ENG Button C on the Autopilot controller Fig 8.1. You will find this below the Throttles. The autopilot will “hold” your current Pitch Attitude and, as you pre-selected HDG mode, it will be tracking the heading of 275 Degrees. Please note: Autopilot can NOT Be engaged below 100 Ft Radio Alt.

FIG 8.1

You can change to a number of vertical Modes on the AP controller.

IAS mode - rather than using the default pitch hold. Press the IAS button Fig 4.5 G (p10) on the autopilot. This will capture the current airspeed and the aircraft will climb at this speed regardless of vertical speed. This can be adjusted via the Pitch control wheel Fig 8.1 D, by rolling the wheel forwards to decrease the airspeed / Increase the climb speed or roll backwards to Increase the airspeed and decrease the climb rate.

VS mode – Pressing VSI Captures the current vertical speed, and the aircraft will continue at this selected rate regardless of airspeed. This can be adjusted via the Pitch control wheel Fig 8.1 D, by rolling the wheel forwards to Reduce the Vertical speed / increase the airspeed or roll backwards to Increase the vertical speed and decrease the airspeed.

CLM mode - 150 Knots is the normal climb speed for the SD3-30 Aircraft so CLM mode will automatically set it there as best climb speed.

DSC mode – Will enter a gentle 600 FPM descent which is adjustable as described in the VSI Mode detail above.

ALL of these modes will revert to ALT HOLD Mode once the preselected Altitude is reached. Please note! Climb modes will be disabled if Preselect is Lower or equal to current Altitude and vice versa for Descent modes.

AUTO FLIGHT.

Once established in the climb we can now follow the GPS Flightplan so, to engage the GPS (remembering we selected GPS prior to takeoff on the selector button just above the HSI Fig 4.5 F on Page 10). Now we press the Autopilot NAV button Fig 7.2 E. The green NAV symbol will illuminate, and the Magenta GPS Symbol will also light. You will see that HDG symbol is now extinguished, and GPS/NAV is illuminated.

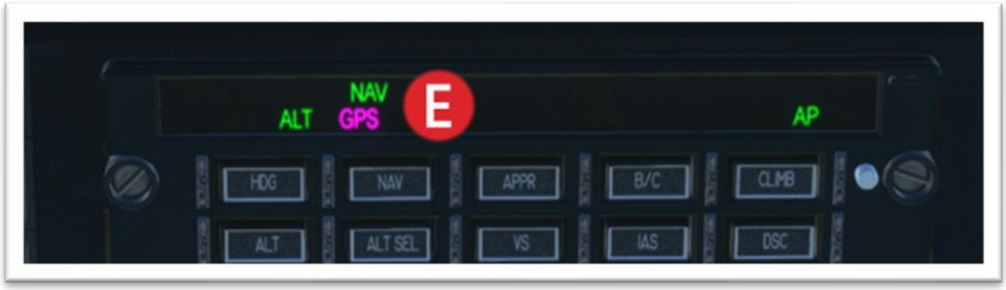

FIG 8.2

You are now following the GPS Flight Plan and the aircraft should follow the GPS track laid out in the CQ10 departure routing towards the INKOB waypoint as you approach the Isle Of Man Fig 8.3.

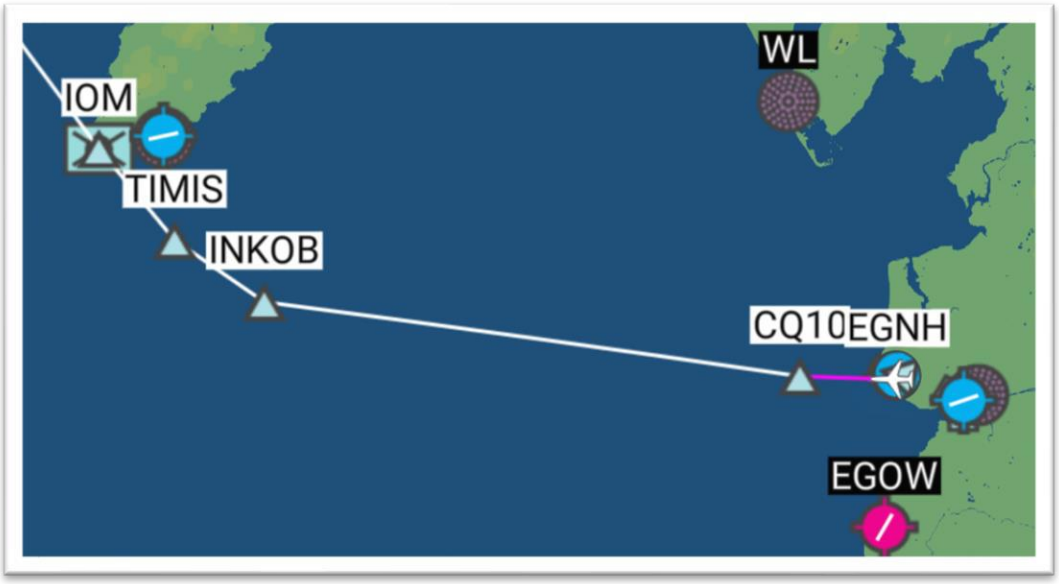

FIG 8.3

If you wish to fly the route Manually of course you can do so by following the Flight Director commands with Autopilot disconnected.

CRUISE FLIGHT

As the aircraft levels off at your assigned altitude you will need to adjust the power and props again to prevent over speeding. Reduce the prop Rpm to approx. 1400 Fig 9.1 A and adjust the power levers to remain between 3.5 and 3.7 Torque Fig 9.1 B for a good economical cruise. This is referred to as (TQ 3.7) and is the “normal” Torque setting used apart from Descent and Deceleration.

FIG 9.1

You May be instructed by ATC To change altitude. This can be achieved easily using the Autopilot controls. In the cruise we are in NAV/GPS mode and also ALT HOLD mode. So If ATC gives us a new altitude, we need to set this new altitude in the preselector, select ALT SEL Fig 9.2 A, and then hit DSC or CLM Buttons on the AP Controller B or C. depending on whether a Climb or Descent is required. When descending Pull the Torque levers back to approx. TQ 2.0 to prevent over speeding and push them back to TQ 3.7 to reacquire your desired cruise speed when you level off.

FIG 9.2

CRUISE FLIGHT

Cruising over the Irish Sea, between the cloud layers. The Radar scope is now pretty clear so we can relax a little. Watch the Outside Air Temperature "Oat" and assign any Anti Icing measures that may be required. Monitor the instruments, fuel, Speed and Altitude and just enjoy the clouds below while we transit the Irish sea above the Isle of Man.

DESCENT

As you reach NELBO waypoint, ATC should instruct you to begin your descent. On this instruction pull power/torque levers back to TQ 2 and preselect the assigned altitude. Then hit DSC on the Autopilot. You can set the descent rate by adjusting the Vertical speed on the Pedestal Autopilot control Fig 10.1 D. By rolling this wheel forwards, you will Increase the vertical speed and of course Vice Versa, Rolling the wheel backwards will decrease your vertical speed. A setting of -1000 Ft for your descent leg would be appropriate.

FIG 10.1

As you approach MAGEE waypoint, the controller may give you a final descent altitude of 2000 ft and tell you to expect an ILS approach on Belfast runway 22. Adjust the preselected Altitude to 2000 if necessary and prepare for the Approach. Set Flaps to 4 degrees and Tune Nav1 to the Runway 22 ILS - 108.1 (This frequency is already set in the standby Nav1 slot and can be activated by flicking the Txfer switch on NAV1 Radio, Fig 10.2, upwards. You also need to set the OBS Course for the ILS Runway heading of 217 degrees on the HSI.

FIG 10.2

FINAL DESCENT AND APPROACH

Please note. The GPS400 cannot send VNAV (Vertical navigation) Commands directly to the Autopilot or flight director like some more modern GPS Systems so a full RNAV Approach is not possible. We have to combine our GPS Flight plan with a Standard NAV1 ILS Approach. We will get a little help though as the System will allow us to select Approach Mode while still following the GPS Track and automatically switch from GPS to NAV modes when the localiser is established. Fig 11.1 Shows our AP in our current GPS tracking mode.

FIG 11.1

At approx. 5 miles from MAGEE waypoint press the APPR Button on the autopilot controller to initialise the Approach Mode. We will see the Green APP is Illuminated and also ARM in amber Fig 11.2. The system will now intercept and lock onto the Localizer and begin to track the glide slope once available.

FIG 11.2

Before turning at MAGEE Waypoint, you should be close to your assigned altitude and prepared for the approach. This is effectively the base leg so set The first level of Flaps and lower the landing gear. We need to control the Airspeed to ensure it remains at approx. 130 Kts as we enter the Final leg. This will require just small power adjustments.

APPROACH AND LANDING

The autopilot and flight director will steer us onto the Glide Path and once we are locked onto the localizer, the amber ARM will extinguish. GS will now illuminate green with ARM alongside in amber to signify that the Glide slope is received and ready to be acquired Fig 12.1. Set flaps to 8 and adjust power for approx. 120 kts. Note The vertical mode can be ALT CLMB VS or DSC at this phase dependant on you being above or below the GS and descending or climbing to intercept it. GS can be acquired from either above or below.

FIG 12.1

Once the Glideslope is acquired the Amber ARM will extinguish leaving APPR and GS showing green. The image below Fig 12.2 shows the AP fully established in the APPR Mode and fully locked onto both Glide Path and Glide Slope. Lower flaps to 15 and push prop levers fully forward to Fine Pitch setting. This will again require some throttle input so adjust power and allow speed to decay to a minimum 110 Kts. This should be between 1.0 TQ and 1.50 TQ. The AP Will now control pitch and heading to hold the aircraft on the Approach. Or as previously mentioned, you can fly the approach manually using the FD bars.

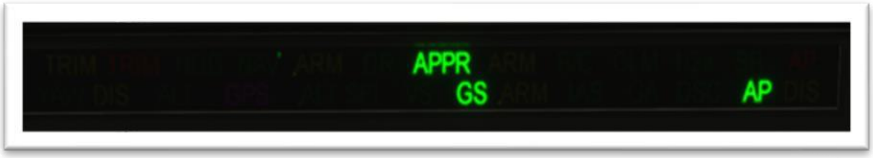

FIG 12.2

Carefully monitor the Approach now as you get closer to the threshold. And at 1000Ft AGL Lower the flaps to Full, adjusting power where necessary to hold around 100 Kts. You may take over manual flight at any time of course by Disconnecting the AP. Use either the AP ENG button on the console or the AP Disconnect on the Yoke. (You may also press the Z Key of course)

BE AWARE! The Autopilot will automatically disconnect at 100 Ft AGL.

APPROACH AND LANDING

As you approach the threshold of runway 22 at Belfast City Airport Your Shorts SD3-30 has been expertly handled and is ready to touch down. As the runway gets closer Be ready to take over manual control at 100 Ft (radio alt) With small throttle movements while holding the Glideslope and Glidepath. Allow the speed to decay further to 95 Kts (With full flap) as you pass over the threshold. Holding the nose off carefully for a mainwheel touchdown at approx. 85 Kts. Lower the nosewheel gently to the runway and select Reverse Thrust by pressing the F2 Key or by setting your throttle levers if they have a Reverse position. You may still need Aileron and rudder to keep the aircraft stable and on the centreline until speed drops to 30 Kts or less. Return the power levers to Flight Idle. Tower will ask you to leave the runway so If you still have TAXI ARROWS Enabled, they will now appear showing the direction to leave the active runway so Follow them onto the indicated taxiway.

TAXI TO PARKING

As you taxi off the runway Stow the flaps and place the engine FUEL Levers Fig 13.1 A, back into the ground (MID) position and the prop levers fully back to TAXI position But NOT Into feather. Its also normal practice to put the control locks back on now by pulling the lever between the seats.

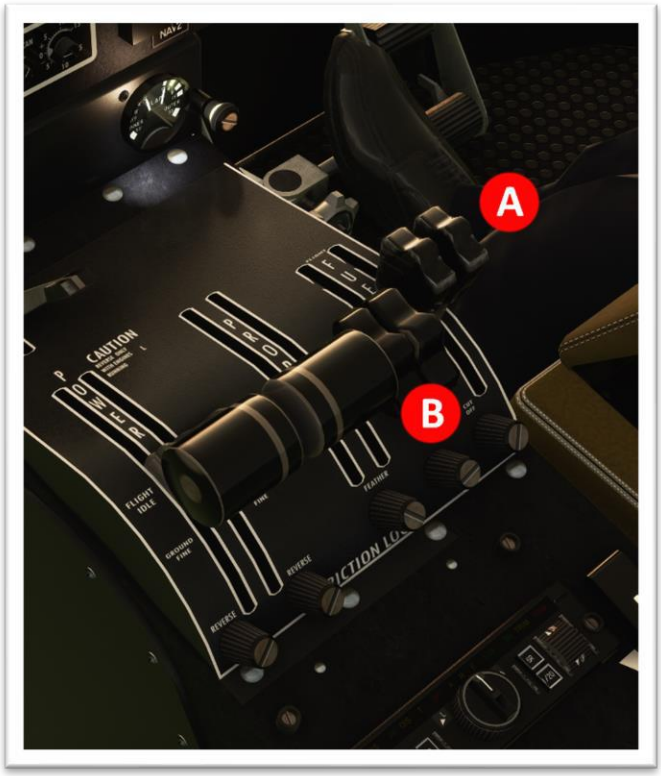

FIG 13.1

On your comms menu select Ground and request Taxi to the gate. The controller will come back to you with a parking slot and directions. Fig 13.2

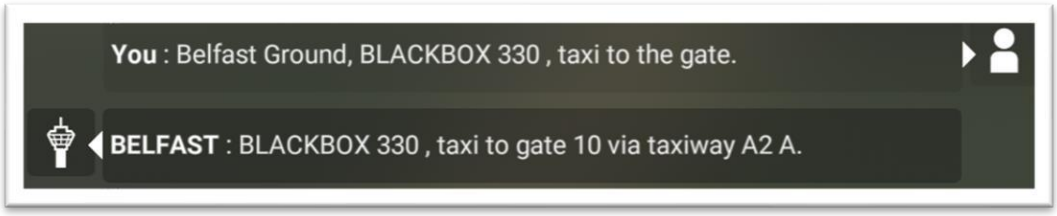

FIG 13.2

Follow the Taxi Arrows as before to your assigned parking slot and follow the Marshallers instructions. Once you are in position and stopped, Apply the

parking brake and switch off Landing, Taxi and Nav lights leaving the beacons until properly shut down.

SHUTDOWN AND SECURING THE AIRCRAFT

Turn off the engines individually, starting with the left engine by placing the respective fuel lever into the off position (fully back) and place the respective prop into feathered by pulling the prop levers fully back. Repeat for right engine.

CONGRATULATIONS

Well done Captain. You have completed your tutorial flight in the Shorts SD3-30 Now perhaps try the SD3-60 from Dublin to the Isle of Man. Or maybe some North American feeder flights. The world is literally your oyster.

ENJOY