QualityWings SIMULATIONS

Complexity...*Simplified!*


# The Ultimate *146* Collection

## Quick Start Manual

Version 1.4 — December 2013

# Content

# FLYING TIPS

*Tutorial Flight*
*(Avro RJ-variants)*

In this chapter our Flight Dynamics Designer Nick Peterson will give you valuable tips and explanations on how to properly operate the Avro RJ series of aircraft.

The Flying Tips are split up into the following topics:

**- Cold & Dark Startup**

**- Pre-Flight**

**- Engine start and Taxi**

**- Take Off and Early Climb**

**- Climb, Cruise and Descent**

**- Approach and Landing**

**- After Landing / Parking**

**- Shutdown**

These techniques were comprised after numerous conversations with real world Avro RJ and BAe146 pilots.
Nick has never personally flown the -146 (other than observation in the jumpseat) but his experience as a professional airline pilot has consisted of flying—in no particular order—the A319/A320/A321, B757-200, B767-300ER, EMB-145, SF-340 and J-31.
This experience gives him a very close understanding and translation of the operating techniques required to fly the Ultimate 146 Collection.

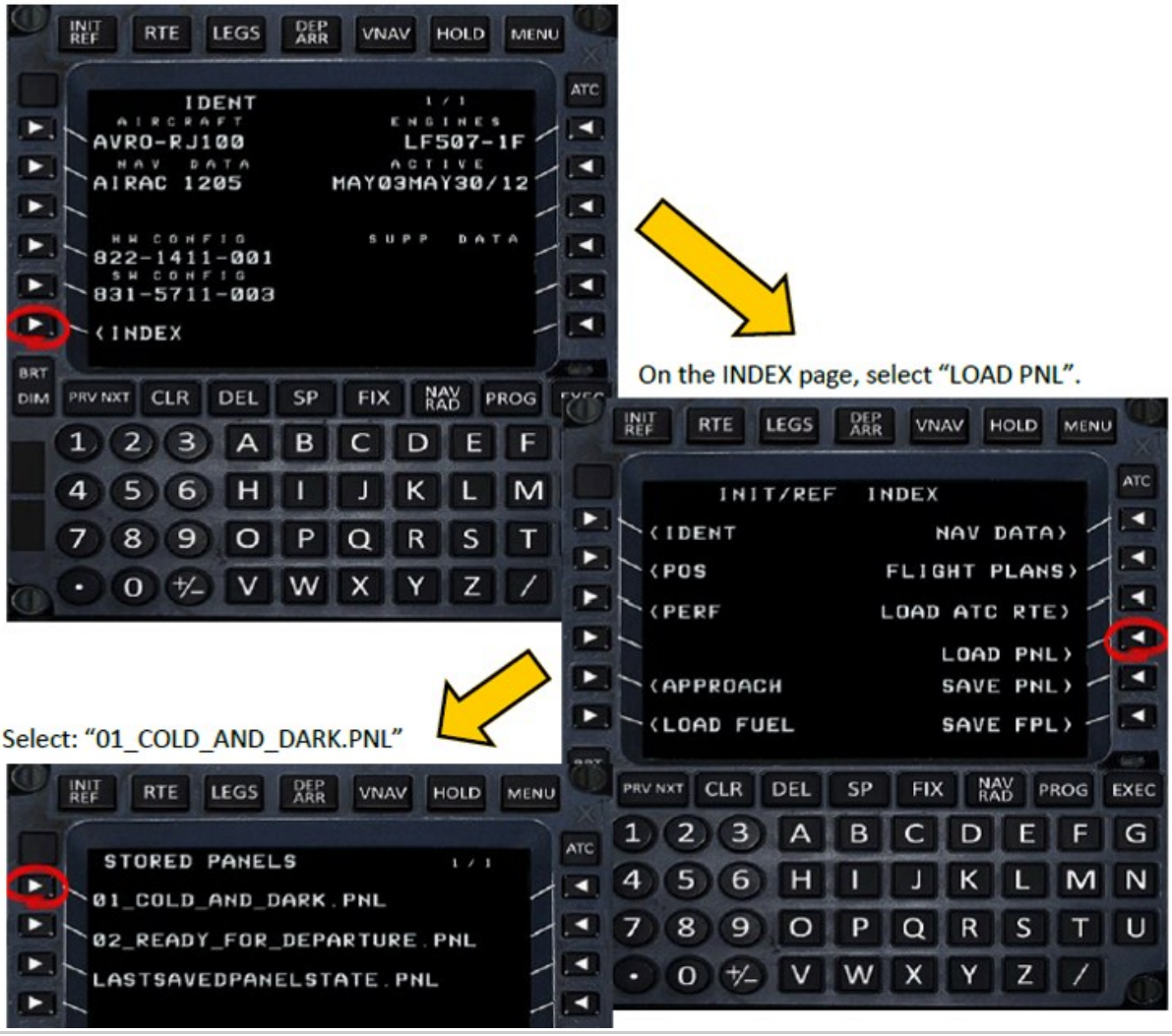
Before we go into details let us explain our general mouse click philosophy...
In the whole cockpit you will always find our left- / right-click philosophy.
A click with the left mouse button always decreases a switch position, while a right click always increases it.
You will quickly learn to love this behavior!

## *Cold & Dark Startup*

When you load the airplane, it will already be ready to go. Should you want to do a complete startup, we have to bring it into a condition called “Cold & Dark”. This is what we call a completely unpowered Flightdeck.
In the Ultimate 146 Collection there are two options to bring the airplane into this condition.

**Option 1)**
Root to your Flight Simulator folder. Open the file qw146.cfg within the QualityWings folder using Notepad or the Editor and add the following line to it:
PanelState=01_Cold_And_Dark.PNL
This will load the Cold & Dark panel state every time you load the plane.

**Option 2)**
Open the FMS by either using the „FMC“ Simicon, by pressing Shift+6 or use it in the Virtual Cockpit.
The first thing you will see is the INIT REF page.
Follow the instructions below to manually load the Cold & Dark panelstate.



***Step 1*** — Switch on the Battery


Switch on the Battery on your lower Overhead Panel. In the 2D Panel it can be accessed via the "OH1" SimIcon or by pressing SHIFT+2.

***TIP:*** *You can easily navigate through the 2D Overhead Panels by using the small arrows in the upper right corner.*

The aircraft is now powered on an emergency power level. You will see various annunciators come on and hear a triple chime warning sound. In order to mute that sound, click the blinking red attention getter on the glareshield in front of you.

Verify that the Standby Inverter and Standby Generator Switches are set to the ARM position.


This is also the time where you should turn on your navigation lights (Upper Overhead Panel. SimIcon: “OH2” / SHIFT+3) and arm the flightdeck emergency lights. You can see the locations of the according switches below.

## ***Step 2*** — Start the APU

The Battery alone will not provide enough power to start the engines and run all systems. We need more power. We can either connect a Ground Power Unit to the plane or use the Auxiliary Power Unit in the tail of the Avro RJ.


Before you start the APU, make sure you switch on the left inner Fuel Pump in order to provide fuel for the APU.

Then move the APU START / STOP switch to START. You will quickly see the RPM and EGT rise. If you open the flightdeck window behind you or change to an outside view you can even hear the APU start.

After about 27 seconds you will see a green APU PWR AVAILABLE Annunciator come on.

The APU is now running and ready to provide power to the aircraft.

**Should you want to use the GPU**, you have to connect it via the QualityWings ControlPanel (described later).
Make sure that your parking brake is set, when you do this.

Once the GPU is connected, press the EXT AC switch on the lower Overhead panel to let the GPU power the aircraft.
If you use this option, you can skip Step 3 on the next page.

The APU is running but doesn't provide any power to the airplane yet. Let's change that!

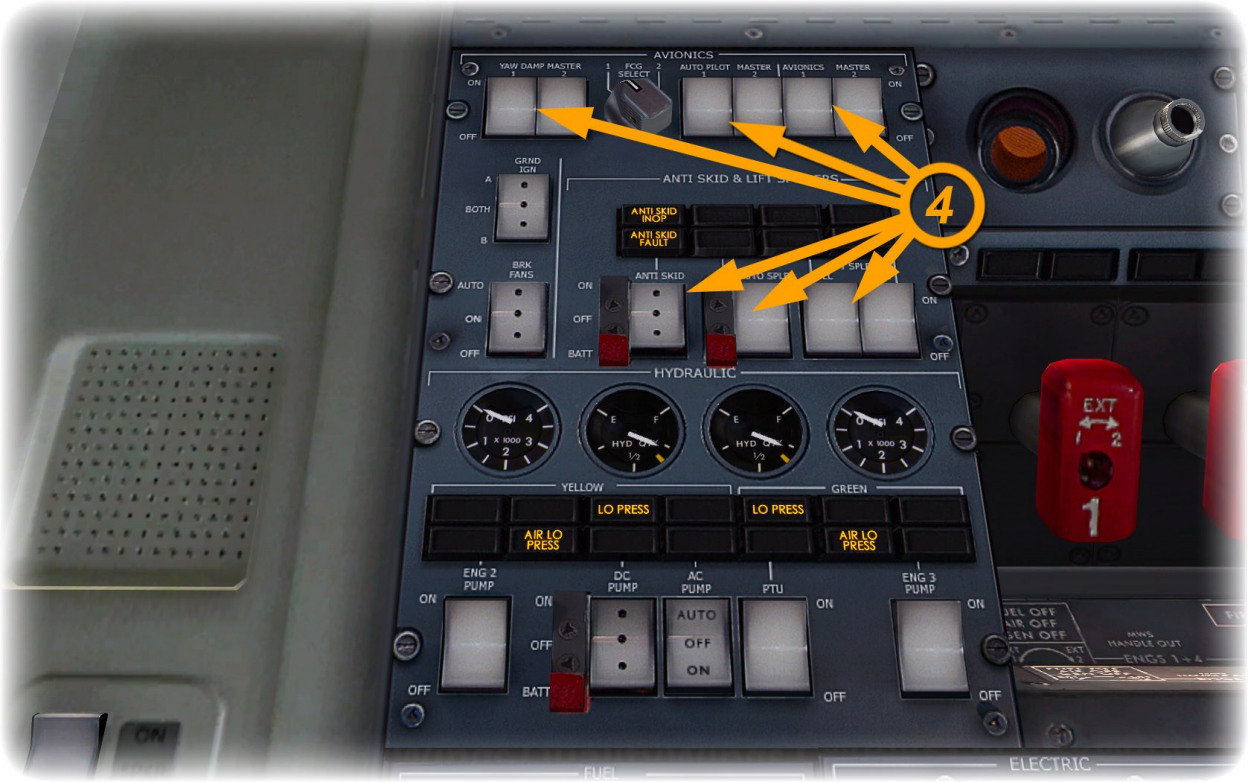
### ***Step 3*** — Connect the APU Generator


First move the APU GEN switch from OFF/RESET to OFFLINE by right-clicking it. This connects the generator drive to the APU.
Now check out the two marked gauges to observe the APU Power output. Move the small selector to 'APU' and observe if the power output is good to use (needles in the green range).

If so, right-click the APU GEN switch again to connect the Generator to the electrical system.
You will hear a clacking sound when the contactor closes and the noise of the equipment cooling fans.

When looking around in the cockpit you will notice that the screens are still off. No worries, we'll take care of that in Step 4.

***Step 4*** — Power up Avionics and set up the Antiskid & Liftspoiler systems




Right above your head on the upper overhead panel you will find plenty switches for Avionics, Antiskid and the Liftspoiler systems. Move all marked switches to the ON position.

Once you flipped the AVIONICS MASTER switches you'll see the screens come on. Note this takes a bit of time since we're talking about CRT screens.

## ***Step 5*** — Align the Inertial Reference System


The Inertial Reference System (IRS) tells us where our plane currently is. As long as this system is not active, you won't see an artificial horizon on the Primary Flight Display as well as no navigation information on the Navigation Display.

To activate the IRS move over to the IRS panel on the First Officer's side and put the two marked rotary switches to NAV. The system will need about 10 seconds to align until it's usable. This time is customizable via the qw146.cfg. In the 2D Panel, the IRS Switches can be accessed by opening the Audio Panel using the "AUDIO" or "IRS" SimIcons, or by pressing SHIFT+7.

Important: Do not move the aircraft while the IRS aligns.

## ***Pre-Flight*** - Programming "The Box"

I'll give a brief explanation of how to program the FMC (sometimes referred to as "the box") for a typical flight.

Today well be flying an Avro RJ70 on a flight from Boston Logan (KBOS) to Buffalo (KBUF), New York.
The flight information is as follows:

**Route:** **KBOS-SYR-ROC-EHMAN-KBUF**
**Altitude:** **FL280**
**Distance:** **348NM**
**Block Fuel:** **4700 KGS (10500 LBS)**

Departing runway 4L on the Logan 6 departure and in Buffalo arriving runway 23.
First, we need to load the fuel from the Dispatcher.

### FUEL PLANNING

*The fuel quantity calculated is only the amount of fuel needed for the fly distance.*
*Like any other real world flight plan you need to add taxi fuel, holding, alternate and minimum reserve fuel (30 or 45 mins depending on regulations)* ***IN ADDITION*** *to what the fuel planner says.*

*For example:*

| | |
|---|---|
| *Fuel Burnoff ( Dispatcher fuel):* | *2800 kgs (distance specific)* |
| *Taxi fuel:* | *180 kgs* |
| *Alternate if required:* | *2000 kgs per hour* |
| *Min Reserve at least:* | *1700 kgs* |
| *Extra for delays or holding:* | *2000 kgs per hour* |

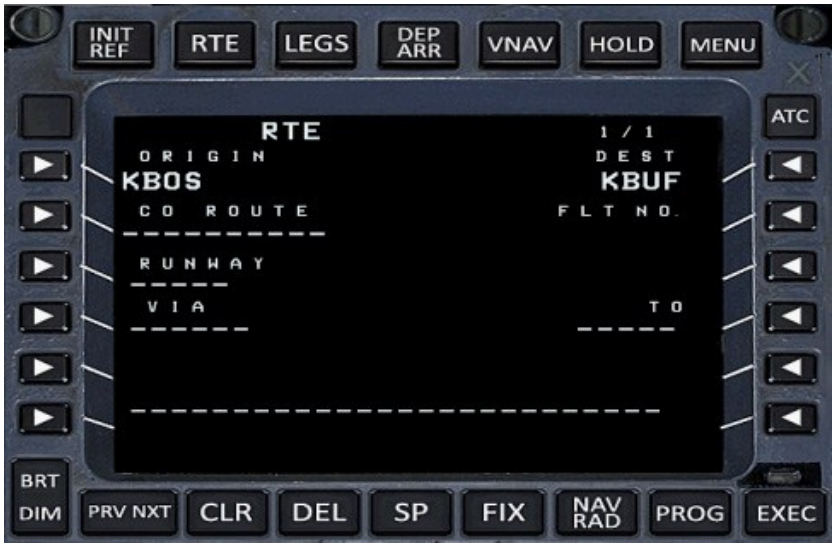
*So at a minimum with no alternate this flight would need* ***4700KGS*** *(rounded) to be loaded.*

If you load the plane, the amount of fuel specified in the QW Dispatcher will be loaded automatically. You can see this by a message in the FMS' scratchpad.

Should this not be the case, you can manually load the fuel by following the steps below:

1. Press the INIT REF button in the upper left corner of the FMS
2. Press LSK 6L to get to the INDEX page
3. Press LSK 6L again to load the fuel ( „<LOAD FUEL" entry on the screen )

Now we'll start entering our actual route. Press the RTE key.
Enter the DEP and ARR airport four letter ICAO codes. In our case this is KBOS and KBUF.




Now select the departure runway and SID. To do so press the DEP / ARR key.


Select DEP (LSK 1L) and then choose runway 04L. The FMS will automatically filter the SIDS to those available for the selected runway. Select the SID LOGAN6.

Return to the RTE page. You will see LOGAN6 inserted as an airway to the last waypoint of the SID. In this case this is HD036.


The next waypoint is SYR. Simply enter SYR in the scratchpad and insert it after the last waypoint of your route. Here this means you have to press LSK 5R.

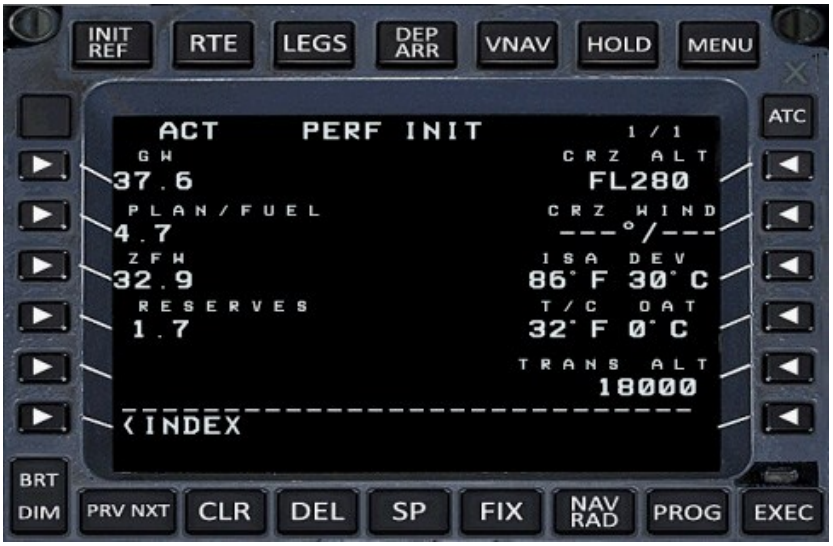

We have reached the end of the page. In the upper right corner of the screen you might have noticed that the page display changed from 1/1 to 1/2. You can now select between the pages via the PRV / NXT key in the lower left corner of the figure above.

Insert the waypoints ROC and EHMAN in the same manner on page 2.

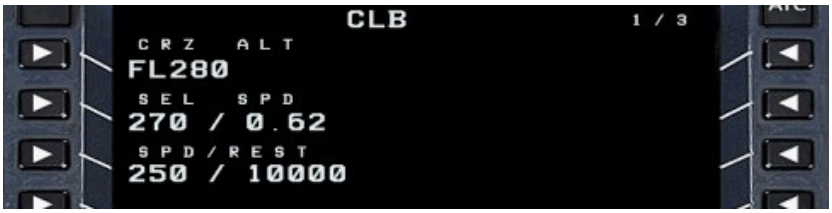

Now return to the DEP/ARR page again and press LSK 2R to get to the arrivals page.


Choose ILS23 and do not select a transition unless it is on the ATC flightplan.

Next press the INIT REF key. Verify the fuel matches what was loaded. Also verify the Zero Fuel Weight and Gross Weight. These should match your planned takeoff weight and the GW will be used to set takeoff V speeds. Enter reserve fuel, in this case 1.7 (1700KGS). Confirm the cruise altitude of FL280 and enter FL280 if not displayed:




Next press the VNAV key. Enter a CLB speed of 270/.70M. This will vary depending on company policy or other factors such as headwind/tailwind. Generally a climb speed of 270-280kts transition to climb Mach of .65-.70 is good:

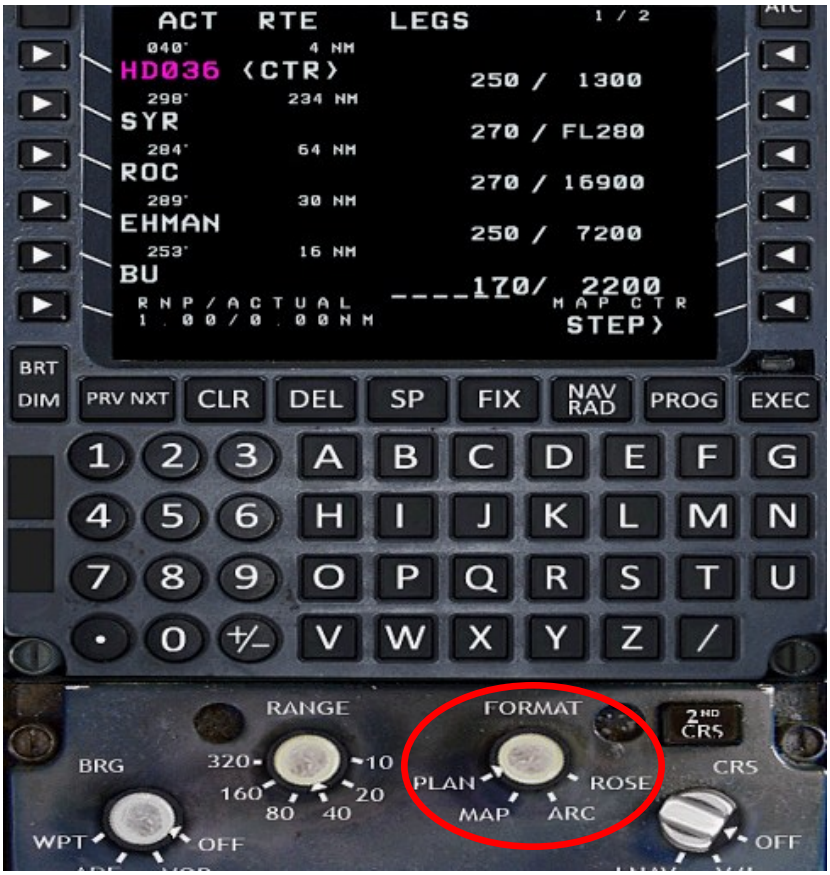



Press NXT to get to the CRZ page in VNAV. Once again enter 270/0.70M. The same speeds above for CLB will work great in cruise.


Press NXT to get to DES. Once again enter 270/0.70M:

Press the PROG key. Verify the distance to KBUF matches the flightplan. There may be some small differences as a SID or STAR will add mileage. What we do not want is a **huge** difference.


Finally select the LEGS page. Using the FORMAT knob on the EFIS control panel select PLAN. Press LSK 6R to step through and verify on the the map display the proper route. Look at any climb restricted altitudes that are part of the SID. If there a restriction, now would be a good time to set in the the MCP altitude window. In this case the LOGAN6 has no constraints.



Should you see a route discontinuity, select the waypoint after it (here: BU) and insert it into the line that contains the discontinuity. Always press EXEC after any changes.



That's it! The route is set up and you are ready to depart. You should now select either the LEGS or VNAV page for the initial departure and climb. After that the PROG page is acceptable.

## ***Pre-Flight*** — The Thrust Rating Panel

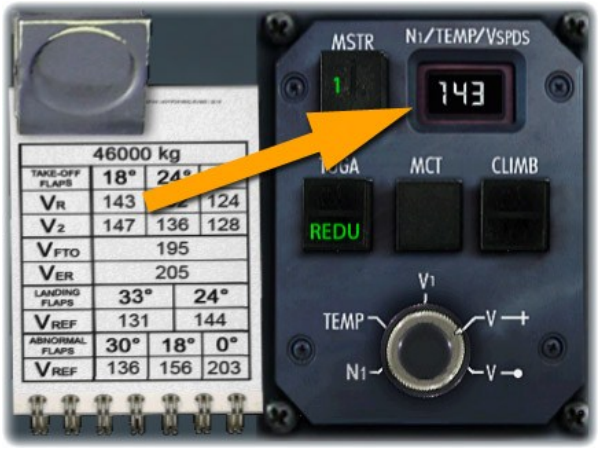
A key feature of the Avro RJ is the so called Thrust Rating Panel (TRP). First of all we have to select our desired take-off rating. Do we need full power for take-off? Can we afford to save fuel and take off with a reduced thrust?

Click on the leftmost button to toggle between maximum and reduced take-off thrust.


Now right-click on the outer ring to switch to the TEMP mode. This let's you set your Outside Air Temperature. The temperature is automatically preset to the current temperature. You can manually adjust the temperature if you wish.

The TRP not only lets you set the take off thrust though. It also let's you insert the relevant speeds for the take off and initial climb.
Rotate the outer knob to $\mathbf{V_1}$ and click the inner knob to adjust the speed. The $\mathbf{V_1}$-speed will appear in magenta on the speedtape of our Primary Flight Display.

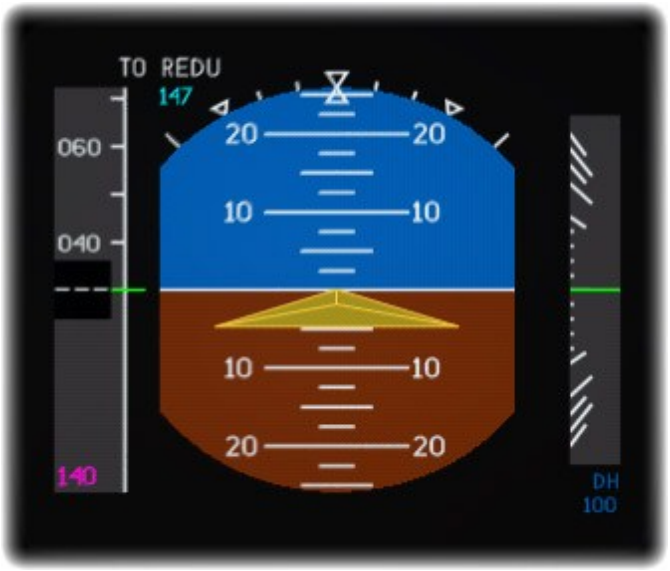

Now select $\mathbf{V_{CROSS}}$ and set the speed to $\mathbf{V_R}$ from the speedcard next to the TRP. The speedcard will always show the correct speeds depending on your aircraft's weight.




Now select $\mathbf{V_{DOT}}$ and set the speed to $\mathbf{V_{FTO}}$ from the speedcard next to the TRP. $\mathbf{V_{FTO}}$ is the speed where you should retract your flaps.

Finally you should dial in the **$V_2$**-speed in your speed select window on the MCP. This speed will show as light blue on your Primary Flight Display's speedtape. **$V_{DOT}$** and **$V_{CROSS}$** are indicated by small symbols on the speedtape as well.

This is what you should see on your Primary Flight Display now:



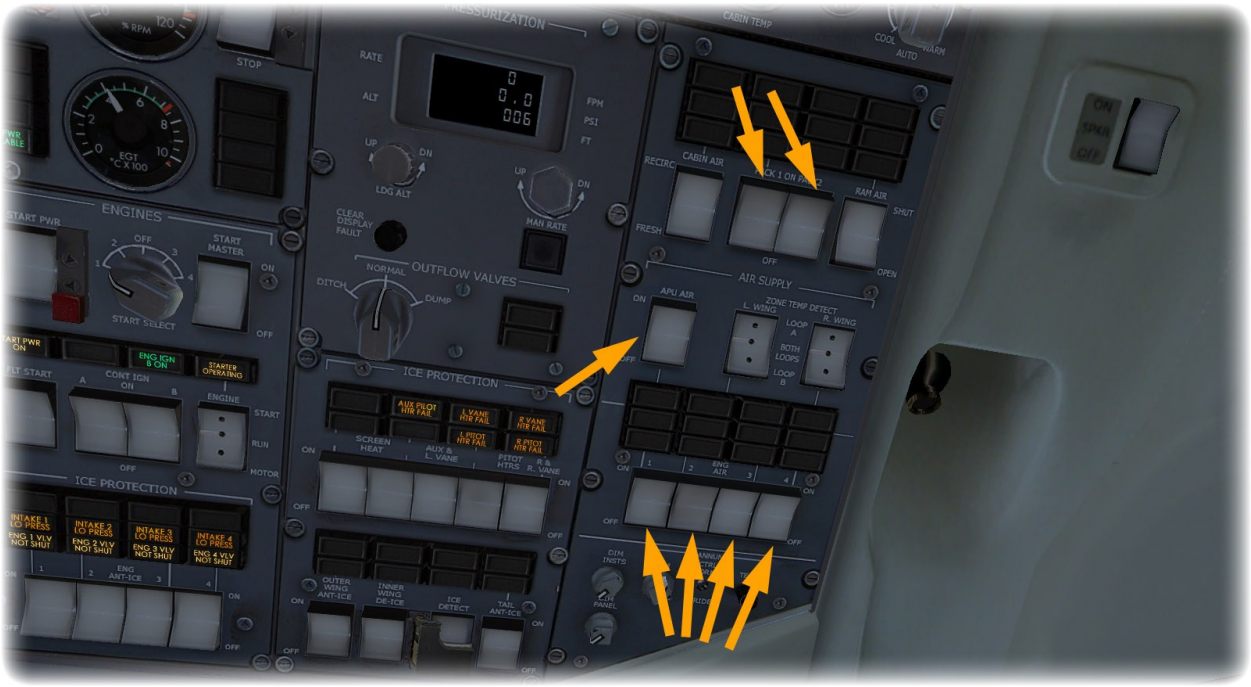
Verify that your Fasten Seatbelt signs are switched on.


*You are now ready for Pushback!*

## ***Engine Start and Taxi*** — Start your engines!

To inform the ground crew that you're about to start the engines, switch on your Beacon Light first. Just as all the exterior lights (except Landing- / Taxi-Lights), the Beacon Light switch is located on the upper right Overhead Panel.


Now make sure you switch off your APU and ENGINE AIR SUPPLY units as well as both packs.



To avoid engine surge, your engine Anti-Ice system must be switched on. Should you miss this step, the Avro has an automatic system that switches on the Engine Anti-Ice system should an engine start be initiated without Engine Anti-Ice selected on.


On the lower Overhead Panel, switch on all four Fuel Pumps first. Then move the rotary engine start selector to the engine you want to start (engine 1 in this case). Move the START MASTER switch to ON.

Now to start the engine start motor, click the ENGINE switch. It moves to the START Position and the engine starts to spin.


Move your view to the main panel and your throttle quadrant.

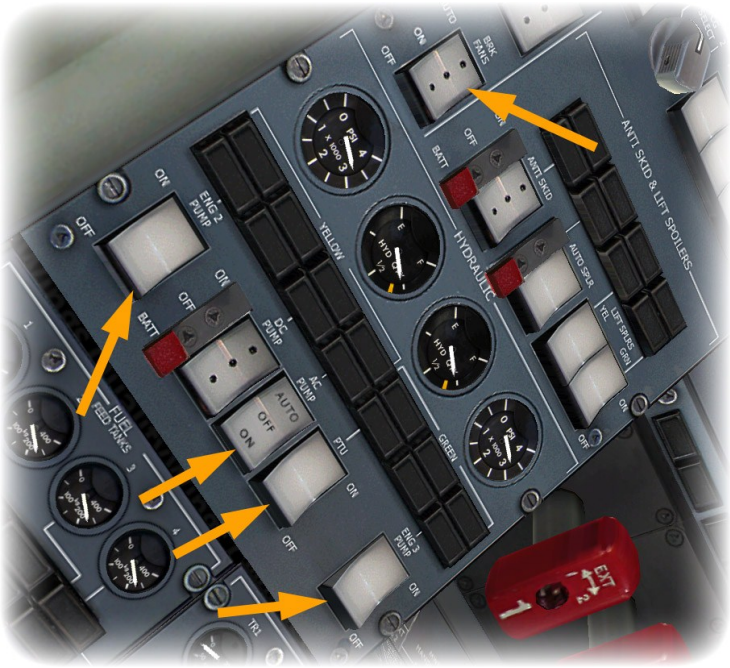

Monitor your primary engine display. At about 10% N2, right-click the fuel-cutoff switch on the thrust lever of the engine you're starting. This will move the thrust lever into the IDLE detent and give your engine fuel. You will see the ignition at about 20% N2.

At 40% N2 the STARTER OPERATING annunciator on the overhead panel will extinguish and your engine is running up to idle thrust.
Repeat these steps for the remaining engines!

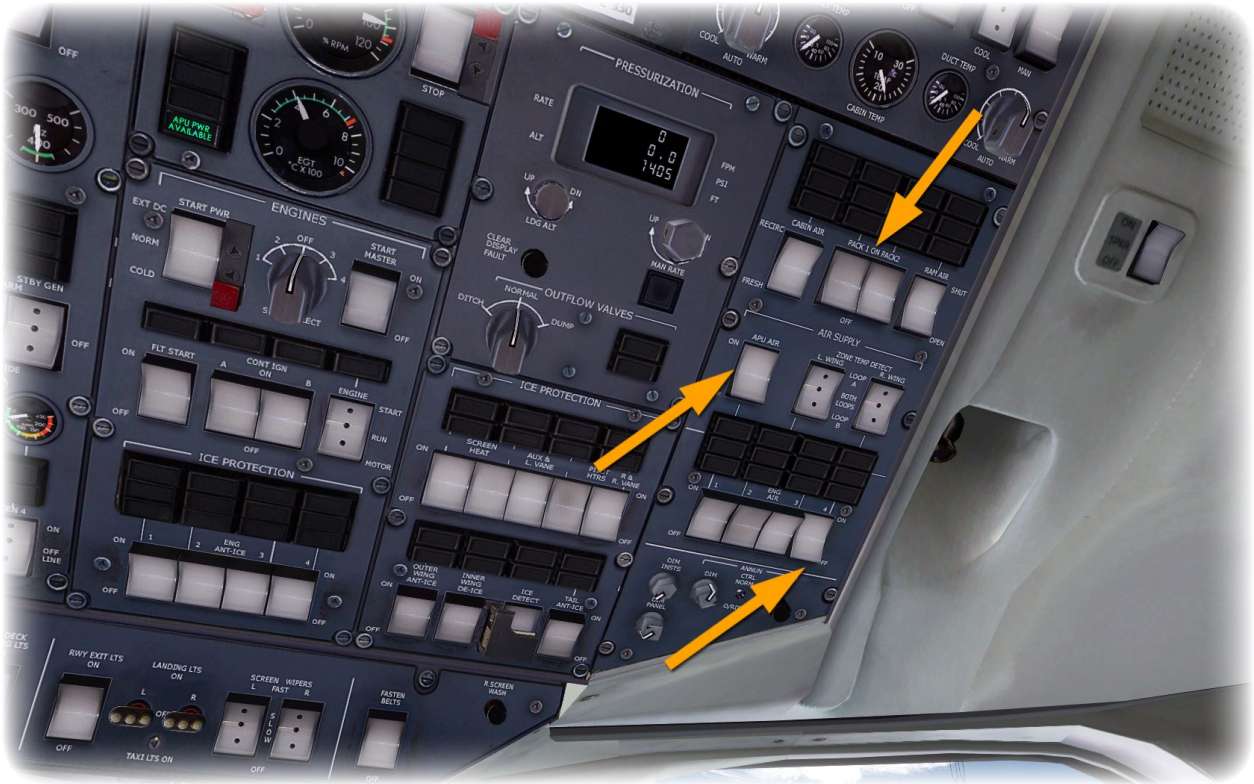
Time to connect the engine generators to the airplane's electric system. After you checked the quality of the electrical power ( as in Step 3 ) provided by generator 1 and 4, put both switches to ON. You can flip the APU GEN switch to OFF/RESET now.


Now switch on your ice protection. That includes screen heat and your various pitot heaters.

Turn on your engine driven hydraulic pumps, the AC Pump and the Power Transfer Unit (PTU).
Put the BRAKE FANS switch to AUTO.




Finally switch on your Engine Air Supply on engine 4 (ENG AIR 4). This will provide the necessary bleed air to operate your pressurization system.
Next, select APU AIR ON and switch on your packs. The APU now provides bleed air to your packs, allowing your aircraft to be air conditioned.



When you are ready and the aircraft is clear, switch on your taxi lights. In the 2D Panel you can either use the lower Overhead Panel or click on the upper portion of the centerpost to open the lighting panel.


We put a lot of work into a realistic taxi-behavior of this product. Only very little thrust is required to get going. Typical breakaway thrust is— depending on the weight – between 30% and 35% N1.

Use the taxi-time to check all flight instruments, the trims (generally around 3.0—3.5 for a flaps 18 take off), the flaps and your MCP settings (speeds, altitude).

## *Take Off and Early Climb*

Here we will discuss the basic takeoff and departure profile for the Ultimate 146 Collection.

It does not matter what series you are flying the profile and techniques are very similar for all models. The normal takeoff flap setting is 18 degrees or the first notch.
For short runways (less than 6500ft) flaps 30 is recommended. At high weights particularly in the RJ100 / 146-300 flaps 30 may be required at lengths over 6500ft.
Takeoff performance is very complicated and every runway has it's own terrain and obstacles and therefore it would be impossible to have completely accurate takeoff performance data. These are overall parameters I use and should work very well.

Once the desired departure flap setting is selected make sure to set the correct Vspeeds based on the flap setting. Flaps 18 will have much higher speeds than flaps 30. Therefore flaps 18 will require a longer ground roll but due to the higher speed/lower drag configuration will have a better climb performance. Conversely, flaps 30 will require less ground roll but a lower climb gradient. Additionally, the trim setting will differ depending on flap setting. For Flaps 18 a setting of about 3.0 (this will require nose down trim) should be set and flaps 30 a setting of 3.5-4.0 should be set.

***TIP:***
By adding `SetTakeoffTrimOnACLoad=1` to the qw146.cfg, the plane will automatically set the trims to the approximate take off position.

Another value we must set is thrust. There are basically two types of takeoff thrust: Max/TOGA (Takeoff/Go-around) and Flex. Max/TOGA is just that...maximum rated thrust for current temperature and elevation. Max would be used for short runways and/or high terrain and obstacles in the departure path. It can be selected on the TRP by pressing the TOGA button as shown below:


Flex is a reduced thrust takeoff. As Max is harder on engine life it is better to takeoff with less thrust if weight and conditions permit. Once again, flex data is runway and weight specific and therefore impossible for us so compute. BUT we can use a little bit of logic in our choice. If we are departing a 10,000 foot runway in flat country we can take a big reduction.

Here is a Flex selection with a flex temp of 46 degrees:


It is important to note when departing with a Flex temp that climb N1 will be reduced as well if we select NORM climb after takeoff. This can limit climb performance at high altitude. Therefore if you have a reduction you may want to remove the temperature set on the TRP at higher altitudes when the rate of climb falls below 1000 feet per minute.

I mentioned earlier about setting Vspeeds. You can see from the images above we have three speed bugs we can set on the PFD speed tape. However, we must actually set **FOUR** for departure. These are: V1, Vr, V2 and VFTO. V1 is decision speed. At V1 we are must continue the takeoff. V1 is set using many factors such as runway length and runway contamination. V1 can never be higher than VR or rotation speed. You can set V1 and VR the same on the speed bugs however the sound files may not play correctly. I set V1 5kts prior to VR. V2 is safety speed for engine out climb performance. This speed should be set in the MCP speed window. VFTO or flap retraction speed should be set in the final speed bug spot.

So, after final checks (flaps, trim, Vspeeds, thrust setting, parking brake off, A/T switch on, speedbrake closed, exterior lights on) we roll out onto the runway and are ready for takeoff.

First I will discuss the flaps 18 takeoff. The flaps 30 takeoff will be the same as flaps 18 until the latter stages of climb and I will explain those below.

When ready for takeoff "stand-up" the thrust levers to 50-60% N1 and allow the engines to spool up and stabilize. Then press TOGA on the MCP. The autothrust will bring the engines up to takeoff N1. Check your airspeed at 80kts to ensure proper airspeed indication.

<u>An important note at this point:</u>
Should you hear a **config warning sound** while advancing throttles, check your take off configuration.

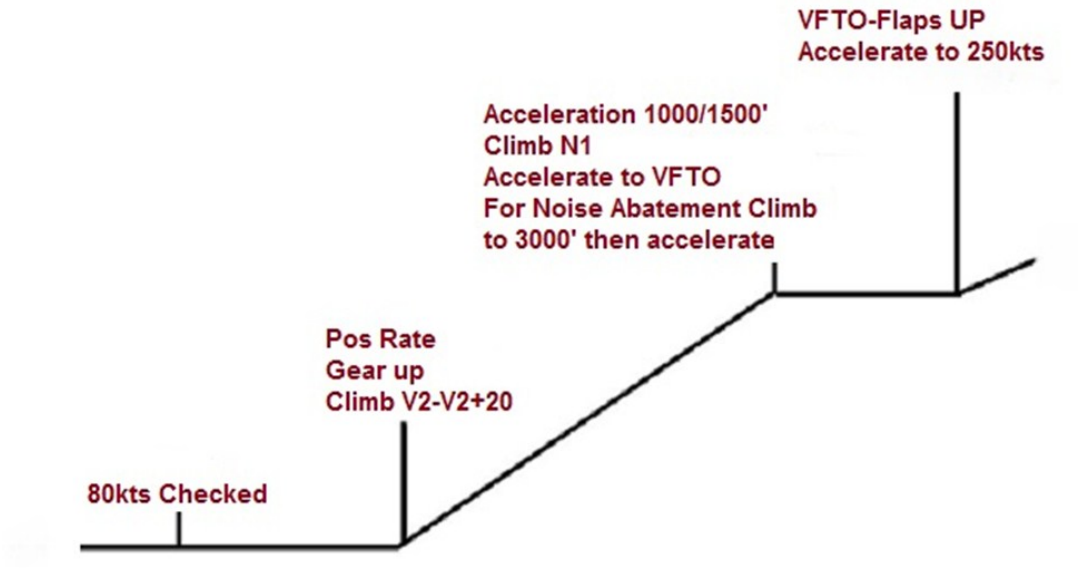
The following conditions must be met:
- Flaps must be at least 18°
- the Elevator trim must be in the green band (indicator on the throttle quadrant)
- Airbrake retracted
- Parking brake released

At $V_R$, smoothly rotate (~4secs) to initial target pitch of 12 degrees. This is not a blow your doors off performer like the B757. You are pitching for a speed of V2-V2+20. If speed keeps increasing it is ok to increase the pitch to 15 degrees or so. Climb at this speed until acceleration altitude. There are typically three different types of acceleration and it mostly has to do with what country you are in.
In the US it's typically 1000' AGL.
In other countries it is 1500' or 3000' AGL. I will use the most conservative noise abatement profile which sets Climb N1 at 1500' AGL. To set Climb N1, click on the CLIMB button on the TRP..

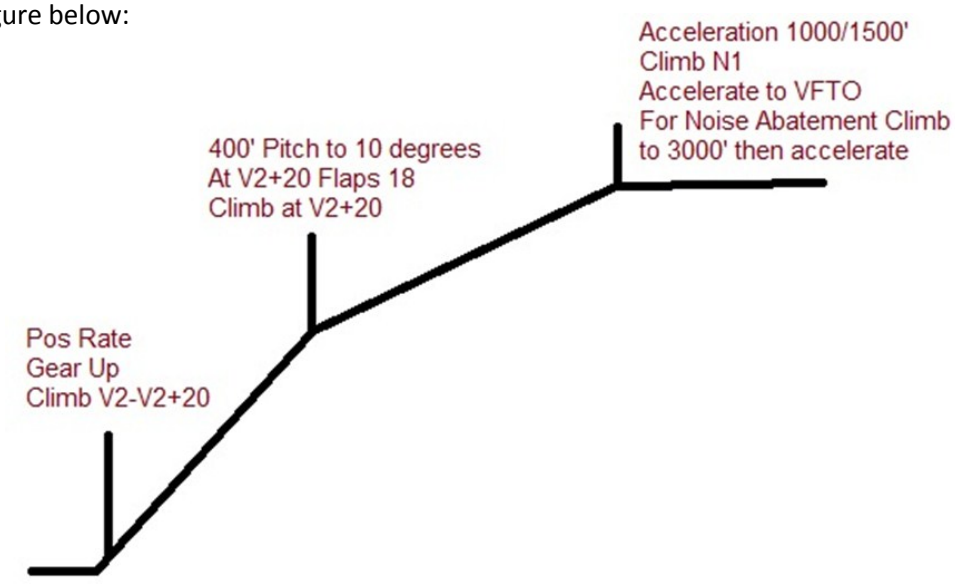

Continue to climb at V2-V2+20 to 3000' AGL.
At 3000' AGL lower the nose to about 7 degrees to accelerate. At $V_{FTO}$ retract the flaps.
Remember if hand flying there will be a **SEVERE** nose down pitch tendency and you need to trim the nose up **A LOT**.

This is also the point where you should go through your After Take Off checklist. Verify that the gear is up and the flaps are retracted. Switch on your Engine Anti-Ice system in case you had it off. Now here comes a specialty of the Avro RJ / BAe146 series of aircraft, the so called bleed change. On the ground the engines didn't provide enough bleed air to operate the air conditioning. Remember that we only had ENG AIR 4 selected to operate the outflow valves and the Packs supplied by APU AIR. Now the engines can take over that job. Switch on all four ENG AIR switches. When you did so, switch off your APU AIR and verify the Packs switches are in the on position. You can now shutdown the APU and the After Take Off checklist is complete.

Continue accelerating to 250 kts. The autopilot can be brought on any point after 400' AGL.
To engage the autopilot, click the VNAV and the LNAV button on the MCP in front of you. This will engage the lateral and vertical navigation for Flight Director guidance. Now click the NAV1 button to engage the autopilot. Your autopilot is now coupled with the FMS and flies the route we programmed earlier in this tutorial.
See below for the typical profile:




For flaps 30 the profile will be exactly the same up to and including Pos Rate / Gear up. Since we needed flaps 30, so shorted the runway length required it is critical we begin to remove the extra drag to clear obstacles. Therefore, after 400' AGL lower the nose **SLIGHTLY** to around 10 degrees and accelerated to at least V2+20. At V2+20 retract flaps to 18.
There will be some pitch change to be prepared to re-trim.
Continue to climb at V2+20 to acceleration altitude. From there the profile is the same for flaps 18. See the figure below:



## AUTOPILOT BASICS

*Let me give a short lesson on general autopilot use. Modern autopilots are very efficient in reducing the workload for the pilot but can, if not operated properly, make what is supposed to be a lot easier in fact much harder.*

*If you have not done so, it is essential that you read the autopilot section of this manual to familiarize yourself with the various autoflight modes. I am mostly trying to explain overall operating technique here and not how each mode works.*

*When dealing with AP modes we have two axis we are mostly concerned about : Pitch and Roll. Yaw is handled automatically by the Yaw Damper and therefore I won't go into detail on that.*

*During takeoff the FD auto flight guidance is in the Takeoff mode. Therefore we will need to select a lateral and vertical mode after takeoff to begin to manage the flight.*

*The first mode selected will be the lateral mode. This will usually be HDG if radar vectors or LNAV if flying an RNAV departure procedure immediately after liftoff. Once heading direct to a fix on a departure use LNAV for lateral tracking. You will need to look at your flightplan legs to see what the departure has you flying. If it's "runway heading climb and maintain 5,000" then select HDG. If you will follow a lateral course then select LNAV. The lateral mode should be selected at 500' AGL.*

*Once we have a lateral mode engaged we must decide on a vertical mode. There are three basic choices: LVL CHG, VNAV or V/S. If we select no vertical mode then by default we will get SPD and V/S. This is not desirable as the speed will be whatever is in the MCP...lets say a V2 of 132 kts. The AP will snapshot 132kts and whatever rate of climb we are currently doing, in this case let's say 2400fpm.*

***It is very important to understand one thing...THERE IS NO SPEED PROTECTION IN V/S!***

*The A/T will try whatever it can do to maintain 132kts and 2400fpm. If there is not sufficient thrust available, even at max thrust, THE AIRPLANE WILL STALL!*
*Therefore, LVL CHG or VNAV should be selected at acceleration altitude, which we know from the Takeoff lesson is 1000' or 1500'. Normally use VNAV if your departure procedure includes altitude restrictions. LVL CHG will not honor altitude constraints, only what is set in the MCP alt window. LVL CHG may be used if you have no altitude constraints in your departure procedure.*

*Once you have a lateral and vertical mode selected.....fly the airplane close to the FD command bars and engage the autopilot.*

***Never engage the AP in an un-stabilized situation or in extreme pitch or bank angles.***

*One final note. The most important part about AP use is to monitor the mode annunciations (green and white icons on the PFD). They will tell you what the AP is doing, not what you have selected on the MCP.*

## *Climb*

This is how your MCP should look like during climb:


An important altitude during your climb is the 10,000ft mark. If you're flying in VNAV, the plane will automatically lower the nose and accelerate to to the CLB speed programmed in the FMS. Below 10,000ft it will adhere to the 250kts restriction.
When passing that mark, switch off your PTU and Landing Lights.

When passing the transition altitude (18,000ft in the US), change your altimeters to the standard atmospheric pressure of 1013hPA by clicking on the BARO knob next to them.
Depending on turbulences you may also switch off your Fasten Seat Belt signs.

It's standard to use CLB NORM thrust for the climb. Only use CLB MAX should your vertical speed drop below 1000fpm.

## *Descent*

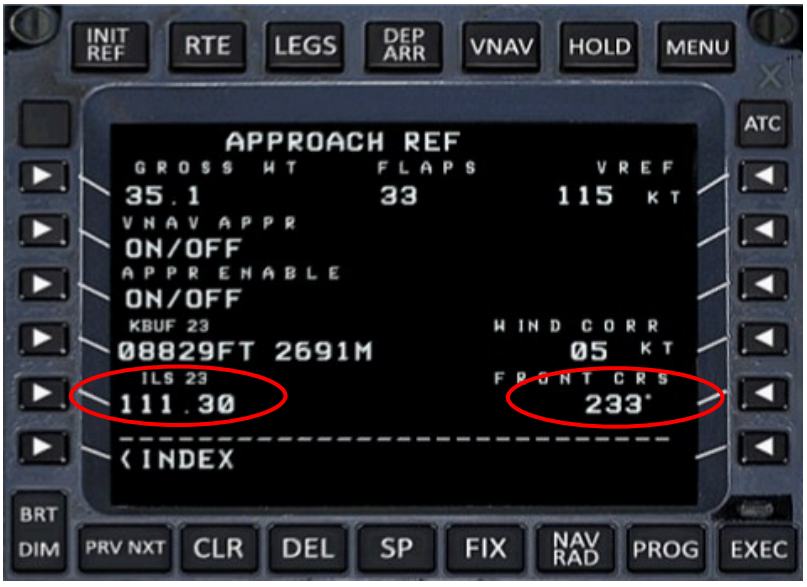
When you get closer to the Top Of Descent, you will see a green circle on the Navigation Display, labeled T/D. This is the Top Of Descent. When you get within 5NM of the TOD, reset your MCP altitude to the next restriction along the route. In our case there is no altitude restriction during approach, so we can set the MCP altitude to our landing elevation, which is about 700ft for Buffalo.
The airport elevation is not only needed for the MCP altitude, but also for the pressurization system. Make sure you set the landing altitude to 700ft as shown in the figure to the right.


As a last step switch on your PTU in the hydraulics section.

When we passed the TOD the plane should start to go down and fly the descent speed. In our case it's 270kts which is the same as the cruise speed.
Make sure that once you passed the TOD, the VDI (Vertical Deviation Indicator) shows on the ND. It gives us our position in relation to the descent path. If the white diamond is in the middle, everything's fine and we're on the path. Slight deviations are acceptable too.


If the VDI does not show, make sure your Primary Course Selector on the EHSI control panel below the FMS is set to LNAV.
While the airplane is on it's initial descent we must set up for approach. We have already placed the ILS procedure in the box but we need to set up the NAV radios and approach bugs.

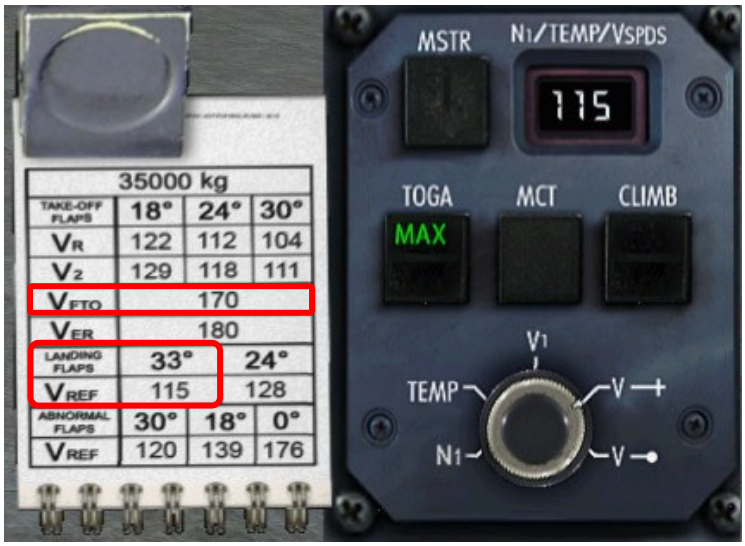
Press the INIT REF key on the FMS to open the APPROACH REF page.




We are looking for the ILS frequency and the final approach course.
In NAV1 set the localizer frequency of 111.30 and set the final approach course of 233 degrees. Use the STBY button to swap frequencies and ensure 111.30 is on the top line as shown on the next page.


It is not required but you may also set NAV2 to the same values.

Open the speed card and TRP. Ensure TOGA MAX is armed on the TRP. Set $V_{CROSS}$ to $V_{REF}$ of 115kts and $V_{DOT}$ to $V_{FTO}$.




We will set the approach speed, usually $V_{REF}$ + 5, later on using the MCP speed window.

## *Approach and Landing*

Now let's discuss the final portion of the flight, that of approach and landing.
There are 3 types of approaches mainly used in real world flying. They are:

**- Precision Approaches**

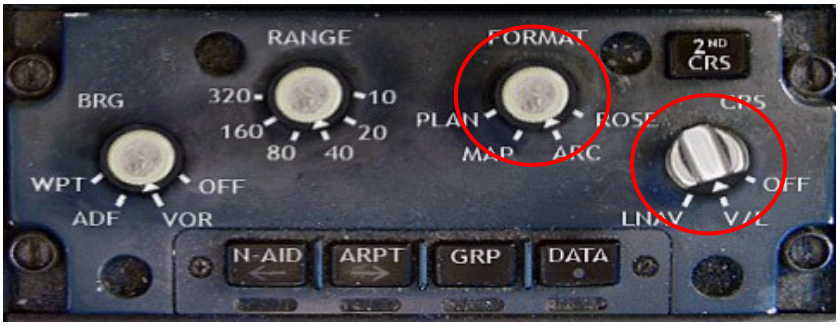
**- Non-precision Approaches**

**- Visual Approaches**

Let's start with the **Precision Approach**. This approach uses a ground based navigation aid that provides vertical and lateral guidance. The most common type is the ILS. In the lesson on programming the box we set up for the ILS 23 into Buffalo (KBUF) so let's start with that.
During initial descent we set up the radios and speed bugs for approach and landing. $V_{REF}$ is typically 1.3 $V_{so}$ or 1.3 times the stalling speed of the aircraft for a given weight in the landing configuration. This is the *minimum* speed we want to fly on approach and do not want to slow below it. Therefore we will add some speed to $V_{REF}$ and call this $V_{APP}$ or V approach. Typically $V_{APP}$ is $V_{REF}$ + 5 knots in a zero wind condition. In higher winds well will add ½ the steady wind plus all of the gust to $V_{REF}$.

For example:
Landing runway 23 and the winds are 230 at 12 gust 20 kts. $V_{REF}$ is 115kts.
**$V_{APP}$ = 115 + 0.5*(12) + 8 or 129 knots. (115 + 6 + 8)**

On any approach plan to arrive 30 miles from the airport at 250 kts and 10,000 feet. Within about 15 miles from the airport descend to the initial approach altitude or IAF and begin to slow to 210 kts. The IAF is different for each approach. Usually it begins about 15 miles from the runway at about 4,000' above ground level and may vary for certain terrain.
The ILS has a localizer which provides lateral guidance and a glideslope for vertical guidance. The approach is terminated with a landing or reaching the DA (decision altitude) with no sign of the runway followed by a missed approach.
Plan to join the localizer about 10-15 miles out from the runway. Slow to 170kts and set flaps 18. Set an intercept heading of no more than 40 degrees from the final approach course. For our final approach course of 233° I selected an intercept heading of 245° using the HDG window on the MCP. This may vary though. Arm the localizer for intercept using the VOR/LOC button on the MCP.
As you get closer to the localizer, make sure you have your EHSI set up correctly. Put the primary course selector to V/L and switch to arc mode as can be seen below:



Below you can see the EADI/EHSI prior to localizer Intercept.


Once established on the localizer arm the approach by pressing the APP button on the MCP. Depending on how far out we intercept the localizer will depend on when we further configure the airplane for landing. The final approach fix is typically 5-7 miles and 1500-2100 feet above ground level from the runway on all approaches. When you are 3 miles from the FAF select gear down and flaps 24 and set a speed of 150kts. When you are one mile from the FAF set flaps 33 and slow to $V_{APP}$. Fly in this configuration to landing.
Below is a graphic display of the ILS approach, once established on the localizer and glideslope:


If you keep the autopilot engaged, the plane will perform a complete autoland. Be prepared that during flare the autothrottle retards the throttles to idle and then disconnects. For the event of a noisy joystick signal we suggest to put your joystick's throttle slider to idle as well to prevent an unintended engine spool up after autothrottle disconnect. The airbrake and liftspoilers will automatically deploy upon touchdown. The autopilot will automatically disconnect at 60kts.

### *Non-Precision Approach*

This approach provides only lateral guidance and no vertical guidance. There is no DA but rather and MDA or minimum descent altitude. Airplane configuring is very similarly to the ILS. The major difference is what happens after the FAF. Since there is no vertical guidance we must descend to the MDA using a vertical mode on the autopilot...typically V/S or vertical speed. At the FAF press V/S and select no more than 1000 fpm descent. We need do arrive at the MDA prior to the missed approach point MAP to see the runway. Once the runway is in sight continue the decent for landing.
New technology is allowing VNAV approaches which use the lateral and vertical components of the FMC in LNAV and VNAV to provide a more stabilized and safer approach. If you have verified all of the altitude constraints in the FMC after the FAF you can set the MDA in the MCP altitude window and press VNAV. VNAV will then follow *an internal* vertical path to that altitude. It's important to remember this is ***not*** a precision approach and appropriate minimums will be higher.

### *Visual Approach & Landing Technique*

This type is fairly straightforward in that we are simply going to point the plane at the runway and use visual outside cues to achieve the proper vertical and lateral path. This can be a VASI or PAPI or an ILS used as a backup. Configuration is similar to the above two approaches. Sometimes a high speed approach will be required for ATC spacing. The Avro has a very powerful airbrake that can slow the plane quite rapidly. Approach speeds of 250kts can be flown up to about 8 miles from the runway and then extending the tail cone. Extend flaps and gear below the maximum extension speeds and slow to $V_{APP}$.

The last part of the approach we will talk about is the flare and the landing. The Avro has long been known since the early days of the BAe146 to be a very nice landing airplane. After disconnecting the autopilot (unless conducting and autoland) continue to fly the airplane in a stabilized descent to the runway. This is usually with a neutral or slightly nose-down attitude. When the audio callout **"60"** occurs open the tail cone airbrake. At **"40"** reduce the thrust levers to idle. ***Slowly*** begin to flare the aircraft for touchdown. Typical touchdown pitch attitude is around 3-4 degrees nose up. Once touched down, verify your throttles are in idle and your spoiler lever is in the LIFT SPLR detent. You should see two green annunciators on the main panel, indicating that the lift spoilers are deployed. After nose wheel touch down, the yoke should not be moved significantly forward of neutral. Rearward movement of the yoke, once the spoilers are deployed, improves deceleration even without wheel braking being applied.
Use brakes as necessary to stop the aircraft.

## *After Landing / Parking*

Once you exited the runway, retract your flaps and switch off the Flight Director, the landing lights and strobes.
The airbrake and liftspoilers should automatically retract as the plane decelerates to below 15kts or the throttles are moved out of the idle position. At any rate make sure they are indeed retracted.
Since the aircraft is very light now, it barely requires any thrust to taxi.

## *Shutdown*

When you arrived at the gate, the first thing you will want to do is setting the parking brake and shutting down the engines.
Be careful though. Shutting down engines also means you will loose your engine generators. So before shutting them down, ensure you have an electrical power source available.
This can either be the APU or the GPU.
We don't want to keep the APU running for the whole time so let's use the external power from the GPU.
First, you have to connect the GPU to the plane. To do this, open the QW Control Panel by either clicking on the 'QW' Simicon in the 2D Panel or click on the PEDAL ADJUST handle in the VC.
If your parking brake is set, you will see a yellow Gnd Pwr button on the Control Panel. Click it to connect the GPU. The button will turn green and you should see the GPU next to the plane.

On the overhead panel you will see a green annunciator indicate “EXT AC PWR AVAILABLE”.
The external power is now available, but still not connected to the plane’s electrical system. To do so, press the EXT AC button and put it in the on position.


Now put the ENG GEN1 and ENG GEN4 switches to OFF/RESET. The switches are located right below the EXT AC switch.

Move your head up to the hydraulics section and switch off all hydraulic pumps and the PTU.

Next move the thrust levers to the FUEL OFF detent by right-clicking on the fuel cutoff levers again. You will hear the triple chime warning sound and see the red attention getter come on as the engines spool down.

When all engines spooled down, switch off the Fasten Seatbelts signs.
Should the APU still be running from approach, switch off the PACK 1 and 2, the APU AIR and shut down the APU by putting the switch to STOP.

Switch off the Beacon light.

We have shut down everything that requires fuel so it's time to also turn off all four fuel pumps.

As far as ice protection is concerned, switch off all heaters and switch ON engine Anti-Ice.
Your overhead panel should look like this:


## *Congratulations!*

You have conducted a complete flight from startup to shutdown.
Now grab a second flight plan and another cup of coffee for the next leg of your day!

For a professional operation we included a full set of checklists in the manual and in the FS Kneeboard.
Should you decide to leave the aircraft, please have a look at the LEAVING AIRCRAFT checklist.

# FLYING TIPS

*Tutorial Flight*
*(BAe146-variants)*

This chapter will deal with the differences between the Avro RJ and the BAe146. In particular the GNS-XLS Flight Management Computer and the normal flying procedures of the BAe146 will be explained. The systems of the airplane, such as fuel, hydraulics, electrics or air are pretty much identical and thus will not be explained again. **It is highly recommended to perform the Avro RJ tutorial flight first.**

The Flying Tips are split up into the following topics:

- ***Programming the GNS-XLS***
- ***Basics about the Thrust Modulation System (TMS)***
- ***Take-off***
- ***Climb***
- ***Cruise***
- ***Descent***
- ***Approach and Landing***

## *Programming the GNS-XLS*

We will be flying with the BAe146-200 and the same route as in the Avro RJ tutorial flight, being:

| | |
|---|---|
| KBOS | Boston Intl. Airport |
| LOGAN6 | Runway 04L Standard Instrument Departure (SID) |
| HD036 | Transition waypoint of SID |
| ROC | Enroute waypoint |
| EHMAN | Enroute waypoint |
| TRAVA | Initial Approach Fix to Runway 23 |
| BU | Final Approach Fix to Runway 23 |
| KBUF ILS 23 | Buffalo Niagara Intl. Airport Runway 23 Instrument Landings System (ILS) |

Make sure you have AC power available, which can be either provided by the engine generators, the APU, or a Ground Power Unit. Then switch on the GNS-XLS by pressing the ON button. A self test will commence.


When it is complete, you will be shown the Initialization page. The ICAO code of the nearest airport will be filled in automatically. If it is correct, press the ENTER button.


Press ENTER two more times afterwards in order to confirm the airport and its coordinates.

The ACTIVE FPL page will show. In order to add the departure airport, press LSK 4L. This will highlight the DEPART entry. Confirm your choice with ENTER.


On the DEPARTURE page, type in the ICAO code of Boston, being 'KBOS'. Confirm again using ENTER.


The SID (Standard Instrument Departure) will highlight automatically and a list of available SIDs shows. In case you want to enter your runway first, click LSK 1R twice. In our case we want to select a LOGAN6 departure. To select it, press LSK 5L twice and confirm with ENTER.

Next, select runway 04L from the list of available runways by pressing LSK 3L and ENTER.


Review your selected SID and add it to your flight plan by pressing ENTER.


The ACTIVE FPL page will show again and should look like this:


Press LSK 3L in order to highlight the “’******’ field below HD036.

Our next waypoint is ‘ROC’. Enter it in the highlighted field and confirm using ENTER.


The DATABASE WPT page will show information on the waypoints matching the entered name. You can step through all found waypoints using the PRV/NXT keys on the left. However, by default they are sorted by distance to your current location which in most cases displays the desired waypoint on the first page. Confirm your selection by pressing ENTER.
Repeat the same step for the next waypoint, which is ‘EHMAN’.

The next step is to set up the arrival at KBUF. Since there is no Standard Terminal Arrival Route (STAR) available, we’ll have to program in an approach directly.
Press LSK 5L twice to highlight the APPROACH field and select it with ENTER. The APPROACH page will display.
Type in ‘KBUF’ and again confirm by pressing ENTER (twice).
A list of available runways is shown. Runway 23 shows up as the third runway in the list and can be selected by pressing LSK 4L and ENTER. Your screen should now look like this:


Confirm ‘ILS’ as your approach type by pressing ENTER. The list of available transitions will show. Select ‘TRAVA’. After doing so, an overview of your selection will be shown. See the next page.

If the overview of your approach looks like in the figure below, select it by pressing ENTER.


The ACTIVE FPL page will show again and the waypoints of the just selected approach are added in the list. Note that there is a gap between ‘HD036’ and ‘ROC’. In order to delete it, first highlight it by pressing LSK 2L twice. Afterwards press the BACK button.


A yellow ‘DELETE?’ caption will appear. Confirm the deletion by pressing ENTER.

All waypoints of the route are inserted. Now we have to set up the vertical profile. For this, press the VNAV button in the upper row of buttons. The VNAV page will open.
In order to insert the desired cruise altitude, press LSK 5L and ENTER.


The VNAV DATA page will display. Pressing LSK 2R allows you to enter our desired cruise altitude of 28000ft. Confirm with ENTER and leave the transition altitude and flight path angle untouched by simply confirming them with ENTER as well.


After the activation of the flight plan, VNAV pages 2/3 will show a predicted altitude for each waypoint.

Do note that the VNAV on the BAe146 –series is not coupled to the autopilot. Although there is a button for it on the MCP, it serves no function and the pilot has to manually fly the descent to match the GNS-XLS prediction. This is the real-life operation and no simplification from QualityWings.

You have now set up your lateral and vertical profile for the route.

**It is important to know that the flight plan at this point is NOT activated.**
How to do this will be explained on the next page.

In order to activate the flight plan, open the NAV page by clicking on the NAV button in the upper row of buttons. The FROM waypoint (RW04L) is automatically highlighted. Press ENTER.


The first waypoint of the SID (HD036) will automatically show up in the TO field. Confirm this again by pressing ENTER.

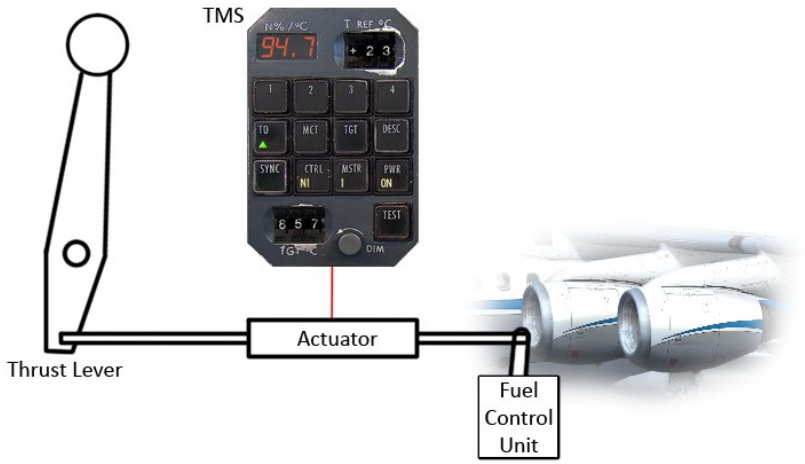

Your flight plan is now activated and the basic programming of the GNS-XLS done. For further tutorials on advanced functions, please have a look at the QW146 BAe146 FMC Tutorial, which is located in your start menu.

## *Basics about the Thrust Modulation System (TMS)*

The Thrust Modulation (TMS) System on the BAe146 provides the ability to:

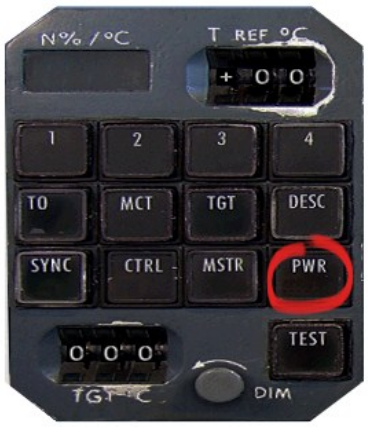
- ◊ Fine tune thrust to enable a flexible or reduced take-off
- ◊ Ensure a minimum thrust descent
- ◊ Synchronize N1 or N2 of all engines to that of a selected master engine
- ◊ Synchronize Turbine Gas Temperature (TGT) to a pre-selected temperature

It does so by means of an actuator which is positioned between each thrust levers and the Fuel Control Unit. The latter directly controls the amount of fuel supplied to the engine and thus the thrust.
The Figure below illustrates the architecture:




The Figure shows the actuator in the central position. The TMS sends commands to extend or retract to each actuator. This way the thrust can be adjusted without any movement of the thrust levers.
The authority of the TMS is limited by the length of the actuator's stroke. If the end of the travel is reached, small arrows on the TMS control unit on the main panel will indicate that the thrust levers have to be moved for the required thrust setting to be in range of the actuator's travel.
See the Figure below:

## *Take-Off*




Switch on your Flight Director and select LNAV on the MCP.

Then switch on the TMS by clicking on the PWR button.


Select your current Outside Air Temperature in the 'T REF' thumbwheel window in the upper right corner of the control unit.
Now click the 'TO' button. A green triangle will illuminate.
The reference N1 value for your take-off will be displayed in the LED window. As soon as your thrust levers are within range Of this reference N1, the TMS will try to achieve it by adjusting the actuators.


As you advance the throttles, blue up-arrows will illuminate.
Advance your throttles until they extinguish again. This means that you are within the actuator's travel and thus the TMS is able to fine tune your $N1_{REF}$.
If you move the throttle too far, white down-arrows will indicate so.
Hold the column slightly forward during the take off run.

On your airspeed indicator you see several speed reference bugs with the following meaning:

| | |
|---|---|
| Red Reference bug: | $V_1$ |
| Yellow Reference bug: | $V_R$ |
| Command Speed bug (yellow triangle): | $V_2$+10 |
| White Reference bug: | $V_{FTO}$ (max flap retraction speed) |

Rotate smoothly and at a moderate rate when reaching $V_R$.

When the aircraft is airborne, climb out at $V_2$+10 knots, but at no more than 20° pitch attitude.

Retract the landing gear when a positive rate of climb is achieved.

Hold the aircraft at this attitude and speed until crossing 1000ft.

## *Climb*

After crossing 1000ft, pitch down to approximately 5° pitch, change to climb thrust and let the aircraft accelerate.

It is suggested to use the N1 **SYNC** mode on the TMS. Do so by clicking the "SYNC" button. This will synchronize engines 2, 3 and 4 to the N1 value of engine 1.

Slowly pull back the throttles and set the climb power. A rule of thumb for standard climb power is 88% N1 at sea level with an additional 1% per 5000ft. For an increased climb rate at cost of engine life, add 2% to this calculation.

Before reaching $V_{FTO}$ (white speed bug), retract the flaps to 0°. Be prepared to commence a continuous nose-up trim to counter the trim change caused by the flap retraction.

Switch on your Engine Bleed Air for all four engines. If done, turn off APU AIR and shutdown the APU.

The standard climb speed is 250 kts. The recommended procedure is to engage the autopilot after crossing 1000 ft. The default PITCH mode will hold the pitch of 5°. When reaching 250 kts, engage IAS mode. It will hold your speed by adjusting the aircraft's pitch angle


In order to level off at your cruise altitude, select the appropriate altitude in the altitude window on the MCP and **press the "ALT ARM" button.**

**If "ALT ARM" is not active, the aircraft will NOT capture the selected altitude!**

During the rest of the climb, make sure to monitor the engines and regularly adjust the thrust setting.
Upon reaching the cruise altitude, the aircraft will level off and automatically engage the ALT autopilot mode. The ALT ARM caption will extinguish.

## *Cruise*

When leveling off, monitor your speed. Best is to keep it at climb thrust until your cruise speed is reached. Cruise speed is up to discretion of the crew and time planning. Do not exceed 300 kts (305 kts on the BAe146-300) or Mach 0.73 at any time. 290 kts is usually a comfortable speed. Adjust the thrust accordingly and monitor the speed regularly.

During the cruise phase, the VNAV page will indicate the distance (range) to the Top of Descent.

Cruise is usually flown in ALT and LNAV Autopilot modes.

## *Descent*

When the Top of Descent is reached, common practice is to engage IAS mode and slowly reduce the thrust. It is important to do this very gently and observe the aircraft lowering the nose. The GNS-XLS VNAV page 1/1 gives you a required descent rate. Try to match your descent rate by adjusting your throttle position.


Select the **DESC**ent mode on the TMS and observe if any arrows light up and signal the need for more thrust. If this is the case, you have fallen below the minimum N2 required for the engines to produce enough bleed air for anti-ice and air conditioning needs. Gently advance your throttles and wait for a reaction of the engine until the arrows extinguish. Use the airbrake if the required rate of descent cannot be reached.

A typical high speed descent is at 290 kts. Adjust your speed bug on the Airspeed Indicator accordingly. Reduce your speed to 250 kts before descending through 10 000 ft.

## *Approach*

The initial approach can be flown between 250 kts and 200 kts. Dial in the frequency / course for Runway 23 in the NAV1 and course window on your MCP.


To slow down the plane it is suggested to change to VS or PITCH mode. The first holds the vertical speed at the time of engagement and allows you to decelerate while holding vertical speed.
The latter is selected by de-selecting any other vertical mode and allows you to adjust your pitch by means of the small PITCH knob on the autopilot control panel (on the pedestal). It is labeled with 'UP'/'DN'. Slow down to be at approximately 190kts when passing 'TRAVA'.

Do note that the speed bugs on the airspeed indicator are automatically set to your approach / landing speeds, being:
Red Reference bug: $V_{REF}$
Yellow Reference bug: $V_{REF}$ + 20
White Reference bug: $V_{FTO}$ (max flap extension speed)

Observe the RDMI and check if the ILS signal comes alive. When this is the case, toggle the HSI switch from 'RNAV' to 'NAV'. This will select the ILS signal as the source for the HSI.


Arm the V/L and GSL autopilot modes, so that the plane can capture the localizer and glideslope signal.


With the glideslope signal alive, select the gear down when you are 1.5 dots below the glideslope and select Flaps to 24° at 0.5 dots.
Then fly at $V_{REF}$ + 20 (yellow speed reference bug) until reaching the outer marker. Reduce your speed to $V_{REF}$ + 5 and select Flaps 33°.

Your instruments should look similar to the figure below:

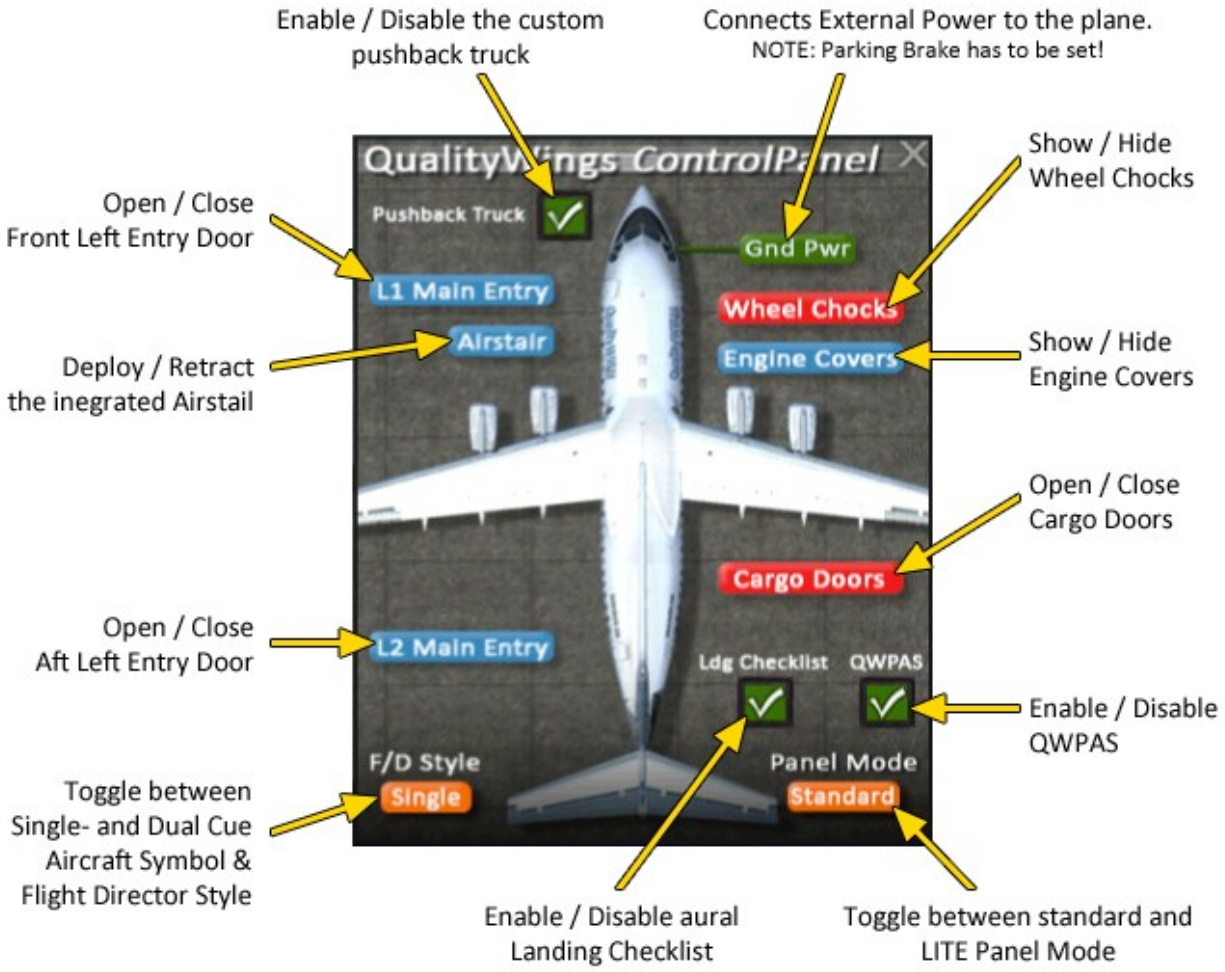

The BAe146 is not equipped with an Autoland function. Thus, when passing the decision height or a minimum of 160 feet radio altitude, disconnect the autopilot and commence a manual landing.

The landing technique is nearly identical as for the Avro RJ.
Since the BAe146 does not have an autospoiler function, remember to deploy the spoilers after touch-down in case your airbrake was not deployed already.

# QualityWings
# CONTROL PANEL

## The QualityWings Control Panel

The QualityWings Control Panel allows for individual door control as well as selection of several options for the QualityWings Panel.
The Control Panel can be opened via the “QW” Simicon in the 2D Panel or by clicking on the “PEDAL ADJUST” handle in the VC.




**NOTE to FSX Users:**

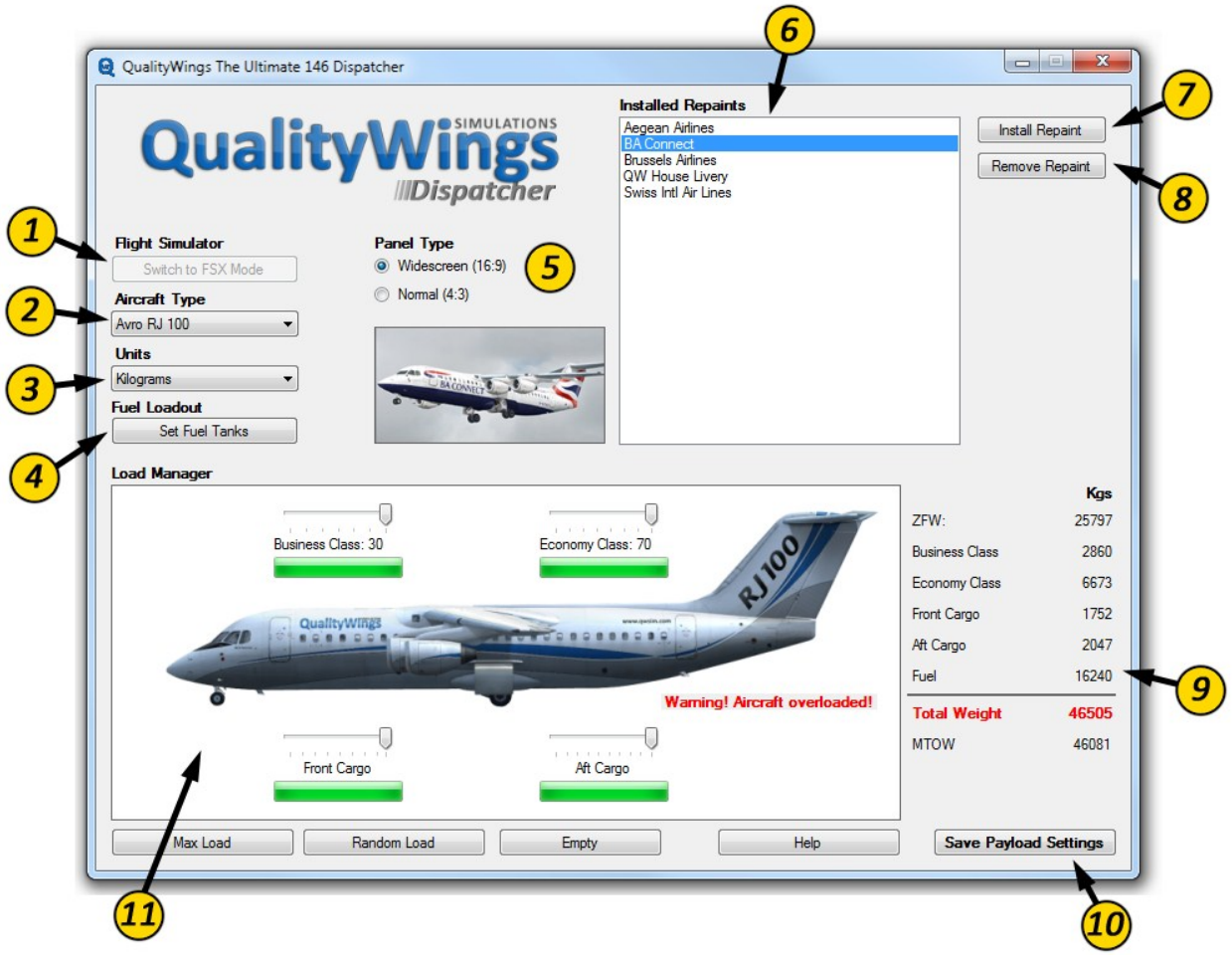
The Airstair is an airline option. Should the Airstair button be greyed out reading “N/A”, then the air-plane’s operator did not choose to fit the Airstair to the plane.

The service doors on the right side of the airplane are only functional in FSX and can be controlled via a button located above the “Cargo Doors” button (not visible in the figure above).

# QualityWings
# DISPATCHER

## The QualityWings Dispatcher

This handy tool allows you to configure your Ultimate 146 Collection to your needs. It lets you install / uninstall airline liveries and configure your Payload as well as Fuel Quantity.




## HOW TO INSTALL A REPAINT

*Installing a new Repaint for your Ultimate 146 is as easy as that:*

a) go to the download section on www.qwsim.com
b) Select your desired Livery and save it on your local hard drive
c) Open the QualityWings Dispatcher from your Start Menu
d) If you have The Ultimate 146 Collection installed in both, FS9 and FSX, select your desired Flight Simulator using Button (1).
e) Select your desired Aircraft Type using Button (2)
f) Click on the Install Repaint Button (7)
g) Browse to your previously downloaded Livery and click “Open”
h) You should now see a confirmation that the installation was successful.

Find a detailed explanation of each function on the next page!

Check out the previous page to see the corresponding position of the buttons explained below.

**1 – Flight Simulator**

*If you have the Ultimate 146 Collection installed in both, FS9 and FSX, this button lets you toggle between both versions. On the picture, the Dispatcher is currently operating in FS9 Mode.*

**2 - Aircraft Type**

*Select the Aircraft Variant you want to load or install Repaints for.*

**3 – Units**

*Select either Kilograms or Pounds to be displayed in the Load Manager.*

**4 – Fuel Loadout**

*Opens an additional window which lets you set the desired fuel quantity. Check out the next page for more details on this.*

**5 – Panel Type**

*The Ultimate 146 Collection comes with both, widescreen and standard aspect ratio 2D-Panels. Choose your desired one here.*

**6 – Installed Repaints**

*A list of Repaints installed for the selected Aircraft Type. Select a Repaint to configure.*

**7 – Install Repaint**

*Download a Repaint from the Downloads section on qwsim.com and save it on your local hard drive. Press the "Install Repaint" button and browse to the file to install it. You will get a confirmation if the installation was successful.*

**8 – Remove Repaint**

*Removes a selected repaint from your installation. The removal of the QualityWings House Livery is not possible.*

**9 – Load Manager / Weights**

*Lists all the currently configured payload weights of the airplane.*

**10 – Load Manager / Save Payload Settings**

*Always save your settings after having made changes to your payload. Changes will not be effective until being saved.*

**11 – Load Manager**

*Allows you to configure your payload stations individually. Simply drag the Sliders to adjust each station's load. You will get a red warning if your aircraft weight exceeds the Maximum Allowed Take Off Weight.*


## HOW TO USE THE FUEL CALCULATOR

*Finding the right amount of fuel for your flights is child's play with our Fuel Calculator!*

a) Open the Fuel Manager by clicking the "Set Fuel Tanks" (4) button on the Dispatcher Main Window
b) Insert the distance of your flight in nautical miles in the "Flight Distance" window
c) Fill in your desired cruise altitude in feet
d) Click "Set Tanks to Calculated Amount"

That's it! The next time you load the airplane in Flight Simulator it will have the right amount of fuel for your planned route. Do note that this doesn't include significant reserves. We recommend to add a bit of reserve fuel.

*NOTE:*
*If a formerly saved flight is loaded, no change is being made to the fuel load. You can however manually load the fuel amount by selecting "LOAD FUEL" on the FMS's Index page.*

# FREQUENTLY ASKED QUESTIONS

**Why are the screens black, while everything else works?**

You probably forgot to switch on the AVIONICS MASTER Switches on the overhead panel.

**I can't see the wipers in the 2D Panel. Is this a bug?**

The animated wipers only work in the virtual cockpit. If we added them to the 2D panel this would have significantly shifted the panel shortcuts and made the handling much less intuitive.

**The Panel Flood light doesn't work in the 2D Panel!**

We haven't found a satisfying solution for this so we had to leave it out.

**I can't engage the autopilot on the ground or shortly after takeoff!**

Autopilot engagement is not possible until above 400ft radio altitude, unless you operate the aircraft in LITE mode.

**I can't find the Fuel Cut Off Switches. Where are they?**

They're fitted to the actual thrust levers. Simply right click below the respective thrust lever to cut off fuel (2D). In the VC you have to right-click the cut-off lever on the thrust lever. You can see this in detail in the quick start guide.

**The thrust reversers don't work!**

The Avro RJ / BAe146 does not have any thrust reversers.

**Can I add the default GPS or a third-party weather radar to the Virtual Cockpit?**

Yes. Simply add the following lines to the [VCockpit02]-section in the panel.cfg (Flight Simulator 9/Aircraft/QualityWings Avro Common/panel.RJ_HD):

*gauge36=fs9gps!gps_500, 442,482,395,327*
*gauge37=QWings146!QW146_VC_WXR_Enable, 0,0,0,0*

**I don't like the Flight Attendant announcements (QWPAS). Can I disable it?**

Yes. Simply open the QW Control Panel and untick "QWPAS". You can also constantly disable it using the QW Config Options.

**If my Navdata is outdated, can I update it?**

Yes. For more information visit [www.navigraph.com](http://www.navigraph.com) *and look for QualityWings Navdata.*

**Can I do anything to improve the Framerate?**

Yes. Have a look at the Config Options. They allow you to manually tweak the refresh rates of the gauges, which can lead to a better Framerate. For FSX we also offer non-QWHDT textures that reduce loading times and increase FPS for the cost of visual quality.

**Where is the autobrake switch?**

The Avro RJ / BAe146 doesn't have an autobrake system. You have to brake manually.

**Why are my Elevators pointing up? Is there any kind of control lock I need to turn off?**

The elevators are tab-controlled, which means there are no hydraulic actuators that move them. They're only moved by the small control tabs you see at the trailing edge. By deflecting in the opposite direction of the desired elevator deflection, they move the control surface into the commanded position. Since this only works when the airflow around the elevator is fast enough, you'll see the elevator point up at low speeds.

**Why does the VNAV button on the BAe146 not work?**

The BAe146 is not equipped with a VNAV autopilot function, although the button is fitted.

# SUPPORT

### How to Obtain Support for your product

Should you need assistance with your product, please feel free to contact us on the Support Forums:

http://qwsim.flight1.net/forums

Technical Support requests will ONLY be handled in the SUPPORT FORUM for "The Ultimate 146 Collection".

Please be advised that the Tech Support Forum will only be accessible to **LICENSED MEMBERS** of this forum. Registered users will need to upgrade their forum accounts to **LICENSED USERS** before they can view the support forum to post topics and receive support.

To become a Licensed User after your purchase, first become a member on the QualityWings forums.

### Support Guidelines

In order to better assist you, you need to be as SPECIFIC AS POSSIBLE as to the nature of your problem
In addition, the following information is REQUIRED in your post to receive support!

- What platform did you experience difficulties? FS9 or FSX?
- What operating System do you use?

Other information to consider providing:

- Have you recently made any changes to your PC (Hardware or software)

HELP US HELP YOU. Vague descriptions of problems will delay progress.

**A quick Note to consider before requesting support**

A LOT of time and effort has been put into developing this manual. Communication between the development team and the end-user (YOU) is paramount here at QualityWings Simulations, and hopefully that is reflected in the manner that this manual was put together. We ask that you CAREFULLY read this manual while you become familiar with the aircraft. We understand that you may want to just "jump right in"...and we have gone through great lengths to make sure that you can do that. But all good pilots put in some level of preparation before every flight. Do not be intimidated by the size of this manual. Information is VERY easy to find through the use of book-marks which are enabled by default.

Before you request support, we suggest that you check this manual carefully. While you request for support on issues that we have covered in this manual will not necessarily fall on deaf ears, let's just say your request for support may not occur as expeditiously as those with legitimate issues that have not been explained. Please do not opt for the quick answer - as it becomes annoying and increases the workload on the development team.

Happy Flying :-)
The QualityWings Development Team