



FLIGHT TECHNIQUE



MD-11

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PREFIX

About this manual

This manual is intended for **flight simulation purposes only**, and should not be used for training or real life operations.

On this manual you will find a compressive explanation of the flight technique of the Sky Simulations MD-11. However it does not replace the reading of the operations manual. Please take a time to read and understand the **OPERATIONS MANUAL** before reading this manual.

As this manual is intended to provide you the flight technique of the Sky Simulations MD-11 we will advocate directly on the functions and operations of the aircraft. We assume that the user can elaborate a flight plan through the Flight Simulator FLIGHT PLANNER. Nevertheless it does not mean that the knowledge on the flight planner would be a requisite to operate the MD-11.

Important Considerations.

- Cargo and Balance

The Sky Simulations MD-11 comes from factory, with a Maximum Gross weight configuration.

The user can change the values of the fuel, and weight directly or by using a third parties software such as FS Passengers u others. In our website the user can find the Payload Models to be used for the FS Passengers.

A correct CG (center of gravity) position must be a positive value an a negative value indicates that the nose is heavy. This would make on Takeoff and landing operations, an excessive nose pitch up and the trim will go till it's maximum position. However an excessive positive CG will make the aircraft rotate to its tail.

That's why is very necessary a correct balance of the aircraft.

You can see the position of the CG on the **EICAS OIL** and **FUEL DISPLAY**

PLEASE refer to the operations manual for more info.

- AUTOMATIC – MAN Modes

The MD-11 incorporates advanced systems which will provide an automatic and manual control of the Hydraulic, Electric, Fuel and Air systems.

On this replica the electric and fuel systems are totally automatic and we provide the automatic and manual mode on the Hydraulic and Air systems. However on the Fuel system we have added two transfer controls directly controlled by the user.

These systems can be switched from automatic to manual, just by clicking directly on the SYSTEM button on each system panel.



PLEASE refer to the operations manual for more info.

- FUEL

The MD-11 adds a new additional tank with respect of the DC-10 on the horizontal stabilizer and it's known as The TAIL TANK.

This new element fulfills important functions and basically has two primary functions:

First, Aid with the adjustment of the trim, this is because: With addition of the extra plug of fuselage after the wings the tail tank, Act's as a element which make more easy the balance of the CG (Center of gravity).

Second, provides an additional fuel which extends the range of the aircraft.

On the development of the flight you must manage the fuel of the tail tank to assure a proper CG configuration. You can do this transferring the fuel of the tail tank to the Main Center Tank and vice versa.

Transfers Fuel from the main tank to the tail tank.



Transfers Fuel from the tail Tank to the Center Main

1.- GROUND PREPARATION

Cold and Dark Configuration

When loading the MD-11 with the default configuration (engines running) normally the systems will automatically switch to normal operating conditions. However some systems, such as Air Conditioning must be adjusted; after that, almost all the systems are operational.

NOTE: The flight Plan could be created or loaded before loading for first time the aircraft or during the preflight process.

- Here we will begin with a Cold and Dark cockpit situation.

Open the overhead panel and locate the electrical section.

- **Select BAT switch On**
The overhead panel will illuminate.



Once the Battery is ON we can select the ground electrical source for starting the systems.

A.- APU as Electrical Source

Locate the APU panel on the overhead panel.

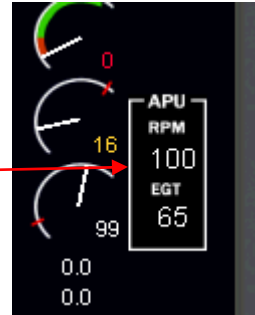
- **Start APU**



Note: When the APU is starting, the FAULT light illuminates momentarily. If it remains illuminated that is an indication that the APU could not be started.

-Go to **EICAS** and select the **OIL** display.

-There you can check the APU status process.



-Once the APU RPM has reached the 100% the Green **AVAIL** legend will turn on.



-Turn **APU PWR** on.

This will make almost all the orange - red lights to extinguish. The Displays, FMC and all the systems will turn on automatically.

The Generators will keep the legend **ARM** illuminated. This means that the switches of the generators are ON and ready relay once the generator of each engine becomes available.

B- GPU as Electrical Source

Call up the external function panel. Shift+6 or



-Switch **GPU ON**.



-Once the GPU is active the Green **AVAIL** legend will turn on.



-Turn **GPU PWR** on.

This will make almost all the orange - red lights to extinguish. The Displays, FMC and all the systems will turn on automatically.

The Generators will keep the legend **ARM** illuminated. This means that the switches of the generators are ON and ready relay once the generator of each engine becomes available.

1.A -Ground Preparation - Electrical Powered Aircraft

Air Conditioning

The Air Conditioning system can be used on Automatic Mode (No light) or Manual Mode (Manual light illuminates)

In the Automatic Mode the aircraft's computer manages almost all the air systems; however, the crew can adjust the temperature of the different compartments for passenger comfort or cargo management.



Once there is a Electrical and Air system available the Packs must be supplied with air coming from either the APU or the GPU.

-Turn on the **APU Bleed Air**



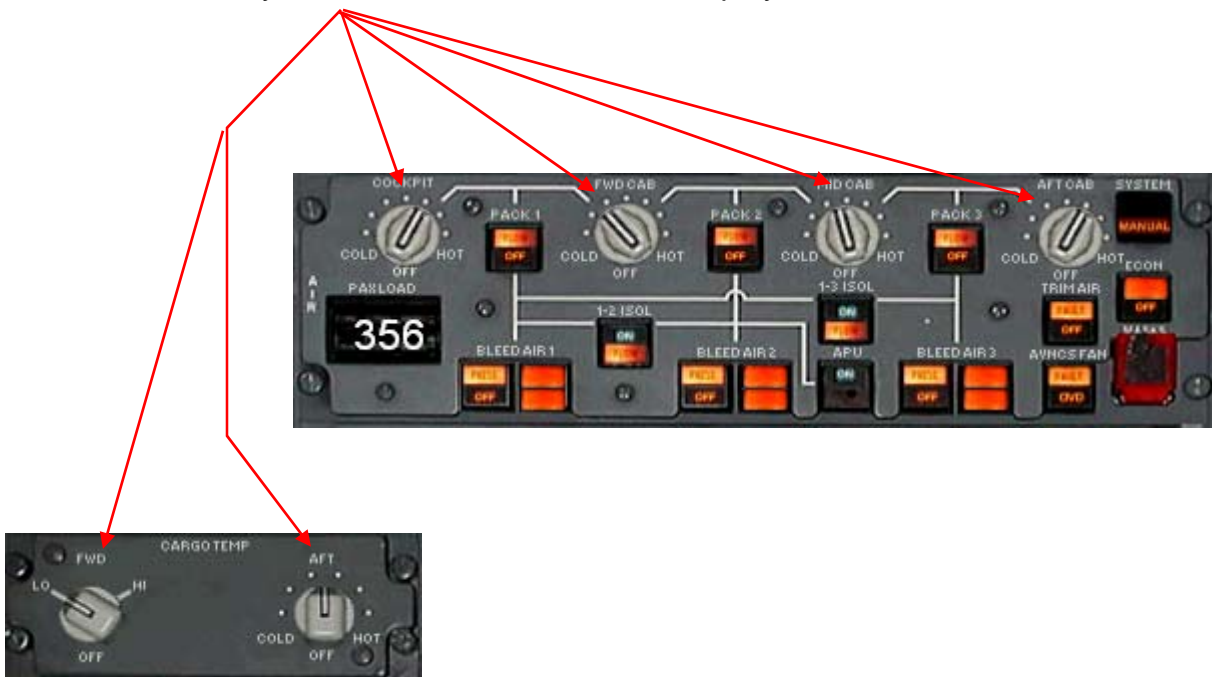
The system automatically engages the Packs and will turn the Isolation valves ON, in order to supply air bleed for the three Packs.

This can be shown too on the EICAS.



-Adjust the temperature for each compartment (Cockpit, FWD, MID and AFT Cabin and FWD and AFT Cargo Compartments)

This action can be performed turning the different knobs from each compartment and can be visually advised on the EICAS –Air Display



Note:

Please refer to operations manual for more detailed information about the Air Conditioning System.

Call up overhead panel

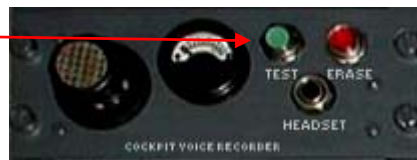
-Perform and IRS Initialization
Turn the three switches to NAV



-Perform a Fire Test



-Check Voice Recorder



-Check Hydraulic Panel
Auxiliary and Transfers pumps OFF



- ARM Emergency lights

-No Smoking & Seat Belts ON/AUTO



-Exterior Lights ON
Wing & Runway Turnoff, NAV and BCN

-Perform an GPWS Test

-Engines and surfaces Antilce OFF

-Windshield heat ASR



-Fuel Used Reset – Reset



-Set Flight Instruments for departure

Adjust radios on the FMC



Open the BaroSet and RA Panel

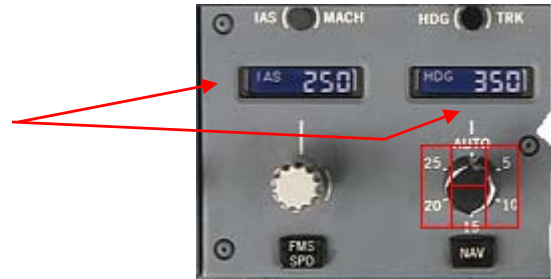
-Adjust the altimeter



- Adjust Initial Altitude and V/S (If required)



- Adjust Initial SPD and HDG (If required)



- Open Pedestal Panel

-SET AUTO BRAKES OFF



-Check and adjust the VHF Radios

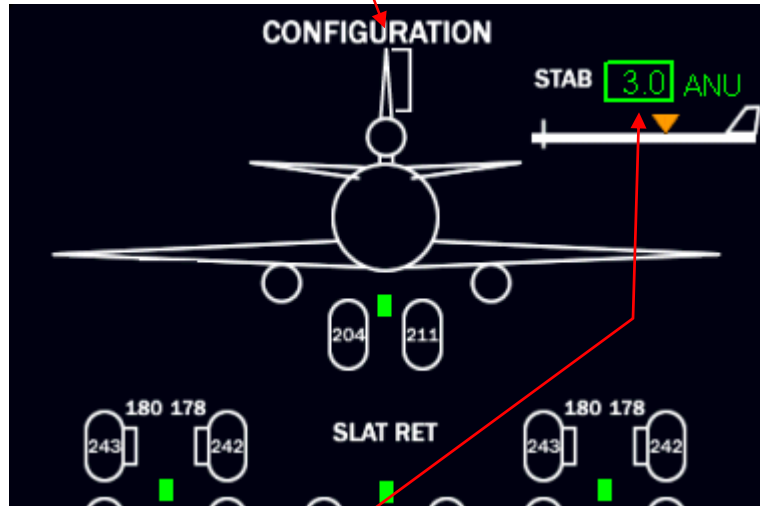


-Adjust TRANSPONDER – STBY



-Open EICAS – Configuration Display

- Check Rudder Trim position to ZERO.



- Check and Adjust Elevator Trim

The elevator trim is shown on the EICAS – OIL or EICAS – CONFIG display and it indicates the position of the stabilizer trim.

If the value is positive, it will be shown with an ANU (Aircraft Nose Up) legend; if the value is negative the indication will turn to AND (Aircraft Nose Down).

The elevator trim must be always adjusted for takeoff position. The correct value depends on various factors such as aircraft weight, airport elevation, Center of Gravity position and runway length.

The normal ranges for takeoff are between 2.5 and 4.5 ANU (Aircraft Nose Up). This values are shown in green, nevertheless, exceeding or lowering this value will turn the indicator to white.

On takeoff, if the trim value is not on a green range, an audible warning will be heard and a Master Caution light will illuminate.

In example:

On a Long route, with almost maximum takeoff weight with a Runway extension longer than 4,500 meters and a negative CG we could use a range between 4.0 and 4.5 ANU.

However, in a short or medium route, with a reduced quantity of fuel we can use less trim for takeoff. A value ranging from 2.5 to 3.5 could be adequate for this situation.

1. –Ground preparation - Completed

2. -ENGINE START

- Set Parking Brakes
- Close all the passenger and cargo doors. Also close the cockpit windows.



All the passenger doors, cockpit windows, cargo doors and stairs must be off. Also on the EICAS – Miscellaneous Display, all the announcements must be extinguished.

-Fuel Pumps – Check On

All the Red-Orange lights must be off



-IGNITION

Select A or B system

The OFF light must be extinguish when selecting one of the systems.

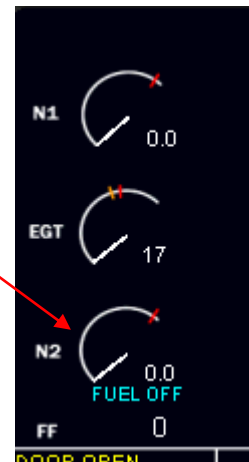


-Check Throttle levers at IDLE



-START Engine 1 with the start switch

-When Engine 1 N2 Indicator is above of 19%
Fuel Switch ON



-Check Engine1 Oil Press

-Check Generator 1 light OFF extinguishes

Repeat for Engine 2

Repeat for Engine 3

- Turn OFF APU Bleed Air
Isolation Valves will turn off



2- Engine Start Check List - Completed

3. - BEFORE TAXI

- **Detach Ground Crew (If applicable)**
External functions panel



- **Adjust temperature of the Air conditioning**

- **IGNITION OFF**
Lights extinguished

- **Engine DE-ICE ON**
(If conditions requires)



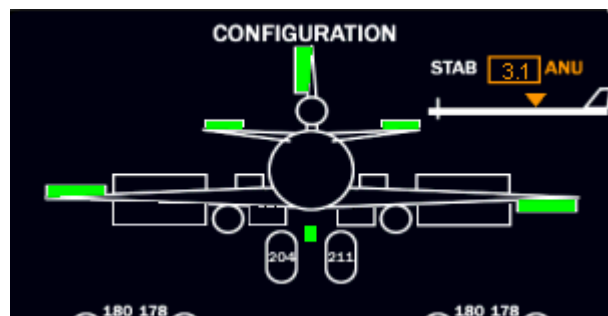
- **CHECK HYDRAULIC PANEL**
(All lights extinguished)



- **APU - OFF**

- **Perform a Flight Controls test.**

On the EICAS – Configuration Display all the control surfaces must be actuated until they reach its maximum range (Indicated when the control surface indicator turns fully green).



- Check all the ground equipment is removed.
On the external functions panel all the lights must be OFF.

3. – Before taxi - Completed.

4. -TAXI

- Extend Flaps and Slats

The required flaps position, is directly related to the weight of the aircraft, airport elevation , among other factors.

- For short routes, with low aircraft's weight we can use 5 degrees of flaps.

-Typical configuration is with 15 degrees of flaps
Slats medium extended and 15 degrees.

- For heavy aircraft's weight or high airport's altitudes we can use 22 degrees of flaps.

Setting the Flaps handle on 28 degrees position and adjusting the **DIAL A FLAP** Selector to 22. This will fully extend the slats and the flaps will extend to 22 degrees.



- Set Autobrake to T.O.



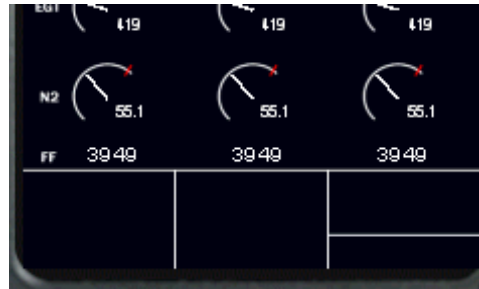
- Set TRANSPONDER

- Set Taxi Lights ON

4. – Taxi - Completed

5. - TAKE OFF

- Check for no YELLOW, RED u ORANGE annunciations on the EICAS (Primary EICAS Display)



- Set STROBE and Landing Lights ON (Lights extinguished)



- No Smoke and seat belts ON

- Engage AutoFlight and AutoThrottle



- Set Throttles between 90.5% and 96% of N1



- Release Brakes.
- Check the V1 on PFD (Available on Version 1.2 and above)
- Rotate at VR (Available on Version 1.2 and above)

5. – Take off - Completed

6. – AIRBORNE

On positive range of climb (V2) *Available on 1.2 and above*

- Landing gear UP
The virtual copilot will announce the status of the landing gear retraction.
- Landing Lights retract - OFF
- Approximately at 172 Knots (depending on the aircraft's weight)
Retract Flaps to 5 degrees
- Between 185 and 195 Knots (depending on the aircraft's weight)
Retract Flaps to 0 degrees. Leave the Slats extended

- **Between 200 and 220 Knots** (depending on the aircraft's weight)
Retract the Slats.

NOTE:

The Flaps retraction speeds are based on a average speeds and are not accurate to the QRH.

These values could be greater or lower depending of the actual aircraft's weight.

- **Above 1000 ft AGL you can activate the Auto flight modes**

For example: Passing 1,000 ft. AGL:

- Activate **Altitude Hold**, the **V/S rate** is the same one as the one we had previously selected, however we can adjust it to our needs.

With a good rate of climb, we can keep our speed, not exceeding the normal regulation of 250 knots IAS at or below 10,000 ft.

However we can activate the **IAS hold** on the AFS panel if we want.



Once the altitude hold is engaged and we are maintaining our speed, we can worry about lateral navigation.

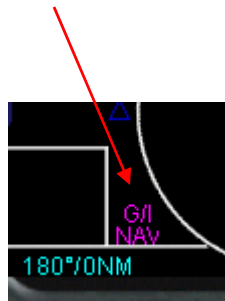
- **Press the NAV button to engage lateral navigation.**



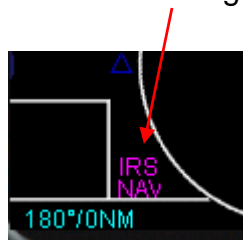
Note:

Normally, the AFS will automatically activate the lateral navigation if there is a Flight Plan loaded and the NAV button is engaged. However, in some circumstances it could not activate this mode.

To check if this mode is activated go to EHSI or ND and check in the left bottom corner. A magenta G/I NAV indicator should be ON.



If the navigation mode shows IRS NAV in magenta color it means that the VOR/LOC is activated and not the lateral navigation.



To activate **LATERAL NAVIGATION** on the AFS Panel **RIGHT CLICK** on the **RIGHT SIDE** of the **NAV** Button as shown below.



Doing this will activate and deactivate the Lateral Navigation manually.

- **Passing 10000 ft turn off the Wing & Rwy turnoff as well the Logo lights.**

6. – Airborne - Completed

7. – CRUISE

To maintain a safe speed and passenger comfort, we must gradually decrease the rate of climb once we are closer to acquire our cruise altitude.

- Above 25000 ft we must change or Speed Hold to MACH Hold

Click on MACH in the IAS-MACH selector. This will change the speed reference to a Mach number. The value will change on the PFD too, and the A/T indication "Thrust" will change to magenta color, indicating that MACH HOLD is selected.



7.A – LEVELING THE FUEL

The Fuel system (fully applicable on Version 1.2) is fully automatic and it will provide enough fuel to the three engines in all moments. However, there is a trick that must be performed when the Tail fuel Tank is filled.

The aircraft can proceed the entirely flight without balancing the tanks; however it's very recommendable to manage the fuel for a proper CG position for landing.

- Open the overhead panel on the fuel section and **TRANSFER FUEL** from the tail tank to the main center tank. (Explained on the Prefix – Fuel section)

- **Watch** the CG position on the EICAS- FUEL or OIL Display to assure an a positive value.

7. – Cruise - Completed

8. - DESCENDING

-Check no warnings

- The descent process varies according to the specific airline company standards and the specific situation the aircraft is in.

A rule of thumb to calculate the distance in which we must start our descent (ToD – Top of Descent); is to subtract the destiny airport altitude to our present or cruise altitude. Eliminate the three zeros and then multiply the result by three.

For example: Traveling an altitude of 33,000 ft. and with a destination airport altitude is 6,000 ft. Subtracting our present altitude minus our destination altitude results in 27,000, eliminating the last three zeros: 27; finally multiply by three, and the result is 81.

So, we must start our descent at 81 miles DME from our destination. To this figure, we must add an additional extra distance if, for example, our arrival procedure is using a DME ARC.

The rate of descent (ROD) varies too, for example we can start with a ROD of -2,000 ft/min then we can increase it to -3000 ft/min as for about 6,000 ft. above our selected altitude we must decrease progressively the ROD to -500 ft/min.

This suggested technique will assure that when we reach our selected altitude, we will stay on, or below of, the established speed or at least, we will be in control of the speed.

- DEFOG/ WINDSHIELD HEAT

Turn on if requires.

- No Smoke and seat belts ON

- Lowering the transition altitude, Set ALTIMETERS

-Turn ON exterior lights (WING& RUNWAY turnoff and LOGO Lt)

When lowering the 10,000ft.

- Adjust Decision Height

8. - Descending - Completed

9. - LANDING

Suggested Flaps extending speeds

- At or Below 220 IAS: Start extending the Slats
- 200 to 185 IAS: Flaps 5
- 195 to 175 IAS: Flaps 15
- **Lower Landing Gear**
- **Check no annunciations**
- **Extend and turn on LANDING LIGHTS**
- **Use the SPEED TABLES to calculate your approach speed**
- **Arm AUTOSPOILERS**
- **Set AUTOBRAKES**
(If requires)

9. - Landing - Completed

10. - AFTER LANDING

- **Retract Spoilers**
- **Set FLAPS at 15°/EXT**
- **AUTOBRAKES OFF**
- **Transponder OFF**
- **LANDING LIGHTS OFF-Retract STROBE Lights - OFF**
- **Turn OFF Windshield Heat and ENGINE DEICE**
(If applicable)
- **START APU**

10. - After landing – Completed

11. - ENTERING THE GATE

- Retract Flaps ad Slats
- Set Exterior Lights
(As required)
- APU BLEED AIR ON
- Transponder STBY

11. - Entering the gate – Completed.

12. - PARKING

- Set Parking Brakes
- Set Fuel Valves OFF
- Set Anti Collision/ Position Lights OFF/ASR
- Emergency Lights OFF
- Set No Smoking/Seat Belts ON/OFF

12. - Parking - Completed

Greetings

Sky Simulations would like to thank the support, effort of all the people that help or contribute in any way on the development of this product.

We also like to thank to all of our customers for helping us increase realism and professionalism of our products and our company, without you we are nothing.

The information contained on this manual should not be altered in any way.



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