



JAPAN AIRLINES VIRTUAL



BOEING 737-800 STANDARD OPERATIONS PROCEDURE (SOP)

Edition 1 – MARCH 2013

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INTRODUCTION

It is my pleasure to welcome you aboard one of the most active programs here at JAL VIRTUAL. The Boeing 737 as it is known is among the largest global aircraft manufacturers, and the second largest aerospace and defence contractor in the world based on defence-related revenue from 2011. In 1967, Boeing introduced another short- and medium-range airliner, the twin-engine 737. It has become since then the best-selling commercial jet aircraft in aviation history. The 737 is being produced as of 2013, and continuous improvements are made. Several versions have been developed, mainly to increase seating capacity and range. The Boeing 737 is a short- to medium-range twin-engine narrow-body jet airliner. It was developed originally as a shorter, lower-cost twin-engine airliner derived from Boeing's 707 and 727, the 737 has developed into a family of nine passenger models with a capacity of 85 to 215 passengers. The 737 is Boeing's only narrow-body airliner in production, with the -600, -700, -800, and -900ER variants currently being built. A re-engine and redesigned version, the 737 MAX, is set to debut in 2017.

Originally envisioned in 1964, the initial 737-100 flew in 1967 and entered airline service in February 1968. Next the lengthened 737-200 entered service in April 1968. In the 1980s Boeing launched the -300, -400, and -500 models, subsequently referred to as the Boeing 737 Classic series. The 737 Classics added capacity and incorporated CFM56 turbofan engines along with wing improvements. In the 1990s Boeing introduced the 737 Next Generation with multiple changes including a redesigned wing, upgraded cockpit, and new interior. The 737 Next Generation comprises the four -600, -700, -800, and -900ER models, ranging from 102 ft (31.09 m) to 138 ft (42.06 m) in length. Boeing Business Jet versions of the 737 Next Generation are also produced. The 737 series is the best-selling jet airliner in the history of aviation. The 737 has been continuously manufactured by Boeing since 1967 with 7,457 aircraft delivered and 3,044 orders yet to be fulfilled as of January 2013. 737 assembly is centered at the Boeing Renton Factory in Renton, Washington.

Many 737s serve markets previously filled by 707, 727, 757, DC-9, and MD-80/MD-90 airliners, and the aircraft currently competes primarily with the Airbus A320 family. There are, on average, 1,250 Boeing 737s airborne at any given time, with two departing or landing somewhere every five seconds.

As a new pilot to the Boeing 737 program you have an opportunity to fly in one of the world's longest serving and successful aircraft in the commercial airline history. As of December 2012, over **10,400** units of the Boeing 737 have been ordered, with **3,020** units to be delivered.

If you would like to receive virtual flight training which is modelled after the real world training, do not hesitate to contact the Training Executive at www.jalvirtual.org

We are hoping that you will enjoy most of your time in the program.

Push it up!!

Hardik Singh
Boeing 737 Chief Pilot

ABOUT US

Japan Airlines group was founded in 2007, as the first independent Japan Airlines in virtual form. Since its founding JAL Virtual has grown to be the best simulated virtual airline representing the JAL Group. In 2012, JAL Virtual celebrated its 5th anniversary and thus got a major overhaul of our website, forum, schedules and fleet. We hope to Dream Skyward! in the future! Our mission is to represent the JAL Group in virtual form. We want to recreate almost every aspect possible of Japan Airlines for Flight Simulator. We strive to be the virtual airline that represents Japan to the world.

We have other divisions which include:

- **JAPAN AIRLINE VIRTUAL** - Japan Airlines Virtual is our mainline division. Japan Airlines Virtual serves international and domestic destinations. Japan Airlines Virtual operates a wide body, all-Boeing fleet of aircrafts.
- **JAL CARGO VIRTUAL** - JAL Cargo Virtual is the cargo arm of the JAL Virtual Group. We transport everything from shoes to cars in our 767-300F, 747-200F and B747-400F/BCF aircraft. We plan to introduce JAL Cargo Virtual into our database in spring 2013.
- **JAL EXPRESS VIRTUAL** - JAL Express Virtual is the low cost carrier (LCC) division in JAL Virtual Group. JAL Express Virtual flies to domestic destinations using Boeing 737-800 Aircraft. Schedules are in the database now.

JAPAN AIRLINES VIRTUAL
We are not affiliated with the real Japan Airlines. JAL Virtual Group is a non-profit organization run by dedicated volunteers. Our task is to simulate the JAL Group in Microsoft Flight Simulator.

All airline logos are different and all images are taken from within Flight Simulator, the graphic is kept intentionally different from the real airline to avoid possible copyright infringement. Trade mark infringements are not possible since the organization is non-profit and does no trading of any kind. Japan Airlines Virtual is in no way affiliated with the real Japan Airlines or any other real world airline. If you wish to visit the real-world Japan Airlines website, please go

to: <http://www.jal.com/>

USAGE PRINCIPLE

Operational procedures, guidance and skills are recommended to the Flight Crew in this manual. The Flight Crew must understand, be proficient and correctly apply all the contents of *Flight Operation Manual*, *Airplane Flight Manual*, *Flight Crew Operation Manual*, *Flight Crew Training Manual*, *Quick Reference Handbook* prior to the usage of this manual. The

Normal Procedure is used by the trained Flight Crew. Every Flight Crew Member should complete a flow scan according to respective area of responsibility **by memory**. The related Checklist is used to confirm that the critical operation is definitely correct and associated Normal Procedure is completed. The Non-normal Procedures are used to handle the abnormal situations on the ground and/or in air. If the abnormal situation/s occur, first check if the system control devices are in the proper position, then check relevant Circuit Breaker and test corresponding system lights (if needed). Before engine start, verify system condition through respective system lights. After engine start, use the Master Caution system, relevant system lights, or alerts as primary method to remind the Crew of certain abnormal system condition/s. If Master Caution or system signal light/s is illuminated, the corresponding abnormal procedure must be completed. Do the Non-normal Checklist after all memory items are completed, the aircraft is under control and not in a critical phase of flight.



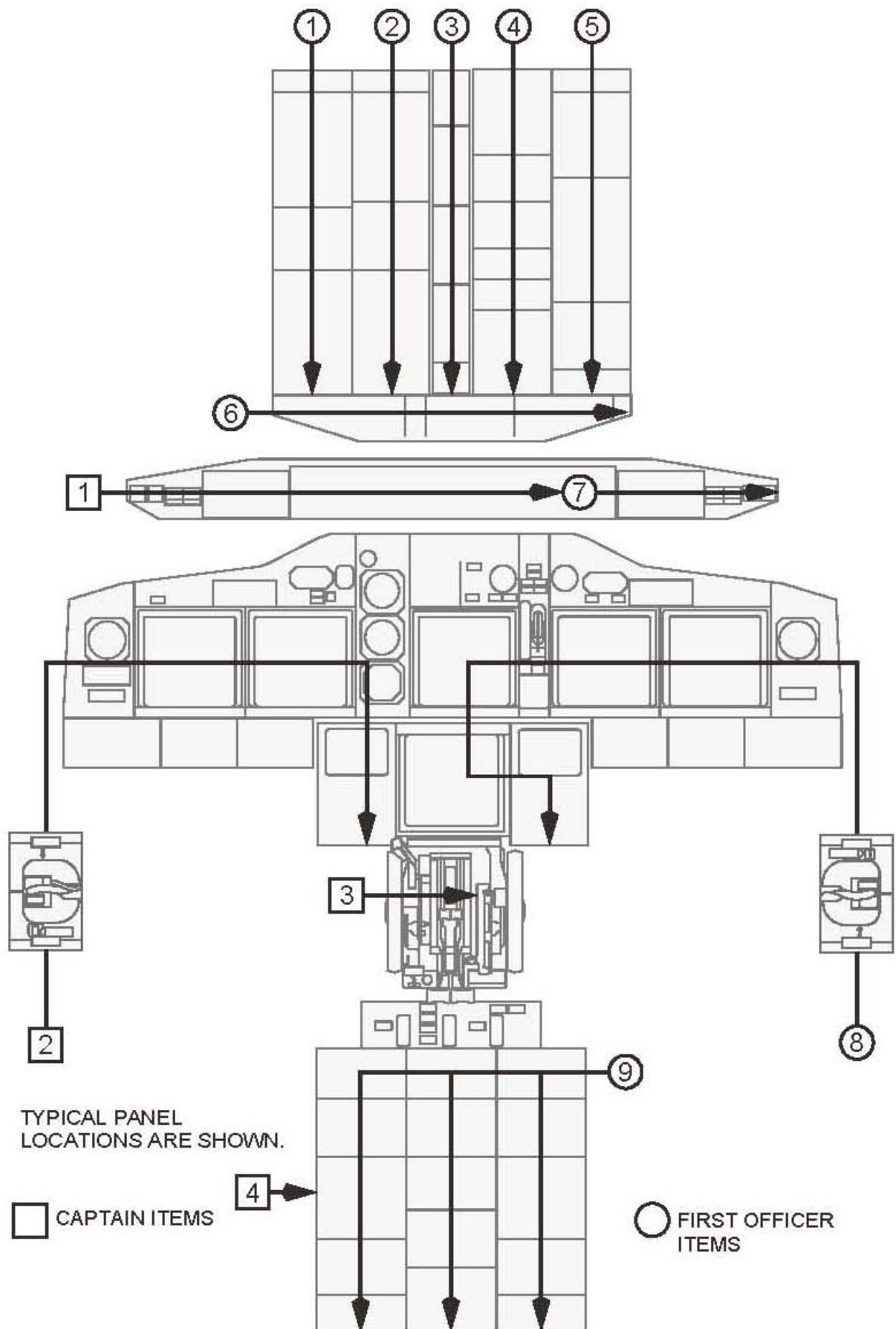
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Flight Crew Responsibility

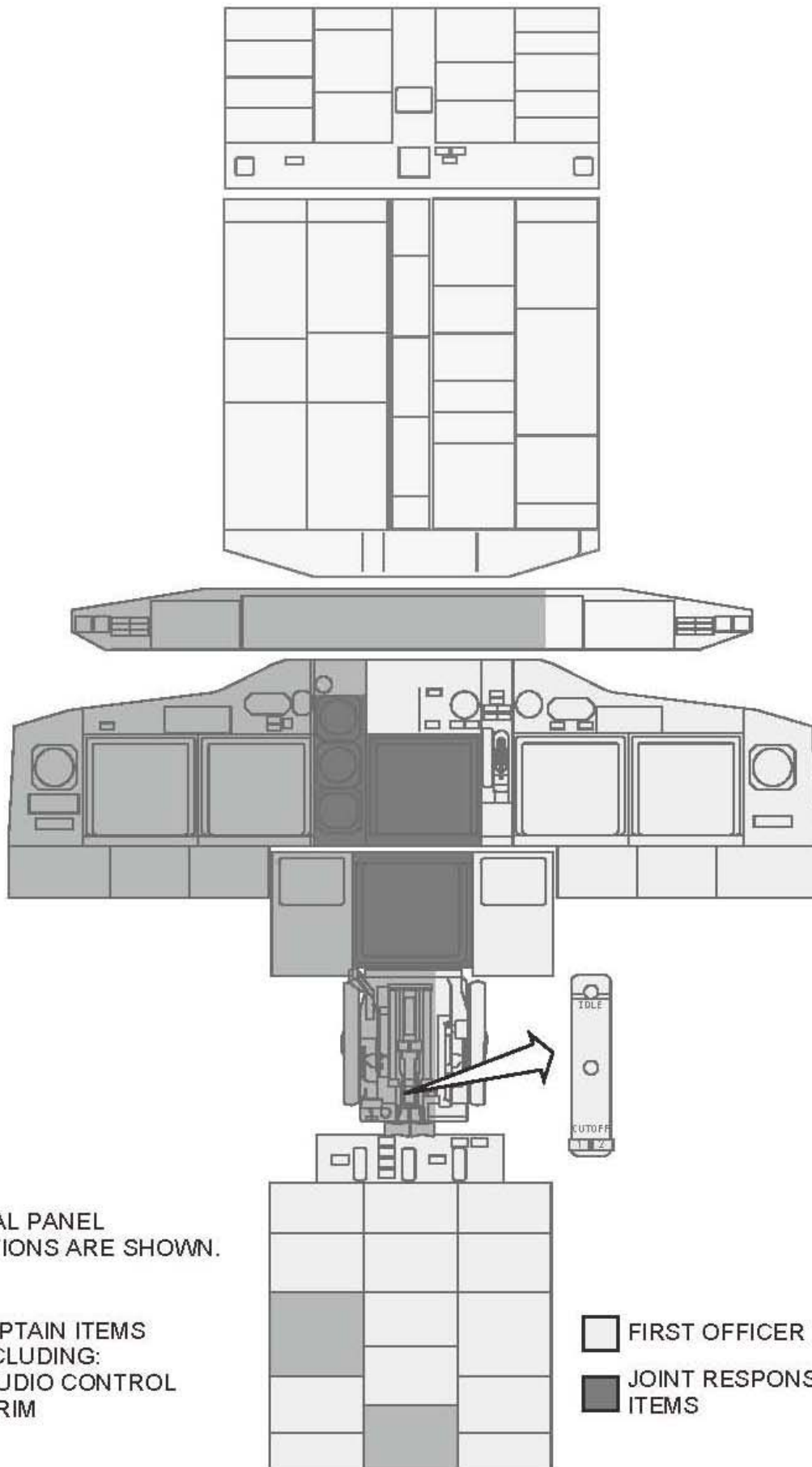
The responsibilities before or after flight are divided into that of Captain (left seat) and First Officer (right seat). The responsibility in each flight phase is divided according to Pilot Flying (PF) and Pilot Monitoring (PM). Every Flight Crew Member is responsible for his respective control/s and/or switches in his area of responsibility. The Responsibility Panel Diagram displays the normal and abnormal situation responsibility area and shows the typical panel position. The Captain could guide the Flight Crew Member to execute actions out of the area of responsibility.



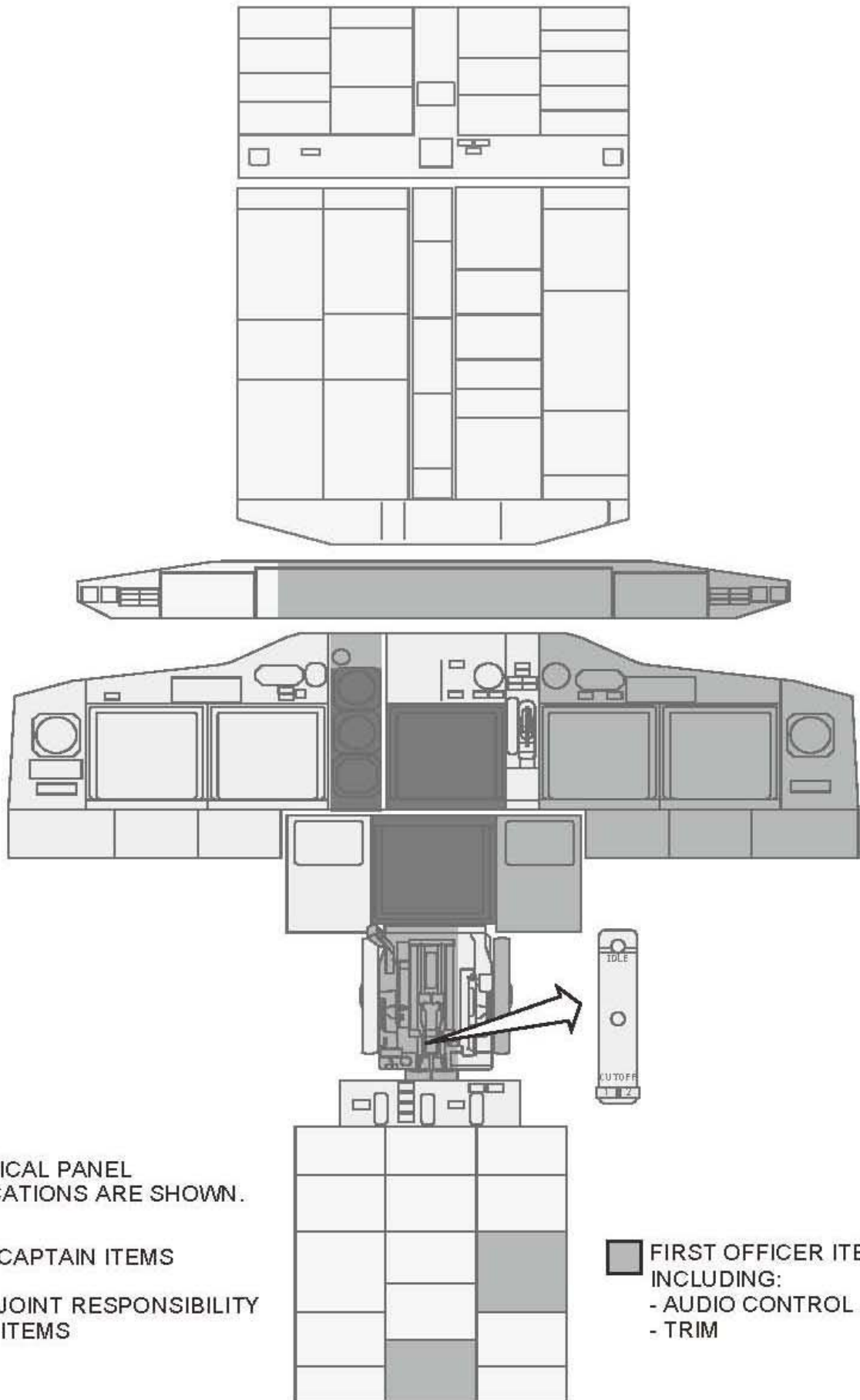
Preflight and Postflight Scan Flow



Areas of Responsibility - Captain as Pilot Flying or Taxiing



Areas of Responsibility - First Officer as Pilot Flying or Taxiing



The normal responsibilities of PF in the following flight phases:

- Taxi.
- Flight track and airspeed control.
- Airplane configuration.
- Navigation.

The normal responsibilities of PM in the following flight phases:

- Read the appropriate Checklist.
- Communication (ATC, Company, Cabin Crew as directed by the PF or Captain).
- The assigned task/s as required by the PF.
- Monitor taxi, flight path, airspeed, aircraft configuration and navigation.

The responsibility of PF and PM could be **changed** during flight. For Example: the Captain could be PF as required during taxi, and could be PM from takeoff to landing. The normal procedure indicates which pilot (C, F/O, or PF, PM) takes the action:

- As the procedure name, or
- At the last column, or
- As the diagram or table name

MCP is the area of responsibility of PF. During manual flight, PF will advise the PM to make changes in the MCP as required. The **Captain** makes the final decision to the execution and correct completion of the responsibilities.

Flight Crew should always monitor:

- Airplane course
- Vertical path
- Speed

When an MCP selection is made, confirm with the **flight mode annunciation (FMA)** and related instruments.

Flight Crew must confirm manual selection of the flight mode or the AFDS automatic change. Confirm the correct changes by referring to the FMA:

- Autopilot.
- Flight Director.
- Auto throttle.

During the operation of **LNAV** and **VNAV**, verify all the changes of the airplanes:

- Flight course.
- Vertical path.
- Thrust.
- Speed.

Good CRM practice requires that callouts should be made when FMA and thrust mode have been displayed or changed.

SPECIFICATIONS

BOEING 737-800 MODEL SPECIFICATIONS	
COCKPIT CREW	2
SEATING CAPACITY	130-215 (MAXIMUM) 108-117 (2-CLASS TYPICAL)
LENGTH	102-138 FT (31m-42m)
WINGSPAN	112 ft 7 in (34.32m) 117 ft 5 in (35.79 m) WITH WINGLETS
WINGAREA	124.58 m² (1341.0 sq ft)
WING SWEEPBACK	24.02 DEGREES
OVERALL HEIGHT	41 ft 3 in (12.57 m)
MAXIMUM CABIN WIDTH	11 ft 7in (3.53 m)
FUSELAGE WIDTH	12 ft 4 in (3.76 m)
CARGO CAPACITY	756-1835 cu ft (21.4-52.0 m³)
OPERATING EMPTY WEIGHT, TYPICAL	80,200-98500 lb (36,400-44,700 kg)
MAXIMUM TAKE-OFF WEIGHT (MTOW)	144,500-187,700 lb (65,500-85,100 kg)
CRUISING SPEED	MACH 0.78 (511 mph, 823 km/h)
MAXIMUM SPEED	MACH 0.82 (544 mph, 876 km/h)
TAKE-OFF FIELD LENGTH (MTOW, SL, ISA)	5,249-9-9,843 ft (1,600-3,000 m)
MAXIMUM RANGE (FULLY LOADED)	3,050-5,510 nm (5,650-10,200 kms) (3510-6340 mi)
MAXIMUM FUEL CAPACITY	6,875 US GALLONS (26,020 l; 5,725 imp gal)
SERVICE CEILING	41,000 ft (12,500 m)
ENGINES (x2)	CFM INTERNATIONAL CFM56-7 SERIES)
THRUST (x2)	19,500 -27,300 lbf (87-121 kN)

POWERPLANT

Engines on the 737 Classic series (300, 400, 500) and Next-Generation series (600, 700, 800, 900) do not have circular inlets like most aircraft. The 737 Classic series featured **CFM56 turbofan engines**, which yielded significant gains in fuel economy and a reduction in noise over the **JT8D engines** used on the -100 and -200, but also posed an engineering challenge given the low ground clearance of the 737.

Boeing and engine supplier CFMI solved the problem by placing the engine ahead of (rather than below) the wing, and by moving engine accessories to the sides (rather than the bottom) of the engine pod, giving the 737 a distinctive non-circular air intake.

The wing also incorporated a number of changes for improved aerodynamics. The engines' accessory gearbox was moved from the 6 o'clock position under the engine to the 4 o'clock position (from a front/forward looking aft perspective). This side-mounted gearbox gives the engine a somewhat triangular rounded shape. Because the engine is close to the ground, 737-300s and later models are more prone to engine **foreign-object damage (FOD)**. The improved **CFM56-7** turbofan engine on the 737 Next Generation is 7% more fuel-efficient than the previous CFM56-3 in the 737 classics. The newest 737 variants, the 737 MAX family, are to feature **CFM International LEAP-1B** engines with a **1.73 m fan diameter**. These engines are expected to be 10-12% more efficient than the CFM56-7B engines on the 737 Next Generation family



Principles of usage of the Normal Checklist

The Normal Checklist can be used when the relevant procedural steps have been completed. The table below shows Pilots' task sharing of reading the Checklist and answering the Checklist. Both pilots should visually check that the required items and steps are completed. The right column refers to the pilot who answers the Checklist. This is different from the right column shown in the normal procedures, which shows which steps are done by which pilot.

<u>CHECKLIST</u>	<u>REQUIRED CHECKLIST CALLED BY</u>	<u>CHECKLIST READ BY</u>	<u>CONFIRMED OR VERIFIED BY</u>	<u>PILOTS RESPONDING</u>
PREFLIGHT	CAPTAIN	F/O	BOTH PILOTS	BOTH PILOTS
BEFORE START	CAPTAIN	F/O	BOTH PILOTS	BOTH PILOTS
BEFORE TAXI	CAPTAIN	F/O	BOTH PILOTS	BOTH PILOTS
BEFORE TAKE-OFF	PF	PM	BOTH PILOTS	BOTH PILOTS
AFTER TAKE-OFF	PF	PM	BOTH PILOTS	PM
DESCENT	PF	PM	BOTH PILOTS	BOTH PILOTS
APPROACH	PF	PM	BOTH PILOTS	BOTH PILOTS
LANDING	PF	PM	BOTH PILOTS	BOTH PILOTS
SHUTDOWN	CAPTAIN	F/O	BOTH PILOTS	BOTH PILOTS
SECURE	CAPTAIN	F/O	BOTH PILOTS	BOTH PILOTS

If the airplane configuration is different from the configuration currently required:

- Stop the checklist
- Complete the associated procedural steps.
- Continue the Checklist.

If the whole procedure is not completed:

- Stop the Checklist.
- Complete the whole procedure.
- Start the Checklist from the beginning.

- ❖ **Try to do Checklists before or after high workloads. The Crew may need to stop a checklist for a short time to do other tasks. If the interruption is short, continue the checklist with the next step. If the Crew is not sure where the checklist was stopped, do the Checklist from the beginning. If the Checklist is stopped for a long time, also do the Checklist from the beginning.**

❖ **Method of the Checklist usage:**

Strictly execute the Checklist operation procedure according to the Checklist operation guide and pay attention to the following:

1. Except Recall Items specified by QRH and SOP, Checklists must not be done by memory.
2. Pilot Flying (PF) or the captain must correctly call out the full name of the Checklist, while PM or F/O reads the Checklist. The Crew verify and respond as required. PM must announce “xxx” Checklist completed” after the checklist has been completed.
3. While doing the Checklist, if a certain item cannot be carried out immediately, the checklist should be stopped at this item until this item has been completed.
4. When the airplane is on the ground, and Ground Maintenance Personnel or any other Flight Crew Members perform a maintenance test or operate certain equipment, the Checklist must be started again from the beginning.
5. If the Checklist reading is interrupted (such as ATC communication), the Checklist should be continued from the break/interruption position.
6. Prior to airplane movement, if both Flight Crew Members have been out of their operating position, the Checklist must be started again from the beginning. .
7. Other Crew Members or Observers in the cockpit must monitor the execution of the Checklists.

A large, semi-transparent watermark of the JAL logo is centered on the page, behind the list of items.

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Flight Crew Coordination:

Flight Crew coordination is the guarantee to flight safety; one flight Crew Member should be the supplementary and backup for the other Crew Member. Good flight crew coordination and crew resource management reduces the work load and enhances flight safety. The Flight Crew Members duties could be as PF, PM and Observer. When the airplane is operated by the F/O (under Supervision of an Instructor), the F/O acts as PF and the Captain (Instructor) takes the responsibility of the PM. During the takeoff, the Thrust Lever shall be always under the control of the Left Seat. But the decision of **RTO MUST** be executed by the Captain (unless incapacitated). During auto flight, ATC cleared attitude, speed and heading directives, PF set MCP panel and call it out which should be checked by PM. During manual operation, PF commands and PM sets MCP panel which should be checked by PF. After PF has completed the actions, report to the PM. The actions beyond the area of responsibility should be commanded by the PF, even when PM is the instructor and PF is a student pilot. (Special and emergencies are the exceptions). The captain (Instructor) reserves the final right to all the action command and execution.

Standard Callouts:

One basic principle of CRM is to assist the flight crew member to act as a backup for the other flight crew member. Good standard callouts is an important tool to guarantee flight safety and improve the cockpit resource management.

All flight crew members should be aware of the altitude, position and status of the airplane. The content of the standard callout contains: **critical data, ATC clearance, flight mode change, indications and caution callouts, etc.**

Standard callouts must be simple, generalized, standard, clear, understandable, and answer as required. Standard callouts provide the pilots with the airplane system status and the required information for the other flight crew to take part in. PM calls out according to instrument indication or observation. The command speed or the obvious deviation from flight path should be reported. PF should check the condition, position on the instruments and make responses. If the PM does not make the required callout, PF should make the call out.

Any pilot should report any abnormal display of the flight instrument (**flags, deviation, pointer loss, etc**).

PF should be aware of the aural callout of the GPWS during approach. If the automatic electronic aural callout is not heard, PM should report the callout (i.e. **MINIMUMS**).

Note: If there is no automatic callout, PM should assist to establish the touchdown and flare using the **radio altimeter** and calling out "**100 FT, 50FT, 30FT, 20FT, 10FT** (other data as required)".

If there is no standard callout during the associated flight phase, it may indicate a fault has occurred in airplane system or an indication of pilots incapacitation.

During critical flight phases, avoid unnecessary talk during taxi, takeoff, approach and landing. Unnecessary talk does reduce the flight crew work efficiency and awareness. Therefore talk not related with flight is inhibited under 10,000FT (AGL).

BOEING 737 STANDARD CALLOUTS

The Following callouts are according to the phase of the flight initiating from the following:

TAKE-OFF>CLIMB>CRUISE>DESCENT

<u>PHASE, CONDITION, POSITION</u>	<u>PF (CM1)</u>	<u>PM (CM2)</u>
Advance thrust levers to N1 : 40%-50% TO/GA After the takeoff thrust has been set	"Set Takeoff Thrust"	"Stable" "Takeoff Thrust Set"
Speed is 80 knots	"Check"	"80" "Thrust Hold"
Speed V1-3kts		"V1"
Speed VR After liftoff, positive vertical speed indicated	"Gear Up"	"Rotate" "Positive Rate" "Gear Up" when selecting
400 feet (AGL)	"Heading Select/LNAV"	"400" "Heading Select/LNAV mode alive" Then illuminated in the FMA
1500 feet (AGL)/clearance Altitude (as procedure required)	"N1, UP speed"	"1500/XX (clearance altitude)" "N1 mode alive, Up Speed Set" when illuminated in the FMA
More than V2+15 speed	"Flap 1"	"Speed Above V2+15" "Flap 1" when selecting the Flap Lever.
More than Flap 1 speed	"Flap UP"	"Flap 1 Speed" "Flap UP" when selecting the Flap Lever.
Clean configuration	"VNAV/ Level Change"	"Flap UP Transit Light OFF" "VNAV/ Level Change mode alive" when illuminated in the FMA.
Stable climb	"After Takeoff Checklist"	After Takeoff Checklist to Transition Height"
Through Transition Height (altitude)	"Altimeter Set, STD Continue After Takeoff Checklist"	"Transition Height (altitude)" "After Takeoff Checklist Completed"
Before entering RVSM airspace (through 8,400 Meters)	"Before Entering RVSM Airspace Checklist"	"Before Entering RVSM Airspace Checklist Completed"

Before descent (approach preparation and approach briefing completed)	"Descent Checklist"	"Descent Checklist Completed"
Through Transition Level	"Altimeter Set To XXXX Approach Checklist"	"Transition Level" "Approach Checklist Completed"
10000 feet (AGL)	"Check"	"10000 feet"
VOR or Localizer Course movement	"Check"	"Course movement"
Course capture	"Check"	"Localizer Captured"
Glide slope movement (ILS) / 2nm before initial descent point	"Check, Gear Down, Flap 15"	"Glide Slope Alive" "Gear Down, Flap 15"
Landing Gear extended, Flap 15 on position green light		"Landing Gear Extended Three Green Lights, Flap 15 Green Light"
Glide Slope capture (only ILS)	"Check, Flap 30/40" "Landing Checklist"	"(only ILS)" "Flap 30/40" watch Placard speeds "Landing Checklist Completed"
Pass outer marker/outer station/ final approach fix	"Check"	"Passing Outer Marker /Outer Station/ Final Approach Fix Altitude xxxx"
1000 feet (AGL)	"Check, switch lights on"	"1000, Landing Configuration Completed, GoAround N1 XX"
500 feet (AGL)	"Check"	"500"
DA (H) / MDA+100 feet	"Continue Approach"	"100 to Decision/Minimum"
DA (H) /MDA Establish suitable visual reference	"Continue/Landing"	"DA/MINIMUMS/Runway in sight"
During Landing roll		"Speed Brakes Up, Reverse Thrust Unlocked, N1 XX"
60 knots		"60"
When Auto brake disarmed		"Automatic Brake Disarmed"

IN CASE OF A GO AROUND

DA(H)/MDA+100 feet	"Continue Approach"	"100 to Decision/Minimum"
DA (H) , MDA(H) or MAP. Suitable visual reference cannot be established, then Go Around	"Go Around, Flap 15, Set Go Around Thrust"	"Negative Contact" "Flap 15, Go Around Thrust Set"
positive vertical speed altimeter	"Gear Up"	"Positive Rate"
400 feet (AGL)	"Heading Select/LNAV"	"Speed above VREF+15" "Flaps 5" when selecting the Flap Lever
Speed above Flap 5 Speed	"Flap 1"	"Flap 5 speed" "Flap 1" when selecting the Flap Lever
Speed above Flap 1 Speed	"Flap up"	"Flap 1 Speed" "Flap UP" when selecting the Flap Lever

Note:

1. CATII/CATIII callout is not included in the precision approach standard callout.
2. Visibility: Except CATII/CATIII approach (whose required visual reference is specifically prescribed in approval document of CAAC) , pilots should at least see and recognize clearly one of the following visual references of the planned runway (if the pilot uses the approach lighting as a reference, he/she should clearly see and recognize the red terminal barrette) , otherwise the aircraft is not allowed to descend below 30 meters (100 feet) above the touchdown zone elevation (TZE).

- A- runway threshold
- B- runway threshold sign ;
- C- runway threshold light ;
- D- runway terminal identifying light ;
- E- precision approach path indicator (PAPI) light ;
- F- touchdown zone or touchdown zone sign ;
- G- touchdown zone light ;
- H- runway or runway sign ;
- I- runway light

3. At 80 knots, during the take off roll, the PM will call "80". PF will briefly look at his/her Speed Tape and Standby Airspeed Indicator and confirm with "Check" and that "THR HLD" is indicated on the FMA.
4. During takeoff and climb out below 400FT (AGL), the Crew is only allowed to do related standard callouts and operations (i.e. selecting Gear Up) and actions of their areas of responsibility. No ATC communication is allowed below this height.
5. When an action such as selecting the Flap Handle, Landing Gear Lever or Parking Brake, the Crew **must** verify its position or status according to the indication of related instruments and/or lights, and then call it out.

- ❖ The callout table does not include the following content, but the following situations **must** be clearly called out:
- You/I have control : **“You have control” “I have control”**;
 - Any FMA mode changes.
 - Altitude, speed and heading changes on the MCP panel.
 - When the autopilot/auto-throttle has been disconnected or engaged;
 - Critical equipment has been switched.
 - When abnormal situations occur.
 - 1000 feet to level off .
 - When any configuration has been changed.



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STANDARD PHRASEOLOGY

❖ SOME RECOMMENDED WORDING AND PHRASEOLOGY:

➤ **THRUST SETTINGS**

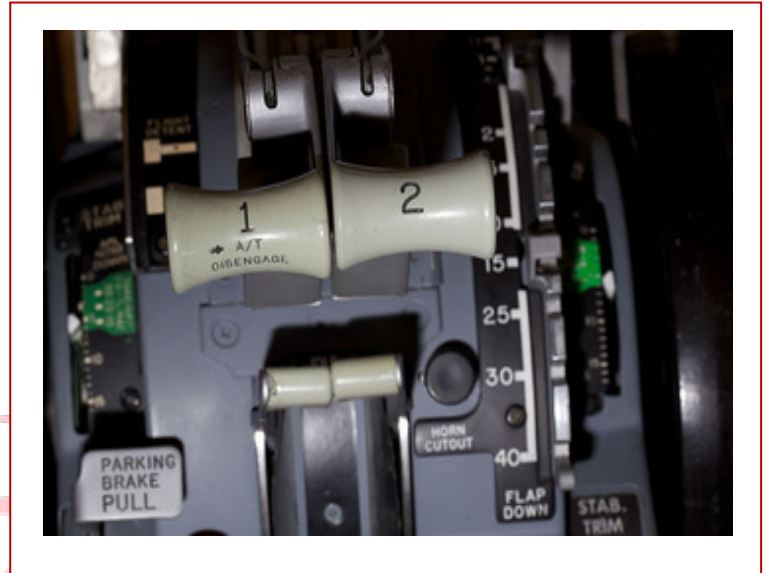
- Takeoff Thrust Set
- Go around Thrust Set
- Maximum Continuous Thrust Set
- Climb Thrust Set
- Cruise Thrust Set

➤ **FLAP SETTINGS:**

- Flaps UP
- Flap 1
- Flap 5
- Flap 15
- Flap 25
- Flap 30
- Flap 40

➤ **AIRSPEED SETTINGS:**

- 80
- V1
- Rotate
- Set speed__
- Set Flaps __ speed
- Set VREF plus__ (increment)



FUEL MONITORING

1. After takeoff, Flight Crew must monitor the fuel consumption on board, and compare with the remaining fuel quantity in the Computer Flight Plan, in order to ensure that there is enough fuel to complete the flight safely and to find out abnormal fuel consumption timely (such as engine or aircraft fuel leak).
2. Flight crew should monitor the fuel balance on board at all times.
3. Flight Crew should monitor the fuel temperature at any moment. Fuel temperature is affected by the Outside Air Temperature (OAT). For example, high cruise flight level will cool the fuel. In some circumstances, fuel temperature may approach the minimum fuel temperature limitation.
4. After a long flight in high altitude under low temperature, if landing on the airport of lower temperature and higher air humidity, the Crew should consider disadvantages to flight safety caused by frost/icing on the wing surfaces.

Flight Crews should respect minimum fuel temperature when it has decreased to or approaches the minimum limit.

Fuel cooling rate is about **3°C/hr**. The maximum is **12°C/hr** in extreme cold weather condition.

The TAT may be increased by using the following three ways (these three ways can be used separately or together)

- Climb or descend to a warmer temperature.
- Divert to a warmer temperature.
- Increase Mach number.

Note: In most cases, the warmer temperature may be reached by descending, but some reports point out that there is warm temperature in a higher flight level. Evaluate the temperature report seriously if the temperature is lower than normal situations. It will take **15-60 minutes** to stabilize fuel temperature. In most cases, descend to an altitude of 3000-5000 feet lower than the optimum altitude. Descending to **25,000-30,000 feet** may be required in more serious situations. The TAT may increase **0.5°C-0.7°C** if Mach number increases by **0.01**.

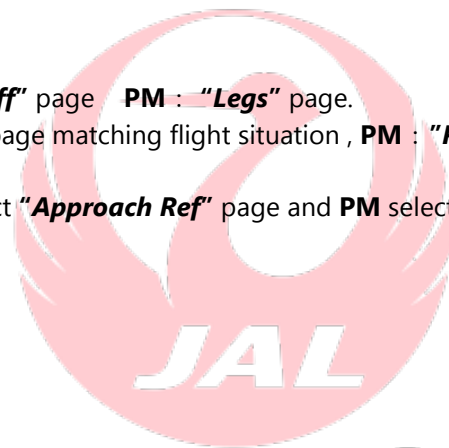
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CDU USAGE

- 1) CDU input can be done by the Captain or First Officer prior to taxi, while the other Pilot is responsible for checking and verifying.
- 2) CDU input should be done prior to taxi or when the aircraft is not moving. If CDU input must be done during taxi, it should only be done by PM when the aircraft is taxiing along straight and non-congested areas and flight safety won't be affected.
- 3) Generally, during flight, CDU input should be done by PM. If workload permits, PF could do simple CDU input during non-critical flight phases. Pilot, who enters the CDU input, can execute it only when the other pilot has verified the input and confirmed.
- 4) At flight phases with high workloads, such as Departure or Approach, reduce the CDU input as much as possible. The aircraft can be controlled through MCP Heading, Altitude and speed control. Using MCP is simpler than entering complex route in CDU.

❖ CDU page selection:

- **Before Takeoff** : PF : "**Takeoff**" page PM : "**Legs**" page.
- **During flight** : PF: select the page matching flight situation , PM : "**Progress**" page , "**Legs**" page or the pages commanded by PF.
- **After ILS established**, PF select "**Approach Ref**" page and PM selects "**Leg**" page or the pages commanded by PF.



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RADIO ALTIMETER USAGE

Use barometric Altimeter except when Radio Altimeter usage is prescribed for the airport approach procedure. Compare the barometric Altimeter readout to Radio Altimeter. This method can also be used to cross check the main altimeter when the airplanes fly over the known terrain in the airport area. Radio altimeter should be used for **CAT II ILS** and **CAT III ILS**.

QFE USAGE

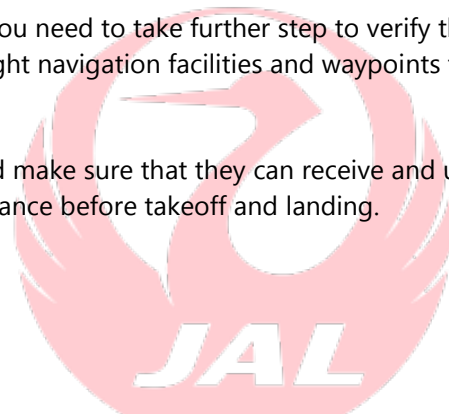
LNAV and **VNAV** are **prohibited** to use when **QFE** is selected. The altitude in the navigation data base is not based on QFE. You can only use raw data navigation. The QFE altitude reference on PFD must be selected in FMS as long as QFE is used, not QNH. If the setting of QFE altimeter exceeds altimeter range, the QNH procedure must be used.



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ATC CLEARANCES

- 1) Comply with ATC clearance anytime in the flight.
- 2) When ATC clearance cannot be met due to airplane performance limitations or weather, the Flight Crew must notify ATC in time and request another Clearance.
- 3) Flight Crew should verify in time if there are any doubts to ATC Clearance.
 - a) ATC Clearances should be recorded in the form which can be understood by both Pilots and they should be kept in the place easy to find out, in order that there is a clarified record when needed.
 - b) Before departure, ATC Clearance should be consistent with not only the planned departure and initial track, but also all the flight legs in the whole plan. This is in the Takeoff Briefing, and also can be taken as an important means to check takeoff data. Read related maps and manuals if there is any serious terrain clearance problem.
 - c) After received ATC Clearance, you need to take further step to verify that navigation data is consistent with actual clearance. Check over flight navigation facilities and waypoints to make sure that planned route is consistent with ATC clearance.
 - d) All Flight Crew Members should make sure that they can receive and understand ATC Departure and Landing Clearance. Crosscheck the clearance before takeoff and landing.



AUTOFLIGHT

JAPAN AIRLINES VIRTUAL

Auto flight system may lighten the workload of Flight Crew, so the Flight Crew can have more time and energy to monitor flight track and progress. Both Pilots must monitor AFDS mode annunciator and current FMC flight plan. PF is responsible for selecting AFDS mode and PM verifies it when Autopilot is used in flight.

Pilots must fly manually any time the Auto flight system does not operate in the anticipated way. Take measures to solve the problem of Autopilot only when the airplane is flied manually and you are sure that the airplane is under control.

LNAV and VNAV flight are prohibited to use below transition altitude/level during takeoff and approach in airport using QFE.

AUTOPILOT

- 1) The minimum altitude recommended by company to engage Autopilot after takeoff is 1000 feet (AGL).
- 2) Autopilot should be disengaged and the airplane should be flired manually anytime there is a situation which is out of the control performance range of the autopilot, or during instrument approach the autopilot cannot maintain the airplane in the anticipated track.

❖ **The following conditions are recommended to use Autopilot :**

- 1) Fight Crew should try their best to use Autopilot during climbing/cruising/descending.
- 2) Autopilot should be used during Non-precision / Precision Approach.
- 3) In marginal weather condition, Autopilot should be used during approach.
- 4) The use of Autopilot is recommended in the following cases when pilots are under heavy workload. (Observe the limit of each type airplane's Operation Manual strictly):
 - a) Pilot's incapacitation.
 - b) Emergency Descent.
 - c) Non-normal situations appear on the airplane.

AUTOLAND SYSTEM USAGE

Generally, sensitive area will not be protected when airplanes make CAT I ILS approach. ILS signals can be affected by ground vehicles, aircraft of other influences. CAT I ILS approach systems are not usually flight checked or certified within the threshold. Based on this, the ILS beam quality in these positions is unknown. Unexpected flight control actions may occur at very low altitude or when autopilot tries to track the incorrect beam during landing.

- 1) Autoland is not recommended for CAT I ILS.
- 2) Before Autoland with Autopilot, confirm that the control system of the airplane has completed the regulated maintenance, and the operation condition of the airport meet the regulated requirements.
- 3) During Autoland with Autopilot, pilots must maintain and control the airplane at any time. Flight Crew must keep very alert all the time, and their hands and feet cannot leave control wheel, pedals and Thrust Lever during the whole automatic Approach and Landing. They should be prepared to disengage Autopilot (A/P) and do manual landing or go-around at any moment.
- 4) Autoland Crosswind capability:

	HEADWIND	CROSSWIND	TAILWIND
BOEING 737-800	25kts (13m/s)	20kts (10 m/s)	10kts (5 m/s)

THE ENGAGEMENT & DISENGAGEMENT OF A/P AND A/T SYSTEMS

❖ Autopilot Engagement Method :

Follow **F/D** closely, maintain the aircraft control and trim is proper. Make sure that there is no force on the control wheel. Engage the Autopilot needed. Observe "**CMD**" is displayed on **FMA**. PF call out **Autopilot A** or **B** engaged (*A for Left seat, B for Right seat*), PM verified it.

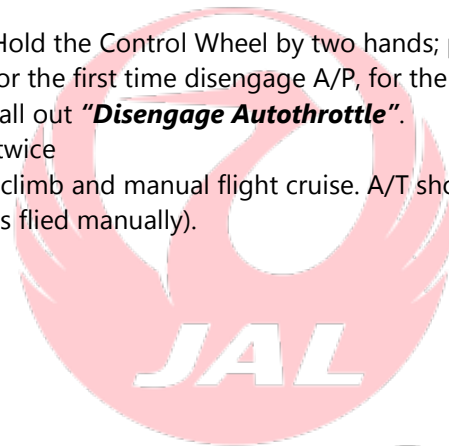
(Note: If there is a force on control wheel, AP cannot be engaged. There will be a significant attitude change if the airplane is not trimmed properly. If F/D disappears after A/P engaged and CWS mode appears, the needed command mode should be engaged immediately).

❖ Autopilot/Auto throttle disengagement Method :

PF announce "**Disengage Autopilot**". Hold the Control Wheel by two hands; push the **A/P button** on the Control Wheel twice. (The interval is 1 second, for the first time disengage A/P, for the second time silence the warning). Then put one hand on the Thrust Lever and call out "**Disengage Autothrottle**".

Push the **A/T Disengagement button** twice

(Note: A/T may be used during takeoff, climb and manual flight cruise. A/T should be disconnected during Approach and Landing phases when the airplane is flied manually).



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MANUAL FLIGHT

- 1) During manual flight, the heading, altitude, speed change, speed selection related to flaps and AFDS mode selection cleared by ATC are commanded by PF, and PM take the actions. For example, PF commands "**Set Heading 170**". PM reports "**Heading 170 Set**", and PF "**Check**".
- 2) The PF can consider to fly manually according to weather condition. Manual flight is not permitted in marginal weather and flight conditions.
- 3) The Flight Crew is prohibited to control the airplanes in a careless and reckless way.
- 4) Do not give the commands or take the actions which will endanger flight safety.
- 5) Bank angle should not exceed **30 degrees (25 degrees for normal situations)** when airplanes are in normal flights.

CONTROL TRASFERRING

During control transferring, the PF must call "**You Have Control**" and the PM will respond "**I Have Control**" after the actions has been taken. During manual flight, the accepting Pilot will place his/her hands on the Control Column and feet on the Rudder Pedals, and then respond "**I Have Control**".

A large, semi-transparent red circular logo with the letters 'JAL' in white, centered behind the main title.

JAPAN AIRLINES VIRTUAL

FLIGHT DIRECTOR

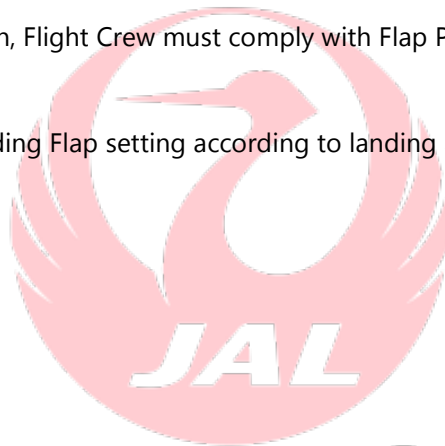
Flight Director should be turned on in all flight phases as long as it is available and indicating correctly. The Flight Crew should cycle the Flight Director during a Non-precision Approach when the aircraft is stabilized, Auto Pilot has been dis-engaged and the required visual reference has been established. Flight Director may not be used during training flights.

FLAP SETTINGS

- Use Flap setting 5 for normal takeoff. Flaps 1 if and when approved.
- Tail clearance during takeoff:

AIRPLANE TYPE	FLAP SETTING	LIFTOFF ATTITUDE (DEGREE)	TAIL CLEARANCE (FEET)	TAILSTRIKE PITCH ATTITUDE (DEGREE)
B737-800	1	8.5	13(33)	11
	5	8.0	20(51)	
	15	7.3	25(64)	
	25	7.0	29(73)	

- Use Flap 30 for normal landing. If condition permitted, use Flap 40 in order to reduce the landing distance to minimum, and reduce the landing speed to minimum.
- When selecting any flap position, Flight Crew must comply with Flap Placard Speed and the altitude limit of 20,000 feet.
- Flight Crew should select a Landing Flap setting according to landing airport, weather and aircraft conditions.



JAPAN AIRLINES VIRTUAL

SPEEDBRAKE USAGE

Speedbrake system is comprised of spoilers. These spoilers may be extended and retracted by moving speedbrake Lever. Speedbrakes may reduce deceleration time and distance by 50%. When using the speedbrakes in the air, PF should put one hand on the speedbrake Lever all the time, which help to prevent the speedbrakes being deployed when no longer required. When using speedbrakes use Flight Detent and no intermediate positions to avoid unexpected roll rates. Airplane may have an increased roll rate when extended during turns. "Up" position is prohibited to use during flight. During descent, the airplane should have sufficient altitude and speed margin to level off smoothly. Retract speedbrake before the A/T increases thrust.

Note: Speedbrake Lever cannot be deployed beyond "**Flight Detent**" in the air.

The rapid retraction of speed brake could increase the airspeed to above VMO/MMO when airplane is descending with Autopilot engaged and the Speedbrake extended when close to VMO/MMO. In order to avoid this situation, retract Speedbrake smoothly, which allows the Autopilot to have enough time to adjust pitch attitude and keep the airspeed within the limit.

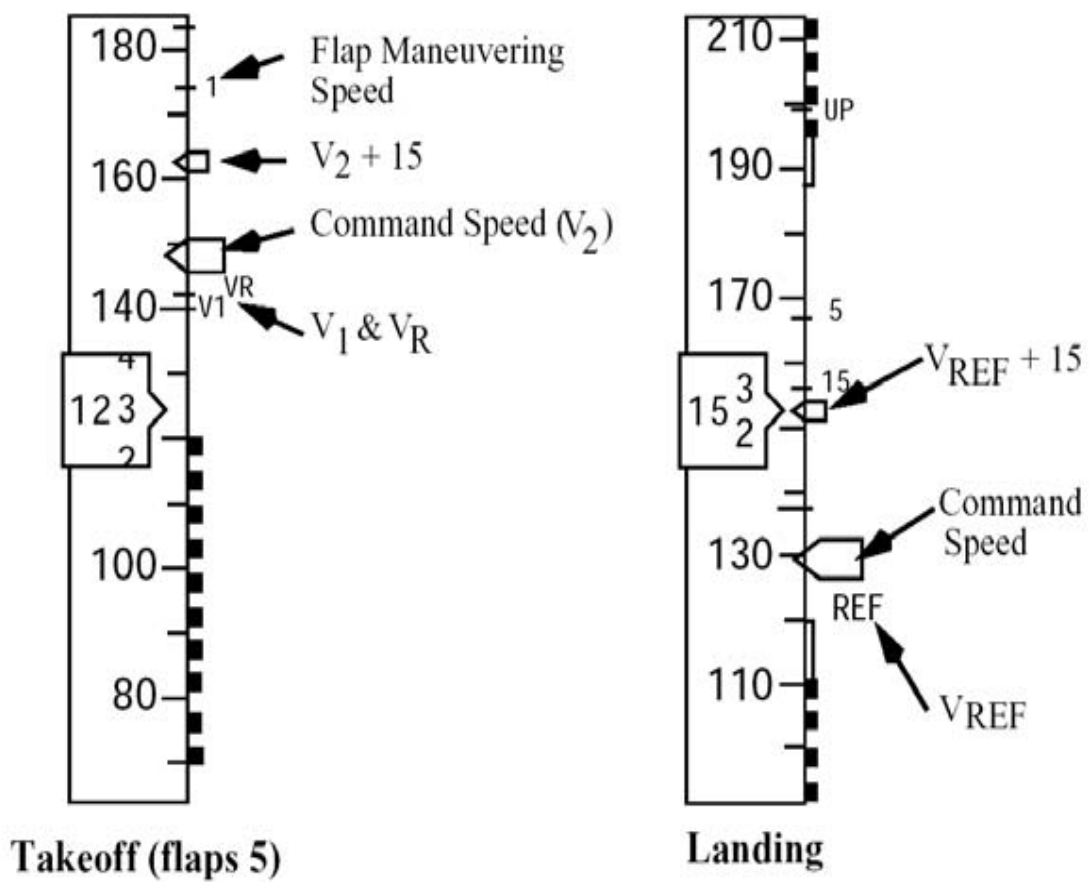
If possible, avoid using speedbrake during flaps extension. Retract speedbrake if flap setting is more than 15. Excess sink rate should be avoided during approach if speed brake should be used during flap extension. Final Approach with speedbrake extended below 2000 feet AGL is not permitted.

Spoiler extension will reduce the wing lift, and press the main gears with airplane weight in order to provide improved braking action. If the speedbrake is not extended at touchdown, the braking action will be reduced by 60%. This is because the full weight of the aircraft is not being transferred to the wheels for the braking/anti-skid system to work efficiently.

In normal situations, on Final Approach, speedbrake should be "**Armed**" and extends automatically at touchdown. After touchdown, both Pilots should monitor the extension of speedbrake. If automatic extension fails, PM shall call it out "**Speedbrakes not UP**", and PF should manually set the speed brake lever to "**UP**" immediately.

JAPAN AIRLINES VIRTUAL

TAKE OFF AND LANDING SPEED BUG SETTING



TAKEOFF BRIEFING

The Takeoff Briefing should be accomplished before engine start, and can be updated during the taxi before takeoff, in the premise of not affecting flight safety.

❖ **The Takeoff Briefing should include at least the following items:**

- Expected Taxi route planned.
- Applicable NOTAM (including affection from construction).
- Adverse weather and runway conditions.
- Dispatch using the MEL.
- Departure flight path or SID, emphasize estimated flight path and altitude limitation/s.
- Rejected takeoff.
- Methods of establishing route, return or alternate with engine failure after V1 (if applicable).
- Any other situation where it is necessary to review or define crew responsibilities.

Takeoff briefing (example):

Plan to take off at ___ runway, turn left/right to a heading ___ to join the route.

After takeoff, ___ procedure departure, initial altitude ___ feet, transition altitude ___ feet, airway altitude ___ feet, full (derated) thrust, flap 5, V1 ___, VR ___, V2 ___

Engine failure before V1 /severe damage, In case of a rejected takeoff : retard the throttle, disengage A/T, extend speedbrake lever, reverse thrust as required, use the brakes according to the speed (RTO).

After V1, Continue the takeoff if the engine fails or is severely damaged. Climb and maintain the speed over V2, report to the Tower to return for landing / or a new Clearance and complete the appropriate Checklist.

The Takeoff Briefing is completed.

APPROACH BRIEFING

Before the start of an instrument Approach, the PF should brief the PM of his intentions in conducting the Approach. Both Pilots should review the approach procedure. All pertinent approach information, including minimums and Missed Approach procedures, should be reviewed and alternate courses of action considered.

❖ **As a guide, the Approach Briefing should include at least the following:**

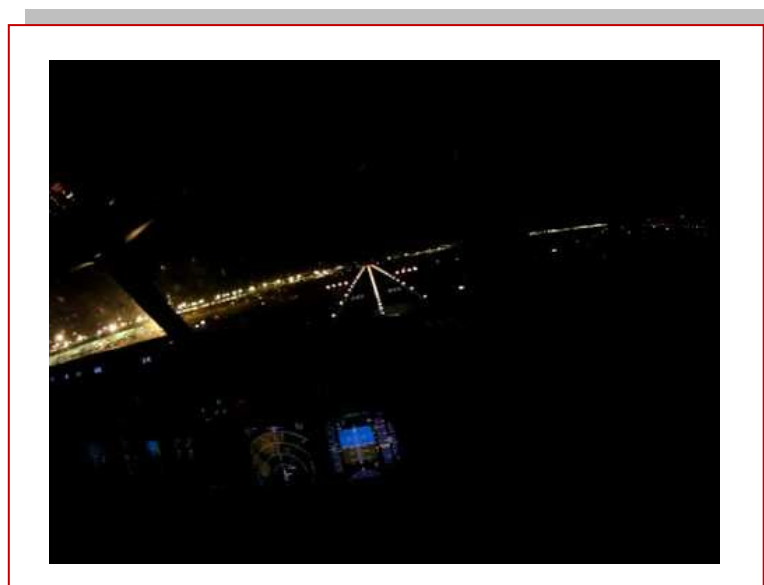
- Weather and NOTAMS at Destination and Alternate, as applicable.
- Approach type and the validity of the charts to be used.
- Navigation and communication frequencies to be used.
- MSA altitudes for that airport.
- Approach procedure including courses and heading.
- Vertical profile of the approach (non-precision approach should clarify VDP).
- Go-around procedure review (including height and position of important obstacles, affection of adverse weather to the path of go around).
- Taxi route to expected Parking Bay.
- Any appropriate information related to a non-normal procedure.
- Management of AFDS.

Approach Briefing (example):

(Precision Approach) Plan to approach at ___ runway, transition altitude is ___ feet, course ___, A/P ___, QNH (QNH) ___, DA (H) ___, Auto brake select ___, Flaps ___, Landing Weight ___, VREF ___, The first VHF navigation ___, Standby ___, the second VHF ___, Standby ___, ADF1 ___, ADF2 ___, Descend to DA (H) ___, if the required visual reference is obtained – I will **“Continue”**. If not, will call **“Go-around”** and perform the Go-around procedure (read according to the approach map) or follow the ATC instructions.

Go-around action:

Advance the Thrust Lever, press TO/GA, Flap 15, positive climb rate Gear Up, 400 feet HDG SEL or LNAV, Flap retraction on schedule.



STABILIZED APPROACH

When the aircraft maintains a planned configuration, attitude, airspeed or corresponding power plant in the planned flight route, the approach is commonly referred to as the stabilized approach concept.

Stabilized approach includes:

- The airplane is on the correct flight path.
- Only small changes in heading/pitch are required to maintain the correct flight path.
- The airplane indicated airspeed is not less than VREF and not more than VREF+20 knots or current flap placard speed, whichever is lower.
- The airplane is in the correct landing configuration.
- Sink rate is not greater than 1,000 fpm; if an approach requires a sink rate greater than 1,000 fpm, a special briefing should be conducted.
- Power setting is appropriate for the airplane configuration.
- All briefings and checklists have been conducted. Specific types of approaches are stabilized if they also fulfil the following :
 - ✓ ILS approaches should be flown within one dot of the Glide Slope and Localizer.
 - ✓ During a Circling Approach, wings should be level on Final and the aircraft is stabilized prior 300 feet AGL.

Unique approach procedures or abnormal conditions requiring a deviation from the above elements of a stabilized approach require a special briefing.

❖ Stabilized Approach Requirements:

ILS approach : When the airplane is below 1,000 feet above threshold elevation;

Visual approach : When the airplane is below 500 feet above threshold elevation, the airplane must be stabilized at the final approach speed or final landing configuration, or it must initiate a Go-around. At 100 feet HAT for all visual approaches, the airplane should be positioned so the Flight Deck is within, and tracking to remain within, the lateral confines of the extended runway edges.

As the airplane crosses the runway threshold it should be:

- Stabilized on target airspeed to within +10 knots until arresting descent rate at Flare.
- On a stabilized flight path using normal manoeuvring.
- Positioned to make a normal landing in the touchdown zone (the first 3,000 feet or first third of the runway, whichever is less).

Manoeuvring : (including runway changes and circling)

When manoeuvring below 500 feet, be cautious of the following :

- Descent rate change to acquire glide path.
- Lateral displacement from the Runway Centreline.
- Tailwind/crosswind components.
- Runway length available.

The stabilized configuration should be established as early as possible during every approach to provide the Flight Crew with more situational awareness to be aware of influences like windshear or other situations that could cause deviations from the stabilized approach profile. So, before descending to the minimum stabilized approach altitude, the stabilized approach must be established :

- 1) In VMC or Straight-In by 500 feet AGL above the runway threshold.
- 2) During a Circling Approach by 300 feet AGL above the runway threshold or the MDA whichever is higher..
- 3) In IMC using an Instrument Approach 1,000 feet AGL above the runway threshold.
- 4) The manoeuvring of above 20 degree bank is forbidden when the airplane is below 500 feet above airport elevation.
- 5) Initiate a Go-around if the above criteria cannot be maintained.

LANDING CONDITIONS

Before landing the Captain should judge whether the landing distance meets the following condition according to the airplane conditions and surface conditions :

1. Received ATC landing clearance.
2. Verify the landing weight is not more than critical landing maximum weight (configuration limits, performance limits) under normal flight conditions.
3. Confirm the runway used.
4. Auto brake is selected according to airplane weight, surface conditions, and weather conditions. Auto brake should be selected before touchdown if operable.
5. Landing flaps are selected according to the flying conditions and airplane conditions.
6. Take into consideration the affects of the wind to landing.
7. Take into consideration the affects of wake turbulence.
8. Take into consideration the affects of birds and other threats on landing.

LANDING MINIMA

There are required limits on how low an airplane can descend on Final without visual contact with the runway environment when making an Approach. Descent limits are based on a Decision Altitude (**DA**) (**ILS OR PAR**) for approaches using a Glide Slope or certain approaches using a **VNAV PATH**, or a **MDA** for Non-precision Approaches without a Glide Slope.

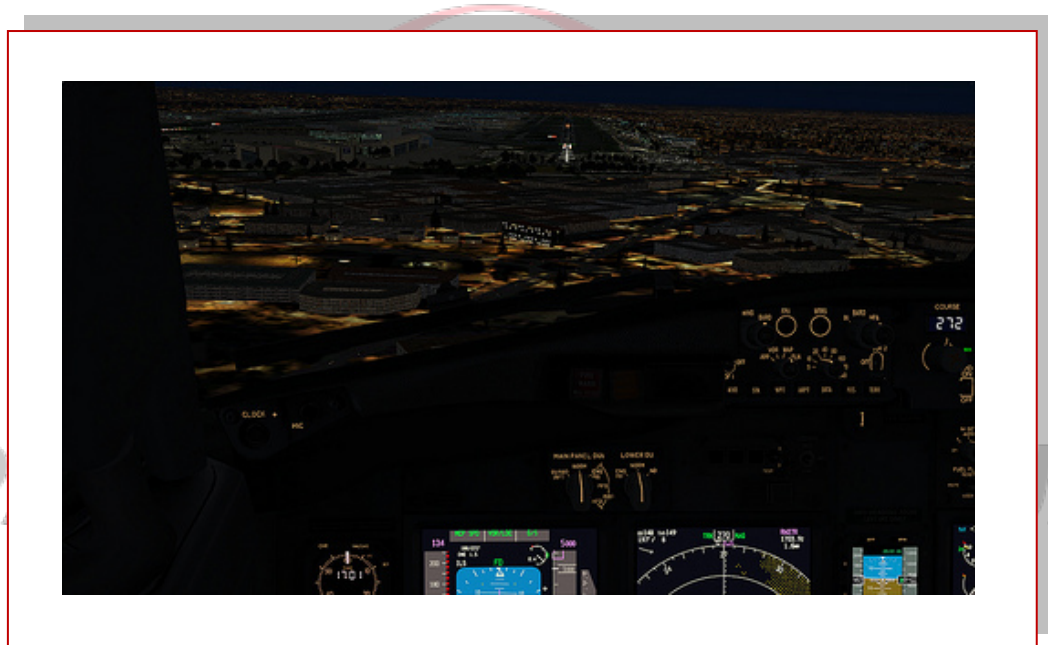
Note: Approach charts use the abbreviation **DA (H)** or **MDA (H)**. The Decision Altitude (DA) or Minimum Descent Altitude (MDA) is referenced to **MSL**, and the **parenthetical height (H)** is referenced to **Touchdown Zone Elevation (TDZE)** or Runway Threshold Elevation. For example, A DA (H) of 1,440 feet (200 feet) is a DA of 1,440 feet with a corresponding decision height of 200 feet.

When **RVR** is reported for the landing runway, it typically is used in lieu of the reported meteorological visibility. When descending to the **MDA** and passing the **VDP** or descending to the **DA** and in-sufficient visual reference is established the Flight Crew must commence Go-around, follow published procedures, advise ATC and follow the new Clearance.

LANDING RUNWAY VISUAL REFERENCE

Visual Reference

Visual reference at or below the DH is described as visibility or RVR. Meanwhile, the distance that pilots need to see (required side-glance distance) is determined by pilot's eye height, downwards observation angle (end angle) and type of ground visual navaids facility. The higher the DH is, and the larger the aircraft, then the higher the distance between the eyes of pilots and ground, the longer the side-glance distance. Instead, the bigger the downwards observation angle is, the longer the approach lighting system is, and the shorter the side-glance distance is.



REJECTED LANDING

Below **1,000 feet AGL** above the **TDZE**, the Captain should consider rejected landing in the following conditions:

- 1) ATC clearance not received.
- 2) The RVR cannot meet the landing requirements during landing such as the affects of advection fog.
- 3) Runway environment cause safety issues or damage such staff, traffic, animals, obstacles, surface damage and so on.
- 4) Landing Gear warning.
- 5) Runway is occupied or blocked.
- 6) Incorrect control inputs leading to an un-stabilized Approach.
- 7) When the Captain thinks it is necessary.

The rejected landing procedure is the same as the Go-around procedure. Press TO/GA switch or manually set Go-around thrust, select Go-around flaps, and pitch the nose up to the correct missed approach attitude simultaneously. Retract the Landing Gear after establishing the positive climb rate. Set the command speed as the flaps retraction operation speed or other required speed at the safety altitude, and retract the flaps as planned. If a rejected landing is initiated after touchdown, auto spoilers retract and Auto brakes disarm as thrust levers are advanced.

❖ **Warning :**

Once Reverse Thrust is deployed, a full stop landing must be made. Factors dictating this are:

- Five seconds are required for a Reverser to transition to the forward position.
- A possibility exists that a Reverser may not stow in the forward thrust position.

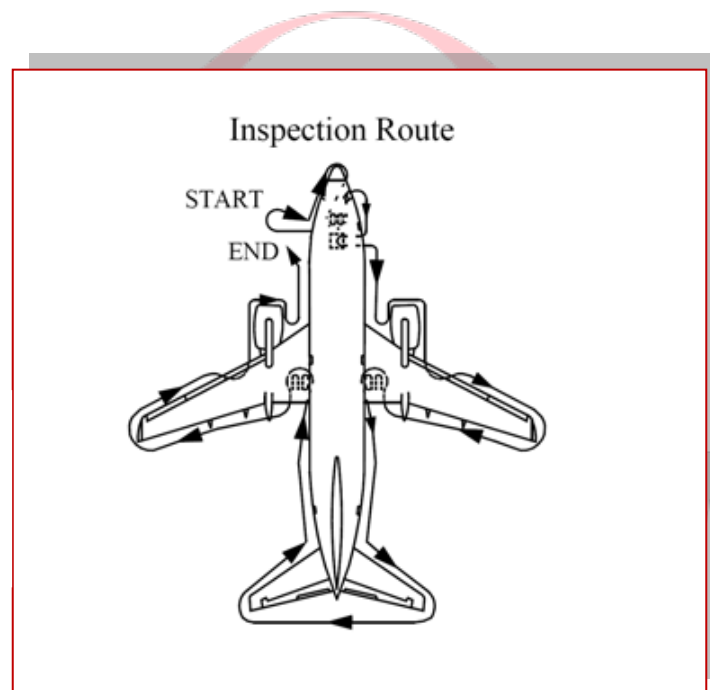
A Go-around in flare or after touchdown increases the possibility of a tailstrike. When a missed approach mode is initiated, the FD immediately indicates the pitch attitude of missed approach. If the Pilot applies the wrong or aggressive pitch attitude this increases the possibility of tailstrike before the airplane reacts and begins climbing out of Ground Effect. A Go-around requires application of both the correct pitch attitude and required thrust. If the pitch attitude increases but the thrust doesn't increase enough, it will cause the decreasing of airspeed and possible tail strike. When a late Go-around is initiated in Ground Effect the Flight Crew may want to avoid Main Gear touch and thus cause a Tailstrike. In this case, wheel contact should not be a concern and the Flight Crew should concentrate on Tailstrike avoidance.

EXTERIOR INSPECTION

Before each flight the captain, first officer, or maintenance crew must verify that the airplane is satisfactory for flight. Items at each location may be checked in any sequence.

❖ **Use the detailed inspection route below to check that:**

- the surfaces and structures are clear, not damaged, not missing parts and there are no fluid leaks
- the tires are not too worn, not damaged, and there is no tread separation
- the gear struts are not fully compressed
- the engine inlets and tailpipes are clear, the access panels are secured, the exterior is not damaged, and the reversers are stowed
- the doors and access panels that are not in use are latched
- the probes, vents, and static ports are clear and not damaged
- the skin area adjacent to the pitot probes and static ports is not wrinkled
- the antennas are not damaged
- the light lenses are clean and not damaged



Left Forward Fuselage

Probes, sensors, ports, vents, and drains (as applicable).....Check
 Doors and access panels (not in use).....Latched

Nose

Radome..... Check
 Conductor straps - Secure
 Forward E and E doorSecured

Nose Wheel Well

Tires and wheels.....Check
 Exterior light.....Check
 Gear strut and doors.....Check
 Nose wheel steering assembly.....Check
 Nose gear steering lockout pin.....As needed
 Gear pin.....As needed
 Nose wheel spin brake (snubbers).....In place

Right Forward Fuselage

Probes, sensors, ports, vents, and drains (as applicable).....Check
 Oxygen pressure relief green discIn place
 Doors and access panels (not in use)Latched

Right Wing Root, Pack, and Lower Fuselage

Ram air deflector doorExtended
 Pack and pneumatic access doors.....Secure
 Probes, sensors, ports, vents, and drains (as applicable)Check
 Exterior lights.....Check
 Leading Edge Flaps.....Check

Number 2 Engine

Access panels.....Latched
 Probes, sensors, ports, vents, and drains (as applicable)Check
 Fan blades, probes, and spinnerCheck
 Thrust reverser.....Stowed
 Exhaust area and tailconeCheck

Right Wing and Leading Edge

Access panels.....Latched
 Leading edge flaps and slatsCheck
 Fuel measuring sticksFlush and secure
 Wing Surfaces.....Check
 Fuel tank vent.....Check

Right Wing Tip and Trailing Edge

Position and strobe lights.....Check
 Static discharge wicks.....Check
 Aileron and trailing edge flaps.....Check

Right Main Gear

Tires, brakes and wheels.....Check
 Verify that the wheel chocks are in place as needed.
 If the parking brake is set, the brake wear indicator pins must extend out of the guides.

Right Main Wheel Well

APU FIRE CONTROL handle.....Up

NGS operability indicator light.....Check
 Wheel well.....Check

Right Aft Fuselage

Doors and access panels (not in use).....Latched
 Negative pressure relief door.....Closed
 Outflow valveCheck
 Probes, sensors, ports, vents, and drains (as applicable)Check
 APU air inletOpen

Tail

Vertical stabilizer and rudder.....Check
 Elevator feel probes.....Check
 Tail skid.....Check
 Verify that the tail skid is not damaged.
 Horizontal stabilizer and elevator.....Check
 Static discharge wicks.....Check
 Strobe light.....Check
 APU cooling air inlet and exhaust outlet.....Check

Left Aft Fuselage

Doors and access panels (not in use).....Latched
 Probes, sensors, ports, vents, and drains (as applicable).....Check

Left Main Gear

Tires, brakes and wheels.....Check
 Verify that the wheel chocks are in place as needed.
 If the parking brake is set, the brake wear indicator pins must extend out of the guides.
 Gear strut, actuators, and doors.....Check
 Hydraulic lines.....Secure
 Gear pin.....Remove

Left Main Wheel Well

Wheel well.....Check
 Engine fire bottle pressure.....Check

Left Wing Tip and Trailing Edge

Aileron and trailing edge flaps.....Check
 Static discharge wicks.....Check
 Position and strobe lights.....Check

Left Wing and Leading Edge

Fuel tank vent.....Check
 Wing Surfaces.....Check
 Fuel measuring sticks.....Flush and secure
 Leading edge flaps and slats.....Check
 Access panels.....Latched

Number 1 Engine

Exhaust area and tailcone.....Check
 Thrust reverser.....Stowed
 Fan blades, probes, and spinner.....Check
 Probes, sensors, ports, vents, and drains (as applicable).....Check
 Access panels.....Latched

Left Wing Root, Pack, and Lower Fuselage

Leading edge flaps.....Check
Probes, sensors, ports, vents, and drains (as applicable).....Check
Exterior lights.....Check
Pack and pneumatic access doors.....Secure
Ram air deflector door.....Extended



JAPAN AIRLINES VIRTUAL

PUSHBACK OR TOWING PROCEDURE

The Engine Start procedure may be done during pushback or towing.
Establish communications with ground handling personnel.

CAUTION: Do not hold or turn the nose wheel steering wheel during pushback or towing. This can damage the nose gear or the tow bar.

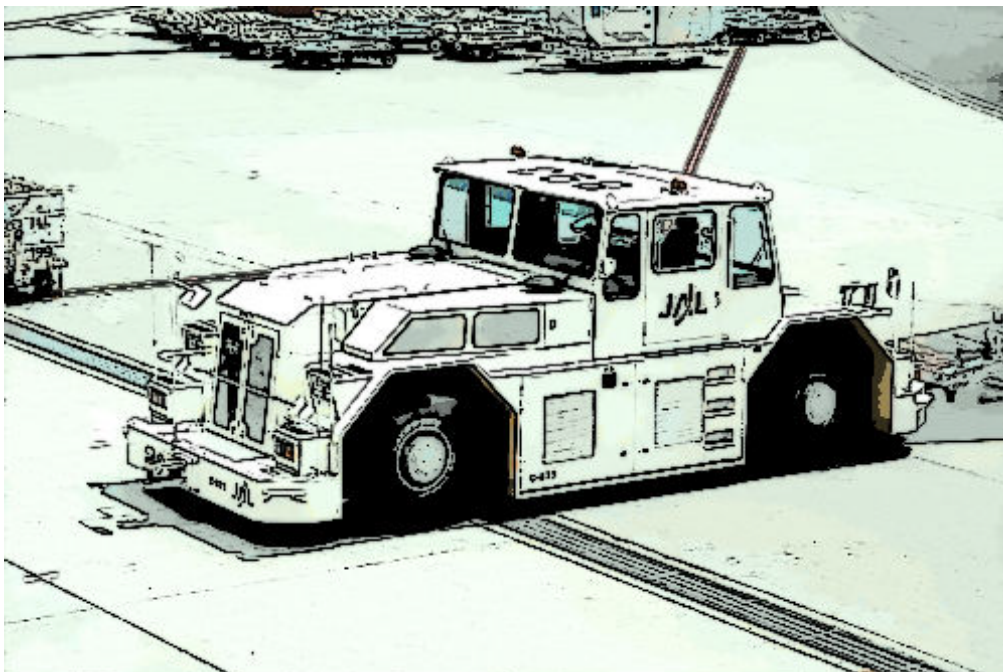
CAUTION: Do not use airplane brakes to stop the airplane during pushback or towing. This can damage the nose gear or the tow bar.

Set or release the parking brake as directed by ground handling personnel.

Note: Notify ground handling personnel to avoid the tailwind start-up if possible.

When pushback or towing is complete:

- Verify that the tow bar is disconnected
- Verify that the nose gear steering lockout pin is removed
- System A HYDRAULIC PUMPS switches



ENGINE START PROCEDURE

- ✓ Select the secondary engine indications.
- ✓ Air conditioning **PACK** switches.....**OFF**
- ✓ Start sequence**Announce**
- ✓ Call "**START __ ENGINE**"
- ✓ **ENGINE START** switch**GRD**
- ✓ Verify that the **N2 RPM** increases.

When N1 rotation is seen and N2 is at 25%, or (if 25% N2 is not possible), at maximum motoring and a minimum of 20% N2:

- ✓ Engine start lever.....**IDLE**
- ✓ Monitor fuel flow and EGT indications
- ✓ At **56% N2**, verify that the **ENGINE START** switch moves to **OFF**.

If not, move the **ENGINE START** switch to **OFF**

- ✓ Verify that the **START VALVE OPEN** alert extinguishes when the **ENGINE START** switch moves to **OFF**.
- ✓ Call "**STARTER CUTOUT**"

Monitor N1, N2, EGT, fuel flow and oil pressure for normal indications while the engine accelerates to a stable idle.

- ✓ After the engine is stable at idle, start the other engine.

❖ **Starter duty cycle:**

- Do not exceed 2 minutes during each start attempt
- A minimum of 10 seconds is needed between start attempts

❖ **Normal engine start considerations:**

- do not move an engine start lever to idle early or a hot start can occur
- keep a hand on the engine start lever while monitoring RPM, EGT and fuel flow until stable
- if fuel is shut off accidentally (by closing the engine start lever) do not re-open the engine start lever in an attempt to restart the engine
- failure of the ENGINE START switch to stay in GRD until the starter cut-out RPM can cause a hot start.

❖ **Do the ABORTED ENGINE START checklist for one or more of the following abort start conditions:**

- No N1 indication before engine start lever is moved to IDLE.
- EGT does not increase by 10 seconds on ground after the engine start lever is moved to IDLE(30 seconds in flight)
- the N1 or N2 does not increase or increases very slowly after the EGT increases
- the EGT quickly nears or exceeds the start limit
- there is no oil pressure indication by the time that the engine is stable at idle
- Abnormal start advisory is triggered.
- Other conditions need aborted start.

Note: Flight deck to ground communication should be completed only after all engines are stable at **IDLE**.

BEFORE TAXI PROCEDURE

- ✓ **GENERATOR 1 and 2** switches..... **ON**
- ✓ **PROBE HEAT** switches..... **ON**
- ✓ **WING ANTI-ICE** switch..... **As needed**
- ✓ **ENGINE ANTI-ICE** switches.....**As needed**
- ✓ **Hydraulic pumps**.....**ON**
- ✓ **PACK** switches..... **AUTO**
- ✓ **ISOLATION VALVE** switch..... **AUTO**
- ✓ **APU BLEED** air switch..... **OFF**
- ✓ **APU** switch..... **OFF**
- ✓ **ENGINE START** switches**CONT**

Verify that the **brake pressure** is **2,800 psi** minimum. Verify that the system **A** and **B** pressures are **2,800 psi** minimum.

- ✓ **Lower DU****Blank**
- ✓ **Engine start levers****IDLE detent**

Verify that the ground equipment is clear.

- ✓ Call "**FLAPS ___**" as needed for takeoff
- ✓ **Flap lever**..... **Set takeoff flaps**

Verify that the **LE FLAPS EXT green light** is illuminated.

- ✓ **Flight controls**..... **Check**

Move the **control wheel** and the control column to full travel in both directions and verify:

- freedom of movement
- that the controls return to centre

Hold the nose wheel steering wheel during the rudder check to prevent nose wheel movement.

Move the rudder pedals to full travel in both directions and verify:

- freedom of movement
- that the rudder pedals return to centre

- ✓ **Transponder**As needed

At airports where ground tracking is not available, select **STBY**. At airports equipped to track airplanes on the ground, select an **active** transponder setting, but **not a TCAS mode**.

- ✓ Recall..... Check

Verify that all system annunciator panel lights illuminate and then extinguish.

- ✓ Update changes to the taxi briefing, as needed.
- ✓ Call "**BEFORE TAXI CHECKLIST**"
- ✓ Do the **BEFORE TAXI** checklist down to the line.

BEFORE TAKEOFF PROCEDURE

- ✓ Make the desired takeoff updates changes (if any) to the take off briefing as needed.
- ✓ Set the "**Weather Radar**" (**Wx**) display as needed
- ✓ Set the "**Terrain Display**" as needed.
- ✓ Call "**BEFORE TAKEOFF**" checklist.
- ✓ Do "**BEFORE TAKEOFF**" checklist.



TAKEOFF PROCEDURE

- ✓ When cleared for takeoff, notify the cabin crew to prepare for takeoff (one chime).
- ✓ **STROBE** light switch to **ON**.
- ✓ Enter the runway offset on the CDU TAKEOFF REF page or update runway position as needed.
- ✓ Align the airplane with the runway and verify that the brakes are released.
- ✓ When cleared for takeoff,
 - All exterior lights**ON**
 - Transponder mode selector.....**TA/RA**
- ✓ Advance the thrust levers to approximately **40% N1** and allow the engines to **stabilize**.
- ✓ Push the **TO/GA** switch.
- ✓ Verify that the correct takeoff thrust is set.
- ✓ Monitor the engine instruments during the takeoff. Call out any abnormal indications.
- ✓ Adjust takeoff thrust before **60 knots** as needed. During strong headwinds, if the thrust levers do not advance to the planned takeoff thrust by 60 knots, manually advance the thrust levers.
- ✓ After takeoff thrust is set, the hand must be on the thrust levers until **V1**.
- ✓ Monitor airspeed and maintain light forward pressure on the control column.
- ✓ Verify **80 knots** and call.
- ✓ Call "**V1**" and verify "**V1 Speed**"
- ✓ At **VR**, call "**ROTATE**", gently rotate towards **15° pitch attitude**.
- ✓ After liftoff, follow **F/D** commands establish a positive rate of climb and monitor airspeed and vertical speed.
- ✓ Verify a positive rate of climb on the altimeter and call "**POSITIVE RATE GEAR UP**"
- ✓ Set the landing gear lever to **UP**.
- ✓ Call "**400**" at **400 feet AGL** and select & verify the **roll mode**.
- ✓ At **1500FT(AGL) (thrust reduction/acceleration height)**, call "**N1**", "**UP SPEED**"
- ✓ Push **N1** switch and set flap up manoeuvre speed.
- ✓ Verify that "**climb thrust**" is set.
- ✓ Verify acceleration. Call "**FLAPS ----**" according to the flap retraction schedule and monitor flaps and slats retraction.
- ✓ After flaps and slats retraction is complete, call and select "**VNAV**"
- ✓ Engage the "**autopilot (A/P)**" when above the minimum altitude for autopilot engagement.



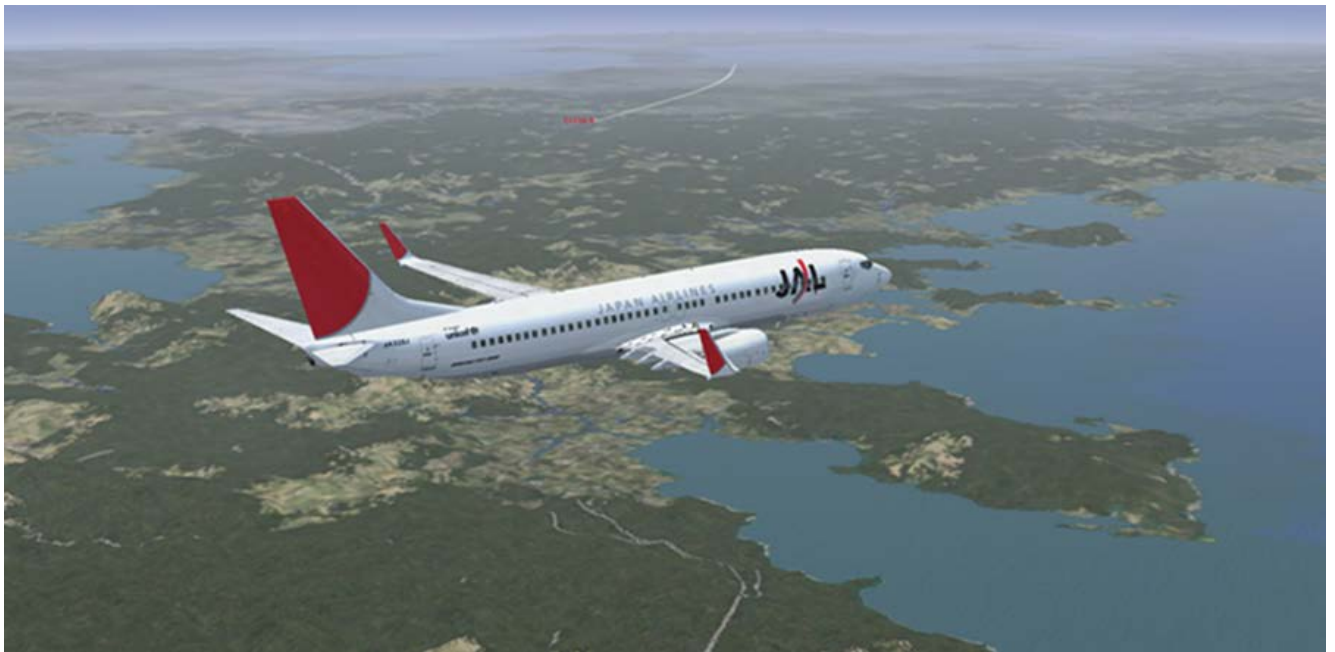
STABILIZED CLIMB

- ✓ Set the **AUTO BRAKE** select switch to **OFF**
- ✓ Set the landing gear lever to **OFF** after landing gear retraction is complete.
- ✓ After the gear lever to **OFF** , switch the **Retractable Landing Lights** to **RETRACT**.
- ✓ Switch off TAXI light, RUNWAY TURNOFF lights, and Wing Illumination Lights and Wheel Well Lights.
- ✓ Set or verify engine bleeds and air conditioning packs are operating normally.
- ✓ Set the engine start switches as needed.
- ✓ Call and verify the **"AFTER TAKEOFF CHECKLIST"**
- ✓ Transition altitude, altimeter set, complete **"After takeoff checklist"**



CLIMB AND CRUISE PROCEDURE

- ❖ Complete the After Takeoff Checklist before starting the Climb and Cruise Procedure.
 - ✓ At or above **10000FT (AGL)**, set the **LANDING** light switch to **OFF**.
 - ✓ Check pressurization, crosscheck altimeter indication.
 - ✓ Set passenger signs as needed.
 - ✓ At transition altitude, set altimeter to standard (STD).
 - ✓ Before top of descent point (**T/D**), change active route as needed to complete approach.
-
- ❖ When changing altitude within **RVSM** airspace, the vertical speed shall not be above **1500 fpm** and within **1000ft** from the target, the vertical speed shall not be above **1000 fpm**.



DESCENT PROCEDURE

- ❖ Start Descent preparations and do descent procedures by **40 NMs** to the **top of descent (T/D)**.
- ❖ Complete the Descent Procedure by **10,000 feet MSL**.

- ✓ Verify that pressurization is set to landing altitude.
- ✓ Recall and review the system annunciator lights.
- ✓ Set **VREF** and verify landing weight, **QNH/QFE** on the **APPROACH REF** page.
- ✓ Set the **RADIO/BARO** minimums as needed for the approach.
- ✓ Set or verify the navigation radios and course for the approach.
- ✓ Set the **AUTO BRAKE** select switch to the needed brake setting.
- ✓ Do the approach briefing.
- ✓ Call and do the "**DESCENT CHECKLIST**"



APPROACH PROCEDURE

- ❖ The Approach Procedure is normally started at transition level.
 - ❖ Complete the Approach Procedure before:
 - The initial approach fix, or
 - The start of radar vectors to the final approach course, or
 - The start of a visual approach
 - ❖ For a BCRS approach, enter the front course in the Mode Control Panel **COURSE** window. Do not select **VOR/LOC**.
-
- ✓ Set the passenger signs as needed.
 - ✓ At or above **10,000 feet MSL**, set the **FIXED LANDING** light switches to **ON**.
 - ✓ At transition level, set and crosscheck the altimeters.
 - ✓ Update the arrival and approach procedures as needed.
 - ✓ Update the approach briefing as needed.
 - ✓ Call and do the **"APPROACH CHECKLIST"**



FLAP EXTENSION SCHEDULE

Current Flap Position	At Speed tape "Display"	Select Flaps	Command Speed for Selected Flaps
UP	"UP"	1	"1"
1	"1"	5	"5"
5	"5"	15	"15"
15	"15"	30 or 40	(VREF30 or VREF40) + wind additives

LANDING PROCEDURE

- ✓ Notify the cabin crew to prepare for landing. Verify that the cabin is alerted.
- ✓ Call and set **"FLAPS ___"** according to the flap extension schedule and monitor flaps and slats extension.
- ✓ When on localizer intercept heading:
 - verify that the **ILS** is tuned and identified
 - verify that the **LOC** and **G/S** pointers are shown
- ✓ Use **HDG SEL** to intercept the final approach course as needed and ARM **"VORLOC"**
- ✓ Verify that the localizer is captured and ARM **"APP"** mode.
- ✓ Engage the other autopilot.
- ✓ When the **glide slope** is **alive**, call:
 - **"GEAR DOWN"**
 - **"FLAPS 15"**
- ✓ Set the landing gear lever to **DOWN**. Verify that the green landing gear indicator lights are illuminated and call **"GEAR DOWN THREE GREENS"** and set the flap lever to **15**.
- ✓ Set the speed brake lever to **ARM** and verify that the **"SPEED BRAKE ARMED GREEN LIGHT"** light is illuminated.
- ✓ When the glide slope (**G/S**) is captured, call **"FLAPS ___"** and set the flaps as needed for landing.
- ✓ Set the missed approach altitude in the **MCP**.
- ✓ Call and do the **"LANDING CHECKLIST"**
- ✓ When the **LANDING checklist** is completed, set go around heading, and altitude, verify landing flaps.
- ✓ At the final approach fix or OM, verify the crossing altitude.
- ✓ Monitor the approach and verify the **AFDS** status at **500 feet radio altitude**

- ❖ **Strictly observe the published altitude to capture glide slope; APP mode cannot be armed too earlier to avoid capture unreliable signals due terrain or other airplanes influence. If captured altitude is above the published captured altitude, V/S can be used as needed, refer glide slope indication to the published captured altitude.**

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GO-AROUND & MISSED APPROACH PROCEDURE

- ✓ Push the **TO/GA** switch and call **"FLAPS 15"**
- ✓ Position the **FLAP** lever to **15** and monitor flap retraction
- ✓ Verify:
 - the rotation to go-around attitude
 - that the thrust increases

- ✓ Verify that the thrust is sufficient for the go-around or adjust as needed
- ✓ Verify a positive rate of climb on the altimeter and call **"POSITIVE RATE-GEAR UP"** and set the landing gear lever to **UP** and verify that the missed approach altitude is set.
- ✓ Above **400 feet**, select appropriate Roll Mode and verify proper mode annunciation and verify that the missed approach route is tracked.
- ✓ Above **VREF+15**, CALL **"FLAP 5"** and set the FLAP lever and monitor flaps and slats retraction.
- ✓ After flap retraction to the planned flap setting, select **"LVL CHG"**. **VNAV** may be selected if the flaps are up.
- ✓ Verify that climb thrust is set and the missed approach altitude is captured.
- ✓ Call and do the **"AFTER TAKEOFF CHECKLIST"**
- ✓ Set the landing gear lever to **OFF** after landing gear retraction is complete, set the engine start switches as needed.



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LANDING ROLL PROCEDURE

- ✓ Disengage the autopilot. Control the airplane manually.
 - ✓ Verify that the thrust levers are closed and the **"SPEED BRAKE"** lever is **UP**.
 - ✓ Verify correct auto brake operation.
 - ✓ Without delay, move the reverse thrust levers to the interlocks and hold light pressure until the interlocks release. Then apply reverse thrust as needed and Call **"reverse unlocked"**
 - ✓ By **60 knots**, start movement of the reverse thrust levers to be at the reverse idle detent before taxi speed.
 - ✓ After the engines are at reverse idle, move the reverse thrust levers full down.
 - ✓ Before taxi speed, disarm the auto brake. Use manual braking as needed.
 - ✓ The nose wheel steering may be used only when taxi speed is below **30kts**. Use steering carefully when speed is above **20 kts** to avoid abrupt inputs.
- ❖ **WARNING: After the reverse thrust levers are moved, a full stop landing must be made. If an engine stays in reverse, safe flight is not possible.**



AFTER LANDING PROCEDURE

- ❖ Start the After Landing Procedure when clear of the active runway.

- ✓ Verify that the **SPEED BRAKE** lever is **DOWN**.
- ✓ Set the **PROBE HEAT** switches to **OFF**.
- ✓ Set the **LANDING LIGHTS** as needed, switch **ON** the **TAXI** light and set the **STROBE** lights to **STEADY**.
- ✓ Set the **ENGINE START** switches to **OFF**.
- ✓ Set the **AUTO BRAKE** select switch to **OFF** and **Lower DU** display to **ENG**.
- ✓ Set the flap lever to **UP**.
- ✓ Set the transponder mode selector as needed. At airports where ground tracking is not available, select **STBY**.
At airports equipped to track airplanes on the ground, select an active transponder setting, but not a **TCAS** mode.

WHEN APPROACHING PARKING AREA

- ❖ If weather condition permits, and **APU** is not needed after landing, shut down **ENG 1**, connect **GPU** before shutting down all engines; otherwise start **APU "2 minutes"** before the airplane taxis in the stand.

- ❖ Switch off the taxi light at the stand.

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SHUTDOWN PROCEDURE

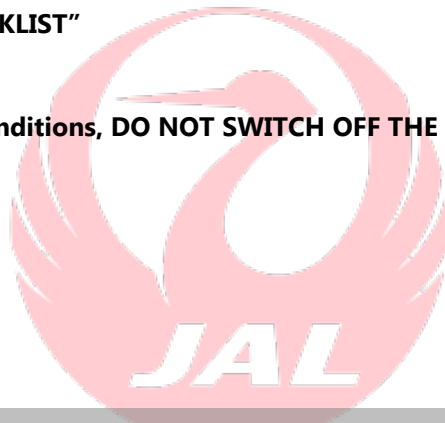
- ❖ Start the Shutdown Procedure after taxi is complete.
- ✓ Parking brake.....**SET**
- ✓ Verify that the parking brake warning light is illuminated.
- ✓ Electrical power**SET**
- ✓ If **APU** power is needed:
 - Verify that the **APU GENERATOR OFF BUS** light is illuminated.
 - **APU GENERATOR** bus switches**ON**
 - Verify that the **SOURCE OFF** lights are extinguished.
- ✓ If **external power** is needed:
 - Verify that the **GRD POWER AVAILABLE** light is illuminated.
 - **GRD POWER** switch.....**ON**
- ✓ Verify that the **SOURCE OFF** lights are extinguished.
- ✓ Engine start levers.....**CUTOFF**
- ✓ **FASTEN BELTS** switch**OFF**
- ✓ **ANTI COLLISION** light switch**OFF**
- ✓ **FUEL PUMP** switches**OFF**
- ✓ **WING ANTI-ICE** switch**OFF**
- ✓ **ENGINE ANTI-ICE** switches**OFF**
- ✓ Hydraulic panel.....**Set**
- ✓ **ELECTRIC HYDRAULIC PUMPS** switches.....**OFF**
- ✓ **ENGINE HYDRAULIC PUMPS** switches.....**ON**
- ✓ **RECIRCULATION FAN** switches.....**As needed**
- ✓ Air conditioning **PACK** switches.....**AUTO**
- ✓ **ISOLATION VALVE** switch.....**OPEN**
- ✓ Engine **BLEED** air switches.....**ON**
- ✓ **APU BLEED** air switch**ON**
- ✓ Exterior lights switches**As needed**
- ✓ **FLIGHT DIRECTOR** switches.....**OFF**
- ✓ After the wheel chocks are in place:
 - **Parking brake**.....**Release**
 - **APU** switch**As needed**
- ✓ Call and do the **“SHUTDOWN CHECKLIST”**
- ❖ **If possible, after high thrust operation, including reverse thrust, run the engines at or near idle for three minutes before shutdown to cool the engine hot sections. Time at or near idle, such as taxiing before shutdown, is applicable to this three minute period. If needed, the engines may be shut down with a one minute cooling period. Routine cool down times of less than three minutes before shutdown are not recommended.**
- ❖ **CAUTION: Do not hold or turn the nose wheel steering wheel during pushback or towing. This can damage the nose gear or the tow bar.**

- ❖ **CAUTION:** Do not use airplane brakes to stop the airplane during pushback or towing. This can damage the nose gear or the tow bar.
- ❖ **CAUTION:** Do not use the centre tank fuel pumps with the flight deck unattended.

SECURE PROCEDURE

- ✓ **IRS** mode selectors.....**OFF**
- ✓ **EMERGENCY EXIT LIGHTS** switch.....**OFF**
- ✓ **WINDOW HEAT** switches.....**OFF**
- ✓ Air conditioning **PACK** switches.....**OFF**
- ✓ Call and do the **“SECURE CHECKLIST”**

- ❖ **NOTE:** In dark atmosphere conditions, **DO NOT SWITCH OFF THE EMERGENCY EXIT LIGHTS** before all the passenger disembark.



NON PRECISION APPROACH (NPA) TECHNIQUE

❖ Non-precision approach is considered a normal instrument approach in flight approach procedure in which lateral guidance is provided only other than electronic glide slope information.

❖ **DEFINITIONS:-**

- **Descent Gradient:** A ratio, expressed as percentage of the descent change in geometric height divided by the horizontal distance travelled in a given time.
- **VDP (Visual descent point):** A defined point on the final approach course of a non-precision straight-in approach procedure from which normal descent from the MDA(H) to the runway touchdown point may be commenced, provided the suitable visual reference is established to the pilot.
At VDP, little flight path adjustment may be needed until touchdown, thus the stable visual segment will be achieved.
- **MA Pt:** Missed Approach Point

❖ During non-precision approach, at **FAF**, normal landing profile should be considered. Select **V/S** mode with appropriate vertical speed to descend to **VDP** prior to the **MDA(H)**. Principle and method to decide **VDP**:

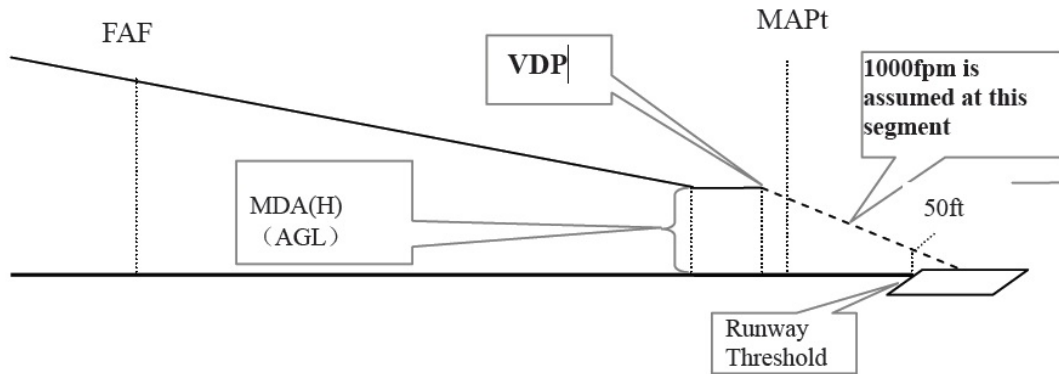
VDP is based on stabilized approach criteria, it means, using published descent gradient from **FAF** to **MDA(H)**, level off prior to the **VDP**, in which further descent would be commenced for establishing a visual contact. The crew should verify **1000 (fpm)** descent rate must not be exceed before landing. If stufiest visual contact is established before this point, the flight crew may continue to landing using normal descent profile, otherwise, go around is mandatory. During missed approach, lateral track should be precisely through **MA Pt** prior published procedure manoeuvres.

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❖ **NOTE:**

1. **MDA(H)** is based on field elevation;
2. ground speed is divided by minute, e.g., indicated ground speed/60 ;
3. the distance to the runway threshold from **DME**. Minus this distances provided the **DME** is between **FAF** and threshold; otherwise, plus these distances provided the **DME** is not between **FAF** and threshold.

- ❖ The following illustration is clarified the relationship between **VDP** and **MAPt**, and the calculation method of **DME** distance to **VDP**:



DME distance to VDP:

DME distance to VDP:

$$\frac{\text{MDA on MCP (field elevation)} - 50\text{ft}}{1000\text{fpm}} \times \text{GS (nm/min)} \pm \text{DME to Threshold (nm)} = \text{DME distance to VDP (nm)}$$

APPENDIX I

PREFLIGHT	
Battery	ON
Parking Brake	SET
All Doors	CLOSED
Throttle	IDLE
Fuel Flow	CUTOFF
BATT Master Switch	ON
Landing Gear Lever	VERIFY DOWN
Spoiler	RETRACTED
Flaps	VERIFY UP
Fuel Quantity	CHECK
Pitot Heat	OFF
Flight Controls	DEMONSTRATE
Avionics	ON
Fasten Seat Belt & No Smoking Signs	ON
ATIS	OBTAIN
Heading Bug	SET (HDG)
Transponder	SET CODE/VERIFY
Crew Briefing	COMPLETED
NAV Radios	SET IDENT
Weight and Balance	VERIFY
Clock/Stopwatch	VERIFY SET
ACARS	CONNECT + START

STARTUP	
Beacons	ON
Parking Brake	SET
Fuel Pumps	ON
Engine Area	CLEAR
IGN Selector	L OR R
Right ENG IGN start	ON
ENG instruments/FF	VERIFY STABLE
Left ENG IGN start	ON
ENG instruments/FF	VERIFY STABLE
NAV Lights	ON
Pitot Heat	ON
De Ice	ON
Elevator Trim	SET
Flaps	SELECTED
TAXI	
Taxi Clearance	OBTAIN
Parking Brake	RELEASE
Taxi Power	SET
Flight Controls	CHECKED
TAXI Lights	ON
LOGO Lights	ON

BEFORE TAKE OFF	
LDG Lights	ON
RWY Turn off Lights	ON
Position Lights	STROBE AND STEADY
Transponder	ON
Parking Brake	SET
Flight Director	VERIFY ON
Flaps	VERIFY SET
COM's , NAV's	VERIFY
Cabin Crew	NOTIFY 2 CHIMES
Approach & RWY	CLEAR
Heading bug	VERIFY RWY HDG
V Speeds	VERIFY
ENG Instruments	MONITOR
TAKE OFF	
Parking Brake	RELEASE
Take Off Thrust	SET
ENG Instruments	MONITOR
Yoke	PRESS FWD till 80 KTS
VR	ROTATE 10 DEGREES
LDG Gear	UP
Autobrake	RTO

CLIMB	
A/P & A/T	ON @ 3,000 ft A.G.L
Gear	UP
Raise Flaps	ON SCHEDULE
LDG Lights	OFF (<10,000 ft)
Position Lights	STEADY
Transition ALT	ALTIMETER STD
CRUISE	
Elevator Trim	ADJUST
Cruise SPD	CHECK
ENG Instruments	MONITOR
APP Briefing	COMPLETED
DESCENT	
ATC	REQ CLEARANCE
Throttle	IDLE
Transition ALT	SET ALTIMETER
Spoilers	AS REQD
LDG Lights	ON (>10,000 ft)
Cabin Crew	NOTIFY 2 CHIMES
Autobrakes	SET
ILS Freq	SET/IDENT
ILS CRS	SET

APPROACH	
Autobrakes	VERIFY SET
Spoilers	ARMED
Flap Selector	Flaps 5, 180KIAS
Flap Selector	Flaps 10, 170KIAS
Flap Selector	Flaps 15, 160KIAS
Flap Selector	Flaps 25, 155KIAS
Landing Gear	DOWN, 155KIAS
Flap Selector	Flaps 30, SPEED (Vref +10)
Stabilized APP	Established
LANDING	
ATC	CLEARANCE
A/P	OFF
A/T	OFF
A/P & A/T DIS WRNG	OFF
Throttle	IDLE (30ft ABV RWY)
ENG REV	REVERSE (>60KTS)
Toe brakes	APPLY (<60KTS)
A/C Exit Speed	10-15 KTS

AFTER LANDING	
Transponder	STBY
LDG Lights	OFF
RWY Turn off Lights	OFF
Position Lights	STEADY
Flaps	UP
Spoilers	RETRACT
Elevator Trim	SET ZERO
APU	AS REQD
GATE SHUTDOWN	
Parking Brake	SET
Taxi Lights	OFF
NAV/Panel Lights	OFF
DE Ice	OFF