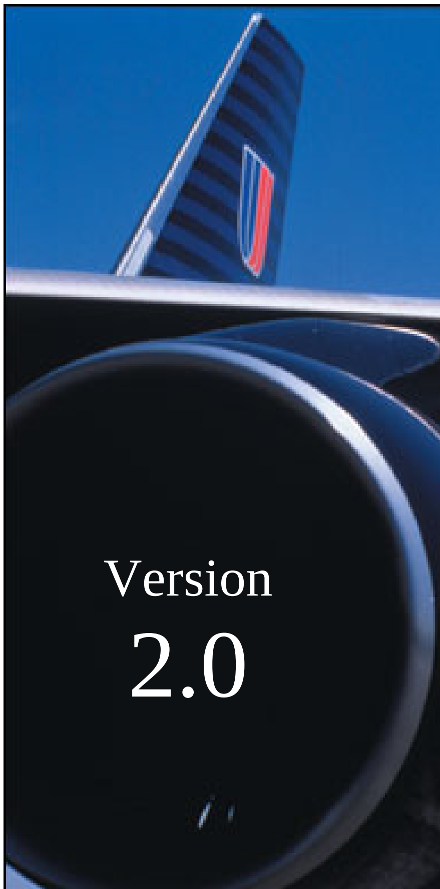
FLIGHT STANDARDS and TRAINING (VHQTD)



Aircrew Standard Operating Procedures Supplement

UNITED VIRTUAL

United Virtual Airlines

Aircrew Standard Operating Procedures Supplement
Version 2.0
Effective December 2011
www.united-virtual.com

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UNITED VIRTUAL

Office of the Chief Pilot
VHQTD
www.united-virtual.com

23 November 2011

From: Chief Pilot
To: All United Virtual Airlines Pilots

Subj: Aircrew Standard Operating Procedures Supplement

1. Use of this Guide is restricted to UVA Operations.

2. This document (ASOPS), is issued by VHQTD and outlines the standard procedures for Flight Operations in expanded detail.

3. The Aircrew Standard Operating Procedures document (ASOP), available separately, is issued by VHQFO and outlines General UVA operations.

4. This ASOPS forms a supplement to the ASOP, and together with the ASOP defines all company standards and expected profiles for flights.

5. The terms *Standard Operating Procedures*, *SOP*, or just *procedures*, wherever referenced in this document, are understood to mean the directives outlined in the ASOP and ASOPS.

6. These company standard operating procedures are directive and will be executed for all UVA flights, and will be specifically reviewed and checked for on checkrides.

7. Anyone with recommended changes to this publication should contact the Chief Pilot.

Enrico Zaffiri

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United Virtual Airlines

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Introduction

A question is often posed along the lines of, “I saw 'Airline X' do 'Y' when I was flying in the real world, so why don't we do it the same way here?”

Standard Operating Procedures (SOP) will vary from airline to airline to *virtual* airline, and will change from time to time. When differences are observed, that does not make one procedure wrong, and the other right. Rather, when you are flying at a given airline, you are expected to fly its SOPs and profiles, as in effect at that time.

There was a major non-North American airline that had a SOP of landing “on the numbers”, say 700ft before the aiming marks, just past the runway threshold. They no doubt had very good reasons for their SOP. They then had an unfortunate occurrence, where on landing an aircraft missed the runway short. That realigned their procedure priorities, and they then changed their SOP. Before the change, you would have been compliant with the SOP when landing on the numbers, after the change you would be in violation!

Airline to airline, and time to time, you will indeed see differences in the use of the thrust reversers, approaches, use of flaps, lights, autopilots, acceleration height and the profiles you are expected to fly, to mention but a few. What the UVA SOP does is spell out a specific set of Standard Operating Procedures (SOP), that are internally consistent, practical, and that will keep you out of trouble. They will no doubt change from time to time, as events or regulations require.

Our SOPs are very similar, but not identical to the Real World United Airlines. We will often set slightly different procedures that may fit better with our virtual world, or are more practical given the hardware or software we use, or the pilot mix and simulated aircraft limitations we have.

You are required to fly every flight according to our SOPs, and we specifically look for execution of the UVA SOPs when reviewing checkrides. Flying by the SOPs makes checkrides pretty straightforward, but more importantly you will be flying in a safe, consistent and reasonable manner, and very closely emulating real-world operations.

And that is what it is all about!

General Notes

“SOPs” - What exactly are they?

UVA Standard Operating Procedures are company-wide, internally consistent, sets of procedures that are directive for operating all UVA flights. You will fly using these procedures, unless a specific operational need requires otherwise to ensure the safety of the aircraft or passengers, other aircraft, or people and places on the ground.

Important Caution

This document contains only minimal explanations and discussions of the techniques of the SOPs. If you are you new to UVA, and in particular unfamiliar with airline flying, then you should first consult the many training documents noted immediately below.

“SOPs” - Where can I find them?

- This document, the **Aircrew Standard Operating Procedures Supplement** (ASOPS) is intended as a quick reference for Flight Operations SOPs. It does *not* provide the “why” or the “how”. It is intended for use once you are reasonably technically proficient with the noted procedures.
- General UVA procedures are listed in a separate companion document, the Aircrew Standard Operating Procedures (ASOP).
- The **UVA Flight Primer** is the key discussion document for many of the procedures listed here. In the UVA Flight Primer you will indeed find the “why” and the “how” for the procedures. The Flight Primer document is our most important instructional tool. It also offers a simple to use web interface.
- A UVA **Generic TurboJet Checklist** is also provided, and is referenced heavily in this document. *Use of checklists is mandatory for UVA Flight Operations*.
- The **UVA Flight Planning & Dispatch Tool** (FPD) is a standalone spreadsheet, and a key tool to be familiar with. It will provide specific guidance for fuel and weight planning and generate a dispatch release, customized to individual aircraft, and covers our entire fleet. Its functionally is also available in the Pilot's Center, when booking a flight. *Use of the FPD or an equivalent planning tool is mandatory*.
- UVA SOPs are also extensively presented and discussed in the UVA forums, of course more in a narrative form. A **Quick Reference Guide** (QRG) is available for download which summarize in a short form all the SOPs contained in this document. Additional guidance and in-depth reviews of selected topics is available in the **Pilot’s Guides**.
- In-depth analysis about key topics is the subject of the several **UVA Pilots’ Guides** available for download in the Training Department web page.
- Many of the procedures are also discussed in the **Training Session Transcripts**.

- All the resources noted above, and many more, are available for download or access from the VHQTD – Flight Standards & Training Division section, the VHQCC Downloads section of the main UVA website, or the UVA Forums.
- Where there is a conflict in directions for Flight Operations between documents, in all cases the directives in this document will apply.

This all looks very complicated!

If you have just arrived and are not used to flying with an emphasis on real world accuracy, this may seem complicated. If that is the case, be sure to start with the **UVA Flight Primer.** There you will find much of what you need to know, all presented in a tutorial fashion. It will provide for an easy, comfortable start.

The primary focus of VHQTD and our checkride system is on education, not "regulation". There is plenty of time for you to gradually absorb, practice and learn the techniques we outline for you. In addition, our expectations on the initial checkrides are modest; only serious, critical infractions would call for a re-fly. Naturally, we do expect more as you fly more with UVA, as you become more experienced, and as you advance to higher Categories. Of course, proper preparation is key.

Simple vs. Complex Aircraft Panels

A minority of the procedures listed here make reference to certain elements of an aircraft panel (e.g. FMC) that may only be available in complex payware simulations. UVA supports the use of all aircraft simulations, simple or complex, for its operations. Where elements referred to are unavailable, then the procedures should be amended in your practice as your simulation allows.

You should note that there are extensive discussions in the educational supporting resources noted above to assist you in making allowances for, sidestepping, or substituting for complex simulation elements that you may not have.

SOP vs. Recommendation

Although the SOPs are directive and must be followed when flying UVA flights, also included in this document are some advisory recommended practices that as PIC you may wish to incorporate as circumstances dictate. These are clearly differentiated by the use of *italics*, and by the inclusion of the word *"Recommended"* in parentheses.

Amendments

2.0 – Minor changes in wording, QRG; addition of:

- In “Flight Planning”: methods of fuel planning, explanation of “domestic”, “flag” and “redispatch” planning, range of takeoff alternates location, 1-1-2 rule, explanation of the 6 hr and 2 hr rule.
- In “Start Up & Taxi”: probe heat usage; cold weather operations; transponder operation; chart availability.
- In “Take Off and Initial Climb”: expansion of discussion on takeoff minima; SOPs for takeoff flaps settings; E-Jet airplane VFS; rejected takeoff reasons; cold and adverse wx operations; sterile flight deck.
- In “Cruise”: Class II navigational error check; Class II navigation meaning; SLOP; weather avoidance; polar operations; waypoint passage procedures; redispatch procedures; cruising levels discussion; metric countries procedures; automation policy.
- In “Descent”: sterile deck procedures; holding speeds and leg times.
- In “Approach”: changes in max permitted winds and prohibition to land with braking action “nil”; circling approaches discussion; crosswind approaches technique; changes in CATII autoland requirement (manual landing approved if autoland is not available with higher minima); changes in CATII and CATIII minima; DH for CATIII in 737 and E-Jet airplanes; restriction of CATII and III availability per type of airplane; HUD-equipped airplanes minima; revised approach flaps settings table; E-Jet airplanes flaps settings for approach and landing; use of flaps 40 setting for 737 airplanes; missed approach standard procedure and inadvertent touchdown during go-around technique; banking limitations on circling approaches below 1000 ft AGL; cold and adverse wx procedures.
- In “Landing”: minimum autopilot/autothrottle disconnect height; caution against stopping on the runway after landing; use of nosewheel landing lights for taxi on porly lighted taxiways; flaps retraction after landing in loose snow conditions.

Added the “Tables” section.

1. Flight Planning

1.1. Flight Planning: Flight planning must include a thorough review of route, weather, applicable SIDs and STARs, relevant NOTAMs and operational limitations. **As PIC you must be familiar with all the information relevant to the flight being undertaken.**

1.2. Company Routes: When available, and if weather/ATC considerations permit, company routes should be used. Otherwise FAA and other flight authorities' preferred routes must be used.

1.3. Flight Plan Crosscheck: You must perform a crosscheck of the flight plan, as displayed by the navigation device in your aircraft, against the printed master flight plan to ensure integrity and consistency of the loaded route with the filed flight plan. This is of paramount importance on extended flights especially when using NAT/PACOT tracks.

1.4. Fuel Planning: Fuel planning must be performed in accordance with applicable rules and the UVA Flight Planner & Dispatch Tool (FPD). Approved methods of fuel planning are: Domestic, Flag and Redispatch. "*Domestic*" refers to operations conducted entirely within and between the 48 contiguous States, entirely within any state or territory of the United States and the enroute portion which may be outside the 48 States; "*Flag*" refers to operations conducted between any point within the 48 States and any point outside the 48 States, between any point within the states of Alaska and Hawaii or any territory or possession of the United States and any point outside these same areas, and between any points outside the United States; "*Redispatch*" refers to an FAA-authorized procedure and is any flag or supplemental (any non-scheduled operation) operation that is planned before takeoff to be re-dispatched or re-released inflight in accordance with FAR 121.631.(c) to a destination airport other than the destination airport specified in the original dispatch or flight release

1.5. Alternate Requirement: An alternate may always be filed at the discretion of the PIC or Dispatcher. But in any case, an alternate must be filed in the following cases:

1. If for 1 hour before and 1 hour after the ETA at the destination, the visibility and ceiling are forecast to be less than 2000ft and 3SM (*1-2-3 rule*); or (only if a CATII/III procedure is available at destination airport) if for 1 hour before and 1 hour after the ETA , the visibility and ceiling are forecast to be less than 1000 ft. and 2SM (*1-1-2 rule*)

2. If weather at the departure airport is below landing but not below takeoff minima, such that a return in the event of an emergency is prevented (*takeoff alternate*). The takeoff alternate must be within 320 NM for the 737 and E-Jets, 840 NM for the 747 and 370 NM for all other mainline types.

3. When operating on a flag flight to destinations other than those listed in the extended domestic list and the *six hour rule* or the *two hour rule* does not apply (*flag alternate*). The "six hour rule" applies if duration of flight is less than 6 hours and for 1 hour before and 1 hour after the ETA at the destination, the weather is forecast to be more than 1500 ft. above (M)DH or above 2000 ft. celling and visibility 2 or 3SM above the minimum visibility for the type of

approach considered; the "two hour rule" applies for destinations so approved and means carrying fuel for a 2 hour endurance beyond destination (hence cancelling the need for filing an alternate).

4. For ETOPS.

1.6. ETOPS Planning: ETOPS (ExTended Operations: flight operations with more than 60 minutes flight time from an adequate airport for 2-engine planes or more than 180 minutes for planes with more than 2 engines) is approved for 737NG (120 min), 757/767 (180 min), 777 (207 min) and 747 (180 min). For additional safety, wherever possible, ETOPS 180 alternates will be filed for 747 operations.

1.7. ETOPS Atlantic: For all Atlantic operations, for the 747, 767, 757 and 777, the preferred alternates are BIKF (Keflavik) and EINN (Shannon).

1.8. Minimum Arrival Fuel: Fuel planning must take into account company minima for Arrival Fuel (or Special Minima, if any). The FPD is the primary guide.

2. Start & Taxi

2.1. Checklists: The *Before Start Checklist* must be completed before pushback begins; the A*fter Start/Taxi Checklist* must be completed before leaving the apron; the *Before Takeoff Checklist* (to the *Cleared for T/O* line) must be completed before arriving at the departure runway.

2.2. Lights: Navigation (NAV) lights must be ON when aircraft is powered/attended, or when powered by APU, OFF when powered off at the arrival gate. Beacon (BCN) must be ON just before engine start, OFF when engines stop rotating at the arrival gate. Logo (LOGO) lights must be ON if the flight is conducted from dusk to dawn or in IMC. Wings (WINGS) lights: with LOGO lights. Wings lights are also used to facilitate wing inspection in flight. Taxi lights (TAXI) must be ON when clear of ramp area, and left ON until 18,000ft.

2.3. Engine Start: If parked at a nose-in stand, engines may not be started until pushback has commenced, and in any case not until clearance to start and the "all clear" signal has been received. Probes heat must be always ON, regardless of weather conditions.

2.4. Engine Start Sequence: If not dictated otherwise by operational conditions, engines will be started one at a time, and in order from starboard to port. That is engine 2, then engine 1, or engine 4, then 3, 2 and 1 for the 747.

2.5. Pushback Procedure: When pushback is terminated, the parking brake must be set to Park until receiving the wave-off signal.

2.6. Use of Reverse Thrust for Backing: Use of reverse thrust for backing (pushback) is prohibited.

2.7. APU (Auxiliary Power Unit): For aircraft so equipped, the APU will be shut down ahead of taxi and normally restarted on approach to the gate after touchdown. In the case of excessive APU startup times in some aircraft, the APU may be restarted with the pre-landing checklist, but in any case never before passing below 10,000ft ASL. Otherwise, excepting appropriate emergency situations, airborne operations with the APU running are prohibited.

2.8. Flaps: Takeoff Flaps must be set for departure while on the apron, as the aircraft first moves under its own power, and preferably while in straight-ahead forward motion.

2.9. Taxi Speed: Taxi speed must not exceed 20 knts in straight sections and 10 knts during 90° turns. If taxiways are wet, cluttered or slippery, reduce speed accordingly.

2.10. Power Management during Taxi: Taxi thrust must not exceed an N1 of 45%.

2.11. Crossing Runways: In advance of crossing any runway and before the runway hold point markings, the aircraft must be slowed and the pilot must be prepared to stop clear of the runway. Even if clearance is received from ATC to cross the runway, the pilot must visually check that no potentially unsafe traffic conditions exist before crossing.

2.12. Cold Weather Operations: Operations are prohibited with braking actionreported as "nil" (Mu coefficient reported less than 20), when freezing precipitation (FZRA, FZDZ) is reported and in case of ice pellets (PL). PL is a very localized precipitation, so a little delay may permit opeartions. De-icing is mandatory with any accumulation of snow/ice on the airplane and if icing conditions are expected on the ground and in the initial climb. Always check for holdover times of de-icing fluids. Taxi with extreme caution on wet/slippery/contaminated aprons and taxiways, keep slower speeds and greater separation from preceding airplanes. Flaps extension may be delayed till approaching the departure runway. Airframe and Engine Anti-Ice must be ON in visible moisture with temperatures below 10 °C.

2.13. MCP (Autopilot) Settings: The MCP must be set before entering the departure runway as follows: V2 speed in the SPD window, runway compass heading (or first assigned heading, or initial heading as stipulated by published procedure) in the HDG window, first assigned altitude in the ALT window.

2.14. Transponder operation: Assigned transponder code ("squawk") should be dialled as soon as received; transponder should be set to ON or XPDR as soon as the engines are running and to TA/RA immediately before takeoff, unless otherwise required by ATC. It should be set again to ON or XPDR when vacating the landing runway.

2.15. Charts availability: Charts appropriate for each phase of flight must be available before that pahse is reached.

3. Takeoff & Initial Climb

3.1. Takeoff Minima: Standard takeoff minima are: 1SM or RVR 5000 ft. for 2 engine aircraft and 1/2SM or RVR 2400 ft. for 4 engine aircraft. Operations allow for *lower than standard minima*: VIS 1/4SM if RVR is not available or RVR down to 500 ft. (150 m) with CL (centerline lights) and HIRL (high intensity runway lights); 1000 ft (300 m) with CL or RCLM (runway centerline markings) and HIRL; 1600 ft (500 m) with HIRL or CL or RCLM. Takeoffs with RVR below 500 ft (150 m) are not permitted. For operations, use charted minima or lower than standard if not charted. However, if the reported minima are below the landing minima at that airport, then a *takeoff alternate* must be planned.

3.2. Fuel Quantity Check: A check of the actual fuel quantity versus the master flight plan requirements must be performed, just prior to entering the departure runway.

3.3. Takeoff Flaps Setting: Unless dictated by operational or performance reasons, standard takeoff flaps settings are: 5 degrees for the Boeings (except the 747: 20 degrees); position 1+F for the Airbus A320 series; position 1 for the E-Jets; 8 degrees for the Regional Jets; 5 degrees for the Dash 8s and 10 degrees for the B1900s.

3.4. Checklists: The *Before Takeoff Checklist* (beyond the *On Clearance for T/O* line) must be complete before taking the departure runway.

3.5. Lights: Landing (LND) - ON on takeoff clearance at the takeoff runway, up to 18,000ft; Taxi Lights (TAXI) remain ON until 18,000ft; Strobe (STROBE) - ON on takeoff clearance at the takeoff runway and kept on throughout the flight.

3.6. Runup: A standing runup to 70% N1 must be performed with the airplane centered and lined up with the runway centerline and held for sufficient time to allow all engines to be checked for proper operation and to establish symmetric, stable thrust. The toe brakes are then released and the aircraft is allowed to start moving forward. The throttle is then slowly and smoothly advanced to takeoff thrust setting and TO/GA or N1/EPR mode is engaged to command takeoff thrust for the takeoff roll. If runway conditions, such as a slippery runway, do not allow for a standing run-up the PIC will use best judgment as to how to proceed. A rolling takeoff may be the best procedure under these conditions.

3.7. Use of Autothrottle (A/T): For best performance and engine wear and tear considerations, for normal operations the autothrottle should be engaged for the entire duration of the flight, from take-off to final approach (see further guidance for autoland operations).

3.8. Use of AFDS Vertical and Lateral Modes: *(Recommended) When available, VNAV (or FLCH/LVL CHG) and LNAV or HDG modes should be used for all takeoffs. In some aircraft the AFDS modes may be set before takeoff or even at the gate. This is encouraged to ensure the proper mode is set.*

3.9. Use of Flight Director (F/D): *(Recommended) Use of F/D to aid in attaining correct attitudes is strongly recommended. However, do not use F/D indications for rotation, F/D bars must not be followed until after positive rate of climb is attained. Proper setup of the FMC or other navigation system is required to properly drive the F/D.*

3.10. Takeoff Thrust: After runup, takeoff thrust is commanded and held to accelerate the aircraft along the runway centerline. Where indicated by low aircraft weight or other operational need, the takeoff thrust may be derated by the temperature and/or derate setting method. Do not use any derated thrust with wet, slippery or contaminated runways. However, the takeoff thrust used must never be less than 85% of the maximum normal takeoff thrust.

3.11. Takeoff Thrust and Simple Panels: The standard takeoff profile is designed to ascend an aircraft as quickly as possible, while still keeping the thrust as low as is safe to save wear & tear on the engines, but always above a safe minimum (85% of maximum). On many simple panels/aircraft, engine thrust is not properly modeled, and is often set as overpowered. This may make it impossible to fly a proper and normal takeoff profile, especially with a light aircraft, if takeoff thrust is not reduced below the usual allowed minimum of 85% of maximum takeoff thrust.

Where you encounter such a situation, the best solution is to use an alternate aircraft that is not flawed, or if you have the technical know-how to adjust the maximum engine thrust to more realistic levels in the aircraft.cfg file.

If neither solution is available to you, then standard practice will be to reduce the takeoff thrust below 85% of maximum takeoff thrust, but not below 70%, in order to facilitate flying the proper ascent profile. In the case of a checkride, ensure that you include a note to this effect, with your submission.

3.12. Rotation Technique: Rotation must be initiated at Vr with smooth, continuous back pressure on the yoke to attain the correct liftoff pitch up attitude of 8°, in 3 seconds time. Never exceed 10° pitch up, until aloft. Do not delay rotation.

3.13. Rejected Takeoff: In the low speed regime (below 80 knts), takeoff must be aborted if receiving any warning or experiencing low acceleration or hearing unusual noises; in the high speed regime (above 80 knts but below V1), takeoff must be aborted only if experiencing an engine failure or an engine fire or getting the takeoff configuration warning. Takeoff must be continued in any case after V1.

3.14. Gear Retraction: The landing gear must be commanded up at *positive rate of climb*, that is when VS exceeds 1000 fpm. This usually occurs before reaching 200 ft. AFE. For aircraft so equipped, the landing gear handle will be moved from the UP to the OFF position by 3000ft AFE to release pressure on the hydraulic system.

3.15. Acceleration Height: For all aircraft and all airports, AH is set at 1000 ft. AFE (above field elevation).

3.16. Second Segment Climb Speed/Attitudes: The second segment climb is from 35 ft. AFE to acceleration height (1000 ft. AFE). The second segment climb must be flown at a set, continuous speed and thrust. After liftoff, hold your speed between V2+10 and V2+25 by adjusting your pitch; however never decelerate if you overshoot your target speed range. Target a pitch up of no more than 15°, but in any case never more than 17°. At acceleration height (1000 ft. AFE), pitch the nose down to no less than 8°, maintain positive climb, and speed up to 250 knts. No configuration change other than gear retraction must be made in the second segment climb.

3.17. Flaps Retraction: Flaps retraction should never commence before acceleration height and must be carried out according to the flaps retraction schedule. Retracting flaps below that flaps minimum maneuvering speed is prohibited. Flaps retraction, unless otherwise dictated by performance or ATC direction or SID design, should be complete by 3000 ft. AFE.

3.18. GPWS Warnings: Always promptly comply with GPWS "Terrain" warnings unless it may be positively visually confirmed that the warning is spurious.

3.19. Clean Speed: This is the speed at which you may safely operate the aircraft without flaps extended. For Boeings, this is set at Vrrf30+80, and will be calculated for you by the FPD. For an additional safety margin, Vref30+100 is recommended. For heavy aircraft, there may be banking limitations below Vref30+100 on takeoff. For Airbus, use a clean speed of V2+80. For E-Jet aircraft use the tabled VFS according to the takeoff weight, as a rule of thumb VFS is roughly V2+40. For Regional Jet aircraft, use 190 knts. For turboprops, 140 knts is recommended, but you should consult the relevant aircraft manuals for confirmation.

Note for complex panels: FMC calculated clean speed will appear as a tick mark on the speed tape; this may be used after a check for consistency.

3.20. Autopilot (A/P) Minimum Engagement Height on Take-Off: The autopilot may not be engaged in command below 1200 ft. AFE, unless it is specifically permitted in the individual aircraft AOM, and it is required for operational needs.

Note for checkride purposes: acceptable use of autopilot is defined in the Checkride Documents.

3.21. Close Turns after Takeoff: No turns may be initiated below 400 ft. AFE, unless a turn is specifically directed to be performed below 400 ft. AFE by the Departure Procedure. Bank is limited to no more than 20° below 1000 ft. AGL.

3.22. Cold Weather Operations: Engine anti-ice must be on for takeoff and climb in icing conditions with OAT > -40 °C; airframe anti-ice must be on in visible moisture with temperature < 10 °C.

3.23. Adverse Weather Operations: Flying into known hail/very heavy rain areas is prohibited. Avoid large TCU (towering cumulus) and CB (cumulonimbus) clouds. Be prepared for windshear during convective activity. Be aware of strong turbulence and mountain waves in windy conditions downwind of mountain ranges.

3.24. Checklists: The *After Takeoff* checklist is to be completed when the aircraft is in clean configuration, and generally by 3000 ft. AFE.

3.25. Sterile Flight Deck: During all ground operations with parking brake released and all flight operations below 10000 ft. ASL except cruise flight, sterile flight deck procedures prohibit pilots from performing any duties which could distract them from the safe operation of the aircraft.

4. Climb

4.1. Speed above Acceleration Height (AH): At acceleration height (1000ft AFE), reduce the thrust to the climb thrust setting and maintain, then pitch the nose down, still maintain positive climb rate and speed up to 250 knts. **A**bove AH, the aircraft speed should be maintained at 250 knts until passing 10,000 ft. ASL. After 10,000ft ASL, maintain full climb thrust, and pitch down (but still maintain positive rate of climb) to accelerate the aircraft to full climb speed up to cruise level.

4.2. Heavy Aircraft Climbout Speed: For a heavy 747 or very heavy 777 aircraft, your minimum clean speed may be greater than 250 knts. Recent changes in the regulations now permit maintaining minimum clean speed to 10,000ft ASL without pre-clearance, even if it is greater than 250 knts. However, informing ATC is always prudent.

4.3. Takeoff and initial climb in Vertical Speed mode (V/S) or Speed mode (with SPD set at 250 knts) is expressly forbidden.

4.4. Banking: Maximum banking should never exceed 30°, and may at times be further restricted.

4.5. Climb Rate: Maximum climb rate should not exceed 5000 fpm for normal operations.

4.6. Lights: LND and TAXI OFF crossing 18,000ft.

***4.7. Use of AFDS Modes:** (Recommended) Where available, full use of VNAV (or FLCH/LVL CHG) AFDS modes should be used, whether for F/D direction or for A/P command.*

5. Cruise

5.1. Navigation Checks: Navigation crosschecks from all available sources (VOR, IRS, GPS) must be performed, to ensure that you are navigating with valid data and that you remain on course. In addition, when departing or arriving on a terminal procedure that includes an NDB, it will be tuned and cross-referenced to assist in navigational safety. A Class II Navigational error check must be performed in all Class II areas before losing NAVAID reception capability. A Class II navigation is any enroute flight operation non defined as Class I (which is a flight operation or a part of it where the aircraft's position must be fixed reliably in order to navigate to the degree of accuracy required by airspace route width or an operation where MEA gaps exists and are authorized or the route lies within the operational volumes of navigational facilities that must be used as primary means of navigation or the route must be flown using RNAV systems, provided that the aircraft's position may be fixed reliably at least every hour by means of airway navigation facilities).

5.2. Flight Progress Checks: A crosscheck on the progress of the flight must be accomplished from time to time, and generally approaching any waypoint in the master flight plan. This check should include position, level, speed, fuel required and fuel remaining.

5.3. Strategic Lateral Offset Procedure (SLOP): SLOP should be applied in all oceanic regions except polar routes. Standard offset is 1NM right of track, starting when outbound the oceanic entry fix and ending at the oceanic exit fix.

5.4. Polar Operations: Select (or check auto-selected) TRUE HDG when passing 74° N northwards.

5.5. Weather Avoidance: Take all steps to avoid severe weather if possible. Always avoid entering large TCU (towering cumulus) and CB (cumulonimbus) clouds and keep sufficient distance downwind of any large CB cell. Coordinate beforehand with ATC any flight path deviation if possible. Intentional flying into SEV TURB (severe turbulence) is prohibited. CAT (Clear Air Turbulence) and mountain waves must be reported to ATC. Avoid any areas of reported volcanic ash (VA). As an additional measure for passenger safety, advice to always be fastened whenever seated. Check fuel temperature periodically.

5.6. Waypoint Passage Procedures: In oceanic/procedural airspace, at each waypoint passage: note waypoint passage time (ATA), fuel at waypoint passage, winds and static air temperature (SAT), ETA for next waypoint, check actual position vs planned on charts, make position report (callsign, name of waypoint passed, time and flight level, ETA of next waypoint, wx info if required).

5.7. Redispatch Procedures: If using a redispatch method, fuel at each waypoint and predicted fuel at next waypoint must be checked vs planned fuel, especially in marginal conditions. Approaching the redispatch fix, fuel, wx and ATC conditions must be assessed before deciding to continue to final destination or divert to the initial destination.

5.8. Use of V/S Mode during Cruise: V/S AFDS mode may be used for altitude changes in cruise if climb or descent is to be no more than 2000ft.

5.9. Cruise Levels: Cruising levels (above transition altitude) are chosen using to the so called “semi-circular” system, which allocates Flight Levels according to the direction (magnetic track) of flight to improve vertical separation. Standard separation is 1000 ft and the standard (“east-west”) system allocates odd FLs to eastbound (magnetic track between 000° and 179°) flights and even FLs to westbound (magnetic track between 180° and 359°) flights. This holds true also in RVSM airspace. 2000 ft separation is applied in non-RVSM areas above FL290. Many areas of the world use a “north-south” system. Details are found in the “Tables” section. Cruise level selection is dictated by performance, weather, ATC and stage length factors. Longer flights should elect to “step-climb” as fuel consumption lowers weight and permits higher altitudes.

5.10. Metric Countries Procedures: Change of FL into metric FL entering into metric airspace from ICAO airspace must be accomplished BEFORE entering the metric airspace and change from metric FL into ICAO FL must be accomplished AFTER leaving the metric airspace. Note that China, even if bordering with other metric countries as Russia and Mongolia, has a different metric FL structure.

5.11. Automation Policy: Proficient automation usage improve performance and safety and the highest level of automation available for each phase of flight should always be used. Nevertheless pilots are required to maintain their flying skills and hand-flying is encouraged especially in low traffic density and good weather conditions.

6. Descent

6.1. Checklists: The *Descent Checklist* must be performed before the calculated top of descent (TOD) point.

6.2. Planning: Advanced or automated descent planning techniques must be crosschecked against the “3x + 10” rule explained in the Flight Primer. Typical resulting descent VS will be 5x your ground speed, and should not exceed 4000 fpm.

6.3. Target Altitude/Speed Restriction: Unless otherwise required for the published approach procedure (STAR), plan for, or at least crosscheck, to a target restriction point of 12,000ft above the airport elevation, at 250 knts, by 40nm out from the field.

6.4. **AFDS modes during descent:** *(Recommended) VNAV is the preferred mode of vertical profile control during descent for best fuel economy. FLCH (LVL CHG) may be used in lieu of VNAV. If requested for best rate of descent by ATC, it is preferable to use FLCH (LVL CHG) in association with idle thrust and speedbrakes. V/S-SPD mode should only be used for small altitude changes, or during the final stages of approach.*

6.5. Lights: LND and TAXI lights ON passing FL180 during descent. LOGO ON in darkness or IMC, WING with LOGO. ***Note:*** LND & STROBE may need to be turned OFF when affecting cockpit environment in fog/clouds.

6.6. Flaps Use: Flaps may not be extended, or left extended above FL200 (20,000ft). Flaps are generally retracted very shortly after take-off, and extended only during final approach.

6.7. Speedbrakes: Idle thrust together with speedbrakes shall not be deployed below 4000ft AGL.

6.8. Sterile Flight Deck: Below 10000 ft. MSL, sterile flight deck procedures must be used.

6.9. Holdings: Speeds and leg times in the holding pattern are as follows:

Domestic: up to 6000 ft.: max 200 ktns / 1 minute legs; 6001 to 14000 ft.: max 230 ktns / 1 minute legs; above 14001 ft: max 265 ktns / 1 ½ minute legs

ICAO: up to 14000 ft.: max 230 ktns / 1 minute legs; 14001 to 20000 ft.: max 240 ktns / 1 ½ minute legs; 20001 to 34000 ft.: max 265 ktns / 1 ½ minute legs; above 34000 ft.: max Mach 0.83 / 1 ½ minute legs.

If the maximum holding speed in the altitude interval in which you're required to hold is below your clean speed, ask ATC to grant permission if possible to hold at a speed greater than the clean speed, to reduce fuel usage.

7. Approach

7.1. Checklists: The *Final Approach Checklist* must be complete passing the Final Approach Fix (FAF).

7.2. Limits for Landing Wind Components: A landing may not be attempted, and an approach may not be initiated or continued, if the following limits for wind component are exceeded:

1. crosswind 29 knts, tailwind 10 knts (lower crosswind in wet/contaminated rwys; see each airplane maximum limits)
2. additional restriction for autoland: headwind 20 knts, crosswind 15 knts
3. any wind condition with braking action reported as "nil"

7.3. Precision Approaches: Precision approaches are IFR procedures, and are classified by the Runway Visual Range (RVR) into CATI, CATII and CATIIIa/b/c subtypes. An ILS approach is a precision approach.

Precision approaches may be flown:

1. completely under pilot control (hand-flown)
2. using an autopilot coupled approach, followed by a pilot flown landing
3. utilizing a full auto-land procedure.

The particular existing conditions of the weather, aircraft, flight crew and airport will both limit the options, as well as determine the best method to use.

7.4. Coupled Approach: Using the auto-pilot to fly the glideslope/localizer approach is not in itself an autoland; that is a coupled approach. A coupled approach may only be flown to CATI or better minima. On a coupled approach, as on any CATI approach, when you become visual then you disengage the A/P and land under pilot control. If you are not visual before the *decision height* (DH), then you must go around.

7.5. Autoland: This is a special type of approach, only flown to specially designated precision approach runways. In an autoland approach, the aircraft will complete the approach, landing, and sometimes even the rollout under full autopilot control. A number of conditions have to be met before an autoland is authorized for use, these are detailed below. Autolands can only be flown to CATII and CATIII approach authorized runways. CATII autolands will still require visual confirmation before landing, but CATIII autolands will allow for landing the aircraft without visual confirmation of the runway environment.

7.6. Category Approach Types

A **CATI** approach may be flown completely under pilot control, or assisted with an initial coupled autopilot approach segment. The coupled autopilot approach segment may not be continued below the *decision height* (DH). Visual confirmation must be achieved by the DH and the aircraft then landed under pilot control with the autopilot disengaged.

Aircraft cleared for a CATI approach may not fly a full autoland as proper safeguards as required for an autoland, are not in force. However for currency purposes, a simulated CATII or CATIII autoland may be flown as long as all approach conditions for a CATI approach are satisfied.

All **CATII** approaches should be flown as an autoland. If autoland is not available, a CATII approach may be executed with a manual landing, with higher minima. A CATII approach has both an *alert height* (AH) and a *decision height* (DH) and hence requires both electronic and visual confirmation. On a CATII approach, after both electronic and visual confirmation, the aircraft can then approach the runway, flare, and land on autopilot.

All **CATIII** approaches also must be flown as an autoland. However, with CATIII approaches there is no associated DH (except CATIIIA with 737 Classics and E-Jets), and no decision or transition is made based on the visual environment. On a CATIII approach, after electronic confirmation at the AH, the aircraft can then approach the runway, flare, and then land on autopilot.

7.7. Decision Height: With CATI and CATII approaches, visual reference requirements specify that the runway environment be visible to continue below the *decision height* (DH). All CATII approaches should be flown as an autoland (unless airplane is not autoland-equipped and CATII is approved with higher minima), but also still require visual environment confirmation at the DH. In the absence of visual runway confirmation, the aircraft must go around. A DH of 50 ft. must be set for 737 Classic and E-Jet airplanes CATIII autoland procedures.

7.8. Alert Height: An *alert height* (AH) of 100ft AFE shall be set for all CATII & III autoland approaches. An alert height is used as a point to perform a final crosscheck that all systems are performing correctly and that there is electronic confirmation of position before the autopilot is allowed to land the aircraft. The alert height is not a visual "decision height".

7.9. Precision Approach Minima: A precision approach landing may not be attempted if weather minima are less than as outlined below. Additional higher restrictions may apply for individual published procedures. *Runway visual range* (RVR) is available from the current airport METAR, when visibility is less than 6000ft.

1. ILS CATI : visibility 1/2SM (800 m) or RVR 2400 ft. (750 m), decision height 200 ft.
2. ILS CATII : RVR 1000 ft. (autoland-300 m), decision height 100 ft.; RVR 1400 ft. (no autoland-425 m), decision height 150 ft.
3. ILS CATIIIA: RVR 700 ft. (autoland mandatory-200 m), no decision height. For 737 airplanes and E-Jet airplanes, DH is 50 ft.
4. ILS CATIIIB : RVR 300 ft. (autoland mandatory-75 m), no decision height
5. ILS CATIIIC approaches are not authorized for UVA operations.

CATII approaches are authorized for all airplanes in UVA fleet (manual landing with higher minima for turboprops and for types without autoland capability).

CATIIIA approaches are authorized for all mainline types in UVA fleet.

CATIIIB approaches are authorized for Boeing 737NG, 747, 757, 767 and 777 and for Airbus A320 series.

HUD (Head-Up Display)-equipped airplanes landing and takeoff minima for UVA operations are currently the same as non-HUD equipped airplanes. Any changes will be announced with a NOTAM.

7.10. Autoland Approved Conditions: CATII, CATIIIA and CATIIIB approach autolands may only be conducted with approved aircraft types, with autoland capability in proper working order, only to autoland designated runways, and with proper ATC CATII or CATIIIA/B autoland clearance.

In our simulated world, there is also a further restriction -- autoland facility is properly simulated in software in only a small number of complex payware aircraft. If you don't have it, you can't fly it.

7.11. Autoland Configuration: At 1500ft AGL, the aircraft will perform a self-test to ensure that autoland is viable. The pilot must ensure that this self-test is positive before commencing an autoland approach. This is achieved by confirming that the appropriate annunciation is signaled by your aircraft. (e.g. LAND2 or LAND3)

7.12. Non-Precision Approaches: Non-precision approaches are IFR approaches using instrument guidance other than an ILS. These include VOR, VOR/DME, RNAV, LOC, LDA and others.

Non-precision approaches are classified by the type of guidance system being used, and the decision to land is driven by the cloud ceiling as compared to the allowed Minimum Descent Altitude (MDA). The MDA for non-precision approaches is available from the approach plates

7.13. Non-Precision Approach Minima: A landing may not be attempted if the cloud ceiling (*broken* or *overcast* layer height) is below the MDA specified on the approach plate. When on approach, you may not descend below the MDA unless you have a visual on the runway or runway lighting system. If you do not have a visual by the *missed approach point* (MAP), or even with a visual of the runway, if you cannot perform a normal landing, then you must go around.

7.14. **Localizer Back Course Approaches:** Accepting LOC/BC approach clearances is strongly discouraged and may only be accepted where other more desirable options are unavailable.

7.15. **Circling Approach:** A circling approach (also called "circle-to-land") is an instrument approach where the final approach course is offset at least 30° from the instrument approach final course. The procedure calls for an instrument descent to a circling MDA then a visual maneuvering to align the airplane with the landing runway. Do not begin the maneuver unless visual reference to the airport is established.

7.16. **Visual Approach:** A visual approach is an IFR procedure, used when conditions allow, to expedite air traffic flow in a terminal airspace. A visual approach can be used with both precision approach runways and non-precision approach runways. A visual approach does not have primary reliance on instrument guidance, but rather on visual cues on the ground. Some runways also have published visual approaches with specific extra-airfield visual cues outlined.

On a visual approach, the aircraft will be fully configured for landing, with landing flaps set, gear down and at Vtgt speed, when flying the downwind segment of the approach, or no later than the outer marker as appropriate.

A visual approach clearance may not be accepted, and a visual approach may not be attempted, unless the runway or runway lighting system is in view and is expected to remain in view until a normal landing can be completed.

7.17. **Use of Autopilot during Approach:** During a **non-precision** approach the autopilot must be disengaged no lower than 50 ft. below the *minimum descent altitude* MDA. During an ILS (**precision**) approach other than an autoland, the autopilot must be disengaged no lower than at 50 ft below the *decision height* (DH). When conducting an ILS approach with **autoland**, the autopilot will be disengaged at touchdown with airplanes not equipped with ROLLOUT mode.

For **training purposes,** VHQTD strongly encourages pilots to become proficient with both pilot-flown, as well as the various types of autopilot-flown approaches. Where conditions and workload permit, for normal operations, the autopilot may be disengaged well before the final approach turn and the approach and landing flown under direct pilot control.

***Note for checkride purposes*:** Acceptable use of autopilot is defined in the Checkride Documents.

7.18. **Prudent Practice:** Regardless of the approach technique utilized, you must tune and use all instrument guidance that is available, and incorporate any visual cues as available on the ground, to crosscheck and validate your approach. If wx conditions are marginal, and the aircraft and instrument procedure are properly certificated, consider using higher instrument category for the approach (eg: with weather close to CATI minima, use CATII procedures if available). Use of Flight Directors is recommended in all approaches.

7.19. **Target Speed:** Target speed (Vtgt) for final approach is the uncorrected Vref for final flaps at the actual landing weight *plus* 5 knts *plus* the wind correction (half the steady headwind component plus the full excess gust) to a maximum of 20 knots total

7.20. Banking: Banking must never exceed 30° during descent and maneuvering to intercept the final approach course, either for a straight-in or a circling procedure, and is further limited to no more than 20° below 1000 ft AGL. For a circling approach procedure, maximum bank permitted below 1000 ft AGL is 30° until established on the final course. Corrections while on a stabilized approach should not exceed 5°, unless in gusty wind conditions.

7.21. Crosswind approaches: *(Recommended) Crosswind approaches should be flown with the "crab technique", where the airplane is held stable on the extended runway centerline by turning the nose into the wind and achieving a proper drft. The crab angle must be corrected immediately before touchdown with appropriate aileron and rudder inputs.*

7.22. GPWS Warnings: Always promptly comply with GPWS "Terrain" warnings unless it may be positively visually confirmed that the warning is spurious.

7.23. Flaps and Speed Management: If not otherwise instructed by ATC or noted in the published approach procedures, flaps and speed management will be as outlined below.

Flaps and Speed Settings	Regional Jets	E-jets	Airbus A320 series	Boeings (except 747)	747
on the downwind	Clean	1/200knts	Clean or 1	1° (optional)	1°
turning base & intercept	8°/180knts	2/180knts	1/180knts	5°/180knts	10°/180knts
GS alive or 9NM, whichever is later *(gear down)*	22°/160knts	3/160knts	3/160 knts	15°/160knts	20°/160knts
GS interception, and no later than final approach fix (FAF)	45°/Vtgt	5 or FULL/Vtgt	FULL/Vtgt	30°/Vtgt (B737 uses 40° for autoland)	30°/Vtgt

1. Airbus does not specify flaps settings in degrees. The same holds true for Embraer in their E-Jets. Boeing 737s should use 40 degrees setting for autoland operations and when dictated by operational/performance reasons. The Turboprops should use the same settings as the Regional Jets with lower speeds.
2. When accelerating or decelerating, always modify your speed in stages with reference to the limitations of the current flaps setting. Never select a new required speed where that might conflict with the velocity requirements of the currently set stage of flaps.
3. Once slowed, hold the speed of the aircraft momentarily at each flaps setting to allow for stabilization before selecting the next stage of flaps and speed. An idle thrust setting during approach must be avoided.

4. If directed by ATC to fly a speed higher than set out above, still advance flaps as per schedule. If this would violate the maximum speed for that flaps setting, then likely the ATC direction would also prevent you from completing a normal and safe landing. In such an instance as PIC you may elect to declare “unable” and explain why. In that circumstance you may need to go around.

7.24. Gear Operations: Unless otherwise dictated by operational reasons, gear must be selected down at glideslope alive or 9NM out, whichever is later, and under no circumstances later than 1000ft AFE. During operations at high ambient temperatures, the gear may be deployed immediately on localizer capture, to facilitate their cooling in preparation for landing.

7.25. Stabilized Approach Criteria: An approach is considered stabilized if the following criteria are met:

1. above 1000 ft. AFE on an ILS approach: you must be within 2 dots of both localizer and glideslope centers
2. below 1000 ft. AFE on an ILS approach: there must be no deviation below the glideslope, and you must be within one dot of both localizer and glideslope centers
3. at any time, if you are not centered, you must take immediate action to recenter
4. at 1000 ft. AFE (500 ft. AFE on a non-precision or visual): full landing Flaps and gear configuration must be achieved, with speed at Vtgt
5. below 1000 ft. AFE on an ILS approach (500 ft. AFE on a non-precision or visual): sink rate may not be more than 1000 fpm. Proportionate allowances may be made to the sink rate for published approaches at substantially greater than a 3° slope, or at high altitude airports.
6. engines must remain spooled above flight idle

7.26. Mandatory Missed Approach: A missed approach is mandatory in the following cases:

1. if there is a full scale ILS overshoot on initial capture
2. if, when on an autoland approach, there is any autoland fail annunciation
3. if below 1000 ft. AFE, any of the stabilized approach criteria are not met
4. if by the DH (or MDA) the runway, the runway lights, or the runway markings are not visible
5. if at any time in the final approach a normal landing is not assured within the touchdown zone (TDZ) area.
6. if you receive *any* Ground Proximity Warnings (GPWS)
7. if at any time the PIC is not satisfied with the approach profile

7.27. Speed Brake usage during the Approach: Use of Speed Brakes is prohibited:

1. in IMC (instrument weather conditions) after the FAF
2. in VMC (visual weather conditions) below 1000ft AFE

3. with Flaps in a landing position. Landing flaps positions are for Boeing: greater than 20°; for Airbus: “4” or “Full”; for E-Jets: “5” or “Full”; for RJ/Turboprops: 45°.

4. In other circumstances, because it may destabilize the wing and at the very least cause significant buffeting, unless required for operational use, speed brakes are not recommended with any flaps extension. If the speed is greatly above the required on the approach, do not use speed brakes, but go around.

7.28. Landing Authority: The PIC is the final authority on aircraft safety. If the PIC believes that a safe landing is compromised for whatever reason, then the landing shall be aborted. The aircraft will then be managed safely and ATC informed as soon as is practicable, but secondarily to the safety of the aircraft.

7.29. Missed Approach Procedure: There are seven steps for the missed approach:

1. **Thrust**
    - **TO-GA** setting – *A caution – in a large relatively empty plane TO-GA mode may rocket you up and could put you in danger of busting the missed approach altitude. If you are not very low, and not in a dire situation, you may wish to use FLCH mode instead.*
    - **Verify throttles** go to G/A thrust, if not then move throttles to full.
2. **Flaps – s**et 15° (20° on a 747, or a mid-setting in non-Boeing aircraft).
3. **Pitch**
    - **Rotate –** when available in a complex panel follow the FD, but in any case pitch up to 12° to 15° nose up attitude and hold best climb speed (in a complex panel “bug +10” to “bug +25”).
    - Be sure to set a **pitch** mode on the MCP.
    - Ensure the **missed approach altitude** (available from the plate) is set on the MCP; this is critical for proper autopilot operation, otherwise the A/P may nose down to the touchdown runway elevation.
    - If you were not flying level when executing the missed, and were descending such as on a precision approach, expect to lose up to 50ft in a properly executed missed approach.
4. **Gear up** on positive rate.
5. **Roll –** in a complex panel you may use LNAV if you will be flying the published missed approach. If ATC will be providing you with vectors, then use HDG or a wings level mode.
6. **Autopilot**
    - If the autopilot is on, leave the autopilot on.
    - Below 250 ft., engage autopilot if it is off
    - Otherwise A/P is at pilot discretion.

7. **Call ATC** and advise of the missed.

Once a missed approach is initiated, it must be continued even if the runway environment becomes visible. Do not abort a go-around! A go-around initiated at very low altitudes may result in runway touchdown: do not attempt to avoid a touchdown or to abort the go-around should a touchdown occur. A go-around may be initiated even after touchdown: in this case, select takeoff flaps, increase thrust to takeoff setting and, when attaining a speed at least equal to Vref, smoothly rotate and continue with the standard go-around procedure.

7.30. Cold weather operations: Engine anti-ice must be ON in icing conditions with temperature above – 40 °C; airframe anti-ice must be ON in visible moisture with temperature below 10° C. Consider delaying flaps and gear extension in moderate icing conditions during descent and approach. Check applicable runway conditions; operations with braking action reported as "nil" are prohibited.

8. Landing

8.1. Checklists: The *After Landing Checklist* must be completed after clearing the runway; the *Parking Checklist* when stopped at the arrival gate.

8.2. Threshold Height and Speed: Threshold height target will be 50 ft. AFE at Vtgt speed. Acceptable deviation for threshold height is not below 40 ft. AFE and not above 90 ft. AFE. Acceptable deviation for speed is Vtgt +/-10 knots.

8.3. Autopilot Minimum Disconnect Height: Except when performing a full autoland, autopilot must be disconnected not later than 50 ft. below MDA. Autothrottles, if used and except when performing a full autoland, must be disconnected before start of the flare.

8.4. Landing Speed: As noted above, the speed on approach and at the threshold must be Vtgt (Vref + 5 + Wind Correction). There will be some loss of speed during the flare. Landing should be accomplished at a speed of about Vref + 5, but in any case never below Vref – 10.

8.5. Stall Speeds – Important Note: Approach and landing speeds are based on Vref. Vref is roughly calculated as just 30% over the aircraft stall speed for a given configuration. For greater emphasis, an illustrative example follows.

In UVA operations, a typical wind-corrected approach speed might be 145 knts, a corresponding safe landing speed might be 135 knts. The stall speed in that situation would be about 105 knts, leaving very little margin for error. **Approaching the stall speed or the stick shaker speed (about 15knts over stall) is a grave error and is expressly forbidden for the landing, or at any time.** If you stall, the aircraft will stop flying and you will not recover.

Vref and other important Vspeeds for the entire fleet are calculated for you by the UVA Flight Planner and Dispatch Creator (FPD). The FPD docs discuss these speeds.

8.6. Landing VS: Landing should be accomplished with a VS target of -150 fpm. A firmer landing may be preferred on wet/cluttered runways or with significant crosswind. Also, it may be needed to force the airplane on the ground if, even at the right landing speed, it is unnecessarily floating above the runway (e.g.: for an unexpected gust or for an excessive long flare) especially when landing on short runways. In any case, do not try to "save" a landing if safety is compromised. Landing VS must never exceed -500 fpm.

8.7. **Landing Position:** Landing must be accomplished with touchdown on the main gears first, centered and aligned with the runway centerline and within the landing touchdown zone (TDZ).

For precision approach runways, the TDZ is between the aiming point markers (solid rectangles) and the last single stripe pair marking, generally from 1000ft to 3000ft from the threshold. The down-runway landing zone limit may be foreshortened by a shorter runway length.

For non-precision approach runways, the TDZ is deemed to be the first 1/3rd of the runway.

8.8. **Spoilers Use:** Spoilers should be armed before landing (unless auto-armed) and their activation must be monitored at touchdown. If automatic extension does not occur, spoilers must be manually deployed.

8.9. **Reverse Thrust Use:** Reverse thrust should be engaged on nose wheel touchdown and must be canceled not below 70 knts ground speed. Below 70 knts reverse thrust is ineffective, and there is danger of FOD (foreign object damage). Reverse thrust is not recommended before nose wheel touchdown, as asymmetric thrust may outstrip your rudder authority and cause runway excursion.

8.10. **Quick Runway Egress:** Once a normal landing and deceleration has been achieved, then prompt clearing of the runway is the primary, immediate goal. Do not stop on the runway.

8.11. **High Speed Taxiway Use**: If available, use of HSTs is encouraged to reduce runway occupancy. HSTs are angled at no more than 45° to the right or left of the runway direction. Maximum speed allowable is 40 knts on the turnout.

8.12. **Lights:** LDG and STROBE lights must be turned OFF on clearing the runway after landing. Nosewheel LND lights may be left ON when taxiing on poorly lighted taxiways.

8.13. **Flaps:** Flaps are to be fully retracted once clear of the runway after landing. Consider leaving flaps partially extended till arriving at gate in loose snow/ice conditions.

TABLES

LANDING MINIMA

(No reduction permitted even if charted.)

Type of Instrument Approach	Minimum Visibility or RVR	DH or MDH or AH	Remarks
Full ILS CATI	1/2SM (800m) or R1800 ft (550m)	DH 200 ft	=
ILS CATII (autoland)	R1000 ft (300 m)	DH 100 ft	=
ILS CATII (no autoland)	R1400 ft (450 m)	DH 150 ft	=
ILS CATIIIA (autoland)	R700 ft (200 m)	AH 100 ft	DH 50 ft E-Jet/737
ILS CATIIIB (autoland)	R300 ft (75 m)	AH 100 ft	=
LOC only/SDA/LDA	Charted minima	Charted minima	=
RNAV	Charted minima	Charted minima	=
VOR and VOR/DME	Charted minima	Charted minima	=
NDB	2SM (3200 m)	Ceiling not below MDA	A319/320 line-selectable approaches: charted minimimums
Visual & Circling	3SM (4800 m)	Ceiling not below 1000ft or charted	=

RVR /VIS CONVERSION

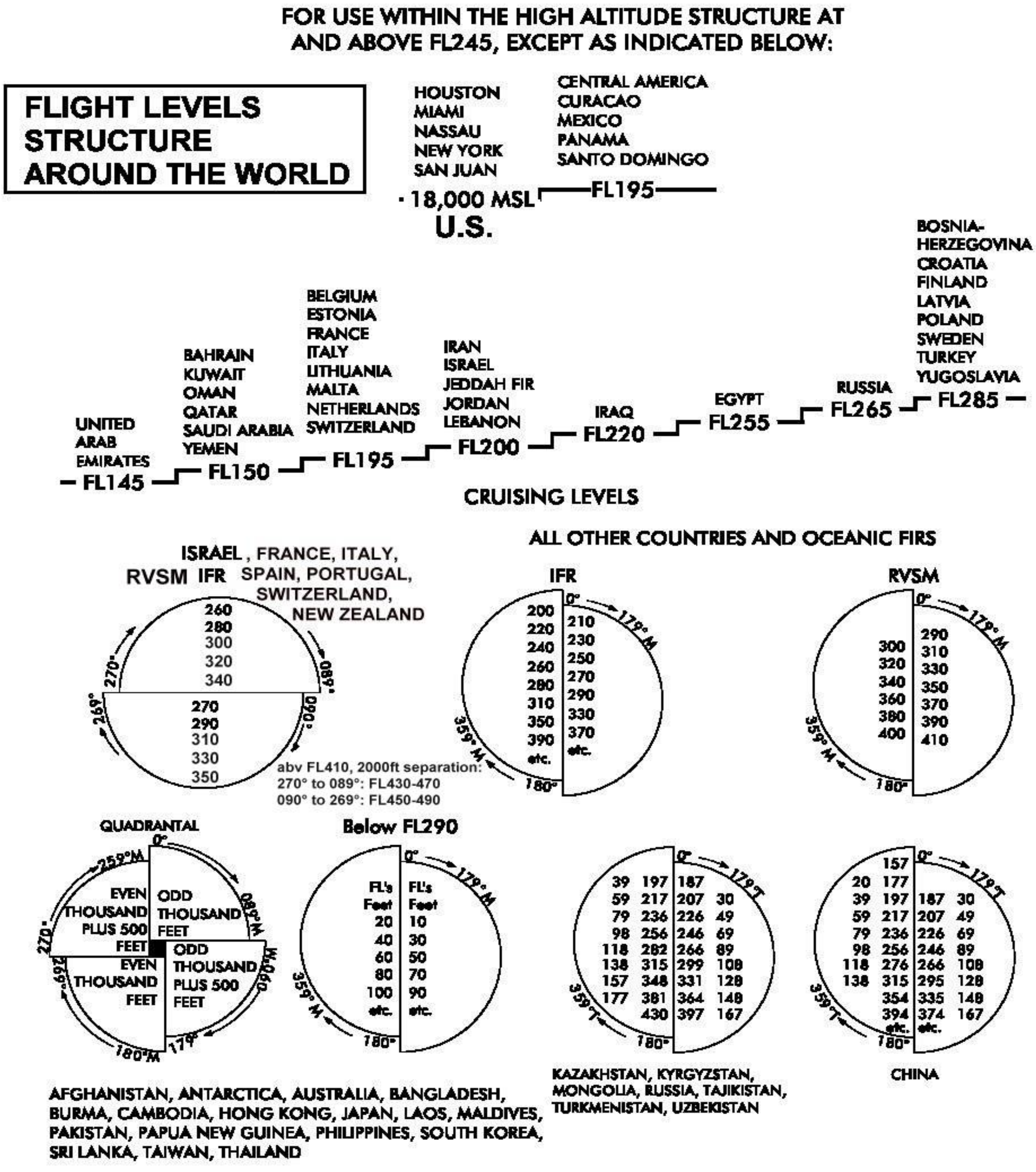
RVR

Feet	Meters	Feet	Meters
300	75	2000	600
400	125	2100	650
500	150	2400	750
600	175	3000	1000
700	200	4000	1200
1000	300	4500	1400
1200	350	5000	1500
1600	500	6000	1800
1800	550		

Visibility

Statute Miles	Meters	Nautical Miles	Statute Miles	Meters	Nautical Miles
1/4	400	3/8	1 1/4	2000	1 1/10
3/8	600	3/8	1 1/2	2400	1 3/10
1/2	800	1/2	1 3/4	2800	1 1/2
5/8	1000	5/8	2	3200	1 3/4
3/4	1200	7/10	2 1/4	3600	2
7/8	1400	7/8	2 1/2	4000	2 2/10
1	1600	9/10	2 3/4	4400	2 4/10
1 1/8	1800	1 1/8	3	4800	2 6/10

CRUISING LEVELS



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