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1. BACKGROUND INFORMATION

[AC 120-71] [DCT]

Standard operating procedures (SOP) are universally recognized as fundamental to safe aviation operations, yet accidents and incidents continue to occur as a direct result from, or related to, a failure by the flightcrew to follow SOPs, particularly during critical phases of flight.

Advisory circular AC 120-71 provides guidance for the design, development, implementation, evaluation, and updating of SOPs. It emphasizes that SOPs should be clear, comprehensive, and readily available within the manuals used by flight deck crewmembers. This AC is developed for Air Carrier service and training.

The basis for this guidance is contained in the related regulations and FAA guidance sections of this AC. This AC is not mandatory and does not constitute a regulation. This AC describes an acceptable means, but not the only means, to design, develop, update, and use SOPs.

Effective crew coordination and crew performance depend on the crew's having a **shared mental model of each task (common strategy)**. That mental model, in turn, is founded on SOPs. SOPs should serve to provide a consistent, standardized model of each task that must be performed by each crewmember during each phase of flight and during any reasonably anticipated abnormal, non-normal, or emergency situation.

SOPs must be kept current and may be individually developed by the operator or by incorporating those procedures found in their aircraft operating manuals into their daily operations. Once established, the SOPs must be applied with consistency and uniformity throughout the operation.

Implementation of any procedure as an SOP is most effective when:

1. The procedure is appropriate to the situation.
2. The procedure is practical to use.
3. Crewmembers understand the reasons for the procedure.
4. Pilot flying (PF) and pilot monitoring (PM) duties are clearly delineated.
5. Effective training is conducted.
6. Adherence to the standard is emphasized by flightcrews, and reinforced by instructors, check pilots, and managers alike.
7. Crewmembers are aware of the potential risks/hazards if SOPs are not followed.
8. SOPs are established for a Crew Model, not a "Captain's Airplane" model.

2. INTRODUCTION

The ultimate in safety and crew coordination can only be achieved when **each crewmember performs the duties and functions for which he is responsible**.

Each crewmember must have thorough knowledge of his job, be diligent in its execution, and by careful planning do his part to help Rennia Global maintain the highest possible standards. With this in mind, Rennia Global has established standard operating procedures (SOP), which are to be followed in the daily operations of company aircraft. These policies specified by the company's standard operating procedures (SOP) chapter, will be issued to each pilot. Annual check- rides will be conducted to assure adherence to Rennia Global's standard operating procedures. Revisions to these procedures will be provided as necessary by the Director of Operations.

While it is expected that crewmembers will follow these procedures in the operation of company aircraft, the Federal Aviation Regulations and the Flight Manual provided by the aircraft manufacturer are the final authority to the operation of the aircraft and will be given priority in the event of conflict with Rennia Global's SOP.

This Chapter should not contradict any other chapter of this manual and is meant to be consolidating knowledge and skills into a "flight profile".

Rennia Global strongly supports the concept that the disciplined use of Standard Operating Procedures (SOPs) is essential to safe, professional, and aircraft operation. The company recognizes that there are many methods and techniques for aircraft operation, and many variations upon the SOP concept. However, it is important from an operational and safety standpoint that Rennia Global personnel support this SOP. Any personal deviation is counter-productive and will not be condoned.

Having established the above, it should also be noted that the SOP may undergo continual change. Suggested changes of the SOP may be presented to the Director of Operations or Chief Pilot through the process in Ch 4 of this manual. Upon evaluation and acceptance, changes will appear as revisions to these SOPs. It is the responsibility of the aforementioned individuals to make the revisions to the SOP. Once distributed, it becomes the **responsibility of each individual pilot to comply and promote**.

2.1. DUTY ASSIGNMENT

Each pilot performs two of the duty assignment functions on each flight. This is the high-level tasks while it is assumed all procedures and processes in this manual are completed to illustrate the difference between "PIC" and "PF". The top row functions are assigned by the company and the bottom row (PF or PM/FPM) is assigned by the Trip Captain. In this document "T" is the planned departure time while T- is a time prior to scheduled departure.

2.1.1. COMPANY ASSIGNED

Trip Captain (TC)	**Trip SIC (TS)**
The Trip Captain is the Assigned PIC by the company. The TC is responsible for all the PIC duties in this manual. The TC must promote the Company Procedures and SOPs in this manual. 1. Flight Plan *FS *TS 2. Performance *GS *TS 3. FBO Coordination 4. Cockpit Preflight 5. Fuel Order 6. Conduct a CRM briefing (to include CA when applicable) to include: 7. Itinerary 8. Weather (especially adverse WX) 9. Expected Turbulence 10. Ground servicing plan 11. MEL items 12. Adjust the Crew Pace to allow the crew to keep in sync. 13. @T-35 Obtains ATC clearance and programs FMS[1] 14. Both pilots review FMS vs Navlog 15. Passenger Coordination (ISC) 16. Trip Captain Check Items (see TRIP CAPTAIN) 17. Primary Emergency Coordinator[2] *FS – Shares ForeFlight. *GS – Shares Genesis *TS – Delegates to TS	The Trip SIC is the Assigned SIC by the Company. In most cases the Trip SIC receives duties by the TC, but can plan on the following as standard: 1. Exterior Aircraft Pre-flight 2. Oversees fueling 3. Stow/arrange any cabin provisioning items (ice, coffee, catering). Delegate to CA when possible. 4. Loads baggage 5. Obtains ATIS 6. @T-35 Obtains ATC clearance and programs FMS[1] 7. Both pilots review FMS vs Navlog 8. TS does a risk assessment in VOCUS and briefs the TC on specific risks and NOTAMS prior to each flight. 9.

[1] If PDC is available, the TS will print the PDC and provide for review. Both pilots will review the FMS vs. the flightplan.

[2] TC decides bet use of the pilot resources; who should be PF vs who is the coordinator of the non-standard event. TC *may* be the only one by training checking to land the aircraft.

2.1.2. PIC ASSIGNED

Pilot Flying	PM/Flight Path Monitor
The Primary Pilot executing the flight based on using Company SOPs in all flight profile changes to guard against unintended aircraft operation. 1. Operates By the Book to Promote SOP 2. Primary Aviator 3. Primary Navigator 4. Primary System Operator 5. Calls for Configuration Changes iaw Company Profiles	The Primary Flight Path Monitor based on both pilots using SOP in all flight profile changes to guard against unintended aircraft operation. 1. Flight Path Monitor by promoting RG SOP 2. Primary ATC Communicator 3. Actions Configurations Changes iaw "Company Profiles" 4. Performs Checklist – All Configuration Items (Gear, Flap and completion of checklists) will be audible.

2.2. TRIP CAPTAIN

At times, two Captains may fly together. This may also cause some confusion in who does what. In this document, Trip Captain duties are the same as PIC duties, but also at times emphasized (eg: TRIP CAPTAIN'S FINAL CHECK BEFORE ENGINE START) for clear task and non-assignable action.

2.3. PILOT IN COMMAND (PIC)

For each flight a PIC will be designated on the scheduling board and Trip Sheet. The PIC will be at a pilot station for takeoff and landing (see 3-man crew) in Ch 4.

2.4. SECOND IN COMMAND (SIC)

For all jet aircraft, a SIC shall also be designated.

2.5. RELIEF CAPTAIN

When a relief Captain is use, this pilot will perform the assigned duties during that period. Since the relief Captain is Captain qualified (need not be landing current. See Ch 4) (s)he may perform PF or PM duties during the flight.

2.6. PILOT FLYING (PF)

The pilot responsible for controlling the flight of the aircraft.

2.7. PILOT MONITORING (PM)

The pilot responsible for Pilot Not Flying duties and monitoring of the Pilot Flying

2.8. COMMON STRATEGY

On departures and arrivals (approaches) aviation may not have a Standardize Approach. A good example is a non-precision or CAT 1 ILS approach. They are **not** standard. The crew may need to synchronize (in briefing and crew discussion) the cockpit's Common Strategy while SOPs have standardized phraseology at certain points.

3. FLIGHT PATH MONITORING PROGRAM

[AC 120-FP] [Active Pilot Monitoring Working Group]

3.1. BACKGROUND

Contemporary aviation operators have access to information that their predecessors did not. Data streams such as those from the line operations safety audit (LOSA), aviation safety action program (ASAP), flight operational quality assurance (FOQA)/flight data monitoring (FDM), and U.S. National Aeronautics and Space Administration Aviation Safety Reporting System (ASRS) allow many errors in different phases of flight to be carefully scrutinized, categorized and analyzed. Many organizations have a data collection and analysis system to document these anomalies. A great deal of information on the various types of errors and where they occur is now well known and documented.
One conclusion emerging from this wealth of information is the importance of effective flight path monitoring (EFPM) in a safe operation. Monitoring is something that flight crews must use to help them identify, prevent and mitigate events that may impact safety margins.

3.2. RESPONSIBILITY

Flight Path Monitoring is always:

1. The responsibility of the entire flightcrew, and
2. The highest priority for all members of the flightcrew.

Each pilot is responsible for:

1. Being fully aware of the current and desired flightpath of the aircraft, and
2. Being fully capable of manually flying the aircraft to achieve the desired flightpath.

3.3. MANUAL FLIGHT OPERATION

Although we encourage the use of auto-flight for threat reduction in most passenger operations, it is also important to use the opportunity during positioning flights to maintain manual flight operation skills.

When deciding whether to fly manually, crews should apply basic TEM[1] principles and take into account the various factors affecting operational workload. Factors to consider include:

1. Weather conditions, terrain, and/or other environmental threats.
2. Time of day.
3. Psychological and/or physiological factors.
4. Level of crew experience.
5. Traffic density.
6. Condition of the aircraft, and/or any non-normal conditions.
7. ATC and/or instrument procedural challenges.
8. Any other operational threats.

[1] Threat and Error Management

3.4. OPERATIONAL POLICY AND PROCEDURE CONSIDERATIONS

In a two-pilot operation, one pilot is designated as PF and one pilot is designated as PM. Each operator should explicitly define the duties of the PF and PM to include:

1. At any point in time during the flight, one pilot is the PF and one pilot is the PM.
2. The PF is responsible for managing, and both the PF and PM are responsible for monitoring, the current and projected flightpath and energy of the aircraft at all times.
3. The PF is always engaged in flying the aircraft (even when the aircraft is under AP control) and avoids tasks or activities that distract from that engagement. If the PF needs to engage in activities that would distract from aircraft control, the PF should transfer aircraft control to the other pilot, and then assume the PM role.
4. Transfer of PF and PM roles should be done positively with verbal assignment and verbal acceptance to include a short brief of aircraft state.
5. The PM supports the PF at all times, staying abreast of aircraft state and ATC instructions and clearances.

3.5. AUTOFLIGHT MODE

Autoflight mode awareness is of particular importance because effective monitoring of autoflight modes is necessary for successful FPM. Below are some recommended strategies for effective monitoring of the autoflight modes that could be included in operator policies and procedures. The pilot should:

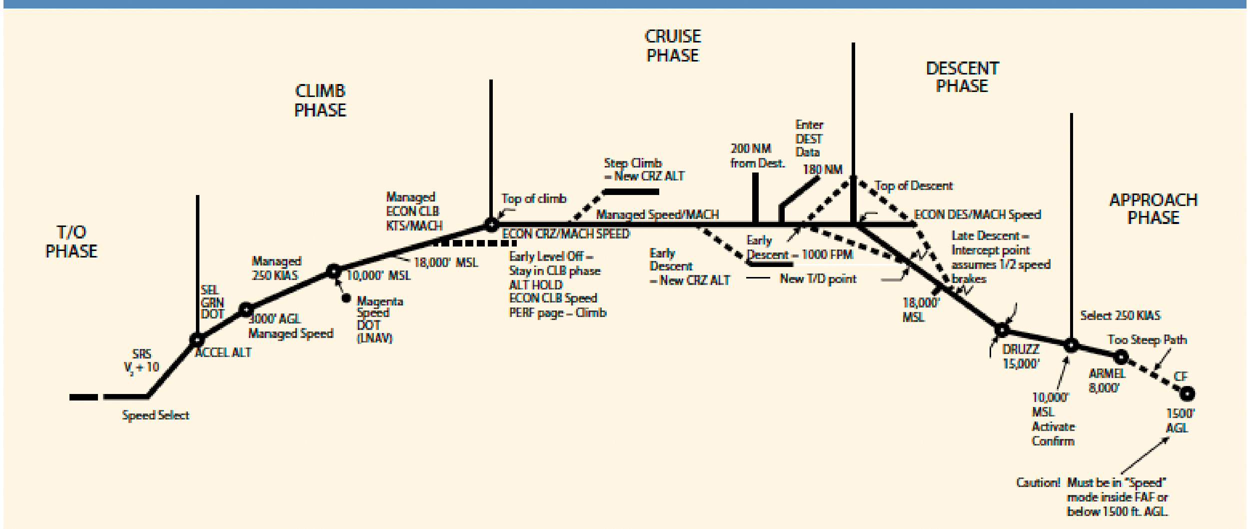
1. Stay in the loop by mentally flying the aircraft even when the AP or other pilot is flying the aircraft.
2. Monitor the flight instruments just as when the pilot is manually flying the aircraft.
3. Be diligent in monitoring all flightpath changes including pilot actions, system modes, and aircraft responses.
4. Always make monitoring of the flightpath a priority task when changes are being made.
5. Always check the FMA after a change has been selected on the autoflight mode control panel.
6. Check the FMAs and flight instruments after being distracted to regain full awareness of the flightpath state.
7. Maintain an awareness of the autoflight systems and modes selected by the crew or automatically initiated by the FMS (mode awareness) to effectively monitor the flightpath.
8. Maintain an awareness of the capabilities available in engaged autoflight modes to avoid mode confusion.
9. Effectively monitor systems and selected modes to ensure that the aircraft is on the desired flightpath.

3.5.1. AUTOFLIGHT MENTAL MODEL

When flying a highly integrated and automated flight management system the pilot must still mentally fly the flight to ensure correct operation. Each manufacturer may have a different automation logic for the most efficient operation of that make and model aircraft. It is imperative that the pilot understands the logic programmed by reading the aircrafts Flight guidance system manuals.

A mental model (my plan for the flight) of a flight may look like this:

Example of an Autoflight 'Mental Model'



As the PF transitions through the phases of flight, CRM through stated intent and change will keep the FPM monitor in sync.

3.6. COMMONLY IDENTIFIED THREATS

Through industry data (ASAP, SMS etc) there are predictable threats we can FPM and prevent error events:

1. Low Altitude Level Off on takeoff or go-around,
2. Departure procedures (DP) with one or more climb restrictions, where environmental conditions and/or aircraft performance may create a challenge.
3. High altitude, performance-limited situations, to include:
4. >Flight at or near maximum altitude for the weight and conditions.
5. >Temperature changes at high altitude. Specifically, flight from colder to warmer air that may result in a reduction of available thrust.
6. >High density altitude takeoff, climb, approach, and landing.
7. Aircraft-specific deceleration and descent capabilities, to include:
8. >Aircraft-specific energy management capabilities with varying wind/groundspeed.
9. Appropriate use of speed-brakes/flaps/gear.
10. Descent restrictions, which may include procedures determined to be complex or challenging, to include:
11. >Off-route ATC vectors and descent restrictions that take the aircraft off the expected and engaged lateral and vertical profiles with subsequent ATC instructions to resume the previous route and profile.
12. Late ATC instructions.
13. Visual approaches, including:
14. >Identifying what combination of drag, thrust, and pitch is appropriate to your aircraft type.
15. >ATC does not vector the aircraft to final.
16. When groundspeed is significantly different from indicated airspeed, but when environmental conditions permit landing.
17. Approaches where ATC does not assign speed.
18. Approaches with a runway change.
19. Landing heavy weight on a short/contaminated or performance-limited runway, including planning for turnoff after landing.
20. Energy management during maximum performance escape maneuvers (e.g., wind shear, Traffic Alert and Collision Avoidance System (TCAS) or enhanced ground proximity warning system (EGPWS) responses).

3.7. PRACTICES SUPPORTING EFFECTIVE FLIGHT PATH MONITORING.

Sometimes, simple practices can promote effective FPM and defend against errors.

Brief flight path–related plans. For the pilot monitoring (PM) to effectively monitor the flight path, he/she needs to know what path the pilot flying (PF) intends to fly.

When the PF shares his/her intentions, it informs the PM what to monitor and thus we establish a better FPM. For example:

1. "I plan to descend no later than 15 nm prior to top of descent."
2. "After crossing Runway 27, I intend to turn left on Alpha."
3. "My intention is to request a right deviation around this storm after we check in with the next ATC [air traffic control] sector."
4. "I plan to extend the gear at 7Nm final"

During this briefing, encourage the PM/FPM to call out any deviation from the briefed plan. Expanding on one of the examples above, the PF might say, **"I plan to descend no later than 15 nm prior to top of descent. *Remind me to descend if it looks like I'm going to miss that target*."**

Requesting and encouraging this type of deviation call can reduce any interpersonal sensitivity barriers between the pilots.

1. Announce deviations from the pre-briefed plans.
2. Provide positive feedback for deviation callouts. For example, say: "Good catch, thanks."

3.8. DESIRED FPM BEHAVIORS

Level of Vulnerability	Definition		Desired FPM Behaviors		
	In Flight	On Ground	PF/PM	FPM Attention and Sampling Rate	Workload Management Strategy
High (red areas)	All changes of: Lateral trajectory Vertical trajectory Speed within 1,000 ft of level-off while climbing or descending All flight close to the ground	Approaching, crossing or entering a runway or tight space	Crew (general)	Both pilots maintain total focus on flight path scan at a high sampling rate	Avoid any task not related to flight path Unavoidable (especially pop-up) tasks must be delayed until exiting high AOV, or accomplished by PM
			PF	Undivided attention to flight path	Avoid all tasks not related to flight path
			PM	Undivided attention to flight path, if possible	Avoid all tasks that are not essential Avoid all tasks not related to flight path Essential and time-critical tasks (not related to flight path) completed if both brief and unavoidable, but focus must be returned to flight path as soon as possible
Medium (yellow areas)	Climbs and descents Flight below 10,000 ft if not already in a high area	All other ground movement	Crew (general)	At least one pilot maintains focus on flight path scan at an elevated sampling rate	Avoid any task that is nonessential Essential tasks may be performed by PM; keep PF focused on flight path
			PF	Undivided attention to flight path, if possible	Avoid all nonessential tasks Avoid tasks not related to flight path, if possible Essential, unavoidable tasks requiring PF involvement may consume only very brief periods of attention — return focus to flight path immediately
			PM	Flight path is primary, but attention may be divided between flight path and essential tasks	Avoid nonessential tasks Essential, non-time-critical tasks (not related to flight path) may be performed but return focus to flight path at frequent intervals
Low (green areas)	Straight and level cruise above 10,000 ft	Stopped with parking brake set	Crew (general)	At least one pilot keeps flight path as top priority, but at a normal sampling rate	Proactively accomplish known tasks to reduce future workload in anticipation of upcoming medium and high AOVs Tasks not related to flight path preferably done by PM; keep PF focused on flight path
			PF	Flight path is primary, but some division of attention to complete other tasks is permitted	Minimize task not related to flight path Ensure frequent return of attention to flight path
			PM	Flight path is primary, but some division of attention to complete other tasks is permitted	Minimize task not related to flight path Ensure frequent return of attention to flight path

3.9. TASK ALLOCATION

Task Allocation Between PF and PM for Heading Change With Autopilot 'ON'

Sequence	PF Duties	PM Duties
1	Monitor radio communications	Read back clearance (with ATC)
2	Acknowledge clearance (with other pilot)	Acknowledge clearance (with other pilot)
3	Rotate heading knob to correct heading	
4	Monitor heading bug (verify correct heading set)	Monitor heading bug (verify correct heading set)
5	Select heading lateral mode	
6	Monitor FMA (verify lateral mode)	Monitor FMA (verify lateral mode)
7	**Autopilot adjusts bank and pitch to execute heading change**	
8	Monitor flight instruments to confirm execution of turn	Monitor flight instruments to confirm execution of turn

ATC = air traffic control; FMA = flight mode annunciator;
PF = pilot flying; PM = pilot monitoring

Source: Active Pilot Monitoring Working Group

Task Allocation Between PF and PM for Heading Change With Autopilot 'OFF'

Sequence	PF Duties	PM Duties
1	Monitor radio communications	Read back clearance (with ATC)
2	Acknowledge clearance (with other pilot)	Acknowledge clearance (with other pilot)
3		Rotate heading knob to correct heading
4	Monitor heading bug (verify correct heading set)	Monitor heading bug (verify correct heading set)
5		Select heading lateral mode
6	Monitor FMA (verify lateral mode)	Monitor FMA (verify lateral mode)
7	Adjust bank, pitch and power to execute turn	
8	Monitor flight instruments to confirm execution of turn	Monitor flight instruments to confirm execution of turn

ATC = air traffic control; FMA = flight mode annunciator;
PF = pilot flying; PM = pilot monitoring

Source: Active Pilot Monitoring Working Group

3.9.1. EXAMPLE OF TASK ALLOCATION

Altitude assigned by ATC,

1. PM puts it in Altitude Pre-Selector.
   1.1. >See ALTITUDE PRE-SELECTOR - VERIFICATION OF ASSIGNED ALTITUDES
2. PM/FPM announces the alt PF reads it back and verifies it on the FGP and PFD.
3. PF changes FG Panel announces mode and rate (eg.: FLCH, Man Speed xyz, VS -1500'+ or +1400',) as appropriate.
4. BOTH acknowledge throttle movement as appropriate.
5. BOTH watch the FG Mode and value to verify direction of altitude change.
6. BOTH agree Flight Path is as intended.

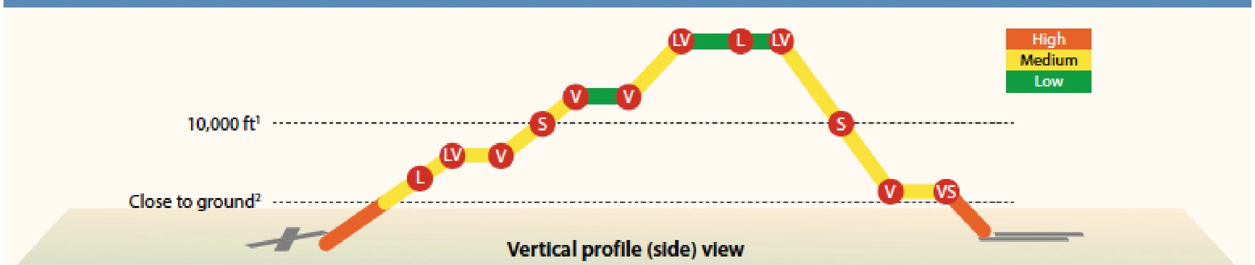
Continued next page….

3.10. AREAS OF VULNERABILITY

To perform effective FPM during periods of high workload and increased vulnerability to flight path deviations, it's **imperative that pilots predict when and where these periods will occur** and prepare for them. By "vulnerability," it means either the potentially increased likelihood of a flight path deviation or the increased severity of potential consequences if such a deviation occurs.

3.10.1. INFLIGHT

Areas of Vulnerability (AOV) to Flight Path Deviation, In-Flight Profile Examples



L Lateral trajectory change V Vertical trajectory change S Speed change

Notes:

1. 10,000 ft is used in the United States as the boundary altitude for sterile cockpit rules and for the 250 KIAS speed restriction (both required below 10,000 ft). For the purpose of the AOV model, an altitude of other than 10,000 ft may be chosen, but it is suggested that this boundary match the use of sterile cockpit rules for your operator (or nation/state) for ease of operational applicability by flight crews
2. "Close to ground" may be defined by the operator, but it is suggested that this be an altitude no less than (a) 1,500 ft AGL or (b) the altitude of the surrounding terrain (if terrain threats exist within 5 nm [9 km] of the flight path), whichever is higher.

Source: Active Pilot Monitoring Working Group

Low AOVs. In this diagram, the green zones depict areas of lowest vulnerability to aircraft path deviations. These are segments where the air/ground path is stable, and where ample time exists to detect and correct possible deviations.

- Low AOVs exist in stable, straight-and-level cruise flight.

Medium AOVs. The yellow zones in the diagram depict areas of medium vulnerability to aircraft path deviations. These are segments where the time available to detect and correct an air/ground deviation is reduced.

- Medium AOVs exist in flight during climbs and descents.
- Medium AOVs exist in some conditions in flight below 10,000 ft.

High AOVs. The red zones in the diagram depict areas of highest vulnerability to aircraft path deviations. These are segments where the path is changing or when the consequences of a path deviation are most immediate and severe. In high AOVs, the time available to detect and correct a deviation is short.

• High AOVs exist in flight when initiating climbs/descents and within 1,000 ft of level-offs, or when turning, or when changing speed or configuration.

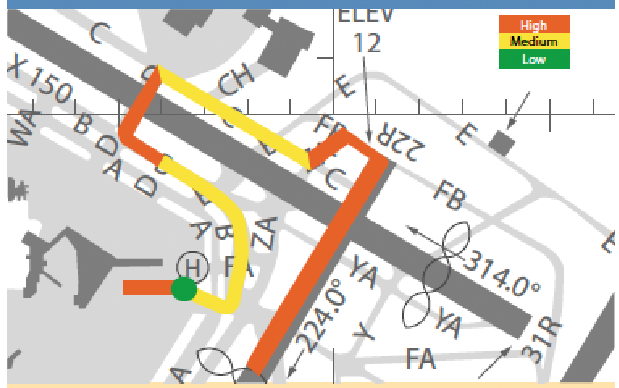
• High AOVs exist in flight when close to the ground and/or below the level of surrounding terrain.

3.10.2. GROUND OPERATIONS

Vulnerability During Flight Path Deviation

Flight Activity (Period)	Level of Vulnerability to a Path Deviation
Taxiing near or crossing a runway	High
Stopped on a taxiway with brakes set	Low
Straight-and-level cruise flight above 10,000 ft	Low
Final approach	High
Climbs and descents	Medium
Within 1,000 ft of level-off while climbing or descending	High
Initiating a course change	High
Initiating a speed change	High
Initiating an altitude change	High
Flight below 10,000 ft (if not already in a high-vulnerability activity/period)	Medium

Areas of Vulnerability (AOV) to Flight Path Deviation, Ground Profile Examples



Source: Active Pilot Monitoring Working Group

Low AOVs exist on the ground when the aircraft is stationary and the parking brakes are set. (On the ground, crews can create a green zone any time by simply setting the brakes.)
Medium AOVs exist on the ground during taxi segments that do not involve approaching, crossing, entering or exiting an active runway.
High AOVs exist on the ground when approaching, crossing, entering or exiting active runways, and when taxiing in confined spaces or close to obstacles.

3.11. FLIGHT PATH MONITORING "SAMPLING RATE"

To monitor the flight path, a pilot must consciously look at many distinct indicators, such as the attitude indicator, airspeed indicator, altimeter, horizontal situation indicator (HSI), FMA, etc. (Often the term "instrument scan" is used as a simplified description of this fairly complex activity.)

The specific items to be scanned during flight path monitoring depend on the situational context. In flight, the items to be scanned certainly include the flight instruments and associated flight guidance automation. In visual meteorological conditions, the scene and objects "outside the windshield" must be incorporated into the pilot's scan. When taxiing, the scan must include items such as the situation outside the windshield, the groundspeed readout and the airport diagram for this phase.

Regardless of what is being scanned by the pilot, it is important in training to highlight "sampling rate," the frequency with which a pilot directs his/her gaze and attention to the external situation and flight deck indicators. The appropriate sampling rate is AOV-dependent — meaning that the higher the level of vulnerability to flight path deviation, the higher the required sampling rate.

- **A normal sampling rate** is the equivalent of the scanning frequency required of a pilot when hand-flying an aircraft in straight-and-level flight. This implies a rate sufficient to reliably detect changes, to recognize factors that may affect the flight path, and to anticipate the need to shift to a higher sampling rate.
- **An elevated sampling rate** is the scanning frequency required of a pilot when hand-flying an aircraft approaching an imminent change in trajectory or energy (e.g., approaching a turn point, or a descent point, or a configuration change point).
- **A high sampling rate** is the scanning frequency required of a pilot when hand-flying an aircraft through the execution of a significant change of trajectory or energy.

3.12. PF CALLS FOR FPM

Although the system expects that both pilots will be automatically synchronized, it is important to realize that the PM's attention may need to be **redirected to FPM duties** as the aircraft approaches an AOV with PF's path-change announcement. E.G:

PF Statement	Both Pilots Perform Flight Path Monitoring
"Descending At 2000'/min"	1. PLs Retarding 2. Pitch Decreasing 3. VSI increasing to -2000'/min
"Climbing out of 350 to Maintain 360".	1. Monitoring the AP to be reducing pitch in preparation to level off 2. PL Retarding to Maintain Speed 3. VSI reducing to zero clim 4. Altitude to maintain FL360 5. AP in Altitude Capture
"Plan Gear Extension at 7 miles Final"	1. As distance approaches 7 miles final, expecting call from PF. 2. If no call, call "7 miles"
1. "Flaps 10" 2. Confirms[1] Flaps 10	1. Select Flaps 10 2. Observe flap movement 3. Confirm and Call "Flaps 10"
"**Low Altitude Level Off**"	PM minimizes secondary duties to concentrate on **FPM** to ensure that a high velocity climb is leveled off correctly.

These are the "commands" to the PM/FPM to reprioritize his/her task to confirm correct path change. This includes appropriate lateral changes as well as vertical and that thrust is appropriate for the change.

At takeoff with an altitude limit of 5,000' or less, the PF should announce "**Low Altitude Level Off**" directing the PM to reduce secondary duties and reprioritize the FPM of the aircraft altitude capture and speed management.

[1] Aircraft configurations of Gear and Flaps will be confirmed by BOTH pilots.

4. GEAR PINS

NOTE: Some models of aircraft do not use gear pins**. TRIP CAPTAIN'S FINAL CHECK BEFORE ENGINE START** still applies in general without Gear Pin Items.

4.1. WHEN ACCEPTING THE AIRPLANE:

Gear Pins and Steering (steering engaged) will be checked by both pilots to be ready for flight. The simplest solution is to show the pins to the other pilot before stowing them. The FBO folks can help, but this is the crew's job, not theirs!

Since the pins may dirty and have storage facilities in the door (Gulfstream) the coordination of ensuring "pins-pulled" is critical.

4.2. WHEN PARKING / LEAVING THE AIRPLANE:

The airplane will be parked with pins installed, steering disconnected and chocked so that the airplane is ready for towing (green "OK to Tow" placard visible in the window). The FBO folks can again help, but this is also the crew's responsibility.

4.3. TRIP CAPTAIN'S FINAL CHECK BEFORE ENGINE START

Prior to the final closing of the aircraft door and specifically after the aircraft has been towed or serviced the Trip Captain will ensure the following:

1. The Gear Pins Are Removed (observed by both pilots),
2. Steering Is Mechanically Engaged,
3. Brakes Are Set and Chocks Pulled,
4. Fuel Door Is Closed.

5. ALTIMETER SETTINGS

During the instrument check portion of the taxi check, both pilots should confirm that the correct altimeter setting has been entered into the Kollsman window of each altimeter (including the standby) or the Baro selector.

In most airplanes the Altimeter Setting must be updated in the altimeters, but need not be updated for the pressurization system since it is performing on its own schedule and only uses Altimeter Setting for the purpose of Landing Field Elevation. On newer airplanes the pilots will set the landing Altimeter Setting in the FMS for the purpose of controlling the Landing Field Elevation.

6. BOTH PILOTS RECEIVE ATC CLEARANCE

The goal is to receive, understand, load and execute the filed flight plan. Since numerous flight plans may exist in the system, it is imperative that the correct flight is loaded in the FMS and the correct clearance is issued. To reduce the potential for errors the following apply:

1. The PIC or pilot who FILED the flight plan with ATC will ensure that BOTH pilots are using the correct recall number. E.G.: **K3284**
2. If possible, BOTH pilots will receive and review the clearance (see T-35 in Ch 6).
3. BOTH pilots will check the FMS routing to synchronize with the filed flight plan and the clearance received.

7. BOTH PILOTS CHECK FMS VS FLIGHTPLAN

Flying with a FMS stored and computed flight plan from a database is different than traditional "green needle navigation" where the pilot flies by a chart, using a earth based nav-aid and a radial.

To ensure that the route waypoints have been loaded correctly from the FMS database iaw with the flightplan, both pilots will follow the same procedure as used for oceanic operation:

1. The PF will read from the FMS the waypoint name
2. The PM will confirm that the waypoint is in the navlog.
3. If possible, the waypoint will be circled[1] or checked.

8. ALTITUDE PRE-SELECTOR - VERIFICATION OF ASSIGNED ALTITUDES

Whenever an altitude is assigned by ATC;

9. The PM will verbally confirm the assigned altitude with ATC, set the newly assigned altitude in the altitude selector, and keep his/her finger on the selector until;
10. The PF verbally confirms the assigned altitude.
11. If any question arises between the flight crew regarding the correct altitude assignment, ATC will be immediately queried for confirmation.
12. The PF will also confirm the mode of the F/D and A/P so that the altitude will capture.

[1] See the IOM Appendix B: Master Document

9. POSITIVE TRANSFER OF CONTROLS

This section outlines procedures to be used by the flight crew once the aircraft is airborne. Refer to the Take-off Procedures section for transfer of control procedures during takeoff. If the primary responsibility for controlling the aircraft is transferred from one pilot to the other once airborne, the person designated as the PF will brief the PM with the following basic information prior to initiating positive transfer of controls.

1. Aircraft altitude instructions.
2. Navigation instructions.
3. Pertinent information regarding aircraft configuration or ATC clearance.

To initiate positive transfer of controls the PF will state, "you have the controls". The pilot receiving aircraft control will then confirm transfer of control by stating, "I have the controls", which indicates that he/she understands and has control of the aircraft.

10. AUTOMATION PROTOCOL

10.1. AUTOMATION PHILOSOPHY

The word automation refers to the replacement of human function, either manual or cognitive, with a machine function. This definition applies to all levels of automation in all airplanes flown by this flight department. The purpose of automation is to aid the pilot in doing his or her job.

The pilot is the most complex, capable and flexible component of the air transport system, and as such is best suited to determine the optimal use of resources in any given situation. Pilots must be proficient in operating their airplanes at all levels of automation. They must be knowledgeable in the selection of the appropriate degree of automation and must have the skills needed to move from one level of automation to another.

Automation should be used at the level most appropriate to enhance the priorities of safety, passenger comfort and efficiency. In order to achieve the above priorities, all training programs, procedures, checklists and day-to-day operations should be in accordance with this statement of automation philosophy.

10.1.1. FOUR LEVELS OF AUTOMATION AND THEIR APPROPRIATE USE

For the purposes of discussion and guidance, it is useful to describe automation in terms of optional levels of direct, basic, tactical and strategic employment.

10.1.1.1. Level One.

No automation is employed. Autopilot, flight director and auto throttles are disconnected.

Except for visual approaches and deliberate decisions to maintain flying proficiency, Level-One is essentially a non-normal mode for advanced cockpit aircraft. It is, however, appropriate for any situation in which immediate, direct control of the aircraft flight path is necessary, including:

1. Any suspicious, confusing or unexpected response from the automation or flight instrument displays
2. Wind shear recovery
3. Collision avoidance maneuvers, including a response to a TCAS RA or a PRM breakout instruction
4. Aircraft upset
5. GPWS terrain warning

10.1.1.2. Level Two

Airplane is being hand-flown with basic flight director guidance and auto-throttle[1]. This is the primary mode used for takeoff, initial departure and landings.

[1] If installed

10.1.1.3. Level Three

Autopilot may be engaged and auto throttles[1] may be in use. Flight director may be coupled to raw radio data or basic modes such as HDG or ALT. Aircraft speed and vertical/lateral flight paths are controlled through the Flight Guidance Control Panel (FGC) on a tactical basis. This level is appropriate when responding to ATC instructions in dynamic environments such as terminal operations, including close-in changes in the landing runway.

10.1.1.4. Level Four

Full use of automation in LNAV/VNAV operation. Flight director, autopilot and auto-throttle[1] are engaged. This is the primary level of automation for non-terminal operations of advanced cockpit aircraft. FMS is used for the control of both lateral and vertical flight paths on a strategic basis. Great care must be taken to maintain situational awareness. Monitoring and mode awareness are critical.

10.1.2. TERMINAL OPERATION

Use of the highest levels of automation during terminal operations must be limited to situations permitting advance preparation, review of FMS programming and complete crew briefings. Level Four is not appropriate when significant changes to route or landing runway have been issued by ATC. In those situations, pilots should revert, at least temporarily, to lower levels of automation.

10.2. AUTOMATION POLICIES – GENERAL

Automation is provided to enhance safety, reduce pilot workload and improve operational capabilities. Automation should be used at the most appropriate level. Proper use of automation will reduce cockpit workload. Improper use will do just the opposite.

Pilots should maintain proficiency in the use of all levels of automation. The selected level of automation should permit pilots to distribute workload comfortably and maintain situational awareness.

10.2.1. THE FOLLOWING GUIDELINES APPLY TO THE USE OF AUTOMATION

1. Minimum autopilot engagement altitude for all takeoffs is iaw GOM Ch 9 C071 AUTOPILOT MINIMUM USE ALTITUDE/HEIGHT (MUH) or the AFM for a specific operation, *whichever is higher*.
2. If the autopilot is engaged, mode selections are made by the pilot flying (PF).
3. If the PF is flying the airplane manually, the pilot monitoring (PM) will perform the mode selection and other settings at the direction of the PF.
4. Briefings should include discussion of automation duties, responsibilities and modes to be used.
5. If any auto-flight system is not operating as expected, it should be disengaged immediately.

[1] If equipped.

6. If the crew begins to feel rushed or overloaded by programming tasks, a lower level of automation should be selected.
7. Pilots should maintain awareness of changes in automation status through verbal callouts. Closed-loop communications greatly enhance mode awareness.
8. No FD/AP mode or Altitude Pre-Selector (ASEL) setting should be changed without the knowledge and verbal confirmation of both pilots.
9. All changes in FD/AP lateral and vertical mode selections should be verbalized to maintain mode awareness; for example, call out "vertical speed," "LNAV," or "heading" whenever the mode is selected or armed. The mode change should be called out regardless of whether the change is automatically or manually selected.
10. Pilots continuously must compare the performance of the auto flight systems with the desired flight path and performance of the aircraft. The PF has direct responsibility for the flight path. This responsibility cannot be delegated to an automatic system.

10.2.2. PRIOR TO ENGAGING NAV MODE OR AUTOPILOT

The PF **and** the PM will confirm that Navigation Information on the PFD is logical; the FMS taking us the correct way?
When the PF requests (L)NAV, the PM will confirm and respond **"LOGICAL"** then **"(L)NAV".**

10.2.3. FMS AND SIDS – HONEYWELL FMS

Due to the way the referenced Honeywell FMSs listed in the below table fly departure procedures that are initially defined by a **heading** (for example, fly runway heading to 3,000 feet) as a **track**, there may be a difference in ground track from other aircraft.

Equipment Model or Aircraft Identification	**Part Number and/or Load**
FMZ-2000: NZ-2000/NZ-2010/IC-615/IC-800/IC-810/IC-1080	7018879-XXXXX (all NZ versions) 7017000-XXXXX (all NZ versions) 7017300-XXXXX (all NZ versions)
Dassault F2000 DX/EX/LX/S	EB7036889-XXXXX (All Certifications)
Dassault F7X	EB7034843-XXXXX (All Certifications)
Dassault F900 DX/EX/LX	EB7036889-XXXXX (All Certifications)
Gulfstream G350/G450	EB7031236-XXXXX (All Certifications)
Gulfstream G550/G500-5000	EB7031236-XXXXX (All Certifications)
Textron Hawker 4000	EB7030192-XXXXX (All Certifications) EB60000578-XXXX (All Certifications)

For standard instrument departure (SID) or other database departure procedures that begin with "Fly Heading 123", the Honeywell business and general aviation (BGA) FMS flies the indicated heading as a track, rather than holding the assigned heading. For example, if the SID reads "**Fly Runway Heading** to ...", the FMS will fly the **runway track** straight out (no drifting left or right due to crosswind) and the *actual heading flown may not match the procedure heading, depending on the actual wind*. This will cause the aircraft to fly a different ground track than aircraft that are either flying the procedure manually or are equipped with an FMS that flies the actual heading. These effects become greater with stronger crosswinds and when the distance the heading is flown is longer.

It is recommended that pilots should be vigilant for aircraft conducting RNAV departures on nearby parallel runways that are properly flying a heading while your aircraft is tracking a course.

Operations during high crosswind conditions on extended track legs may inappropriately reduce aircraft separation, and pilots should manually intervene and fly *heading* (not LNAV) to avoid any potential traffic conflicts.

10.3. WORKLOAD DISTRIBUTION – FMS/AUTOPILOT

It is imperative that both crewmembers are synchronized at all times. This is normally achieved through Common Strategy, SOPs and briefings. In simple terms, the PF flying should always let the PM know what the intent is through navigational paths set in the FMS and through briefings.

The standard "mode of operation" is during;

10.3.1. AUTOPILOT OFF / HAND FLYING:

1. The PF will handle the Yoke and the Thrust Levers primarily. If a target EPR setting is needed the PF may ask the PM to set this. The PF is still, however, the primary navigator and aviator of the aircraft.
2. The PM will typically set all panels (FD panels, MCU/FMS, Gear, Flaps etc), communicate and run checklists. The PM is the Flight Path Monitor to ensure that the briefed plan is progressing as intended.

10.3.2. AUTOPILOT ON:

1. The PF Navigates (through Flight Guidance Panel or MCDU) and controls all modes of the autopilot.
2. The PM monitors that the flight is progressing as briefed. The PM is also the primary communicator, checklist reader and maintains the flight/nav-logs. The PM is theFlight Path Monitor to ensure that the briefed plan is progressing as intended.
3. The PM will set the Altitude Pre-select as discussed in "Altitude Assignment".

10.4. AREA NAVIGATION SYSTEM OPERATIONS

The following policies apply to all area navigation system (FMS) operations:

1. Prior to flight, the PIC will crosscheck the FMS routing against the ATC clearance. This step is to ensure the complete and accurate programming of the FMS. Particular attention shall be paid to any fix that defines a course change.
2. During periods of high cockpit workload, the PM will execute all FMS inputs. All FMS inputs will be verified by a crosscheck of the Flight Mode Annunciator.
3. Pilots should maintain proficiency in programming and operating their aircraft's area navigation system. Initial and recurrent training will include use of FMS/GPS for departure, enroute, arrival, holding, approaches and missed approach operations.
4. In the event of a discrepancy between a charted airway or procedure and the FMS database, the chart is the final authority. It is the responsibility of the crew to ensure that the FMS guidance conforms to the chart.
5. Aircraft must remain on published routes when operating in non-radar terminal environments. Approaches must begin at an IAF and include the full procedure.
6. For departures, arrivals and approaches, appropriate charts will be out of the flight kit, opened and available. During the enroute phase of flight, supporting documents should be readily available.
7. Bearing and distance between each waypoint on the MCDU should be verified by crosscheck of charted information or in the case of Oceanic Lat/Lon waypoints, by

crosscheck of the computer- prepared flight plan. Due to the differences in magnetic variation models, small differences in magnetic courses are acceptable.
8. Both pilots should not become involved with area navigation system tasks simultaneously during high workload periods, such as departure and approach. Complete as much programming as possible during low workload phases of flight.
9. Prior to engaging LNAV and/or VNAV, both pilots should have a clear understanding of the lateral and vertical paths constructed by the FMS. Never couple the FD to the FMS unless the active leg and any associated altitude constraint on the MCDU have been reviewed.
10. The EFIS map display should have the active waypoint visible during departure and descent in order to provide effective position awareness. If an active waypoint is "off-scale" on the EFIS map, the crew should verify its position by reasonableness of bearing and distance and/or checking another source such as the chart or computer flight plan. When available, raw data should be tuned and displayed to maintain position awareness on long "direct" legs.
11. When ATC issues close-in changes to route or runway, raw data should be tuned and displayed first. Reprogramming of the FMS should not be attempted unless it can be accomplished in accordance with department policies on waypoint entry, review and confirmation. Raw data VOR, ILS and ADF displays should be used in the traditional manner whenever necessary.

10.5. FMS APPROACH OPERATIONS

FMS approaches demand high levels of crew knowledge, skill and proficiency. Situational awareness, briefings and communication are critical to safe operations. Initial and recurrent pilot training must support and test these requirements.

1. Crews should use all available radio navaids, but also should endeavor to navigate using identical navigation displays provided the state has certified the procedures for GPS or FMS operations. GPS[1] is approved for approach operations only in countries compliant with WGS-84 survey standards.
2. FMS programming for the IAP and the approach briefing should be completed prior to arrival into the terminal area, preferably prior to descent. The FMS/MCDU should be examined to confirm that all waypoints and course/distances contained in the database procedure, including the missed approach, conform to the printed chart. The approach chart is the final authority.
3. The PM selects the database Instrument Approach Procedure (IAP), programs the FMS, reviews the entries and modifications with the PF. Review should include crosscheck of individual leg course/distance as well as the vertical constraint and descent angle at each waypoint.
4. Proper setting of the Altitude Preselector (ASEL) is critical to VNAV approach operations. Incorrect settings of the ASEL may result in unintentional descents when VNAV is engaged. The PM will set the ASEL as requested by the PF. Both pilots will confirm all settings verbally.

[1] In these airplanes, the “GPS” is a nav-sensor and not a navigational computer. The FMS performs this task.

10.6. DISPLAY AND MONITORING REQUIREMENTS

10.6.1. APPROVED GPS OVERLAY AND ALL GPS/FMS STANDALONE PROCEDURES

Both pilots display FMS on EFIS/HSI. Available raw data is monitored with RMI indications.

10.6.2. OTHER PROCEDURES (INCLUDING NON-U.S. IAP'S)

The PF may display and fly FMS on the EFIS/HSI. The PM must display and monitor raw data on the cross-side Course Deviation Indicator (CDI). Display of RMI indications alone is not adequate. Any deviation from the raw data CDI should be called out immediately by the PM. Raw data is the final authority.

10.7. VNAV FOR NON-PRECISION APPROACHES

VNAV can facilitate a stabilized, constant descent during non-precision approach operations. The stabilized descent is preferable to the traditional "dive and drive" descents previously associated with non- precision procedures.

1. Pilots should be mindful that the VNAV path is based upon barometric air data, and unlike an electronic glideslope, a VPATH is susceptible to corruption by altimetry errors. Also, it is critical to understand that descents below the MDA **must** be conducted visually, as obstacle clearance is not provided by the VPATH indication below MDA.
2. ARINC 424 database coding is used in the FMS to construct VNAV descent paths. The path characteristics vary, depending upon the design of the IFR procedure and most significantly, the location of the missed approach point (MAP) specified by the government source (chart).
3. Pilots must be familiar with the FMS vertical path for each type of missed approach waypoint and know that some database coding may result in a vertical path that is unsuitable for approach operations. In those cases, VS or other vertical mode should be selected.
4. While VNAV "guidance" often is displayed below MDA, it provides **no guarantee of obstacle clearance**. VASI/PAPI and other visual references should be used to establish and maintain a stabilized descent to the runway. **Following VNAV guidance below MDA in IMC is never permitted.**
5. When VNAV database coding provides a useable path, it is preferable to fly the non-precision approach using VNAV for vertical guidance; however, the crew must make the decision to land/go-around slightly prior to reaching MDA. If the required visual references required by FAR are not present upon reaching MDA, a missed approach climb is required. FMS guidance is used for the missed approach climb, consistent with the policies of prior review and final authority of the charted procedure.
6. Crosscheck of distance to TOD and VNAV indications is required prior to the FAF; VNAV should not be used if indications disagree by more than a half of a dot between sides.
7. Altitude pre-selector (ASEL) is set to MDA until visual references are established and then set to zero for landing.
8. A Missed Approach climb is started immediately upon reaching MAP if not visual. Capture of the ASEL altitude calls for a Missed Approach. The ASEL quickly should be set to the Missed Approach altitude.

10.8. MISSED APPROACHES

1. PF toggles the TOGA button, then calls, "Missed approach, Set Max Power, Flaps (go-around setting), LNAV.[1]"
2. PM re-engages LNAV upon call from PF for lateral missed approach guidance. ASEL is reset to Missed Approach altitude. Gear is retracted and remaining climb checklist is completed.

[1] As appropriate for make, model, series.

11. CHECKLISTS AND FLOW-PATTERNS

11.1. GENERAL

As an Aircraft Management Company, and not an aircraft owner, the Rennia Global checklists will include all elements in the manufacturer's checklist. The sequence of system operations will be the same while company added "housekeeping" items may be placed in the most logical place.

The use of flow patterns during aircraft operation is an integral part of Standard Operating Procedures. During each phase of flight, checklist items will be accomplished with the use of flow patterns; the crew will then confirm that each item has been properly accomplished through the use of the Rennia Global checklists for normal operations and the manufacturers Emergency or Abnormal Checklist.

It is also recognized that if a pilot chooses to call for a checklist as a "read and do" to prompt the sequence of action in lieu of a flow, this is acceptable. The goal is that the aircraft is operated by a formalized process (checklist) and not by relying on memory.

Checklists should be initiated by the PF. However, good airmanship requires that when initiation of the checklist has been overlooked, the PM should call for the appropriate checklist.

In Air Carrier operation with CVR, aircraft configuration items (gear, flap, speed brakes) and "Checklist Complete" will be audible on the CVR (not silent).

While executing the checklist, the PM reads each checklist item and the response out loud. Items, which are the responsibility of the PF, are validated as accomplished and the PF responds verbally also. (Challenge – Response) These items are denoted in the checklist by an asterisk (*). Upon completion of a checklist the PM shall state "_______checklist complete" thus keeping the PF in the loop, maintaining and enhancing situational awareness.

Checklist item responses listed "As Required" will have actual switch/lever/button position as the response, i.e. *Galley Power As Required*, will be responded as either *ON or OFF*.

Other than Before Landing Checklist, flows and profiles should be designed so that no checklist is required below 5,000' HAA since Flight Path Monitoring is the PM's primary function.

11.2. PERFORMING PAPERWORK TASKS

Paperwork of any kind may only be accomplished in cruise flight, during periods of low workload and low traffic levels. When one pilot is engaged in the completion of paperwork, the other pilot must be at his station with his undivided attention focused on controlling the aircraft.

11.3. CHANGE OF AIRCRAFT CONFIGURATION

The PF shall make the PM/FPM aware of any changes in the aircraft configuration prior to initiating any change. Examples of such changes include but are not limited to:

1. Speed Brake Extension,
2. Use of De/Anti Ice Systems
3. Fuel Transfer and/or Fuel Cross-Feed.

Additionally, the placement of any switch whose incorrect movement, or movement of the wrong switch, may induce system failure or other undesired effect, shall not occur without both crewmembers concurrence (FPM) that it is the proper switch, and that following its movement the desired effect is observed. Good crew coordination is the cornerstone of a professionally managed cockpit, and every effort shall be made to keep both crewmembers synchronized.

12. BEFORE START

Normally the SIC will accomplish the cockpit set up and before start checklist; when time permits the PIC should review the checklist items to insure all items have been completed.

It is recommended that the PF give the takeoff briefing at this time.

12.1. FINAL AICRAFT CHECK

See TRIP CAPTAIN'S FINAL CHECK BEFORE ENGINE START

12.2. FLIGHT FOLLOWING CALL

Prior to starting engines, notify **Flight Following (Ch 5)** that aircraft door is closed, and passengers are on board.

> **NOTE:** When operations are conducted in conditions conducive to the formation of ice, snow, and frost, etc. the pilot in command must check the aircraft surfaces to verify no contaminants are present iaw Chapter 15.

13. ENGINE STARTS

Before starting an engine, each crewmember will occupy their respective seats, and the area shall be cleared visually. A ramp “start guard” is desirable and shall be utilized whenever possible.

13.1. AFTER START

The PF completes the after-start flow. The PM observes, and then completes the checklist. The PF will give a pre-taxi/departure briefing that includes the expected taxi route and restrictions. The PM shall request taxi clearance. Both pilots will monitor the frequency when initial taxi clearance is called for to ensure that both pilots hear the taxi clearance. After taxi clearance has been received, the crew will agree on the runway assigned, any restrictions, and the taxi route. Crews will have the taxi chart out and accessible for all ground movements GPS generated symbols on IFIS or other EFB’s will not be used as the primary means of navigation on the ground.

13.2. COCKPIT USE OF CELL PHONES AND PDA’S

13.2.1. PRE-ENGINE START

Cellphone and/or PEDs may be used as required.

13.2.2. POST ENGINE START

To prevent the potential distractions associated with crewmembers leaving their cell phones or iPhones in the ON position during critical phases of flight, the following procedure will apply to all Rennia Global flight operations:

The use of cell phones and iPhones in the cockpit is authorized only when the airplane is either parked at the gate or is parked in a designated holding area. At no time will the use of these devices be permitted in flight or during taxi operations. All cell phones and iPhones will be placed in the OFF position after the initial call to Flight Coordination is made prior to departure, and prior to commencing taxiing. If, after being informed of a delay and placed in a designated holding area, a call is made to inform Flight Coordination, caution must be exercised to ensure that the cell phone or PED is placed in the OFF position prior to aircraft movement.

14. TAXI FOR TAKEOFF

14.1. SAFE GROUND OPERATIONS

Taxiing of aircraft is considered a critical phase of flight due to the many distractions and high frequency of changes. It is imperative that the crew;

1. Review airport layouts as part of preflight planning, during cruise, before descent, and while taxiing,
2. Know and understand airport signage,
3. Read back all runway crossing and/or hold short instructions,
4. Review Notices to Airmen for runway/taxiway closures and construction areas,
5. Request progressive taxi instructions when unsure of the taxi route,
6. Check for traffic before entering any runway or taxiway,
7. Turn on aircraft lights while taxiing,
8. Clear the active runway on rollout as quickly as possible, then wait for taxi instructions before further movement,
9. Study and use proper phraseology found in the Aeronautical Information Manual when responding to ground control instructions.

14.2. TAXI

Both pilots shall occupy their respective seats before the aircraft moves on the ramp. The PF (left seat) shall control the aircraft during all phases of the taxi. Flight crews will observe "sterile cockpit", especially while taxiing. When cleared to taxi, the brakes should not be released until both pilots have visually cleared the area of obstructions. Each pilot shall state "clear left / clear right" as appropriate. Brakes and steering should be checked as soon as possible during taxi. Tests and checks to be accomplished during the taxi should be accomplished using a flow pattern, with both pilots maintaining a high level of vigilance.

The PM shall complete the checklist following completion of the flow pattern. Taxi clearances must be read back using standard phraseology; the read back must include the runway assignment and any other instruction that requires the pilot to taxi on, hold short of, taxi across, or near a runway. This procedure will be repeated following any ATC frequency changes made during ground operation prior to receiving clearance for takeoff. Both pilots shall have the airport diagram out, available, and in use. Crosscheck the heading situation indicator, airport diagram, and airport signage to confirm aircraft position while taxiing.

A "Hot Spot" is a runway safety related problem area or intersection on an airport. Typically, it is a complex or confusing taxiway/taxiway or taxiway/runway intersection. A confusing condition may be compounded by a miscommunication between a controller and a pilot and may cause an aircraft separation standard to be compromised. The area may have a history of surface incidents or the potential for surface incidents. This may be due to any mix of causes like Airport geometry, Ground traffic flow, Markings, signage, or lighting or Human factors. Hot Spots must be briefed prior to taxi.

During taxi operations both pilots shall monitor the assigned ATC frequency. Prior to crossing a runway both pilots must be in agreement that a clearance to cross has been received. When approaching a runway for crossing, any non-monitoring tasks such as Checklists, FMS programming and company radio calls shall be discontinued until safely on the other side.

14.3. HEADING-BUG DURING TAXI

When the runway assignment is received the heading-bug will be placed on the runway heading as depicted on the Jeppesen 10-9 chart (nearest degree).

15. DESIGNATION OF PF AND PM

[EOD 80]

As early in the flight preparations as possible. The PIC will designate the PF. Conditions which may affect the decision can be:

15.1. GENERAL CONSIDERATIONS

Although all pilots are qualified by training and checking, at time, experience may be a factor in choosing who will perform PF and PM duties. The PIC may consider the SIC's experience in combination with crosswind component, runway contamination and complexity of departure on choosing who the PF is.

The PIC may also choose to start with the SIC as the PF to later become the PF by POSITIVE TRANSFER OF CONTROLS

15.2. C079 IFR LOWER THAN STANDARD TAKEOFF MINIMA

SIC must, to perform the takeoff as PF, have more than 100hrs in specific make and model aircraft.

15.3. EOD 80 CONSIDERATIONS

1. Landings at the destination airport when **80% landing performance data is used; and** in any of the following conditions:
   - 1.1. The prevailing visibility for the airport is at or below 3/4 mile.
   - 1.2. The runway visual range for the runway to be used is at or below 4,000 feet.
   - 1.3. The runway to be used has water, snow, slush, ice, or similar contamination that may adversely affect aircraft performance.
   - 1.4. The braking action on the runway to be used is reported to be less than "good."
   - 1.5. The crosswind component for the runway to be used is more than 15 knots.
   - 1.6. Windshear is reported in the vicinity of the airport.
2. Any other condition in which the pilot in command determines it to be prudent to exercise the pilot in command's authority.

16. TAKEOFF CREW BRIEFING

It is essential that a thorough briefing by the PF precede each take-off and approach. The following information pertains to standard Rennia Global, Inc. briefings. The first flight of the day will include the standard take off briefing plus additional elements particular to that flight. Subsequent briefings will only include the elements particular to that takeoff and it will be assumed that the conditions of a standard briefing will apply. The following is a general discussion of the takeoff and approach briefings. For the briefings specific to a particular aircraft, refer to the appropriate appendix of this manual.

16.1. STANDARD TAKEOFF BRIEFING:

This briefing must be completed prior to contacting the controlling facility for takeoff clearance:

1. Prior to 80 kts (this value will differ between various aircraft types) the takeoff can be aborted for any item.
2. Between 80 kts and V1 the take-off will only be aborted for an engine failure, a fire, loss of directional control, or a thrust reverser deployment. (A loss of directional control is defined as both main wheels on the same side of the runway centerline.)
3. Either pilot may call out an abort item.
4. Any malfunction after V1 will be considered an "airborne emergency" and addressed only after the aircraft is safely in the air. "Immediate action" items will be accomplished in a timely manner and the appropriate checklist completed only after the aircraft is at least Acceleration Altitude per APG Genesis.
5. The PF will continue to control the aircraft unless the PIC determines, for reasons of flight safety, it is necessary to assume control of the aircraft.
6. In the event of a thrust reverser deployment after V1, the following general procedure will be used. For the specific procedure, refer to the specific aircraft appendix:
   - 6.1. Recognizing pilot will call "(Left or Right) Reverser."
   - 6.2. PM will retard the throttle of the offending engine and complete the emergency stow procedure for the offending reverser.

16.2. LEG PARTICULAR TAKEOFF BRIEFING

The following items must be discussed prior to each takeoff:

1. Power setting, V-speeds and flap setting.
2. Runway required, runway available, and runway surface condition.
   - 2.1. Runway contamination or precipitation
     - 2.1.1. Ensure FMC Perf Computer and Ice-Protection is synchronized or a config failure may take place.
   - 2.2. Static or rolling takeoff.
3. Departure plan for:
   - 3.1. Initial heading, altitude, and airspeed restrictions.
   - 3.2. SID Compliance
   - 3.3. Automation Failure (manual SID Compliance)
   - 3.4. Engine Failure Navigation Plan (DP etc)
4. Flap Retraction Altitude / Level-Off Altitude (per APG)

5. On course heading or first IFR fix.
6. Emergency plan including alternate destination if required.
7. Any deviation from the SOP required due to a particular situation.
8. Any planned deviation due to adverse weather.

16.3. DEFENSIVE TAKEOFF PLAN

During Takeoff and Initial Departure **three** (or more) plans should be reviewed:

Normal Departure	Defensive Flying / Flight Path Monitoring	
	Navigation Failure	Engine Failure after V1
The briefed departure.	A plan if the 1st navigational fix or altitude does not work; What is the plan for detection by PF and/or PM/FPM and what is the backup procedure. Eg: SID "at 700', turn right heading 320" LNAV fails to turn, what is the early detection and backup method (ie HDG Mode). Establish PM/FPM priority	The goal is for SID and DP to be the same lateral flight path. How will we convert to the APG DP, notify ATC of Emergency and New Emergency Route etc? Depending on the complexity of the SID vs the DP a Strategy must be briefed.

17. PRE-TAKEOFF CONTAMINATION CHECK

Verify aircraft is free of contaminants (ice) as required.
Engine clearing procedures designated for each aircraft will be requested (high power/N1) and conducted prior to takeoff if conditions conducive to the formation of ice, snow, and frost, etc are present. See Chapter 15

18. HOLD SHORT LINE

Experience shows that modes set prior to taxi may no longer be in effect by the time the aircraft arrives to the runway. Just prior to entering the runway -

1. The **PF** will re-confirm the FMS and announce all critical waypoints and crossing altitude(s) on the SID or Clearance for the departure.
2. The **PM** will confirm.
3. **Both pilots** will re-verify the FD flight modes, ie (TOGA/HDG/NAV/TO/PITCH/VS).

19. TAILWIND TAKEOFFS

If a tailwind takeoff is planned, the following considerations must be taken:

1. Instantaneous Low Wind will NOT be utilized.
2. The highest tailwind velocity (tailwind component) must be used in performance calculations.[1]
3. Reported gusty winds is an indication of potential tail-wind windshear.

20. POSITION/LINE-UP

The PM completes the LINE-UP checklist items using the flow. His actions are observed by the PF. The PM then completes the POSITION/ LINE-UP checklist. Once the aircraft is in position for takeoff and before the power levers are advanced for takeoff, the PF will verbally announce the runway in use and the heading of the aircraft.

20.1. BOTH PILOTS WILL CONFIRM:

1. The runway, runway heading and heading bugs all agree and then announce "*check*" to confirm heading and runway agree.
2. Confirm that the Flight Director is level to agree with correct runway heading. The FD is now in the correct lateral mode to assist in the event of an engine failure.
3. Confirm appropriate FD modes (lateral and vertical) as specified for the aircraft in this chapter.

20.2. LIGHTS

When entering a runway after being cleared for takeoff, or when taxiing into "Line Up and Wait", make your aircraft more conspicuous to aircraft on final behind you and to ATC by turning on lights (except landing lights) that highlight your aircraft's silhouette. Maximum external lighting should be used on all take-offs to provide the highest visibility to other aircraft in the vicinity. Aircraft equipped with pulse lights should have pulse selected for take-off and landing. Care should be given to certain aircraft when using landing lights as the temperature of the light may damage the light lens during prolonged usage.

Aircraft Lights requirements is discussed in Chapter 8.

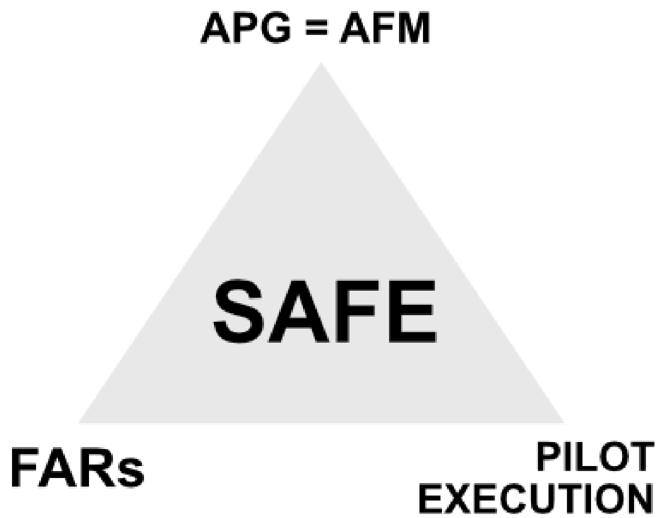
21. NADP1 ICAO NOISE ABATEMENT DEPARTURE CLIMB

See discussion in Ch 6 NADP1 ICAO NOISE ABATEMENT DEPARTURE CLIMB

[1] All aircraft accidents involving windshear has been a tailwind (loss of performance) windshear.

22. DISCUSSION ON 2ND SEGMENT CLIMB CONFIGURATION

22.1. PERFORMANCE DISCUSSION - GENERAL



FAR 135.379 requires any "Person Operating" to use the AFM to calculate the takeoff weight which allows:

1. Accelerate to V1 And Stop – Aborted Takeoff
2. Accelerate to V1, Lose an Engine and Continue the Takeoff – Accelerate Go (Although engine loss is assumed at the worst time it may take place any time during the takeoff profile).
3. Clear Any Obstruction Vertically or Horizontally in a Plan Created Prior To Takeoff Roll.

Continuing with the enroute performance requirements and arrival regulations, we transition ***takeoff performance*** to ***enroute performance requirements*** when you achieve an altitude of:

1. MEA
2. MOCA
3. MSA
4. And most commonly, MVA by the statement "**Radar Contact**".

> NOTE: ATC does not know the performance capability of your airplane and may issue a climb clearance requiring a steeper climb that your airplane's capability. See minimum altitudes on airways, e.g.: MEA, MOCA etc. in the AIM and Instrument Flying Handbook.

Thus, the goal of the takeoff profile is to transition the aircraft from the commencement of takeoff roll to one of the above obstacle-protected airspaces, at which time you may transition to the enroute obstacle plan. This still does not mean that the aircraft is capable of a continuous OEI climb throughout changing MEAs.

22.2. APG PERFORMANCE PLANNING

Typically, APG Genesis will climb the aircraft into the enroute segment directly but may have to end the takeoff in an obstacle protected holding pattern where a climb may take place (eg.: ASE LINDZ.)

When the enroute route structure commences at an altitude below completion of a normal takeoff (eg: KTEB RWY 24 RUDY SID) and SIDs stops your climb below ACCELERATION ALTITUDE, a transition to the 4th segment (or enroute configuration) may commence at a lower altitude than the standard takeoff profile.

When the area is noise sensitive (eg.: KTEB RWY 24 RUDY SID after 10pm) it is beneficial to level at the published altitude and reduce power by maintaining the lowest safe airspeed (V2 or Vfto) in the takeoff profile and thus passing the noise sensors at minimum power before the aircraft is accelerated and configured for enroute climb.

APG Genesis does not "invent" or design, but merely follow the Performance Chapter in the aircraft's AFM. APG Genesis meets the regulatory requirements of 135.379 and best industry practices described in AC 120-91. The best payload is achieved by keeping the aircraft in the 2nd segment configuration for as long as the engine can maintain its certificated takeoff power setting.

1. For a "5 minute at MTOP" engine, the acceleration altitude is commonly between 400'(min) to 1000' above the takeoff runway (HAA). This provides a higher takeoff weight than a forced fixed Level Off Altitude.
2. By using an aircraft w suffix **8** the Level Off Altitude has been fixed to 800' HAA to match with standard noise profiles like NADP1 or NBAA Noise Profile (eg: N954MB**8**).
3. For a "10 minute" engine, the Level Off Altitude is typically 1500' above the takeoff runway. (eg N40VC & N535V)
4. The Rennia Global APG Genesis subscription manages these calculations for best MTOW.

NOTE: FAR 61 training programs commonly executed by the 142 vendors for 91 operators do not require obstruction clearance and therefore 142 vendors commonly do not promote Air Carrier requirements quoted above.

Thus, following the APG GENESIS profile makes the "Person Operating" compliant with the FARs. The "Person Operating" is a combination of:

- Rennia Global (certificate) and Management providing a system for compliance.
- Each and every Pilot operating for Rennia Global complying with the system.

22.3. FLAP SETTING

Rennia Global does not dictate a specific flap setting. The optimal flap setting for Pay Load should be used.

Greater flaps typically yield better Accelerate Stop performance, lower tire speeds and may be beneficial with field length limited takeoffs. Depending on the airplane's thrust to weight ratio, takeoff with flaps may have a lower climb gradient than a lower/no flap setting.

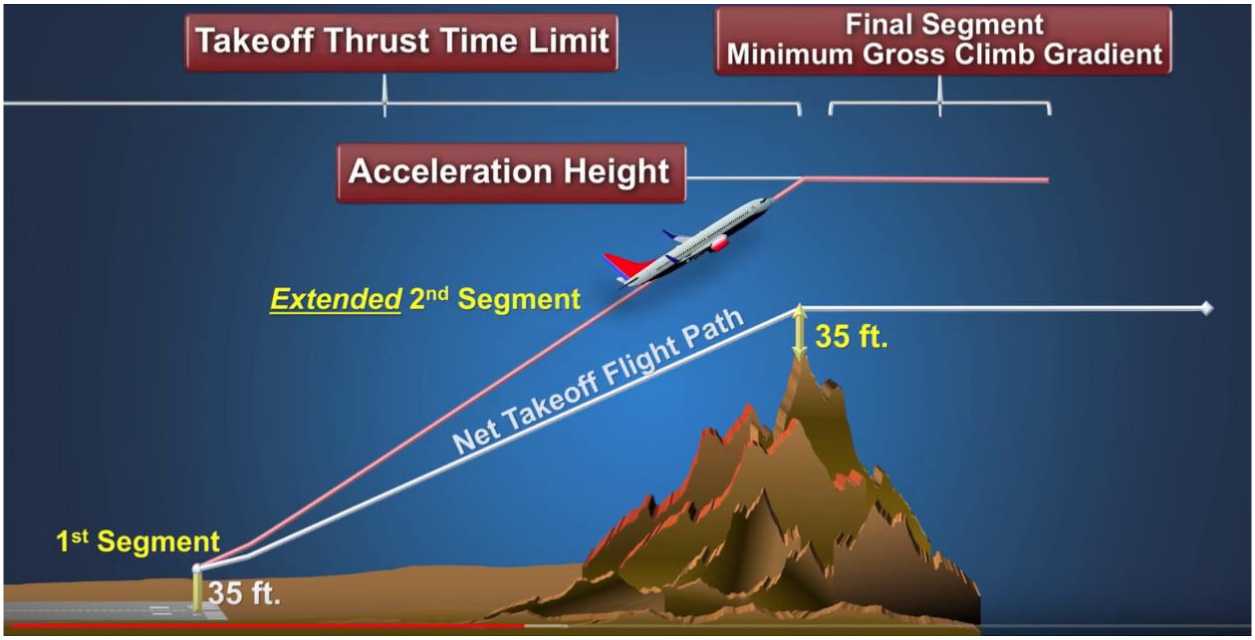
The acceleration segment from a V2 with flaps to Vfto for flap retraction is, in the AFM data, a no-climb segment. Thus, the overall climb gradient is greatly reduced, but may deceivingly be presented in greater vertical rate (VSI) in the cockpit.

Statistically, there is a higher chance of aborting a takeoff rather than losing an engine at V1. It may be beneficial to add runway margin by using flaps rather than a no-flap takeoff. In any case, calculations in APG Genesis provides the limiting weight.

22.4. CLIMB GRADIENT VS RATE

High Climb Gradient at low forward Ground Speed may be mistaken by a higher Climb Rate covering much greater distance for altitude gain (approaching an obstacle at greater ground speed).

22.5. EXTENDING THE 2ND SEGMENT



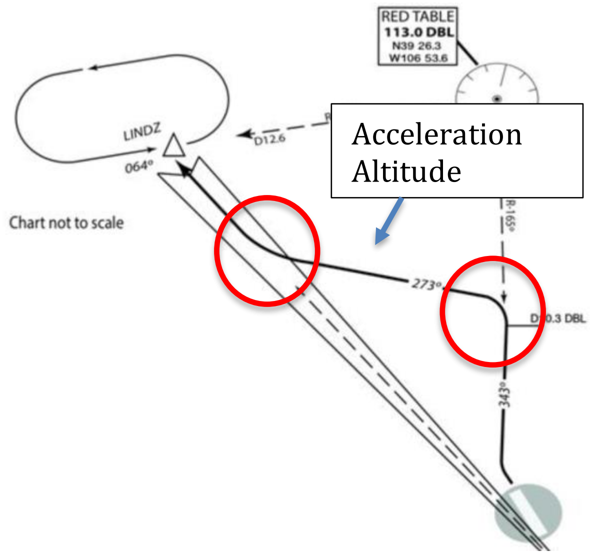
2nd Segments may be flown with or without flaps (as calculated and planned) but is at a defined airspeed (V2) yielding a defined climb gradient and turn radius for turning obstacle clearances.

In a "5 minute" engine equipped aircraft, a higher payload is achieved in the AFM performance data by **not** accelerating[1] the aircraft at the lowest possible altitude of 400' above the runway but utilizing the available rated engine power and continuing the 2nd segment climb for a long as possible without exceeding the engine rating's time limit.

If an aircraft is equipped with APR (automatic power reserve) a credit for the automatically added power during an engine is allowable.

[1] During the 3rd segment while accelerating from V2 to Vse/Vfto the rate of climb is reduced and the overall climb gradient is also reduced.

If FLEX Power is used, the correct application of such procedure still assures obstacle clearance. Optionally, the engine may be increased to the rated takeoff power.



APG Genesis published the ACCELERATION or LEVEL OFF altitude (in MSL) to transition the aircraft from the 2nd segment configuration to the 4th segment.

During a DP or Turn Procedure, the Acceleration Altitude also changes the speed which is used to comply with a required **turn radius for obstruction protection**. As a pilot, you know the speed needed in the turn by simply being below Acceleration Altitude (V2) or above Acceleration Altitude (Vfto).

A premature acceleration and flap retraction negate all performance calculations.

22.6. THE BENEFIT

Complying with the described profile sets the aircraft up to be able to clear the obstacles *regardless of an engine failure in any segment*. **It sets you up for success!**

23. AFTER TAKEOFF

Upon departing 3000 FT AGL, or when out of congested airspace, the PF calls for the After-Takeoff Checklist. The flow pattern may be used by the PM, and monitored by the PF. The checklist is then used to confirm all items have been completed.

Note: Observe CH 9 C071 and AFM Limitations.

24. ABNORMAL / EMERGENCY PROCEDURES

Upon recognition of an abnormal or emergency condition by any crewmember, the PIC verbally designates which pilot is responsible for flying the aircraft, and then calls for the appropriate checklist to be accomplished. The pilot designated to fly the airplane (PF) does not perform tasks that compromise his responsibility, regardless of whether the PF is using the autopilot or flying manually.

Emergency situations requiring immediate corrective actions, identified in the respective checklistas memory or recall items, are accomplished without reference to the checklist. All other abnormal and emergency procedures should be accomplished by reference to the printed checklist. Pilots, however, are expected to be thoroughly familiar with each checklist procedure.

Abnormal and emergency checklists should be accomplished so that the pilot reading the checklist states both the challenge and response when the item is accomplished. When a checklist procedure calls for the movement or manipulation of controls or switches critical to the safety of flight, the pilot performing the action obtains verification from the other pilot that he is moving the right control or switch prior to initiating the action.

Any checklist action pertaining to a specific control or switch, which is duplicated in the cockpit, should be read to include its relative position (i.e. left power lever, left ignition).

In the event an emergency landing should become necessary, the crew will complete the appropriate checklist prior to touchdown. Once the aircraft has stopped and subject to the Captain's discretion the First Officer will go to the cabin and assist with passenger evacuation, life rafts, etc. The Captain will secure the cockpit and then assist passengers as required. Post impact duties should be carefully detailed prior to touchdown.

Chapter 10 of this manual provides guidance for the more common situations.

24.1. TIME CRITICAL SITUATIONS

In time critical situations, three actions must be performed:

1. Maintain aircraft control – FLY THE AIRPLANE FIRST!
2. Analyze the situation – RECOGNIZE THE CHALLENGE AND PRIORITY
3. Take appropriate action – RESPOND

A malfunction during a critical phase of flight should be announced by the observing crewmember. As time permits, the other crewmember should make every effort to confirm / identify the malfunction before initiating emergency action.

On takeoff, for example, the PM usually is the first one to observe any indications of a critical failure. Upon observing such indication, he simultaneously announces and identifies the malfunction graphically to the PF by pointing to the indicator / annunciator.

Upon verifying the malfunction, the PF announces confirmation of the failure and commands accomplishment of the appropriate checklist memory items while monitoring the PM in his tasks. Note that the takeoff abort maneuver may be called by any crewmember. The PM announces "ABORT!" and the PF executes the abort procedure.

25. WIND SHEAR ON TAKEOFF AND INITIAL CLIMB

Horizontal and/or vertical Wind Shear on takeoff result in sudden loss of airspeed and/or reduction in climb rate, with potentially disastrous consequences. It is vital that such conditions should be quickly recognized if they are encountered, and that pilot response should be immediate and correct.

25.1. BEFORE DEPARTURE

Whenever wind shear conditions are forecast or reported for takeoff, pilots should include in their departure briefing the following wind shear awareness items:

Assessment of the conditions for a safe takeoff based on:

1. Most recent weather reports and forecasts;
2. Visual observations; and,
3. Crew experience with the airport environment and the prevailing weather conditions; and,
4. Consideration to delaying the takeoff until conditions improve."
5. Select the most favorable runway, considering the location of the likely wind shear/downburst condition;
6. Select the minimum flaps configuration compatible with takeoff requirements, to maximize climb-gradient capability;
7. Use the weather radar (or the predictive wind shear system, if available) before beginning the takeoff to ensure that the flight path is clear of hazards;
8. Select maximum takeoff thrust for temperature;
9. After selecting the takeoff/go-around (TOGA) mode, select the flight-path-vector display for the monitoring pilot (PM), as available, to obtain a visual reference of the climb flight path angle; and,
10. Closely monitor the airspeed and airspeed trend during the takeoff roll to detect any evidence of impending wind shear.

25.2. WIND SHEAR RECOGNITION AND RECOVERY

If wind shear is encountered during the takeoff roll or during initial climb, the following actions should be taken without delay:

25.2.1. RECOGNITION

The windshear escape maneuver should be performed whenever the GPWS has given a WINDSHEAR aural warning or whenever the aircraft control becomes marginal below 1000 HAA.

Marginal Aircraft Control may be recognized by ***un-commanded changes in flight*** path in excess of:

1. 15 KIAS
2. 500 feet/min vertical speed
3. 5° pitch attitude
4. Rapid one dot displacement from glideslope

25.2.2. BEFORE V1

The takeoff should be rejected if unacceptable airspeed variations occur (not exceeding the target V1) and if there is sufficient runway remaining to stop the airplane;

25.2.3. AFTER V1

1. Disconnect the autothrottles (A/THR), if available, and maintain or set the throttle levers to maximum takeoff thrust;
2. Rotate normally at Vr; and,
3. Follow the FD pitch command if the FD provides wind shear recovery guidance, or set the required pitch attitude (as recommended in the aircraft operating manual (AOM)/quick reference handbook (QRH));
4. During initial climb:
   - 4.1. Disconnect the auto-throttles, if equipped, and maintain or set the throttle levers to maximum takeoff thrust. If negative performance is experienced, advance to firewall until positive performance is achieved;
   - 4.2. If the autopilot (AP) is engaged and if the FD provides wind shear recovery guidance, keep the AP engaged; or,
   - 4.3. Follow the FD pitch command, if the FD provides wind shear recovery guidance; or,
   - 4.4. Set the required pitch attitude (as recommended in the AOM/QRH);
   - 4.5. Level the wings to maximize the climb gradient, unless a turn is required for APG obstacle clearance;
   - 4.6. Closely monitor the airspeed, airspeed trend and flight-path angle (as available);
   - 4.7. Allow airspeed to decrease to stick shaker onset (intermittent stick shaker activation) while monitoring the airspeed trend;
5. Do not change the flaps or landing-gear configurations until out of the wind shear condition; and,

6. When out of the wind shear condition, increase airspeed when a positive climb is confirmed, retract the landing gear, flaps and slats iaw the Takeoff Climb Profile, then establish a normal climb profile.

26. ENROUTE

26.1. TRANSITION LEVEL

The aircraft will be operated on Flight Levels above the Transition Level and on Altitudes (typically in relations to MSL) below the Transition Altitude.

26.1.1. DOMESTIC

The 18,000' checklist is called for by the PF, and accomplished by the PM utilizing the flow pattern, while monitored by the PF. The checklist is then used to confirm all items have been completed.

26.1.2. INTERNATIONAL

The Transition Level is typically defined for each airport region. It is imperative that this is a part of the takeoff briefing and that the altimeters are adjusted accordingly. When climbing through FL180 the 18,000 checklist is completed. Consult the IOM on Transition Levels.

26.2. CRUISE FLIGHT

For flights over four hours and flights involving extensive over water operations a computer-generated flight plan will be used and carefully monitored.

27. ALTITUDE PRESELECTOR / ALERTER

Upon receipt of clearance to a new altitude, the PM sets the altitude alerter, and points to the altitude window until the PF points and states "CLIMBING / DESCENDING TO____." If an acknowledgement is not received the PM will query the PF. Any discrepancy between what each pilot heard should become immediately apparent, and the correct altitude should be confirmed with ATC.

28. RADIO TUNING AND COMMUNICATION

The PM accomplishes the tuning of the navigation/FMS and communication radios, as well as identification of selected frequencies. FMS entries should be made by the PM during the critical phase of flight or whenever the autopilot is not in use.

Primary ATC communications will be accomplished on the com radio that is associated with essential or emergency bus or the PM will maintain a written log of ATC communication frequencies while in flight. Chapter 9 PRIMARY ATC COMM RADIO details policy on comm radios.

Generally, the PM accomplishes all ATC communications. Exceptions occur when the PM may be engaged in acquiring the ATIS, communicating with an FBO, or on the Flight Phone. In these cases, he will advise the PF, "I AM OFF FREQUENCY" and receive an acknowledgment. He will also advise when "BACK ON". At this the PF will advise the PM of any changes, which occurred. This procedure is also applicable if the PF leaves the frequency.

The PM will check with the PF, or be advised by him prior to changing the PF's NAV frequency or modifying the FMS route.

On an ILS approach, the marker beacon audio will be used to back up the visual annunciator in confirming station passage. Final Approach Fix altitude will be verified verbally.

The Airman's Information Manual / Pilot-Controller Glossary is the standard for terminology and procedures used by Rennia Global. Every effort to maintain highly professional standards shall be made by all flight crews. Crewmembers will also monitor oxygen requirements pertinent to FAR part 135 regulations. Refer to Aircraft Flight manual limitations and FAR 135.157

29. APPROACH AND LANDING

29.1. ATIS WEATHER, RUNWAY AND APPROACH

As early as practical in the descent the PM will retrieve weather by (D)ATIS to establish local weather conditions, runway in use and approach to be expected. After briefing the PF, the crew will decide how to set up the navigation equipment for the arrival. Additionally, performance and V-speeds will be calculated and posted for the approach.

29.2. APPROACH SETUP

It is preferred that the PF sets up and briefs the approach to be flown.

1. Use POSITIVE TRANSFER OF CONTROLS.
2. Load the approach in the FMS and, if applicable, preview the flight instruments.
3. Brief the approach, Flight Path plan and at the same time confirm the FMS waypoints and ILS Frequency (Nav Radios), as appropriate, to include the missed approach.
4. Transfer the airplane back to PF (POSITIVE TRANSFER OF CONTROLS) to allow the PM to get set up.

Any **discontinuities** in the FMS flight plan must be discussed and corrected to provide a continuous flight path all the way through missed approach. The PM will also identify the NAV AID (ILS, VOR or NDB as appropriate) if possible. Otherwise, the PM will perform this task later when in range of the Nav-aid, but prior to the use.

After the PM has loaded the approach, (s)he will ensure the two sides are in sync. Any discrepancy indicates confusion, and it must be resolved.

29.3. APPROACH BRIEFING

The approach briefing shall include the following:

> **Note:** For the approach, these **6 key * points will be committed to memory**. A briefing can quickly become an overload. Thus, a Strategy Discussion is imperative, but only key elements should be committed to memory.

1. Designation of approach in use,
2. Chart number and effective date,
3. Pertinent Notes and Restrictions on the procedure,
4. *Plan for disconnecting the Autopilot. Identify the more restrictive of:
   4.1. Approach Procedures
   4.2. AFM Limitations
   4.3. OpSpec C071 (Ch 9)
5. Nav Frequency,
6. Inbound / Final approach course,
7. Initial approach altitude,
8. *Final approach course intercept altitude,
9. *DA/MDA/MAP,
10. *Expected ALS and use strategy,

11. *TDZE to establish TDZE + 100' (PM needs this for second DA call),
12. Type of approach lighting and activation procedure if pilot controlled,
13. Missed approach procedure,
14. *Initial MAP Heading/Course and Altitude,
15. The appropriate Ref. Speed will be posted,
16. Review of the airport diagram and anticipated runway exit for the taxi route.

By one pilot setting up the approach and the other pilot briefing and reviewing the setup, it will provide checks and balances.

29.4. DESCENT

Upon receipt of the descent clearance to descend below FL180, the PF calls for the DESCENT CHECKLIST. It is accomplished by the PM according to the flow, and monitored by the PF. The PM then confirms all items by the checklist. When flying internationally, the 18,000' checklist and transition level review shall be completed in the same manner when passing the appropriate flight level.

29.5. IN RANGE

Generally, these checks are called for by the PF and completed by the PM around 15,000[1] FT (HAA). The ATIS, when available, will be used to alert the crew as to the approach in use while still in a low workload, low traffic phase of the flight. In so far as possible, this should be completed by 5,000 FT (HAA) or well prior to passing Initial Approach Fix (IAF).

29.6. APPROACH

The appropriate approach aids will be tuned during all approaches (IMC and VMC). The PF and PM will accomplish the cockpit setup of their respective Flight instruments or MFD's at appropriate times during the approach. The PM will maintain a crosscheck of the PF flight instruments and Nav's.

Upon completion of the briefing, and when the PF has completed his review of the Approach, the approach chart or EFB will be readily available to allow both pilots to reference the information and monitor the approach / missed approach throughout the procedure.

1. The PM will announce the fact that both NAV radios are tuned and identified to the appropriate facility.
2. If the #2 radio (VOR/NDB) is used to define a crossing radial, the PF will be advised of that fact, and will be further advised when PM's NAV radio is tuned to the facility defining the approach.
3. When a LOM is available as part of an ILS, the tuning / identifying of this facility will also be communicated to the PF.
4. During precision approaches both pilots will use class 1 navigation. During non-precision approaches one pilot may have long range nav displayed on their MFD.

[1] Flight Path Monitoring Program background data identifies 10,000' MSL +/- to be an Area of Vulnerability and should be avoided.

5. The PF will announce leaving any intermediate altitude, where upon the PM will confirm (referencing the approach plate) that this is the referenced step-down fix, or that the aircraft has joined a published portion of the approach. The altitude pre-selector will be set accordingly.

Upon commencing descent from the FAF when flying an approach to a DA (ILS LPV, LNAV/VNAV), the PM resets the altitude preselector / alerter to the initial level-off altitude of the missed approach procedure[1].

Upon leaving an intermediate approach segment altitude restriction or commencing the descent to an MDA (VOR, NDB, LNAV) the PM resets the altitude-select to the appropriate altitude or minimums for the approach as required.

The PF will brief the use of circling approach when required, to include aircraft weight, configuration, altitude, pattern and the airspeed to be used, etc.

[1] During a FMS Approach, some FD/AP system require that the Altitude Preselector is initially set to TDZE before it will correctly function for the Missed Approach.

29.7. CIRCLING APPROACHES

[AIM 5-4-19 (f)] [TERPS Chapt. 2 - Section 6 – Para. 260]
In some busy terminal areas, ATC may not allow circling and circling minimums will not be published. Published circling minimums provide obstacle clearance when pilots remain within the appropriate area of protection. Pilots should remain at or above the circling altitude until the aircraft is continuously in a position from which a descent to a landing on the intended runway can be made at a normal rate of descent using normal maneuvers. Circling may require maneuvers at low altitude, at low airspeed, and in marginal weather conditions. Rennia Global pilots must use sound judgment; have an in-depth knowledge of the aircraft capabilities and performance to determine the exact circling maneuver. It is imperative that pilot determine the proper aircraft configuration and airspeeds to be flown.

Circling approach area is the obstacle clearance area which shall be considered for aircraft maneuvering to land on a runway which is not aligned with the final approach course of the approach procedure. The size of the approach area for approach category C aircraft is 1.7 nm and for category D aircraft, 2.3 nm. The protected area is an area measured from the end of each of the runways, in intersecting arcs. A minimum of 300 feet obstacle clearance shall be provided in the circling protected area.

Airspeeds flown and aircraft configuration during circling approach maneuvers will be iaw aircraft manufactures recommendations, but in no case less than 1.3 Vso. For instance, Gulfstream recommends flying the G-IV at full flaps from the FAF at Vref + 10 for circling maneuver. This guidance provides a 10-knot margin above 1.3 Vso to allow for maneuvering. It is imperative that Rennia Global pilots follow the appropriate Aircraft Flight Manual procedures and fly the way they are trained.

29.7.1. CIRCLING WEATHER

Rennia Global will train and qualify pilots to the charted minimum of the approved TERPS procedure.

During operation, Rennia Global has the policy to add 400-1 to the charted weather to build a reasonable “fly zone” between the MDA and the Cloud Base.

29.8. STABILIZED APPROACHES

A stabilized approach is characterized by a constant-angle, rate of descent and speed within APPROACH WINDOW and the approach profile ending near the touchdown point. A stabilized approach is the safest profile in all cases.

See APPROACH WINDOW

29.9. WIND SHEAR ON THE APPROACH AND LANDING

Horizontal and/or vertical wind shear during the approach can result in sudden loss of airspeed and apparent loss of power, with potentially disastrous consequences. A sudden change of wind component or drift prior to landing can make the approach unstable at a point where go-around is not possible or would be extremely hazardous. It is vital that such conditions should be quickly recognized if they are encountered, and that pilot response should be immediate and correct.

29.9.1. DESCENT BRIEFING

Whenever wind shear conditions are forecast or reported for approach and landing, the approach briefing should include the following:

Based on the automatic terminal information service (Automatic Terminal Information Service (ATIS)) broadcast, review and discuss the following items:

1. Runway in use (type of approach)
2. Expected arrival route (standard terminal arrival (STAR) or radar vectors)
3. Prevailing weather and,
4. Reports of potential low-level wind shear (LLWAS warnings, Terminal Doppler Weather Radar data) and,
5. Discuss the intended use of automation for vertical navigation and lateral navigation as a function of the suspected or forecasted wind shear conditions.
6. The briefing note contains some valuable recommendations for preparation and flight procedures. The section concerning Recovery during Approach and Landing is reproduced below.

29.9.2. RECOVERY DURING APPROACH AND LANDING

If wind shear is encountered during the approach or landing, the following recovery actions should be taken ***without delay***:

1. Announce "WINDSHEAR"
2. Select the takeoff/go-around (TOGA) Flight Guidance mode and set and maintain maximum go-around thrust,
3. Follow the Flight Director pitch command (if the FD provides wind shear recovery guidance) or set the pitch-attitude target recommended in the AOM/QRH. On some airplanes the correct pitch is just below stall,
4. If the AP is engaged and if the FD provides wind shear recovery guidance, keep the AP engaged; otherwise, disconnect the AP and set and maintain the recommended pitch attitude,
5. Do not change the flap configuration or landing-gear configuration until out of the wind shear,
6. Level the wings to maximize climb gradient, unless a turn is required for obstacle clearance,
7. Allow airspeed to decrease to stick-shaker onset (intermittent stick-shaker activation) while monitoring airspeed trend,

8. Closely monitor airspeed, airspeed trend and flight path angle (if flight-path vector is available and displayed for the PNF) and,
9. When out of the wind shear, retract the landing gear, flaps and slats, then increase the airspeed when a positive climb is confirmed and establish a normal climb profile.

29.9.3. REPORTING PROCEDURE

If significant wind shear is encountered during approach and landing, it should be reported to air traffic control immediately. If the effects on aircraft control are exceptional and/or beyond the effects typically encountered, then an appropriate air safety report(s) should be completed post flight. An OCR will also be completed iaw Ch 4 OCR Reporting.

29.10. APPROACH WITHOUT GLIDEPATH – "DIVE AND DRIVE"

On approaches where no vertical guidance is provided, the flight crew should plan, execute, and monitor the approach with special care, considering traffic and wind conditions. If no visual contact is established at MDA and/or if the missed approach point is reached (missed approach time), the pilot shall perform the published missed approach procedure.

Use of FMS VNAV guidance to establish a constant descend angle should be considered. Upon establishing visual contact with the runway or appropriate runway lights or markings, the pilot should be able to continue to a safe landing using normal bracketing corrections, or, if unable, will perform a missed approach.

When flying a "Dive and Drive" approach with a Glidepath to a "DA", a MDA buffer altitude is used so that the aircraft does not descend below the actual MDA in the case of a missed approach. This buffer may be published in the aircraft AFM, but if not, common practice is to add a 50' buffer above MDA for a "DA".

Non-Precision approaches commonly do not have a complete approach light system, but only REILS or ODALS. The lack of a gradual transition from instrument navigation to visual navigation close to the runway is typically compensated with higher required visibility for the approach.

See section HIGH VISIBILITY APPROACH ALS for more information in CAT I ALS.

See section MISSED APPROACH POINT (MAPT) for more information on Missed Approach.

29.11. DEVIATION CALLOUTS DURING APPROACH

In addition to standard callouts during approach, if the PM observes any of the following deviations at any time during flight, the PM will provide a prompt, verbal challenge. The PF will acknowledge all alerts.

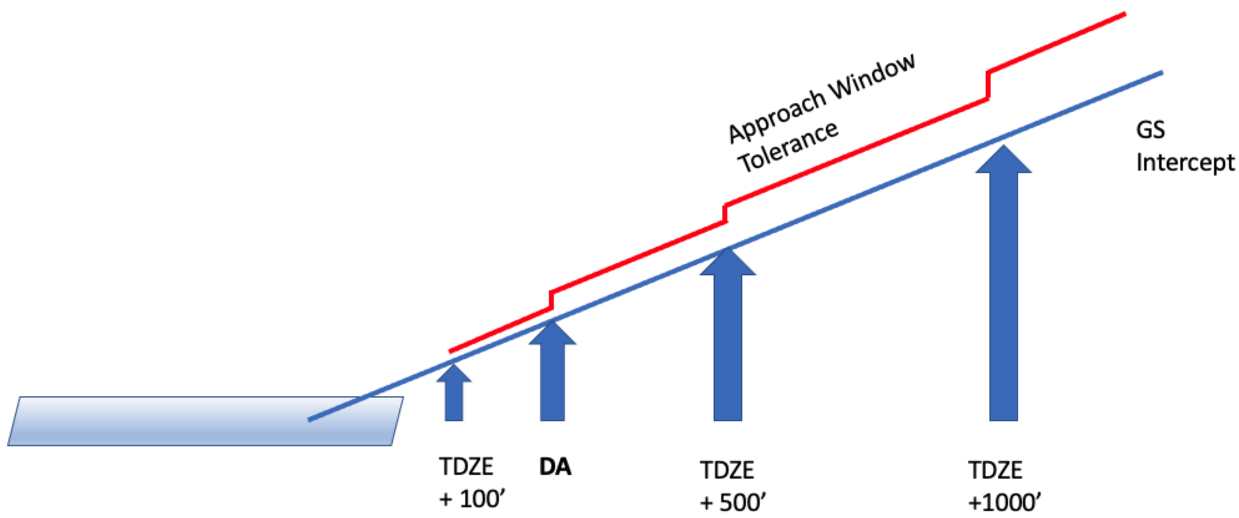
In section APPROACH WINDOW the tolerances for continuing the approach are discussed. Additionally, the following deviations will be called out:

1. Indications of wind shear, as unusually large variations in indicated airspeed.
2. Descent rates exceeding 1500 FPM after passing the Final Approach Fix inbound.

3. “High” or “Low” deviations with respect to the VASI glide path.
4. NDB course deviations exceeding 10 degrees.
5. Any flags, alarms, or other malfunction indications.
6. Any other callouts requested by the PF.

29.12. APPROACH WINDOW

Rennia Global is employing a variable tolerance for "Stabilized Approach" according to Height Above TDZE as follows to eliminate pre-mature Missed Approach or crews ignoring deviations at higher altitude:



	GOOD –> CONTINUE	"Missed Approach"
TDZE + 1000'	LOC and GS within 1/3 scale deflection	Out of Tolerance
	Vertical Rate < 1,500 /min	Greater Than 1,500
	Speed as Briefed +15 Kias, -0 Kias	Out of tolerance
	Gear Down Flaps Configured for Approach or Landing	Gear Up Flaps Not Configured
		FMS and/or Autopilot Not Configured as Briefed
TDZE + 500'	LOC and GS within 1 dot	Out of tolerance
	Vertical Rate < 1,000'/min	Out of tolerance
	Speed as Briefed +10 Kias, -0 Kias	Out of tolerance
	Gear and Flaps Configured for Landing	Not Configured
At DA[1]	LOC/GS Centered in the "DONUT"	ILS **NOT** in "DONUT"
	Speed as Briefed +5 Kias, -0 Kias	Anything else

[1] See discussion on FLY THE APPROACH LIGHTS

	GOOD –> CONTINUE	"Missed Approach"
	Approach Lights In-Sight, (Or Runway Environment Items)	No / Not Sure
DA to TDZE + 100'	Flight Visibility as Required by Approach[1]	Less
May Descend to TDZE + 100' by Approach Lights	Approach Lights In-Sight, (Or Runway Environment Items)	Lost
	Speed as Briefed +5 Kias, -0 Kias	Anything else
Lateral Alignment	**Use Approach Lights for *Minor* "Maneuvering" To *Align with Extended Centerline*.**	**NOT** Positively Correcting Towards Centerline
Glide Path	Stable and *Establishing* on VASI (if available)	Glide Path / VSI Excessive
At TDZE + 100' or at Visual Decision Bar	Flight Visibility as Required by Approach[1]	Less
Lateral Alignment	***Established*** Tracking Extended Centerline **Wings Level**	Not On Extended Centerline Centered Over Approach Lights
Glide Path	Stable or establishing on VASI	Glide Path / VSI Excessive
	Runway Environment Item(s)	Not Sure?
	Altitude Normal Projecting 50' above Threshold Touchdown at 1000' Markers+/- or VASI	Glide Path Excessive "Ducking Under"
		"Maneuvering"
Landing	Flight Visibility as Required by Approach[1]	
	Altitude Normal Projecting 50' above Threshold Touchdown at 1000' Markers -250'/+500'	
Below DA the Decision is Binary: Perfect or Missed Approach!		

[1] RVR is Controlling for Initiation (crossing FAF), Descent Below DA and Landing. OpSpec C052.

29.13. APPROACH LIGHT SYSTEM (ALS)

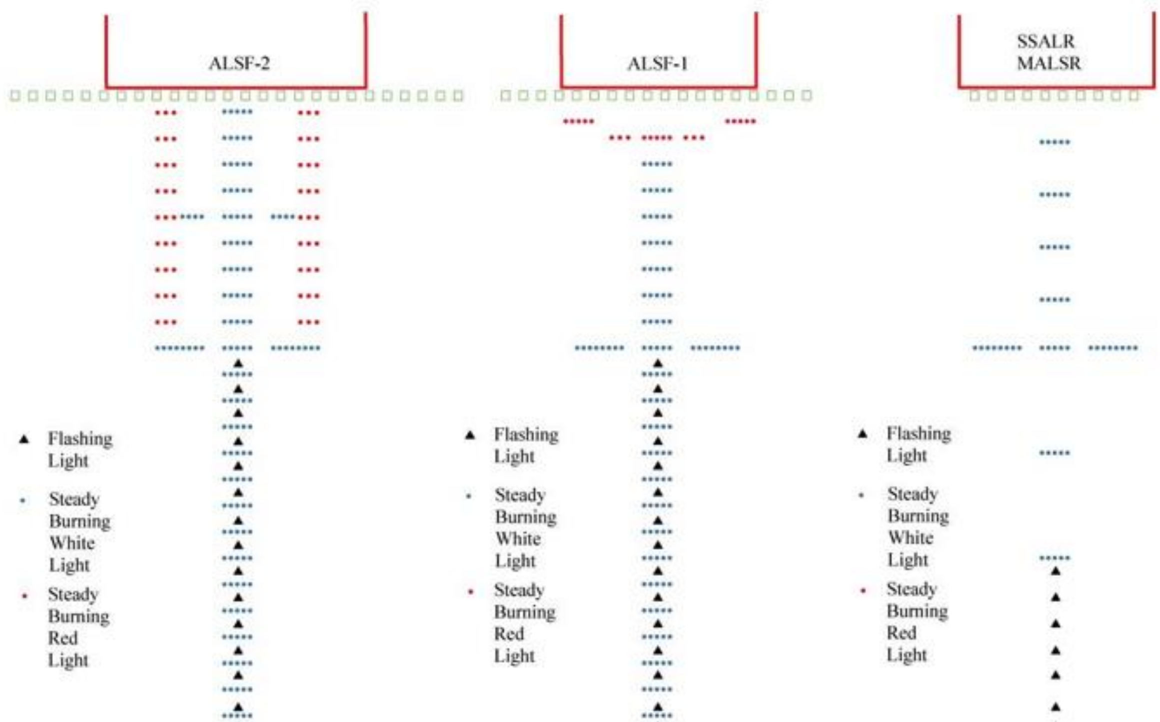
[AIM]

Approach Light System (ALS) provide the basic means to transition from instrument flight to visual flight for landing. Operational requirements (type of ILS minimums) dictate the sophistication and configuration of the approach light system for a particular runway.

ALS are a configuration of signal lights starting at the landing threshold and extending into the approach area a distance of 2400-3000 feet for precision instrument runways and 1400-1500 feet for nonprecision instrument runways.

Some systems include sequenced flashing lights which appear to the pilot as a ball of light traveling towards the runway at high speed (twice a second).

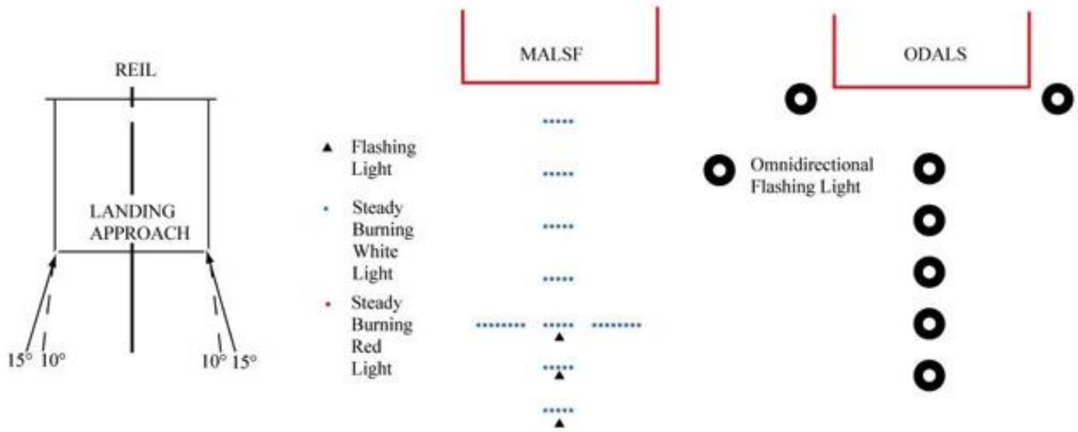
29.13.1. LOW VISIBILITY APPROACH ALS



Approach Light System approved for use with RVR visibility of 1800 or less are typically of the above including:

1. Sequenced Flasher
2. CAT 1 Decision Bar located 1000’ prior to the threshold
3. Runway Edge Lighting (Green when approaching, Red when departing)
4. High Intensity Runway Lights (HIRL), Medium Intensity Runway Lights (MIRL)
5. RCCL

29.13.2. HIGH VISIBILITY APPROACH ALS



ALS systems used in conjunction with approaches requiring higher visibilities stated in statue mile (Sm) or fractions of Sm, may utilize a simplified light system. An ILS like KFRG (visibility required 3/4Sm) may have:

1. Sequenced flasher
2. Decision Bar
3. Alignment lights to the Runway Centerline, but there is no requirement for RCLL

A non-precision approach may have REILS, ODALS or no approach lights. The lack of ALS is then compensated with greater flight visibility required.

29.14. CAT I ILS

All ILS systems are not the same. CAT II and III systems are installed at airports with long runways and with automatic switchover to redundant navigation, ALS and runway light systems. Thus, some operators are authorized to fly all the way to the surface with little or no visual guidance.

A CAT I ILS does not conform to a single standard. The ILS system is designed for the pilot to end the flight in a visually referenced final approach to landing from an altitude of TDZE + 200' or more and with a visibility requirement more than 1800 RVR or ½ Sm or more when RVR is not available. Approaches with anomalies may be approved with higher minimums. This is a clue to the pilot to transition to visual flying sooner.

Furthermore, disturbances to the LOC and/or GS signal may cause the FAA to require higher DA and/or Visibility. This may also cause the navigation signal to be unusable below DA.

The FAA systems designers never intended for a pilot to "remain on the gauges" below DA or MDA equivalent to a CAT II approach low to the ground, but to transition to visual flight over the approach lights.

The ALS replaces the localizer and the VASI (if installed) replaces the glideslope. The VASI is however not necessarily visible in the initial phase of this visual transition. This leads to the few seconds where we must remain on the current "dead reckoning" glide path. The airplane should, however, already be in a stable configuration with power set for airspeed and descent rate. No pitch change (control input) should be required as the pilot looks up and transitions outside. A quick cross reference of the GS until the VASI is in view may, however, be an acceptable *technique*.

In some simulators with low visual system fidelity, it may be difficult to do a visual transition at minimum weather. Some instructors may suggest a technique of "remaining on the gauges" or "staying inside". This is a *technique* and *not* a part of the Rennia Global SOPs since it causes a late transition to visual conditions.

A CAT I approach can be a hybrid of precision and non-precision approaches making the decision to continue or abandoning the approach that much harder. Having a clear understanding of the limitations of a CAT I ILS is therefore important.

29.15. FLY THE APPROACH LIGHTS

On an approach to a DA of 200' above TDZE we will have a visual segment of about 16 seconds total. This yields 8 seconds from 200' to TDZE + 100' and then 8 seconds to touch down.

29.15.1. FIRST 8 SECONDS

In the first 8 seconds, you transition from flight instruments to visual navigation on the Approach Lighting System's *extended runway centerline.*

It is imperative to align the aircraft's ground-track to the ALS *quickly* and prior to reaching TDZE + 100'.

> **WARNING:** Common jet-engine spool-up time from idle to missed approach power can be 7 seconds or more during which time your aircraft is still descending towards the runway.

A visual "Decision Bar" is located at the end of the sequenced flashers (rabbit) and 1000' before the Threshold. This is also the point where the aircraft will be at approximately TDZE + 100' when on the glidepath.

29.15.2. PF TOOLS:	**29.15.3. THE PM/FPM WILL:**
1. The ILS has positioned you over the approach lights, 2. The approach light system provides and extended centerline to the runway, and 3. A visual Decision Bar – To continue you need to consider: 4. Is the Flight Visibility as prescribed by the approach, 5. Are You aligned, 6. Do You have the required lights or markings to identify the runway environment, and 7. Are Your wings close to level so to ensure ground-track of the extended centerline? Note: A crosswind component may still place the runway outside the 12 o'clock position. Knowing the expected wind correction angle is imperative. Arriving at the Decision Bar without the above should yield an expectation of, or a command of, "Missed Approach". As you descend, requirement for wind correction will change since you transition from free airflow to ground friction.	After leaving DA/MDA transition from outside visual to cross-referencing the visual flying with the instruments in the same manner as a "visual approach backed up with the ILS". The PM is monitoring for: 13. PF remaining in APPROACH WINDOW 14. Monitoring the altimeter for the TDZE + 100' decision making altitude ("New DA"). 15. Announce New DA (TDZE + 100') 16. Monitoring that the Glidepath does not vary excessively from the electronic or visual glideslope or path. NOTE: • The PNF should ***not*** lean forward while attempting to acquire visual references. If the PNF calls "visual" while leaning forward, the PF might not acquire the visual reference because his/her viewing angle will be different.

29.15.4. NEXT 8 SECONDS

By TDZE + 100 the runway environment must be identified, the visibility must meet the approach[1] and the aircraft must be on a glide-path for touchdown at the 1000' markers.

The VASI (if installed) should now be visible and the FARs for Class D, C and B terminal airspace requires;
To land on a runway served by a visual approach slope indicator must maintain an altitude at or above the glide path until a lower altitude is necessary for a safe landing.

[1] RVR is controlling!

29.16. "STAYING ON THE GAUGES"

In the simulator, it is common that the instructor will attempt to help you by compensating for the simulator's 2-dimensional visual system and they may encourage to "stay on the gauges" during descent below DA. In a CAT 1 Approach the localizer is designed to guide you to a visual approach by the ALS. In a CAT II and CAT III Approach it is designed to bring you to the centerline of the runway. **The "SIMism" ("stay on the gauges") must not be mistaken as SOP.**

29.17. STANDARD CALLS

The importance of task-sharing and standard calls during the final portion of the approach cannot be overemphasized. See the general call outs in this Chapter and each fleet's (training program) standard calls.

"Visual" or [acquired visual reference (e.g., "runway in sight")] usually is called if adequate visual references are acquired and the aircraft is correctly aligned and on the approach glide path; otherwise, the call "visual" or "[the acquired visual reference]" is followed by an assessment of the lateral deviation or vertical deviation (offset).

"Ground Contact" is **not** used since it does not reference anything pertinent to approaching the specific runway.

Either pilot can determine whether the lateral deviation or vertical deviation can be corrected safely, and calls "continue" (or "landing") or "go-around iaw APPROACH WINDOW.

29.18. RECOVERY FROM A DEVIATION

Recovering from a lateral deviation or vertical deviation when transitioning to visual references requires careful control of the pitch attitude, bank angle and power with reference to raw data to help prevent crew disorientation by visual illusions.

The PNF is responsible for monitoring the instruments and for calling any excessive deviation.

29.18.1. Vertical Deviation

A high sink rate with low thrust when too high may result in a hard landing or in a landing short of the runway.

A shallow approach with high thrust when too low may result in an extended flare and a long landing.

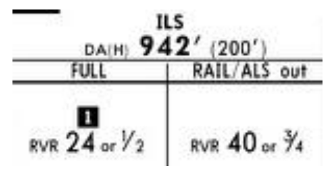
29.18.2. Lateral Deviation

Establish an aiming point on the extended runway centerline, approximately half the distance to the touchdown point, and aim toward the point while maintaining the correct flight path, airspeed and thrust setting.

To avoid overshooting the runway centerline, anticipate the alignment by beginning the final turn shortly before crossing the extended runway-inner-edge line.

29.19. ALS INOPERATIVE

When the Runway Alignment System (Approach Lights System) is inoperative the visibility requirement of the approach is commonly increased since you must now be able to see beyond this area and align with the actual runway as compared with the approach light system.



The CAT I ILS system does NOT require a Runway Centerline Lighting System (RCLL). At night, on a wide runway with obscured visibility, flickering from aircraft landing lights reflecting in the obscuration and nearly invisible center line marking, it can feel like a dark hole effect followed by a sinking effect.

29.20. MISSED APPROACH POINT (MAPT)

[Pilot / Controller Glossary]

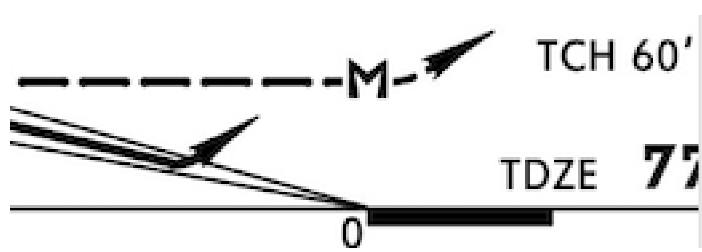
Missed approach point (MAPT) is the point prescribed in each instrument approach at which a missed approach procedure shall be executed if the required visual reference does not exist.

It defines the point for both precision and non-precision approaches wherein the missed approach segment of an approach procedure begins.

A pilot must execute a missed approach if a required visual reference (normally the runway or its environment) is not in sight upon reaching the MAP or the pilot decides it is unsafe to continue with the approach and landing to the runway.

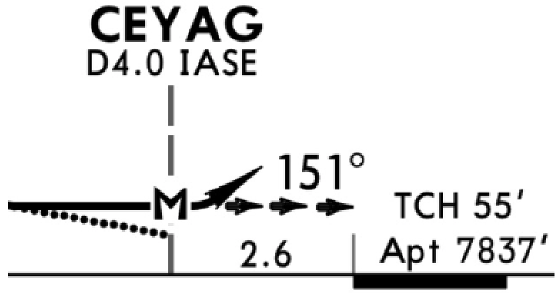
The missed approach point is published in the approach plates and contains instructions for missed approach procedures to be executed at this point.

29.20.1. MAPT NON-PRECISION APPROACH



The MAPT for a non-precision approach is typically crossed at the minimum descent altitude (MDA). The location may be anywhere from well prior to the runway threshold to past the opposite end of the runway, depending on terrain, obstructions, NAVAID location and air traffic considerations. MAPT is denoted on Jeppesen Charts by a **M**.

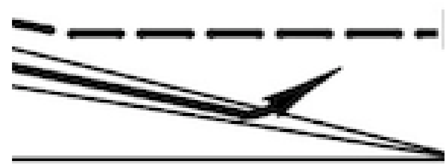
29.20.2. MAPT PRIOR TO RUNWAY



In cases where the missed approach procedure requires a early turn off the approach for terrain (or other) reasons, the required approach visibility will be increased so that the crew has a chance to see and acclimate to the visual segment of the approach. The picture shows a MAPT 2.6Nm prior to the runway. The required visibility is then increased to acquire the approach lights or runway environment about 15 seconds prior to making a decision.

> WARNING: Flying past the MAPT and then perform a late missed approach may not provide a obstruction free missed approach procedure.

29.20.3. MAPT ON PRECISION APPROACH



The MAP on a precision approach is reached when the *aircraft reaches the decision altitude prescribed for the approach while maintaining the glideslope*.
In both cases, the pilot in command must make a clear and unequivocal Yes/No decision upon arrival at the MAP point. On an ILS, this is so close to the runway that the missed approach procedure is common to that of a non-precision approach.

29.21. MISSED APPROACH – BALKED LANDING

Either the pilot flying (PF) or the pilot monitoring (PM) may make the “MISSED APPROACH” or “GO AROUND” call.

In the event of a missed approach or rejected landing, the PF will initiate a smooth coordinated transition from the approach phase to the missed approach segment. The flying pilot must immediately execute the missed approach procedure in response to a “GO AROUND” or “MISSED APPROACH” callout.

The PF shall command all aircraft configuration changes during the missed approach. **The PM shall:**

1. State the initial heading/course and altitude to be flown,
2. Confirm with PF the navigation source,
3. Reconfigure aircraft for missed approach/go-around on the PF’s command,
4. Advise ATC,
5. Manage checklist at direction of PF,

During the transition, the PM monitors engine power settings, pitch and bank, airspeed, VSI, heading and altitude. Deviation from the norm/briefed parameters shall be vigorously stated by the PM with an appropriate verbal response from the PF (i.e.:” CORRECTING”).

NOTE: Execution of a missed approach from a point between the FAF and the MAP must be flown to remain within protected airspace! Climb out on the final approach course until reaching the MAP prior to commencing the Missed Approach Procedure (or as directed by ATC).

30. POST LANDING

30.1. AFTER LANDING

The left seat pilot shall assume control of the aircraft upon reaching airspeed of 80 KTS. The after-landing checklist is called for by the PF upon vacating the runway. The flow pattern is utilized, backed up by the checklist. Caution is to be exercised, and safe lookout is to be always maintained by at least one pilot. The checklist is to be suspended if workload, traffic or obstructions warrant. If necessary, the AFTER LANDING and SHUT DOWN checklist may be completed when the aircraft comes to a full stop on the ramp.

NOTE: Observe anti-ice and deice equipment ground limitations.

30.2. POST FLIGHT

Generally, the PIC will complete all required company paperwork and make any necessary telephone calls, i.e., FLIGHT Coordination and Maintenance.

The SIC is responsible for the Post Flight Walk Around, restocking the aircraft and personal paperwork such as duty log (if different than PIC's) and personal expense report.

30.3. FLIGHT FOLLOWING CALL

As soon as practical after parking, notify Flight Following (Ch 5) that you have arrived safely. Call back with more information if needed.

Complete JetInsight (Ch 12).

31. STANDARD CALLOUTS

31.1. STANDARD CALLOUTS ALL PHASES OF FLIGHT

SITUATION	PF	FPM
***First indication of LNAV/VOR/LOC course**	*CHECK*	*COURSE ALIVE*
***Arrival at fix or Intersection**	*CHECK*	*NAME OF FIX*
*Flight mode awareness is an important part of crew situation awareness. It is important to be cognizant of the active vertical and lateral modes whenever in use. Rennia Global strongly recommends verifying and verbalizing all mode changes after selecting from the flight control panel. All mode changes will be verified from the PFD and not by button selection from the FCU/FCP.		

31.2. SMART TURN

PRIOR to the waypoint passage, the FMS starts calculating at what time to start a standard flight director/autopilot turn so to perfectly intercept the next course based on ground speed and degree of course change. If a standard turn is about 2 minutes for 360°, then 90° is about 30 seconds. At a ground speed of 180kts, one can expect the **Smart Turn** to commence about 0.75Nm ***prior*** to the waypoint.

31.2.1. SMART TURN SEQUENCE

The **Smart Turn** may look like this:

- Change of waypoint annunciation takes place,
- FMS Sequences to next leg,
- Distance, instead of nearing zero, jumps to next leg distance,
- CSI or Course Setting on the HSI is changed to the new course,
- The heading bug may or may not change, but the ***aircraft rolls into a turn*** to perfectly intercept the next course with little or no over-shoot.

31.2.2. STANDARD SMART TURN CALLOUT

SITUATION	PF	FPM
***Smart Turn at fix or intersection**	*SMART TURN @ (Name of Fix)*[1]	(Confirms logical direction of turn) TRACK LOGICAL

[1] The PF is the primary navigator. When a Smart Turn is expected the PF will ensure the pre-turn sequence is logical per the aircraft's FMS.

31.3. STANDARD CALLOUTS- CLIMB, CRUISE, DESCENT, IN RANGE

The following callouts will be used during the flight. These callouts should be used at the appropriate times and are the same for all aircraft. The PM is listed first since much of the standard callouts are initiated by the PM.

SITUATION	PF	FPM
Within 1000 FT of assigned altitude	SET AND SELECTED	OUT OF ……..FOR…. _
Within 500 FT of assigned altitude – Hand-flying	CHECK	**500 to go**
10,000 FT (up or down)	CHECK	OUT OF 10,000 FT
18,000 FT (up or down)	TRANSITION LEVEL CHECKLIST COMPLETE	18,000 CHECKLIST
CRUISE	CHECK	POWER/(CABIN) PRESSURE
DESCENT	DESCENT CHECK	COMPLETE
TRANSITION LEVEL	18000/TRANSITION LEVEL CHECK	COMPLETE
IN RANGE/APPROACH	IN RANGE/APPROACH	COMPLETE

31.4. STANDARD CALLOUTS APPROACH – NON EVS EQUIPPED AIRCRAFT ONLY

SITUATION	PF	FPM
Maneuvering for Final Approach Course	*FLAPS ____*	*SELECTED / INDICATING*
Localizer / Radial alive or On Final Approach Course	*CHECK*	*LOCALIZER / RADIAL ALIVE*
If Precision Approach: Glide slope alive	*GLIDESLOPE ALIVE*	*GLIDESLOPE ALIVE*
Two Dots below Glide Slope / Before FAF	*FLAPS ____*	*SELECTED / INDICATING*
One dot from Glide slope intercept / Or At FAF	*GEAR DOWN BEFORE LANDING CHECKLIST*	*GEAR DOWN THREE GREEN LANDING CHECKLIST COMPLETE*
On glide slope	*GLIDESLOPE CAPTURED*	*GLIDESLOPE CAPTURED*
At FAF	*FINAL FIX, MIN. IS FT*	*ALTIMETERS CHECKED, NO FLAGS*
1000 FT above Minimums	*CHECK*	1000 FT ABOVE MINIMUM
500 FT above Minimum	*CHECK*	500 FT ABOVE MINIMUM
100 FT above Minimum	*CHECK*	100 FT ABOVE MINIMUM
At DA / MDA	*CHECK*	MINIMUMS
If Approach Lights	*CONTINUING*	*"LIGHTS "*

31.5. STANDARD CALLOUTS APPROACH – LANDING OR MISSED APPROACH

SITUATION	PF	FPM
If Approach Lights / Runway NOT Insight	*GOING AROUND*	*GO AROUND*
If Runway Insight	*LANDING*	*RUNWAY IN SIGHT*

31.6. FMS CALLOUTS

The following FMS callouts will be utilized in addition to standard callouts for the Honeywell – equipped aircraft:

SITUATION	PF	FPM
Approach Page	INITIALIZE	COMPLETED/VERIFIED
Landing Init	INITIALIZE	COMPLETED/VERIFIED
2 nm outside FAF	CHECK	APPROACH MODE, MAP PROMPT DISPLAYED

31.7. STANDARD CALLOUTS – APPROACH – FOR EVS-EQUIPPED AIRCRAFT ONLY

PHASE OF FLIGHT	PF	FPM
DESCENT	1. Select FLIR on DC HUD page. NOTE: FLIR takes up to 10 minutes for cooling	
IN RANGE	1. Review and brief procedures, including approach. 2. Set Baro Alt to field QNH or QFE. 3. Set Published Minimums. 4. Set Seat Height to Design Eye Angle. 5. Ensure FLIR selected on DC HUD page. 6. Select EVS on DC HUD page. 7. Set touchdown zone elevation and glideslope angle. 8. Select FLIR Mode to AUTO, H or L (5R selection of DC HUD page)	1. Obtain landing weather. 2. Set Baro Alt to field QNH or QFE and crosscheck. 3. Set Published Minimums and cross-check NOTE: If one RADALT is Inoperative, both pilots will select the operative RADALT for display on each PFD. 4. Set Seat Height to Design Eye Angle
TRANSITION TO FINAL APPROACH	1. Verify proper frequencies set. 2. Set approach course. 3. Select ADF . bearing pointer(s) displayed on PFD H.S.I. 4. Slow to maneuvering speed. 5. Call "Flaps 10" 6. Verify that the Non-uniformity Correction (NUC) occurred when flaps were selected to 10	1. Tune and identify ILS/ADF frequencies. 2. Set approach course and cross-check 3. Select ADF ½ bearing pointer(s) displayed on PFD H.S.I. 4. Select Flaps 10 and verify

PHASE OF FLIGHT	PF	FPM
Cleared for Approach	1. Select APR mode when within 90° of approach course. 2. Call "Flaps 20° " 3. Call "Localizer Capture" 4. Call "Gear Down, Landing Checklist" 5. Verify on the HUD the desired EVS operating mode "EVS C,A,H or L"	1. Set missed approach altitude in preselect window. 2. Select Flaps 20 and verify. 3. Call "Localizer Alive". 4. Call "Glideslope Alive". 5. Select Gear Down and complete Landing Checklist. 6. Call "Landing Checklist Complete"
ONE DOT BELOW GLIDESLOPE	1. Call "Flaps Full" or "Flaps 20" (Single Engine) 2. Vref + 5	1. Select Flaps and verify
GLIDELOPSE INTERCEPT	1. Call "Glideslope Capture"	
NOTE: Following Callouts are optional where GPWS makes the same callouts.		
OUTERMARKER	1. Observe Outer Marker	1. Call "Outer Marker, Glideslope Altitude Checks"
500' Above Airport	1. Respond "Systems Normal EVS Normal"	1. Call "500 Feet"
100' Above Minimums	1. Respond "Check"	1. Call "100 above"
PUBLISHED MINIMUMS	1. With EVS Visual Cues: Call "EVS Lights". With Visual Cues: Call "Lights" 2. Without EVS or Visual Cues: Responds/Calls "Going Around"	1. When visual cues appear: Call "Lights and Field Insight" 2. Call "Go-Around" (If PF does not call lights or EVS lights)

PHASE OF FLIGHT	PF	FPM
EVS DECISION ALTITUDE	1. When actual Visual Cues: Call "Landing" 2. Without Visual Cues: Responds/Calls "Going Around"	1. At 100 feet HAT call "Go-Around" if PF does not report "Landing"
LANDING	1. Disconnect Autopilot by 50' HAT Note: Keep autopilot engaged between DH and 50' until landing picture is positively established 2. Perform visual landing. 3. Utilize normal landing / rollout procedures	1. Monitor localizer, glideslope and airspeed 2. Call "50 feet" 3. Utilize normal landing/rollout

32. GV SOP
Reserved for future use

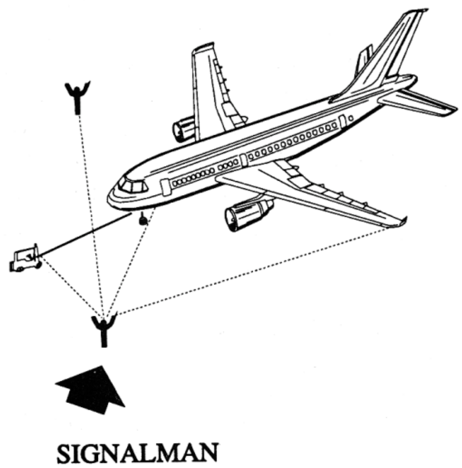
33. G-IV SOP
Reserved for future use

34. FALCON 2000 SOP
Reserved for future use

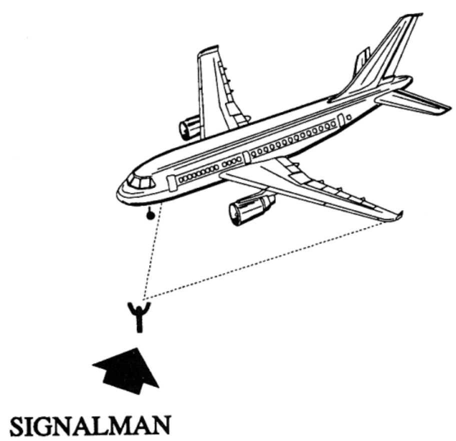
35. FALCON 50 SOP
Reserved for future use

36. HAND SIGNALS

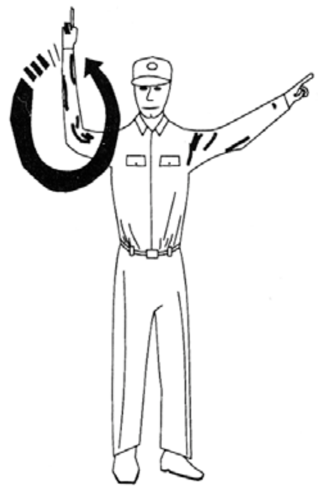
36.1. Signalman Directs Towing



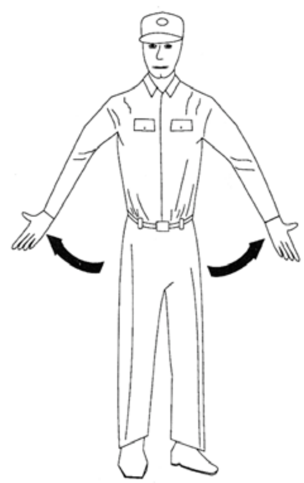
36.2. Signalman's Position



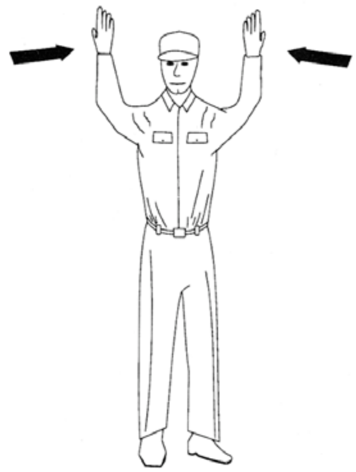
36.3. Start Engine



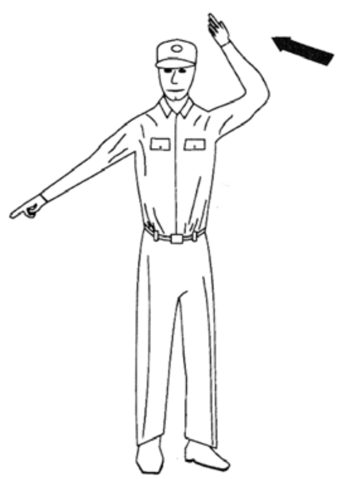
36.4. Pull Chocks



36.5. Proceed Straight Ahead

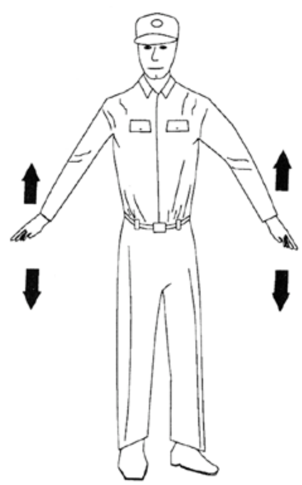


36.6. Left Turn

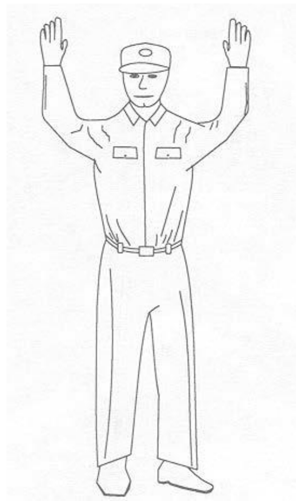


36.7. Right Turn

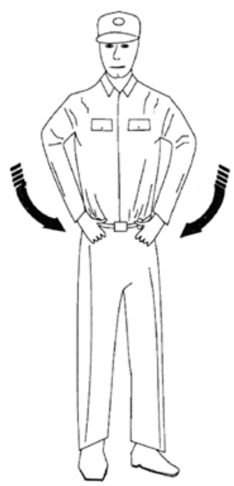
36.8. Slow Down



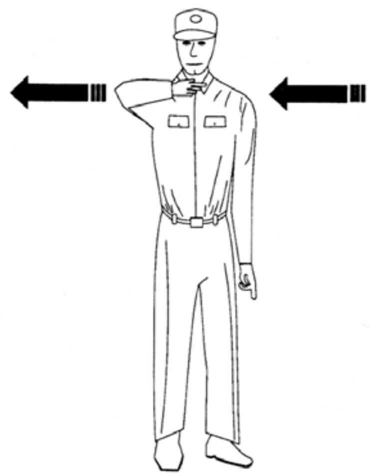
36.9. Flagman Directs Pilot



36.10. Insert Chocks



36.11. Cut Engines



36.12. Night Operation

Use same hand movements
as day operation

36.13. Stop