TRANSNORTHERN AVIATION

Metro III Maneuvers & Procedures

Principal Base of Operations:
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This Manual is current through:

REVISION 1

April 1, 2026

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FLIGHT MANEUVERS
and
PROCEDURES MANUAL

Fairchild
METROLINER III
SA-227

PREFACE

This guide will be used and followed in the training, testing and checking of Company pilots. In regards to the maneuvers contained herein that are a normal part of everyday line flying, it represents the way the Company expects pilots to fly, however it should in no way be construed as so hard and fast as to prevent the pilot from exercising imagination, good judgment and professionalism in responding to unusual or emergency situations. In tests and checks, competency will be measured in accordance with the FAA's ATP or Commercial Pilot Practical Test Standards as described herein.

The SA227-AC (Metroliner III) is certified IAW Type Certificate Data Sheet A8SW. Specifically authorizing "Minimum Crew: One pilot except as otherwise required by the Airplanes Flight Manual" (or operating regulations). In the event that a second crewmember is necessitated either by the Certificate Holder's operational considerations or by regulatory requirements, two pilot crew procedures and CRM operating practices described in this document will be adhered to. For Single Pilot Operations "callouts" and/or verbal acknowledgment of compliance with these procedures IS NOT required except when specifically requested by and examiner or company instructor pilot. In this document "PF" means Pilot Flying and "PM" means Pilot Monitoring.

This document is an integral but separate part of TransNorthern's FAA Approved Company Training Program and receives separate FAA Approval. It is applicable to all flight training and checking with the Metro III Aircraft.

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HIGHLIGHTS OF CHANGES

This manual was originally submitted and approved by the ANC FSDO in 2005. It was based on the manual utilized by Flight Safety International of San Antonio for Metroliner Type Ratings. In 2010 "pictorial displays" were added at the request of the FSDO. Later it was abandoned at the request of the FSDO to be "all pictorial" passed on an interpretation of Order 8900.1. The company has determined that many of the situations needed to be trained and tested by regulation were missing from that version. We are reverting to the manual approved in 2010 for the Metro and revising it to suit the flight training and testing requirements of the company today. The following are the changes made from the previous version to this Revision.

- A preface was updated explaining the history and general purpose of this document.
- Reformatting Entire Document.
- Updated Table of Contents.
- Page numbering for this document is completely revised and the Log of Revisions Page has been updated.
- This version utilizes the abbreviation "PF" to indicate Pilot Flying and "PM" to indicate Pilot Monitoring.
- This document lists Individual Training/Testing Tasks that detail the Objective, Description and Acceptable Standards for each as required by:
  14 CFR §135.327(b)(3). "*Detailed descriptions or pictorial displays of the approved normal, abnormal, and emergency maneuvers, procedures and functions that will be performed during each flight training phase or flight check, indicating those maneuvers, procedures and functions that are to be performed during the in-flight portions of flight training and flight checks*."
- A PowerPoint Slide Show "Introduction to Metro Maneuvers Presentation" has been created showing pictures of various Metro Maneuvers that may be utilized as desired by Instructors as part of the Metro Flight Maneuvers and Procedures Training/Testing program. It is available thru the Chief Pilot's office.
- Added Information about Stall Avoidance System (SAS) (p 17)

REVISIONS

It is the responsibility of the Director of Operations or Chief Pilot to keep the Metro III Maneuvers & Procedures Manual current.

All revisions will be submitted to the FAA for approval prior to being implemented.

Revision control is accomplished in the footer of each page.

LOG OF REVISIONS

Revision #	Description	Date
Original	Initial Version	November 2005
One	Minor revision per regulatory changes and add pictorial descriptions of specific events	September 2010
Original	Complete Reissuance of document per FSDO to All pictorial content	January 2021
One	Reverting to original format modified to represent single & two pilot crew operations.	April 2026

LIST OF EFFECTIVE PAGES

This listing contains all current pages, with effective dates, as provided to the FAA for this Manual. It is used after posting changes to ensure the manual is complete and approved by the FAA as indicated in Signature Block below.

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JAMES M HOWERY

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USE OF THE MANEUVERS MANUAL

The flight maneuvers and procedures manual contained herein are designed to support the flight training curriculum segment. The procedures established for each maneuver are designed to standardize company flight training. Flight training should be completed after completion of Ground Training IAW the FAA Approved Training Program.

All crewmembers are expected to demonstrate knowledge and proficiency in each maneuver (both ground & flight) listed in the flight training curriculum segment in accordance with the standards set forth in the applicable airman certification standards guide. While TransNorthern LLC recognizes standards for operating the aircraft, we also recognize our diverse operating environment may require the pilot to use judgement in determining the proper operational criteria for a given situation.

These flight training maneuvers do not replace the aircraft performance and operating limitations published in the Metro III AFM. Listed Speeds may be confirmed by consulting the Metro III AFM.

All flight maneuvers must be conducted at a safe altitude, typically a minimum of 3000' AGL

Each flight training session is to be preceded and followed by an instructor briefing and debriefing. All inflight maneuvers should be completed at a safe altitude and the pilot and instructor will maintain external vigilance and perform clearing turns prior to initiating the maneuver. Instructors will emphasize use of appropriate checklists and single or multi-crewmember resource management.

Pilot Flying (PF) and Pilot Monitoring (PM) Expectations

The following describes general expectations of the PF and PM during all aircraft maneuvers listed.

The PF is expected to:

- Maintain positive control of the aircraft
- Initiate checklists and command required configuration changes
- Verify that PM duties are being accomplished

The PM is expected to:

- Set and manage avionics
- Execute commanded configuration changes (within aircraft limitations)
- Set and verify altitude selector
- Conduct all radio communications with ATC
- Call out deviations in altitude, heading, and airspeed
- Make altitude callouts:
  - "1,000 feet to go" when within 1,000 feet of the assigned altitude
  - "Approaching [altitude]" when within 200 feet of the assigned altitude.
- Maintain an external visual scan, particularly during approach and landing phases.
  - Call ***"Runway in sight, __ o clock"*** or ***"Runway not in sight, go around"***

Note: While expectations are defined generally above, there may be circumstances in which the PF may assist the PM with their responsibilities and vice versa.

REFERENCE SPEEDS

The speeds referenced in the individual Aircraft Flight Manual (AFM), and aircraft placards take precedence over any speeds mentioned in this document. Please advise the Chief Pilot or Director of operations if you notice any discrepancies.

METRO III OPERATIONAL SPEEDS (KIAS)

V_X	98	Two Engine Best Angle of Climb Speed
V_{YSE}	134	Single Engine Best Rate of Climb Speed (Blue Line)
V_Y	147	Two Engine Best Rate of Climb Speed
	150	Cruise Climb Speed
	140	Recommended Approach Speed (see notes)
	20	Demonstrated Crosswind

METRO III 14,500 lbs LIMITATION SPEEDS (KIAS)

V_{MC}	87	Minimum Single Engine Control Speed (Red Line)
V_{FE}	214	Flaps 1/4
	179	Flaps 1/2
	159	Flaps Full
V_{LO}	176	Landing Gear - Maximum Operating Speed
V_{LE}	173	Landing Gear - Maximum Extended Speed
V_A	176	Maneuvering Speed
V_{MO}	246	Max Operating Speed (SL to 17,800 FT)

METRO III 16,000 lbs LIMITATION SPEEDS (KIAS)

V_{MC}	91	Minimum Single Engine Control Speed (Red Line)
V_{FE}	215	Flaps 1/4
	180	Flaps 1/2
	165	Flaps Full
V_{LO}	175	Landing Gear - Maximum Operating Speed
V_{LE}	175	Landing Gear - Maximum Extended Speed
V_A	185	Maneuvering Speed
V_{MO}	246	Max Operating Speed (SL to 17,800 FT)

NOTE: * Airspeeds in this maneuvers guide are based on maximum gross weight of 14,500 pounds for the Metro III and 16,000 pounds for the Metro IIIB and flown under ideal conditions. Caution should be exercised as changes in gross weight and/or environment will result in a change in required power settings, airspeed or both.

* Company policy is to fly all approaches at 140 KIAS (ILS, Non-Precision, Circling, Single Engine, No Flaps etc.) reducing to V_{REF} + 10 when landing is assured and crossing threshold at $V_{REF.}$

GENERAL

A. The flight maneuvers and related procedures described herein will be used as a basis for simulator and aircraft flight instruction, for standardization of training, and as guidelines for safe operation of the aircraft.

B. At no time during training will limitations of the aircraft be intentionally exceeded nor will maneuvers be conducted that would jeopardize safety.

EQUIPMENT ORAL

A. OBJECTIVE: Exhibits adequate knowledge appropriate to the airplane; its systems and components; its normal, abnormal, and emergency procedures; and uses the correct terminology with regard to the following items –

1. Landing Gear - indicators, brakes, tires, nose-wheel steering, and shock absorbers.
2. Powerplant - controls and indications, induction system, cooling, fire detection/protection, mounting points, turbine wheels, compressors, deicing, anti-icing, and synchrophasing
3. Propeller - type, controls, feathering/unfeathering, negative torque sensing, synchronizing, and synchrophasing.
4. Fuel System - capacity, drains, pumps, controls, indicators, cross feeding, transferring, fuel grade, color and additives, fueling and defueling procedures, and substitutions, if applicable
5. Oil System - capacity, grade, quantities, and indicators
6. Hydraulic System - capacity, pumps, pressure, reservoirs, grade, and regulators
7. Electrical System - generators, battery, circuit breakers and protection devices, controls, indicators, and external power sources and ratings
8. Environmental System - heating, cooling, ventilation, pressurization, controls, indicators, and regulating devices
9. Avionics and Communications - autopilot, flight director, Electronic Flight Indicating Systems (EFIS), Flight Management System(s) (FMS), Long Range Navigation (LORAN) systems, Doppler Radar, Inertial Navigation Systems (INS), Global Positioning System (GPS/DGPS-/WGPS), VOR, NDB, ILS/MLS, RNAV systems and components, indicating devices, transponder, and emergency locator transmitter as applicable.
10. Ice Protection - anti-ice, deice, pitot-static system protection, propeller, windshield, wing and tail surfaces.
11. Crew Member and Passenger Emergency Equipment - Survival gear (location/content), Oxygen system, oxygen mask for crew members and passengers and life raft as applicable.
12. Exhibits adequate knowledge of the contents of the Airplane Flight Manual with regard to the systems and components listed in Paragraph 1 (above); the Minimum Equipment List (MEL), if appropriate, and the Operations Specifications, as applicable to type.

B. DESCRPTION: The pilot may be asked to present or point out the aircraft registration

airworthiness certificate, radio station license, airplane flight manual and weight & balance documents. The pilot will be required to demonstrate a practical knowledge of the performance capabilities and operating procedures and limitations for the aircraft. This includes power settings, placard speeds, time and range, fuel & oil requirements, the operation of aircraft systems & special equipment, critical performance speeds and emergency procedures. Pilots are required to apply the company approved weight and balance data for the specific aircraft and make accurate loaded weight, center of gravity and center of gravity limits.

C. ACCEPTABLE PERFORMANCE: The pilot should be able to identify, find and explain the purpose and significance of each required document aboard the aircraft. He should be able to obtain essential pilot information that is available in the aircraft and have an accurate knowledge of operating data and procedures and be able to make accurate determinations of permissible gross weight loading and load distribution within the gross weight.

PREFLIGHT INSPECTION

A. OBJECTIVE: To provide training in making a practical determination of whether or not the aircraft is ready for flight.

B. DESCRIPTION: The pilot will be expected to use an orderly procedure in conducting a preflight check of the aircraft in accordance with the checklist provided by the manufacturer or operator. This check covers the aircraft's readiness for flight, including fuel and oil supply, the presence of all required equipment and documents, and its airworthiness as far as can be determined by external inspection.

C. ACCEPTABLE PERFORMANCE: The pilot should know the significance of each item checked, and not overlook any obviously unairworthy condition. The pilot must demonstrate knowledge of the appropriate remedial action for a pilot to initiate for the correction of each unsatisfactory item detected.

STARTING ENGINES

A. OBJECTIVE: To provide standard procedures in engine starting and systems checks in determination of the aircraft's immediate readiness for flight.

B. DESCRIPTION: The pilot will be expected to use proper AFM procedures in engine starting and run up with weather conditions considered as a factor. The proper usage of appropriate checklists combined with attention to and communication with ground marshaller(s) to indicate engine start, GPU connect/disconnect, install/remove chocks, etc. is required.

C. ACCEPTABLE PERFORMANCE: Performance will be evaluated on the basis of the accuracy of the procedures used, and the thoroughness of the engine and related systems checks. Proper starting techniques to assure the least possible chance of damage to the engines will be evaluated.

Note: The pilot MAY be required to demonstrate knowledge of engine starts on cold and hot engines using manual and automatic systems, battery starts, generator assisted starts, and GPU starts.

TAXIING

A. OBJECTIVE: This procedure provides training in smooth, safe, and practical taxi operations with and without Nose Wheel Steering (NWS).

B. DESCRIPTION: When ready to taxi, release the parking brake and, as the aircraft begins to move forward, test the brakes by depressing each brake pedal individually. Check travel, feel and performance. Then depress brake pedals and check for travel, feel and performance. (Brake pedal reaction should feel hard with very little travel.)

Taxi at a moderate speed (a brisk walk) and avoid making fast turns that put abnormal sideloads on the landing gear. Maximum speed for taxiing should be that which would allow the aircraft to be safely controlled in the event of brake failure or steering "hard over". UNLESS PASSING CLOSE TO ANOTHER AIRCRAFT, OR OBJECT, THE NOSE OF THE AIRCRAFT SHOULD ALWAYS CENTER ON THE PAINTED TAXI LINES. The NWS check, will be completed when the aircraft is clear of congested areas.

Taxi without Nose Wheel Steering (NWS) will be accomplished in the same manner, with the exception that directional control will be maintained with differential power and brakes. Prior to taxi without NWS it must be confirmed that the nose wheel will freely caster.

Practice of nose wheel steering inoperative will be accomplished by arming the system and pushing the right speed lever forward approximately ½" off the micro switch.

Taxi operations during periods of excessive outside air temperatures present other factors to keep in mind. The interior of the aircraft can reach extreme temperatures. To help cool the cabin, taxi with speed levers in the high position to increase cooling turbine effectiveness. (Remember you must depress the nose steer button on the power lever to engage the NWS system.) Engine oil temperatures may also become excessive. To reduce excessive oil temperatures, advance the power levers leaving the speed levers in the low position. This will increase airflow over the oil cooler and help aid oil cooling. Approximately 80- 85% is sufficient.

C. ACCEPTABLE PERFORMANCE:

1. Accomplish a proper passenger briefing prior to engine start.
2. Systematically follows the checklist items for Before Start and After Start phases.
3. Displays awareness of safety concerns for bystanders, ground crew and other aircraft and equipment upon starting engines.
4. Preventing aircraft movement after engine start and before ready to taxi.
5. Avoid excessive engine RPM and monitor engine instruments carefully after the start.

KNOW WHERE YOU ARE, WHO AND WHAT IS AROUND YOU AND RAMP SURFACE CONDITIONS RELATIVE TO POTENTIAL PROP OR WIND BLAST DAMAGE.

NORMAL TAKEOFF

A. OBJECTIVE: To provide training in methods and techniques to be employed during a normal takeoff.

B. DESCRIPTION: Prior to takeoff, the performance charts will be reviewed to determine the aircraft reference speeds and torque for the density altitude concerned. The PF will give the takeoff briefing and the V-Speeds.

PF Takeoffs:

The PF will advance and set takeoff power.

At V1 the PF will place both hands on the control yoke and smoothly rotate the aircraft nose-up. The PM will continue to monitor engine instruments, guard the power levers and set the friction lock. After liftoff, when the first indication of positive rate of climb is noted, the PM will call out "Positive Rate". This indication can be confirmed by an upward movement of the altimeter and VSI. The PF will command "Gear Up" when he agrees with the positive rate of climb indication. The PM will move the gear handle up; when all gears are up and locked, he will call "Gear Up".

Single Pilot Takeoff:

The captain will assume all the duties normally performed by the First Officer.

After Takeoff:

The PF will allow the aircraft to accelerate to 140 KIAS adjusting pitch as required to maintain 140 KIAS but not to exceed nose-up pitch. After reaching 500 feet AGL the PM will call "500 feet", and the PF will command "Flaps Up, Climb Check".

Aborted Takeoff:

In the event of an aborted takeoff and the inability to maintain directional control, the nosewheel steering button should be depressed. Differential power and braking should also be utilized as necessary.

Night Takeoff:

Same as normal takeoff.

C. ACCEPTABLE PERFORMANCE:

1. Correct use of nosewheel steering.
2. Tracking maintained down center of runway for takeoff.
3. Rotates smoothly to nose-up and maintains runway heading.
4. Use of proper techniques/procedures.

D. NOTES:

Pilot flying may ask the Pilot Monitoring to precisely set takeoff power after the initial power setting and prior to V1 during the pilot briefing if desired.
Prior to 80 KIAS the PM will establish the charted takeoff power.

CROSSWIND TAKEOFF

A. OBJECTIVE: This maneuver provides training in the more complex control techniques and limitations of the aircraft during takeoff with crosswind conditions.

B. DESCRIPTION: Careful consideration should be given to the effects of a strong crosswind before taxiing to the takeoff position. At the start of the takeoff, the controls are displaced as though the aircraft were being slipped into the wind. When the aircraft becomes airborne, the upwind wheel leaves the ground last. The aircraft should remain in slipping flight until clear of the ground and then allowed to crab into the wind to continue the flight path straight out the extension of the runway centerline.

C. ACCEPTABLE PERFORMANCE:

1. Track maintained down center of runway for takeoff.
2. Flight path correctly maintained after takeoff.
3. No skipping or sideloads imposed on gear during takeoff.

REJECTED TAKEOFF

A. OBJECTIVE: This maneuver provides training in positive aircraft control while stopping the aircraft when a malfunction occurs during the initial takeoff phase.

B. DESCRIPTION: The takeoff abort maneuver may be called by either crew member. When an abort is called, the pilot will announce the malfunction (time permitting) and state "*Abort, Abort, Abort!*". The abort procedure is a preplanned maneuver. Both crew members must be aware of and briefed on the types of malfunctions that will constitute an abort.

Any malfunction, including amber and red annunciator lights, prior to V1 will constitute an abort.

The power levers should be retarded to ground idle (as directional control permits in the case of a failed engine). Brakes, nosewheel steering and reverse thrust will be used as required to bring the aircraft to a safe stop and perform any immediate action items that may be required. The captain will complete the abort procedures and the SIC (if 2 pilot crew) will notify Air Traffic Control as soon as practical.

If the aircraft has reached V1, the crew should continue the takeoff unless sufficient runway remains to assure a safe stop on the runway OR in situations that the aircraft is not capable of flight due to flight control malfunction, other structural failure, or other abnormal situations which makes continued flight a more dangerous option.

CAUTION: Reverse thrust on the operating engine will cause a yawing moment toward the operating engine which is proportional to the amount of reverse thrust applied. On wet or icy runways, it is possible to apply more asymmetric reverse thrust than can be counteracted by opposite brake, rudder, and nosewheel steering.

Note: Rejected takeoff will not be practiced at speeds in excess of 60 KIAS.

C. ACCEPTABLE PERFORMANCE:

1. Before Takeoff Checklist Completed
2. Alignment of aircraft on centerline.
3. Maintain positive directional control of aircraft.
4. Power reduced smoothly and promptly, braking used as appropriate to conditions.
5. Checklists completed.

TAKEOFF WITHOUT NOSE WHEEL STEERING

A. OBJECTIVE: To provide training for takeoff conducted without nosewheel steering.

B. DESCRIPTION: The principal difference in techniques between a takeoff without NWS and normal takeoff is that a "standing start" is used for no NWS. When the aircraft is aligned with the runway, the brakes should be held while the power is advanced. When the torque reaches approximately 40% the PF will release the brakes and continue to advance and set the power. The PF will maintain directional control with slight brake pressure, differential power, rudder, or a combination.

C. ACCEPTABLE PERFORMANCE:

1. Same as normal and crosswind takeoff for existing conditions.

CONTINUOUS ALCOHOL/WATER INJECTION (CAWI) TAKEOFF

A. OBJECTIVE: To demonstrate the system checks and use of CAWI and associated performance charts for takeoff.

B. DESCRIPTION: The principal difference in techniques between a CAWI and normal takeoff is that a standing start is used for the CAWI takeoff. When the aircraft is aligned with the runway the brakes should be held while the power is advanced evenly. The PF will continue to advance the power towards 40% and call for "Water On". At this point the PM will turn on the CAWI, note that both green AWI pump lights are illuminated, and check for symmetrical torque increase.

Normal takeoff calls and procedures will be followed from this point. When the CAWI is turned off engine torque may decrease by as much as 35%. The PM will turn off the CAWI when the climb check is called for by the PF.

C. ACCEPTABLE PERFORMANCE:

1. Same as normal and crosswind takeoff for existing conditions.

ENGINE FAILURE DURING TAKEOFF

A. OBJECTIVE: To provide the pilot with the skill and knowledge required to cope with an engine failure during any flight phase from left or right seat, from start of takeoff roll to reaching a safe maneuvering altitude.

B. DESCRIPTION: All simulated engine failures for this maneuver will be produced by retarding a power lever. The right engine is the critical engine and will create the more challenging directional control problem if it is rendered inoperative.

Takeoff before V1

In this situation, both power levers should be retarded immediately to Ground Idle and the takeoff aborted using prompt braking action and reverse as required. Care must be exercised when using reverse during single engine operations to avoid excessive asymmetrical thrust as described in the "Rejected Takeoff".

Takeoff after V1

The PF experiencing an engine failure will set Max. Power to maintain directional control with rudder, at VR, rotate to takeoff attitude (approximately 10° pitch up) and establish a bank into the operating engine.

The after the aircraft is off the ground the PM will call "Airborne". The PF will, when he agrees, command "Gear Up". V2 should be maintained until 500 feet AGL. At this point the inoperative engine should be "identified and verified". The PM will verify the inoperative engine by torque indication. During this time the PM shall continuously observe that the operating engine to set at max power.

The PF will guard the operative engine Stop & Feather Knob and command the PM to put pull the appropriate Stop & Feather knob. PM will call 115 KIAS, PF will command "Flaps Up", the PM complies. The PM will notify ATC of the emergency. The PF will accelerate to VYSE, and call for "Engine Failure Checklist – Take-off continued at or above V1" from the top.

C. ACCEPTABLE PERFORMANCE:

1. Track maintained down center of runway for takeoff.
2. Flight path correctly maintained after takeoff.
3. No skipping or sideload imposed on the gear during takeoff.
4. Proper single engine control input is maintained throughout flight.

CLIMB AND CLIMBING TURNS

A. OBJECTIVE: These maneuvers provide practice in controlling the aircraft during a climb with normal angles of bank while scanning the area for other aircraft.

B. DESCRIPTION: Climbs and climbing turns will be made in clean and takeoff configuration with climb power. Climbing turns to a predetermined headings up to 360° will be practiced. In climbing turns, 30º max angle of bank can be used to demonstrate loss of performance with a rise in "G" forces. Normal banks will not exceed of 30° bank under Part 135 flight operations.

CLIMB PROCEDURE: When reaching 500 feet, ensure airspeed is above VYSE, call for flaps up, then continue climb to 1000 feet AGL. After reaching 1000 AGL, the "Climb Check" will be completed, however, other duties such as contacting departure, clearing the traffic pattern, etc., can take precedence over completing the checklist.

C. ACCEPTABLE PERFORMANCE:
1. Performs clearing turns
2. Altitude: +/- 100 feet.
3. Bank +/- 5 º
4. Airspeed +/- 10 KIAS.
5. Recovery within 10º of assigned heading.

SHALLOW AND MEDIUM TURNS

A. OBJECTIVE: These maneuvers provide practice in controlling the aircraft during normal angles of bank.

B. DESCRIPTION:

1. Shallow bank turns involve bank angles up to 15° .
2. Medium turns involve bank angles up to 25º .
3. A pilot's instruction will include the following items:
   a. Checking for traffic before starting turns
   b. Use of rudder to overcome adverse aileron yaw.
   c. Effect of speed on control forces and responses.
   d. Effect of "G" forces in a turn.
   e. Turns in the clean configuration at cruise speed, and in the takeoff and landing configuration.

C. ACCEPTABLE PERFORMANCE:

1. Airspeed: +/- 10 knots.
2. Bank within: +/- 5º of desired angle.
3. Altitude within: +/- 50 feet shallow turn.
4. Altitude within: +/- 100 feet medium turn.
5. Recovery to assigned heading within: +/- 5° shallow turn.
6. Recovery to assigned heading within: +/- 10º medium turn.
7. Ball not more than ½ diameter out of center due to skids or slips.

STEEP TURNS

A. OBJECTIVE: Steep turns allow the pilot to become familiar with the flight characteristics of the SA-227. This maneuver affords practice in controlling the aircraft in pitch and bank with greater than normal bank angles, and developing the pilot's instrument scan.

B. DESCRIPTION:

Steep Turn – Steep turns typically involve banks of two predetermined headings up to 360. The pilot will stabilize the aircraft in level flight at 170 KIAS. (Approximately 35% torque will result in 170 KIAS depending on aircraft weight and density altitude.) The aircraft will then be smoothly rolled into a bank turn. Fifteen degrees prior to the completion of the first of heading changes, roll out of the turn and stabilize the aircraft in straight and level flight or, at the discretion of the instructor pilot/check airman, reverse the direction of turn and repeat the maneuver.

Power – As bank angle increases to 30º, an additional 5-10% torque should be added to maintain airspeed.

Pitch – As the aircraft rolls into 45° of bank, the pilot will need additional nose up pitch to maintain altitude. This may be accomplished by adding 3-6 beeps of trim.

Recovery – The bank should be smoothly reduced to wings level starting approximately 15º prior to reaching the desired heading. The back pressure force will need to be released as the increase in lift is gained, due to the reduced bank. When the maneuver is completed, the power should be reduced to the initial power setting to hold 170 KIAS, and the aircraft retrimmed to maintain level flight.

C. TECHNIQUE:

1.	Altitude	Safe Altitude for current conditions.
2.	Speed Levers	100%
3.	Airspeed	170 KIAS
4.	Torque	Approximately 35%
5.	Bank	45º
6.	Torque	Approximately 40-45%
7.	Heading	Left & Right turns
8.	Torque	Reduce to approximately 35%

D. ACCEPTABLE PERFORMANCE:

1. Performs clearing turns
2. Altitude +/- 100 feet.
3. Bank +/- 5º.
4. Airspeed +/- 10 KIAS.
5. Recovery within 10º of assigned heading.

STALL RECOGNITION & RECOVERY

A. OBJECTIVE: To familiarize the pilot with the flight characteristics of the SA-227 at critically slow airspeeds and provide training to recognize and recover from an impending or actual stall. In addition, they afford the pilot an excellent opportunity to become familiar with the flight characteristics of the SA-227 at varying airspeeds and configurations.

B. DESCRIPTION: Approaches to stall warning activation should be practiced at a Safe Altitude.

The instructor may at his discretion request that the stall be done in a turn. In that case, the PF will use a 15° bank for Takeoff/Departure Stalls. Unless otherwise stated, recoveries will be initiated at the first indication of stall.

The PF will advance the power levers towards maximum power and will roll the wings level. All recoveries should be made with a minimum loss of altitude. After a positive rate of climb is established, the PM will call out "positive rate" the landing gear should be raised. If the flaps are extended more than ½, they should be raised in increments on command of the PF. The altitude at which the stall recover was initiated should be maintained throughout the recovery. As airspeed increases the flaps should be retracted. If the flaps are at ¼, they should be left in that position until reaching 115 KIAS, then raised. At the point the PF should return to desired speed and altitude and set power as required. At this point the maneuver is considered to be complete.

C. STALL AVOIDANCE SYSTEM (SAS). As covered in ground training, the Metroliner is equipped with a SAS system that is required to be operational for all flight operations per Type Certificate. (ref AMF Limitations pages). The SAS is NOT MELable and required due to the aircraft tendency to "have undesirable stall characteristics at aft center of gravity loadings." (Ref AFM p 3-16, etc). Utilization of the SAS is appropriate during Training and Testing Flight Operations.

D. SPECIFIC STALL PROCEDURES:

DEPARTURE CONFIGURATION STALL

Entry – The airplane should be stabilized in straight and level flight. The power levers are then brought to 40% and the speed levers full forward to 100% RPM. The PF will command "Flaps ¼". The landing gear is selected down for departure stalls. Considerable nose-up pitch and trim must be added in order to maintain altitude as the airspeed is reduced. Do not trim below 120 KIAS, as it may result in excessively high nose-up tendency with the application of maximum power. As the airspeed reaches 120 KIAS, the PF will establish a bank of approximately 20° .

Specific Entry Procedures:

a. Clearing turns -- Complete
b. Power Levers -- 20%
c. Flaps -- Selected ¼
d. Gear -- Down
e. Speeds -- Verify high
f. Pitch -- Maintain altitude
g. Bank -- Established at 120 KIAS

Recovery – At the first sign of the stall, unless otherwise stated, the PF will set max power. The PM will call out "Positive Rate" the landing gear should be raised on command of PF.

MINIMIZING ALTITUDE LOSS IS DESIRABLE BUT THE PF MUST REDUCE THE ANGLE OF ATTACK AS REQUIRED TO RECOVER FROM AN IMPENDING STALL IN ANY CONFIGURATION.

As the airspeed reaches 115 KIAS, the PF will command "*Flaps Up*". Then the PF should return to desired speed and altitude and set power as required. At this point the maneuver is considered to be complete.

Specific Recovery Procedures:

a. Power -- Maximum
b. Pitch -- Lower to above the horizon
c. Bank -- Roll wings level
d. Gear -- Up
e. Pitch --Reduce gradually to maintain altitude
f. At 115 KIAS -- Flaps Up
g. Speed -- 140 KIAS
h. Power -- As Required

LANDING CONFIGURATION STALL

Entry – The airplane should be stabilized in straight and level flight with power levers at approximately 10% torque. When below flaps speeds, the PF will command "Flaps ¼", "Flaps ½", "Gear Down". Airspeed permitting, the PF will command "Flaps Down". After the flaps are selected full, the power levers are brought to 10% torque. This is the same sequence as a normal approach to landing. The flap extensions from ½ to full will cause the airplane to balloon. This ballooning can be offset by applying a slight amount of nose-down pitch during flap extension. Do not trim below 120 KIAS. As the airplane is reconfigured, the airspeed will decay rapidly. By the time the airplane slows to 110 KIAS nose-up pitch will be needed to maintain altitude prior to the stall. Smoothly continue the pitch increase to reduce airspeed until the first indication of a stall.

Specific Entry Procedures:

a. Clearing turns – Complete
b. Speeds -- High
c. Power Levers -- 10% torque
d. Altitude – Set to initially maintain an approx. 500 fpm decent.
e. Flaps -- Selected ¼ when airspeed permits
f. Flaps -- Selected ½ when airspeed permits
g. Gear -- Down when airspeed permits
h. Before Landing Checklist – Complete
i. Flaps -- Full when airspeed permits
j. Pitch -- Increase to reduce airspeed

Recovery – At the first sign of the stall, unless otherwise stated, the PF set maximum power and reduce Angle of Attack. The PF should call for ***"Flaps ½".*** After a positive rate of climb is established, the PM will call out "***Positive Rate***" the landing gear should be raised on the PF's command. The PF should call for "***Set flaps ¼***" and then ***"Flaps up".***

THE ALTITUDE AT WHICH THE RECOVER WAS INITIATED SHOULD BE MAINTAINED THROUGHOUT THE RECOVERY.

As the airspeed increases, the flaps should be retracted. If the flaps are at ¼, they should be left in that position until reaching 115 KIAS, then raised. Then the PF should return to desired speed and altitude and set power as required. At this point the maneuver is considered to be complete.

Specific Recovery Procedures:

a. Power -- Maximum
b. Gear -- Up after positive rate
c. Flaps -- ¼
d. Pitch -- Lower as required to reduce AOA.
e. Bank -- Roll wings level
f. At 115 KIAS -- Flaps Up
g. When stabilized increase pitch to initiate positive rate of climb.
h. Speed -- 140 KIAS
i. Power – Set power as required.

CLEAN CONFIGURATION STALL

Entry - This stall is identical to the takeoff configuration stall except that the flaps and the landing gear will remain in the up position.

Specific Entry Procedures:

a. Clearing Turns -- Complete
b. Power Levers -- 10%
c. Altitude -- Maintain throughout the maneuver
d. Speed -- Slow to 120-110 KIAS
e. Pitch -- 15º- 20° nose up
f. Bank -- 15° - 30° , if requested

Recovery - The PF will initiate the recovery at the first indication

a. Power -- Maximum
b. Pitch, -- Lower as necessary to reduce AOA and initiate recovery.
c. Bank -- Roll wings level
d. Pitch -- Reduce gradually to maintain altitude
e. Speed -- 140 KIAS
f. Power – Set as required.

D. ACCEPTABLE PERFORMANCE:

1. Prompt and correct control application.
2. No uncontrollable pitching of the nose.
3. No secondary stalls.
4. No abrupt pitch changes during recovery
5. Smooth, positive control of the aircraft during stall entry, the stall and recovery.

WARNING: STALLS OR APPROACH TO STALLS IN THE AIRPLANE DURING ACTUAL OR SIMULATED SINGLE ENGINE FLIGHT OPERATIONS ARE PROHIBITED.

MANEUVERING WITH POWERPLANT INOPERATIVE

A. **OBJECTIVE**: This maneuver provides practice in properly maintaining aircraft control during one of the more critical in-flight emergencies. It develops knowledge of aircraft characteristics under adverse conditions, together with control applications necessary to achieve a maximum margin of safety.

B. **DESCRIPTION:** With one engine feathered or set to zero thrust (10-20% torque). PF will maneuver the aircraft to become familiar with handling characteristics with one engine operative.

Note: Depending on temperature or altitude or both, the aircraft may not be able to maintain altitude if flaps are extended or with the landing gear extended.

C. **ACCEPTABLE PERFORMANCE:**

1. Airspeed: within 5 KIAS of V_{YSE} or higher
2. Altitude: +/- 100 feet if the aircraft's performance has the capability
3. Heading: +/- 5º
4. Bank: 20-30°
5. Power: As required to maintain assigned altitude and airspeed.

WARNING: UNDER NO CIRCUMSTANCES ALLOW THE AIRSPEED TO DECAY BELOW V_{YSE} FOR EXISTING CONDITIONS.

ENROUTE

A. **OBJECTIVE**: To provide standards in VFR and IFR operations for safe navigation of the airspace under VFR and IFR flight conditions and safe handling of the aircraft under normally anticipated emergency situations.

B. **DESCRIPTION:** The pilot will be asked to demonstrate the use of pilotage and/or radio navigation for VFR or IFR flight. The pilot will be expected to be able to execute a cross-country flight which he has planned before the flight. The cross-country demonstration will be of sufficient duration to allow the examiner to evaluate the pilot's ability to navigate by pilotage and/or radio navigation and follow instructions issued by ATC.

The demonstrations required will vary as necessary with the equipment installed and the type of flight simulated. The pilot will be required to demonstrate, or have practical operating knowledge of all aircraft systems and special equipment installed.

Emergency operations such as the emergency extension of the landing gear, emergency fuel system management, manual operation of pressurization, and use of auxiliary hydraulic and standby electrical systems will be performed when practical.

C. **ACCEPTABLE PERFORMANCE**:

1. The enroute flight will be evaluated on the basis of the pilot's ability to follow the intended course, correctly identify checkpoints, maintain heading and altitude within established tolerances, provide reasonable estimates to times over checkpoints, and plan alternate courses during flight.

2. The pilot will be expected to have an accurate knowledge of emergency procedures applicable to the aircraft used and will be evaluated on the accuracy of their application.

3. The use of appropriate checklists will be mandatory during all normal, emergency, and abnormal operations.

EMERGENCY DESCENT

A. **OBJECTIVE**: This maneuver provides training in recommended procedures for establishing the highest practical rate of descent available during emergency conditions arising from a sudden loss of pressurization, uncontrollable fire/smoke or any other situation demanding an immediate and rapid descent.

B. **DESCRIPTION:** The primary purpose of this maneuver is to descend the aircraft as rapidly as practical to a safe attitude. In order to maintain positive 'G' forces, and for the purpose of clearing altitudes below, a turn should be established in the initial descent for a heading change for better visibility or as directed by ATC. This maneuver should be performed with the aircraft configured as follows:

1. Speed Levers High (100% rpm)
2. Power Levers Flight Idle
3. Flaps ½
4. Gear Down
5. Pitch Down 10º
6. Speed 173 KIAS
7. Start turn and descent

Performance of this maneuver should strictly adhere to the procedures outlined in the Emergency Descent Checklist. In addition, for crew standardization purposes, the PF will be required to demonstrate knowledge of the following:

1. At the onset of the emergency of PF will command the PM to don his mask, The PM will remove his headset, don oxygen mask, smoke goggles (if required), position the *MIC* switch to the *MASK* position and select speaker. While the PM is donning his mask the PF will set up the aircraft for the emergency descent, turn off the airway, and start down.

2. Once the PM has accomplished the above and reestablished communication with the PF, he will take the controls of the aircraft momentarily and continue down from that point. The PF will don his mask and smoke goggles (if required), position the MIC switch to the *MASK* position and select speaker. The *Passenger Oxygen Valve* will be turned on at this time by the nearest crew member. The PM will be responsible for distributions of passenger mask(s) and briefing of the passengers.

3. Once the above is completed, the PF will again assume control of the aircraft, advise ATC of intentions, and squawk 7700. The PF will reestablish communication with the PM and call for the "*Emergency Descent Checklist*". Once completed, any other required checklists should be completed. MSA/MEA/MOCAs must be known before descent below FL 180.

Recovery - At approximately 1000 feet above the desired/assigned altitude the PF will command "*Gear Up, Flaps Up*" while adding approximately 40% torque and leveling off at the assigned altitude.

Note: A pitch attitude of approximately 15º nose-down will allow the airplane to stabilize very close to the gear limit speed in the 1/2 flap configuration.

This procedure results in a descent from 31,000 feet to 15,000 feet within 3.5 minutes when initiated from cruise power and airspeed. After the aircraft is at a safe altitude and the cockpit/cabin environment is safe, the PM will remove his mask and smoke goggles, return the *MIC* select switch to BOOM position, and stow the mask. That person will then take control of the aircraft to allow the other crew member to remove and stow their mask.

C. **ACCEPTABLE PERFORMANCE:**

1. Maintain positive aircraft control and 'G' forces.
2. Do not exceed designated maximum speeds.
3. Recovery at assigned altitude.
4. Proper use of checklist.

INSTRUMENT HOLDING PROCEDURES

A. **OBJECTIVE:** This maneuver provides practice in instrument holding pattern procedures.

B. **DESCRIPTION:** Holding will be accomplished at 160 KIAS. (torque to +/- 30%).

Decelerate to holding airspeed within 3 minutes prior to the holding fix. The lower airspeed will require less power and allow prolonged holding and fuel economy while retaining minimum power for altitude and good aircraft control.

Outbound leg Time will be 1 minute below 14,000 ft. and 1 ½ minutes above 14,000 ft.

Entry –

1. Parallel Procedure: When crossing the fix, turn to a heading to parallel the holding course outbound on the non-holding side for I minute, then turn in the direction of the holding pattern more than 180, and return to the holding fix or intercept the holding course inbound.
2. Teardrop Procedure: Fly to the fix, turn outbound to a heading for a 30º teardrop entry within the pattern, on the holding side of the fix for a period of 1 minute, then turn in the direction of the holding pattern to intercept the inbound holding course.
3. Direct Entry Procedure: Fly directly to the fix and turn to follow the holding pattern.

C. **ACCEPTABLE PERFORMANCE:** Adheres to holding procedures as listed in the AIM and outlined above.

1. Altitude: +/- 100 feet
2. Airspeed: +/- l0 knots
3. Uses proper wind drift correction to maintain the desired radial, track or bearing.

INSTRUMENT APPROACHES: GENERAL

A. OBJECTIVE: Both pilots will review the approach chart and be familiar with all phases of the approach and exchange information as to instrument approach procedures and/or special landing procedure.

During the Descent Check, the pilot who is going to fly the approach and landing accomplishes the approach briefing. The PF will transfer control of the aircraft and brief the approach. As a minimum, the following items should be determined and briefed:

VISUAL (VFR) APPROACHES:

1. Airport Name; Runway
2. Altitudes:
   a. Field elevation
   b. MSA
   c. Highest Obstacle
3. Vertical guidance (Glideslope or VASI)
4. Straight-In Instrument Approach Course, if applicable. (LOC, VOR, NDB)

Note: From the point at which the aircraft is established on final approach and until 50 feet AGL, the aircraft will be flown on a normal glideslope (3°). If a VASI or electronic glideslope is available, it will be followed to the maximum extent possible.

INSTRUMENT (IFR) APPROACHES:

Prelanding Brief - Approach type, Active Runway, Airport name, Frequencies, Approach components (LOC, NDB, VOR), Outbound/Final approach course(s), Altitudes, Initial approach segment altitude Intermediate segment altitude (if applicable), Final approach fix altitude, Minimums (DH, MDA) Circling procedures (if applicable) Missed approach point (MAP) identification Touchdown Zone Elevation or Field Elevation (as applicable) Missed approach procedure, Notes on Profile View. Utilize all navigation receivers for maximum situational awareness. For example, if there is no DME for this ILS approach being flown, but there is a VORTAC on or near the airport, tune that station in and select the DME to HOLD position for additional position information.

The PM will ensure that all radios are properly tuned and identified.

The PM should advise when visual conditions exist, even if it is prior to DA or MDA. It is recommended that the PF stay on the instruments until the "*Runway in sight ___ o'clock*" or "*Not in Sight*", at which time the PF will transition to visual for landing or execute a missed approach.

Airspeed of 140 KIAS will be used during the final approach segment until the landing is assured, and the airspeed adjusted to not less than the V_{REF} +10. Slow to V_{REF} over the threshold. Single-engine approach speed will be 140 KIAS until landing is assured.

The PM should set the altitude selector to ATC assigned altitudes, critical departure altitudes, desired cruise attitudes, approach altitudes, and approach minimums. Do not set the altitude selector until there is no risk of jeopardizing aircraft control or causing procedural delays.

Approach: The PM will monitor the approach, advise the PF on deviations from published or cleared procedures, and also advise the PF if his airspeed goes above or below the computed approach speeds.

Note: §97.3 indicates Speeds to be utilized to determine the aircraft's approach category. For the purpose of determining whether minimums for an approach, the Approach Category for the SA-227 will be considered "**B**" for Straight-In landings and "**C**" for Circling approaches, HOWEVER, Pilots may determine a next higher approach category should be utilized during high wind or turbulent air conditions. With two pilot crews this is confirmed during the prelanding briefing.

Final Approach: During the approach the PM will monitor engine instruments, crosscheck flight instruments, set radio frequencies as necessary and be ready for gear, flap, and other commands. If malfunctions or deviations occur, he will advise the PF immediately. The PM must also be ready to assist with the missed approach procedures, if necessary

Final Approach Fix Inbound: Both pilots check configuration, altimeters, instruments, and flag warnings. Pilots must assure "GEAR DOWN" indication within 300' AGL.

STABILIZED APPROACH CRITERIA

When within 1,000 feet above touchdown, the aircraft must be within the 'Approach Window'. The exception is in an actual emergency situation when the aircraft is unable to maintain a descent rate that will permit landing on the runway with the landing gear down in a normal situation.

APPROACH WINDOW

1. Within 1/4 scale deflection of the LOC and GS
   a. On VASI or PAPI for a visual approach
   b. Normal glide path if VASI is unavailable
2. VSI less than 1,500 fpm.
3. 140 KIAS until landing assured
4. After landing assured, no less than VREF +10 knots
5. No flight or Nav instrument flags when the landing runway or visual references are not in sight.
6. In Landing Configuration.

Note: (Unless during an emergency situation (simulated or actual), If the aircraft is not within this 'window', a missed approach should be executed. No airspeed calls are required in excess VREF+20. No sink rate calls are required unless the rate is in excess of 1,000 fpm.

Note: Certain authorized procedures require flight profiles that do not conform to the listed Stabilized Approach Criteria. In these cases, the operation is conducted in accordance with specific authorization and procedure design. Pilots are required to complete additional, approach-specific ground training prior to conducting these approaches.

The PM calls out at DH or MDA, "Runway (or visual reference, i.e. approach lights, VASI, REIL, Touchdown zone markings, etc.) "***In sight ___ o'clock***" or "***Nothing in Sight***". If missed approach is executed, the PM will assist in the go-around maneuver, as directed, and coordinate the missed approach instruction with the PF.

The decision to continue approach, land, or execute the missed approach will be made by the Pilot-In-Command. He will command the missed approach by calling out "***Missed Approach***".

If, at any time during the approach, the runway or related lighting is sighted, the PM will advise the PF. The PM must immediately notify the PF anytime visual contact is lost with the approach lights and/or runway environment.

Note: If the pilot believes that they are unable to have the aircraft stabilized at the start of the Approach Window described above (1) discuss with instructor or check pilot PRIOR to initiating the procedure OR (2) advise that it's an emergency and continue the approach OR (3) miss the approach.

WARNING: IF THE AIRCRAFT GOES BELOW DH/MDA, CALL IT OUT IMMEDIATELY.

ILS APPROACH – NORMAL AND SINGLE ENGINE OPERATIONS

A. **OBJECTIVE:** To standardize procedures in terminal arrival area utilizing Instrument Landing System approach procedures during both normal and single engine operations.

B. **DESCRIPTION:** Normal ATC procedures will be followed using the appropriate ATC and navigational facilities. The Flight Instructor or ATC will clear the pilot for the approach. The localizer frequency will be tuned and identified on the appropriate NAV receiver with the appropriate inbound or outbound course set. The secondary VHF NAV receiver should be tuned and identified as necessary to provide fix points along the approach course, if applicable, or may also be tuned to the localizer being used or for missed approach maneuvering. The Descent Check should be completed prior to initial approach fix, speed 140-160 KIAS, and flaps ¼. At 1 dot below the glideslope on the final approach fix inbound, flaps will be extended to ½., the speed levers will be brought forward, the gear will be extended and the Before Landing Check called for. The airspeed will be maintained at 140 KIAS until (DH) decision altitude. At DH the PF will continue the approach and land or execute a missed approach as appropriate for existing conditions. At DH the PM will callout "Runway (or visual reference, i.e. approach lights, VASI, REIL, Touchdown zone markings, etc.) "***In sight ___ o'clock***" or "***Nothing in Sight***". The PF will stay on the instruments until "***Runway in sight***" is called indicating to transition to visual flight conditions. When landing is assured, the aircraft will be slowed to VREF+10 and then slowed to VREF when crossing the threshold. Speeds below VREF are only allowed in ground effect. Additional airspeed on final may need to be maintained as required to compensate for gusts (½ the gust factor).

C. **ACCEPTABLE PERFORMANCE:** The pilot will comply with ATC or Instructor's clearances and fly the airplane in a precise, coordinated manner configuring the airplane appropriately as previously described. The following standards are considered acceptable:

1. Altitude: Initial; +/- 100 feet Final; +50, -0 feet
2. Airspeed: Initial; +/- 10 knots Final; 5 knots
3. Fly the approach with sufficient accuracy to be able to make a safe landing from DH. The maximum allowable deviation from the localizer or glideslope centerline is 1/4 scale defection of either the CDI or the glideslope indicator inside the FAF.
4. Care must be exercised when using reverse during single engine operations to avoid excessive asymmetrical thrust.
5. The same tolerances for single engine as for normal approach and landings with special consideration to airspeed and power control. After landing, the pilot must maintain directional control smoothly while the aircraft is being slowed.
6. Do not move the speed levers from high with the propeller in reverse.

NOTES: For single engine approaches engine failure will be simulated in the airplane with the power lever on the affected engine set to flight idle. Propeller feathering will be simulated in the airplane with affected engine power set to approximately 10% torque. A single engine precision approach and landing will be accomplished with aircraft configuration and procedures identical to a normal ILS approach and landing. After landing and before retarding the power lever aft of flight idle, the pilots should start braking and be ready to use differential braking when going into Beta Mode. Nose wheel steering should be armed for landing. Typically, for training purposes both engines will be used on landing rollout unless specifically stated otherwise. Power setting for the operating engine will need to be adjusted as required to obtain desired positive performance.

RNAV, LOC, LOC-BC, LOC-BC/DME, VOR & VOR/DME, LDA, LDA/DME APPROACHES: NORMAL

A. **OBJECTIVE**: To standardize terminal arrival area procedures utilizing GPS or VHF navigation equipment while conducting non-precision approaches.

B. **DESCRIPTION:** Non precision approaches involve a great deal more planning versus precision approaches. Due to the location of nearly all MAPs on non-precision approaches, it requires a circling maneuver to land despite the fact it is a straight-in approach to a certain runway. For that reason, it is vital to incorporate in the crew briefing a plan for circling in the event it should become necessary. Normal ATC procedures will be followed using the appropriate ATC and navigational facilities. The instructor pilot, check pilot or ATC will clear the pilot for a specific approach. The primary VHF navigational receiver to be used will be properly tuned and identified and the course selector set for the approach. The secondary VHF NAV receiver should be tuned and identified as necessary to provide fix points along the approach course, missed approach point if appropriate, or as a backup for the number one receiver and will be properly tuned and identified.

The Descent Checklist should be completed prior to initial approach fix, speed 140-160 KIAS. Flaps ¼ at the IAF.

After the completion of the procedure turn and prior to the final approach fix, the flaps will be selected to ½. Prior to the FAF the landing gear will be selected down, speeds will be set High and the Before Landing Check called for by the PF. At the FAF (if timed approach) the time will be started and descent initiated. Once inside the FAF, airspeed will be maintained at 140 KIAS until leaving MDA for landing.

On circling approaches, flaps will be maintained at ½ and an airspeed of 140 KIAS will be maintained until the aircraft is ready to begin its final descent for landing. At the MAP, the PF will continue the approach and land or execute a missed approach as appropriate for existing conditions. At the MAP the PF will continue the approach and maneuver the aircraft for landing or execute a missed approach as appropriate for existing conditions. Upon reaching the MAP the PM will callout "***Runway in sight ___ o'clock"*** or "***Nothing in Sight***". The PF will stay on the instruments until "***Runway in sight***" is called indicating to transition to VMC. If a straight-in landing cannot be made execute circling maneuver as previously briefed. The PM should assist by calling out deviations in airspeed and altitude during circling (as briefed). When landing is assured, the aircraft will be slowed to V_{REF} +10 and then slowed to V_{REF} when crossing the threshold. Speeds below V_{REF} are only allowed in ground effect. Additional airspeed on final may need to be maintained as required to compensate for gusts (½ the gust factor).

C. **ACCEPTABLE PERFORMANCE:** The Pilot will comply with ATC and published procedures while configuring the aircraft as previously described for non-precision approaches. The aircraft will be operated in a safe, smooth, coordinated manner. Proper tuning and setting of the radios should be accomplished. The following standards are considered acceptable:

1. Altitude: +50, -0 feet at MDA
2. Airspeed: +10, -0 knots for approach
3. Straight-in or circle for landing not to exceed 30 bank maintaining normal maneuvers and appropriate airspeed for category (B) or (C) as appropriate.

NDB APPROACH

A. **OBJECTIVE:** To standardize terminal arrival area procedures utilizing ADF navigation equipment while conducting non-precision approaches.

B. **DESCRIPTION:** Non precision approaches involve a great deal more planning versus precision approaches. Due to the location of nearly all MAPs on non-precision approaches, it requires a circling maneuver to land despite the fact it is a straight-in approach to a certain runway. For that reason, it is vital to incorporate in the crew briefing a plan for circling in the event it should become necessary. Normal ATC procedures will be followed using the appropriate ATC and navigational facilities. The NDB will be tuned identified, and monitored throughout the approach. It is recommended the PM monitor the station to reduce workload on the PF. The Instructor Pilot or ATC will clear the pilot for a specific approach from any position, or give vectors to final approach segment. Emphasis will be placed on the proper technique in tracking magnetic bearing and the incorporation of planning for a probable circling maneuver.

The Descent Checklist should be completed prior to initial approach fix, speed 140-160 KIAS. After reaching the initial IAF or if radar vectors on base leg, set flaps ¼. The flaps will be extended to ½ and the aircraft speed maintained at 140-160 while on the intermediate approach segment. Prior to reaching the FAF airspeed will be established at 140 KIAS. Then at ½ nm or ½ min. prior to reaching FAF, the gear will be extended, the speeds brought forward and the Before Landing Checklist completed.

At the FAF the time will be started (if timed approach) and the descent initiated. Station passage is confirmed when the ADF needle has made more than a 90 swing. After passing the FAF inbound the airspeed will be maintained at 140 KIAS until leaving MDA for landing.

The pilot will continue the approach and land or execute a missed approach as appropriate for existing conditions. Upon reaching the MAP, the PM will callout "***Runway in sight __ o'clock***" or "***Nothing in Sight***". The PF will stay on the instruments until "***Runway in sight***" is called indicating to transition to visual flight. If a straight-in landing cannot be made a circling maneuver should be executed as previously briefed. The PM should assist by calling out deviations in airspeed and altitude during circling (also briefed). When landing is assured, the aircraft will be slowed to V_{REF} +10 and then slowed to V_{REF} when crossing the threshold. Speeds below V_{REF} are only allowed in ground effect. Additional airspeed on final may need to be maintained as required to compensate for gusts. (½ gust factor.)

D. **ACCEPTABLE PERFORMANCE:** The Pilot will comply with ATC and published procedures while configuring the aircraft as previously described for non-precision approaches. The aircraft will be operated in a safe, smooth, and coordinated manner.

The approach briefing should include plans for circling. The following standards are considered acceptable:

1. Altitude: +50, -0 feet at MDA
2. Airspeed: +10, -0 knots from station inbound
3. Vertical Speed: Not to exceed 1,000 fpm
4. Maneuver for landing: Straight-in or circle for landing not to exceed 30º bank maintaining normal maneuvers and appropriate airspeed for category (B) or (C) as appropriate.
5. Course tolerance: +/- 5° of the published approach course

SINGLE ENGINE NON-PRECISION APPROACHES

A. **OBJECTIVE:** This maneuver provides procedures in accomplishing a non-precision instrument approach and landing after the failure of one powerplant. Single engine non-precision instrument approach and landing procedures should not be considered a normal procedure. It is included in this manual because under certain emergency circumstances a single engine non-precision instrument approach and landing, may be necessary and the maneuver will acquaint the pilot with the problems involved.

B. **DESCRIPTION:** Engine failure will be simulated in the airplane with the power lever on the affected engine set to flight idle. Propeller feathering will be simulated in the airplane with affected engine power set to approximately 10% torque. Power setting for the operating engine will need to be adjusted as required to obtain desired positive performance.

Non-precision instrument approaches involve a great deal more planning versus precision approaches. Due to the location of nearly all MAPs on non-precision approaches, it may require a circling maneuver to land regardless of the fact it is a straight-in approach to a certain runway. For that reason, it is vital to incorporate in the crew briefing a plan for circling in the event it should become necessary. Normal ATC procedures will be followed using the appropriate ATC and navigational facilities. The instructor pilot, check Pilot or ATC will clear the pilot for a specific approach. The primary navigational receiver to be used will be properly tuned and identified and the course selector set for the approach. Any additional navigation receiver should be tuned and identified as necessary to provide fix points along the approach course, missed approach point if appropriate, or as a backup for the number one receiver and will be properly tuned and identified. If using ADF as a primary navigation, the station will be tuned, identified, and monitored throughout its use as primary nav receiver.

The Descent and the Single Engine checklist should be Reviewed prior to initial approach fix, speed 140-160 KIAS, and flaps ¼. Except that the landing gear will not be extended until landing is assured. When Landing is assured complete Single Engine Checklist.

At the FAF (if timed approach) the time will be started and descent initiated. Once inside the FAF, airspeed will be maintained at 140 KIAS until leaving MDA for landing.

On circling approaches, flaps will be maintained at ¼, landing gear up, and an airspeed of 140 KIAS will be maintained until the aircraft is ready to begin its final descent for landing. At the MAP, the PF will continue the approach and land or execute a missed approach as appropriate for existing conditions. Upon reaching the MAP the PM will callout "***Runway in sight ___ o'clock"*** or "***Nothing in Sight***". The PF will stay on the instruments until "Runway in sight" is called indicating to transition to visual flight conditions. If a straight-in landing cannot be made a circling maneuver may be executed or missed approach. The PM should assist by calling out deviations in airspeed and altitude during circling. When landing is assured and within 30 of runway centerline the landing gear should be extended, flaps set to ½ and aircraft should leave MDA. Airspeed should be no less than V_{YSE} until committed to land and then slowed to V_{REF} +10 crossing the threshold with touchdown at V_{REF}. Additional airspeed on final may need to be maintained as required to compensate for gusts (½ the gust factor added to V_{REF}).

C. **ACCEPTABLE PERFORMANCE**: The Pilot will comply with ATC and published procedures while configuring the aircraft as previously described for single engine non-precision approaches. The aircraft will be operated in a safe, smooth, coordinated manner. Proper tuning and setting of the radios should be accomplished. The following standards are considered acceptable:

1. Altitude: +50, -0 feet at MDA

2. Airspeed: +10, -0 knots for approach

3. Landing Assured: Straight in or Circle for landing not to exceed 30 bank maintaining normal maneuvers and appropriate airspeed for category (B) or (C) as appropriate.

4. Care must be exercised when using reverse during single engine operations to avoid excessive asymmetrical thrust.

5. The same tolerances for single engine as for normal approach and landings with special consideration to airspeed and power control. After landing, the pilot must maintain directional control smoothly while the aircraft is being slowed.

6. Do not move the speed levers from high with the propeller in reverse.

NOTE: Special attention should be given to airspeed control due to single engine operations and low drag configuration.

CIRCLING APPROACHES (NORMAL)

A. **OBJECTIVE**: This maneuver is used to establish standard procedures in maneuvering the aircraft under weather conditions at the published circling minimum descent attitude and landing on a runway from a circling maneuver.

B. **DESCRIPTION**: The approach to the airport from the FAF is accomplished with the landing gear extended, ½ flaps and 140 KIAS. Prior to the FAF the Before landing checklist should be accomplished. Maneuver the aircraft onto the downwind leg at a position not more than the published minimum visibility distance from the landing runway. Visual reference with the airport environment must be maintained throughout the maneuver. Maintain MDA until a normal descent can be made and slow to V_{REF} +20. As part of the approach briefing the PM should be briefed on making callouts during the circling maneuver on deviations in airspeed and altitude. The turn and rate of descent should be established as to bring the aircraft smoothly in alignment with the runway utilizing a normal 3 glide path to the runway. Plan to cross the threshold at V_{REF} +10 with touchdown at V_{REF}. Speeds below V_{REF} are only allowed in ground effect.

It should be emphasized that excessive angles of bank (>30º) are not acceptable under Part 135 operations and must be avoided.

NOTES: For a circling approach with one engine inoperative, do not extend the landing gear or more than flaps ¼ until landing is assured. The size of the circling area varies with the approach category of the aircraft, as shown in the following table. To define the limits of the circling area for the appropriate category, draw an arc of suitable radius from the center of the threshold of each useable runway. Join the extremities of the adjacent arcs with lines drawn tangent to the arcs. The area thus enclosed is the circling approach area. A minimum of 300 feet of obstacle clearance shall be provided in the circling approach area. There is no secondary obstacle clearance for the circling approach.

CIRCLING APPROACH AREA RADII

Approach Category	Aircraft Maximum Speed	Radius (Miles)
A	91 kts	1.3
B	120 kts	1.5
C	140 kts	1.7
D	165 kts	2.3
E	>165 kts	4.5

Source: TERPS/AIM

C. **ACCEPTABLE PERFORMANCE:**

1. Attitude: +100, -0 feet at MDA
2. Airspeed: +10, -0 knots
3. Bank Angle: 30º Maximum
4. Vertical Speed: Not to exceed 1,500 fpm

MISSED APPROACH

A. OBJECTIVE: To provide standard procedures in the execution of missed approach procedures in various aircraft configurations.

B. DESCRIPTION: At the completion of an instrument approach, at either MDA or DH, as applicable, the PF must make the decision to continue to land or execute a missed approach. If the runway is not in sight at the MAP the PM will call ***"Nothing in sight, missed approach".*** To execute a missed approach, the PF will set max power and call for ***"Flaps ¼ "*** and adjust the pitch attitude to 10° nose up to initiate a climb. After a positive rate of climb has been established and announced by the PM, the PF will then call for "Gear Up" and airspeed accelerating to VYSE. . The PM will announce "500 feet". The PF will call for "***Flaps Up, Climb Check***" and execute the published missed approach procedure.

C. ACCEPTABLE PERFORMANCE:

1. Desired altitude at 100' and heading 5° .
2. Airspeed +/- 5 knots @ 140 KIAS.
3. Accurately tracks course, radials and bearings.
4. Correct sequence of procedures.
5. Compliance with published missed approach procedures or ATC instructions as appropriate.

6 Altitude not below MDA or DH as appropriate.

SINGLE ENGINE MISSED APPROACH/GO-AROUND

A. OBJECTIVE: To provide established procedures from the Airplane Flight Manual for the execution of a single engine missed approach or go around. Single engine missed approach/go-around should not be considered a normal procedure. It is included in this manual because under certain emergency circumstances, a single engine missed

approach/go-around may be necessary and the maneuver will acquaint the pilot with the problems involved.

B. DESCRIPTION: Single engine missed approach/go-around should be avoided if possible. If committed to go-around or go missed, do not allow the airspeed to drop below VYSE. At the completion of an instrument approach, at either MDA or DH, as applicable, the PF must make the decision to continue to land or execute a missed approach. If the runway is not in sight at the MAP the PM will call ***"Nothing in sight, missed approach"***. To execute a single engine missed approach, the PF will advance the power levers to maximum power and call for ***"Flaps ¼"*** and adjust the pitch attitude to 10 Nose up to initiate a climb. "***Gear Up***" should be called for immediately by PF and set by the PM.

Airspeed should be Vyse. The bleed air switch should be turned off and engine anti-ice off unless required. The PM will announce "***500 feet***". The PF will call for "***Flaps up, Climb Check***" and execute the published missed approach procedure.

NOTE: Bold Items Denotes Memory Items

1. **Power Lever …... Max.**
2. **Landing Gear …. Up**
3. **Flaps Up (in increments)**
4. **Airspeed ..... VYSE**

VISUAL APPROACH AND NORMAL LANDING

A. **OBJECTIVE:** To standardize and establish safe flight operations throughout the landing traffic pattern, including touchdown and rollout. It is used to develop proper techniques in power and control usage at relatively low airspeeds during the critical phases of final approach and touchdown.

B. **DESCRIPTION**: Prior to traffic pattern entry, power should be reduced, speed levers set to high, flaps set ¼ and airspeed no more than 160 KIAS. Unless otherwise directed by ATC, entry to the traffic pattern should be at midfield on a 45 angle to the downwind leg at pattern altitude (1500 feet AGL). On downwind leg flaps should be set to ½. When abeam the point of intended landing, extend the gear, set speeds high, and complete "Before Landing Check". Begin normal descent of 500-600 fpm.

After turning base, A minimum speed of 140 KIAS should be maintained until on final approach. While on final approach, the pilot will maintain a normal approach angle and if, VASI or electronic glideslope is available, it will be used. At 500', flaps should be set to full when the PM calls "***500 ft***", verify Landing Gear is Down and call "***Gear Down***" or "***Gear NOT Down***". PM should also verify airspeed of VREF +20 established and announce if any discrepancies. Crossing runway threshold, airspeed of VREF +10 should be maintained with touchdown made at VREF. The landing will be made on the centerline in the touchdown zone of the runway with a smooth transition from approach to landing attitude accompanied by smooth and coordinated power reduction. The "***After Landing Check***" will be accomplished after contact is established with Ground Control and the aircraft is clear of the runway and any narrow taxiways or intersections.

Note: Special care should be taken to prevent power levers from being retarded aft of flight idle until the airplane is securely on the ground. Selecting Ground Idle or Beta aft of the ground idle position for speed reduction after landing is most effective at higher indicated airspeeds.

C. **ACCEPTABLE PERFORMANCE**:

1. Touchdown should be made in the touchdown zone with the runway centerline between the main gear. Don't go below glidepath indicator unless previously discussed with Instructor/Check Pilot.
2. Maintains a stabilized approach and the desired airspeed within 5 knots.
3. Completes after-landing checklist.

D. **AIRCRAFT NOTES:**

1. Do not use full reverse above 40 KIAS.
2. Do not move the speed levers from high to low with the propellers in reverse.

CROSSWIND LANDING

A. **OBJECTIVE:** To standardize and establish safe flight operations through the entire landing traffic pattern, including touchdown and rollout. It is used to develop proper techniques in power and control usage at relatively low airspeeds during the critical phases of final approach and touchdown in the more complex control techniques and limitations of the aircraft during crosswind landing crosswinds.

B. **DESCRIPTION:** Aircraft configuration and pattern entry is identical to NORMAL APPROACH. On final approach, the crab into the wind is changed to side slip into the wind just above touchdown. The force held on the controls will be proportionate to the crosswind. The slip must keep the flight path and the fuselage of the aircraft aligned with the runway centerline. As ground contact is made on the upwind wheel, the controls are gradually moved farther in the same direction to compensate for loss of control effectiveness as speed decreases.

C. **ACCEPTABLE PERFORMANCE**

1. Track maintained down center of runway for landing.
2. No drifting or crabbing at touchdown.
3. No skipping sideloads imposed on gear during landing.
4. Proper control input to ensure safe transition from air to ground operations.

D. **AIRCRAFT NOTES**:

1. The demonstrated crosswind component is 20 knots.

2. DUE TO THE RUDDER PEDAL GEOMETRY INADVERTENT BRAKE APPLICATION MAY OCCUR ON THE UPWIND WHEELS. THIS CAN RESULT IN THE LOSS OF DIRECTIONAL CONTROL UPON TOUCHDOWN.

NO-FLAP APPROACH AND LANDING

A. **OBJECTIVE**: To provide established procedures from the Airplane Flight Manual for the execution of approach landing in the event of failure of components of the landing flap system.

B. **DESCRIPTION**: No flap landings will be conducted as a normal landing except without flaps and from a speed equal to l.3 VS at 0 flaps. The pilot should be aware that the touchdown will be in a higher-than-normal nose-up attitude and that the landing roll will be longer due to the loss of drag caused by the no flap condition and higher touchdown speed.

C. **ACCEPTABLE PERFORMANCE**:

1. Touchdown should be made on the centerline of runway.
2. Touchdown is not short of nor excessively beyond desired point.
3. Airspeed +10, -0 knots before over runway.
4. No excessively high sink rates.

D. **AIRCRAFT NOTES**:

1. An alternate procedure to determine approach speed with flaps up is to add 10 KIAS to the full flaps approach speed provided by figures 4-56 or 4-57 in the Airplane Flight Manual.
2. Compute flaps up landing distances by adding 74% to the landing distances
3. Do not use full reverse above 90 KIAS or before Beta Lights are illuminated.
4. Do not move the speed levers from High with the propellers in reverse.

LANDING USING SIMULATED MANUAL GEAR RELEASE

A. **OBJECTIVE:** To provide established procedures from the Airplane Flight Manual for the execution of landing with simulated failure of DC electrical power or hydraulic pressure components of the landing gear system.

B. **DESCRIPTION:**

1. Approach and landing configuration
   a. If DC electrical failure only:
      i. Normal flap configuration, flaps 1/2 until landing is assured
      ii. When landing is assured, extend landing gear by manual release system

(Emergency Checklist)

      iii. Select full flaps
   b. If hydraulic pressure failure, follow no-flap approach and landing procedures

(Emergency Checklist)

      i. The runway is in sight and when landing is assured, extend landing gear by manual release system

(Emergency Checklist)

2. Pilots should be aware that nose wheel steering will not be available following manual gear extension due to hydraulic failure and it should not be armed.

C. **ACCEPTABLE PERFORMANCE**:

1. The Pilot will comply with the recommended procedures outline in "B" above.
2. The Pilot will be evaluated on the basis of judgment, crew coordination and use of the emergency gear extension checklist.
3. The same tolerances applicable to normal approach and landing with special consideration to airspeed until landing is assured.

Notes: If the failure was in the landing gear electrical control system, the hydraulic pressure gauge will continue to indicate 2000 psi. In this case, the pressure to the gear down actuators can only be detected by the effort required to move the emergency hand pump. Hydraulic pressure to the nose wheel steering system will not be available following landing gear emergency extension required by either hydraulic failures or gear position selector valve electrical failures. Do not arm nose wheel steering.

SINGLE ENGINE RATE OF CLIMB WILL BE NEGATIVE FOR MOST CONDITIONS WITH THE LANDING GEAR EXTENDED.

LANDING WITH SIMULATED POWERPLANT FAILURE

A. **OBJECTIVE:** This maneuver provides procedures in accomplishing an approach to land (and landing) after the failure of one powerplant.

B. **DESCRIPTION:** Engine failure will be simulated in the airplane with the power lever on the affected engine set to flight idle. Propeller feathering will be simulated in the airplane with affected engine power set to approximately 10% torque. Power setting for the operating engine will need to be adjusted as required to obtain desired positive performance

A single engine approach and landing can be accomplished with the flight path and procedures identical to a normal approach and landing, with four noteworthy exceptions:

1. Airspeed should be 140 KIAS until landing is assured.
2. Flaps will not be extended beyond 1/4 until landing is assured. In this configuration, approach speed should be V_{REF}+20. Over the threshold the speed should be reduced to V_{REF}.
3. After landing and before retarding the power lever aft of flight idle, the pilot should start braking and be ready to use differential braking when going into Beta Mode.
4. Nose wheel steering should be armed for landing.

C. **ACCEPTABLE PERFORMANCE:**

1. Care must be exercised when using reverse during single engine operations to avoid excessive asymmetrical thrust.
2. The same tolerances as for normal approach and landings with special consideration to airspeed and power control until landing is assured. After landing, the pilot must maintain directional control smoothly while the aircraft is being slowed.
3. Do not move the speed levers from high with the propeller in reverse.

Note: SINGLE ENGINE RATE OF CLIMB WILL BE NEGATIVE FOR MOST CONDITIONS WITH THE LANDING GEAR EXTENDED.

AFTER LANDING AND SECURING THE AIRCRAFT

A. **OBJECTIVE:** To provide training in proper procedures for stopping engines and post flight inspections. The pilot will be expected to use proper procedures for engine shutdown and securing the aircraft. Emphasis will be placed on engine cooling times and start lock engagement. During post flight inspection, the pilot should demonstrate a practical knowledge of the aircraft systems which would allow any pertinent item needing attention to be properly reported.

B. **ACCEPTABLE PERFORMANCE**: Will be evaluated on the adherence to the checklist and the use of correct procedures. Proper techniques to assure best engine cool down and to lessen the chance of engine damage will be evaluated. On post flight the pilot should know the significance of each item checked and not overlook any obvious discrepancy.

WINDSHEAR ESCAPE PROFILES

A. **GENERAL**

Awareness and recognition when conditions are such that moderate windshear may be encountered even though they are not reported, the following precautions and escape maneuvers are recommended.

B. **TAKEOFF**

1. Use maximum available takeoff power settings instead of reduced power procedures.
2. Use the longest suitable runway.
3. Maximize available airspeed margins between V1/VR and stall speed through delayed rotation. The delayed rotation speed must not exceed tire speed limitations.

C. **LANDING**

1. Add an appropriate airspeed correction to your VREF speed. (i.e. 1/2 of the reported gust factor).
2. Select the longest runway available that avoids areas of suspected windshear.

D. **RECOGNITION**

1. As a guideline, marginal flight path control may be indicated by uncontrolled changes from normal steady state flight conditions in the following areas:
   - indicated airspeed.
   - vertical speed.
   - pitch attitude.
   - glide slope displacement.
   - heading variation.

E. **ESCAPE**

1. If flight path control becomes marginal below 1,000 feet above the ground on takeoff or landing, accomplish the following procedure without delay. The first two steps should be accomplished simultaneously.
   - Power - Set Maximum.
   - Aggressively position the power levers to ensure maximum available power is attained.
   - Pitch – Begin to rotate toward 15º pitch up.
   - Rotate smoothly at a normal rate toward a target pitch altitude of plus15° .
     - **Stop rotation if buffet occurs**.
   - Control flight path with pitch as necessary.

Check vertical speed, airspeed, and radar altitude if available. If the aircraft is maintaining level flight or climbing, maintain 15º pitch attitude. If the aircraft is descending, adjust pitch attitude smoothly and in small increments to avoid ground contact. Reducing airspeed to as low as V1 is acceptable to avoid ground contact, however, be aware that an airspeed as low as V1 leaves little margin for flare.

- Control pitch attitude in a smooth steady manner to avoid overshooting the attitude at which stall warning is initiated. Do not use more pitch than is necessary to control the vertical flight path since the resulting high drag and inefficient angle of attack will cause a lower recovery altitude. Control column forces necessary to control the flight path may vary from a push force to a heavy pull force.
- Maintain Configuration. Do not change flap, gear or trim position until terrain contact is no longer a factor.

NOTE: It is recognized that a change in flap position may improve windshear recovery. However, the risk of moving the flaps in the wrong direction or the wrong amount is considered to be greater than the risk of encountering a shear so great that a flap change is needed for recovery. When terrain contact is no longer a factor, continue with a normal go-around procedure.

F. **CALLOUTS:**

The PM must closely monitor and call out pertinent flight path indications and also may call out directive commentary when appropriate (i.e. "***airspeed increasing", "altitude decreasing", "pull the nose up***").

G. **ACCEPTABLE PERFORMANCE:**

The flight crewmembers demonstrate awareness in early recognition, sound judgement and recovery techniques with regard to windshear and make appropriate aggressive actions selecting engine power settings, airplane pitch attitudes and aircraft configurations necessary to avoid ground contact. The flightcrew must also be evaluated on communication skills and crew coordination throughout the procedure.