North Star

AVIATION

Master Checklist

(PA-28-161)

(PA-28-181)

(PA-44-180)

Introduction

This document has been prepared by North Star Aviation, Inc. and is being furnished to students of the flight school in accordance with 14 CFR Part 141.75(a). To better serve our students and promote future improvements to be made, the formatting of this document has changed. Previous versions where provided in separate books for each aircraft. This book contains the required normal and emergency procedures for the safe operation of our aircraft as specified in the respective Piper Information Manuals. In addition to procedures required by Piper, some NSA specific procedures have been added for reference.

Organization

This document has been divided into three separate sections: PA-28-161/181, PA-44 -180, and Appendices. The two aircraft sections are further divided into Normal and Emergency procedures.

Inside the PA-28 section, procedures specific to the Archer (181) will be found in GOLD.

Inside the PA-44 section, procedures specific to non-G1000 equipped aircraft will be found in PURPLE.

In each section, procedures surrounded in red dotted boxes are considered "Memory Items". These procedures are required to be memorized and will be evaluated periodically throughout training.

Revision Control

To allow for improvements based on safety, performance, or standardization, this document is being provided in an easily revisable format. It is the student's responsibility to ensure their copy of this document contains the most current revision(s). A record of revisions can be found on the next page that will track individual page numbers affected by each revision. Each individual page will have its revision number printed in the lower left-hand corner.

Disclaimers

This document is provided for training purposes only and is not intended to replace the required Pilot Operations Manual in each aircraft. In actual Emergency Situations, the POH should be consulted if able. No replication of this document is authorized without the express written consent of North Star Aviation, Inc.

Record of Revisions

Number	Date	Summary of Changes	Affected Pages
Original	July 13, 2011	Original Issuance of Warrior checklist	ALL
Original	Aug. 01, 2011	Original Issuance of Seminole checklist	ALL
Rev 1	Nov. 16, 2011	First Rev. to Warrior Checklist	3, 4, 9, 10, 11, 36
Rev 1	Feb. 22, 2012	First Rev. to Seminole Checklist	ALL
Rev 2	Aug. 02, 2012	Second Rev. to Warrior and Seminole Checklists	3, 4, 9, 10, 11, 36 3, 12, 19, 32
Rev 3	July 01, 2014	Third Rev. to Warrior Checklist	3, 14-36
Rev 3/4	Jan. 01, 2015	Third Rev. to Seminole Checklist Fourth Rev. to Warrior Checklist	ALL ALL
Rev 4	Jan. 13, 2015	Fourth Rev. to Seminole Checklist	9, 10, 17
Rev 5	April 13, 2015	Fifth Rev. to Warrior Checklist	2, 9, 12, 18, 19
Rev 5	Feb. 22, 2016	Addition of G1000 procedures to the Seminole checklist	ALL
Rev 6	Jan. 13, 2016	Sixth Rev. to Warrior Checklist	9
Rev 7	Aug. 27, 2018	Combination of Warrior, Archer, Seminole, and company Procedures in one manual.	ALL
Rev 8	Jan. 8, 2019	Small Formatting changes, Updated Procedures for G1000 NXi and Fuel Injected Engines.	ALL

Record of Revisions Cont'd

Number	Date	Summary of Changes	Affected Pages

NOTE

Prior to beginning the preflight walk around, check oil, fuel, and windshield and notify line service if needed.

COCKPIT INSPECTION

AIRCRAFT DOCUMENTS ..... VERIFY
HOBBS/TACHTIME ..... CHECK
PARKING BRAKE ..... SET
COMPASS DEV CARD ..... CHECK
PITOT/STATIC ..... DRAIN
MAGNETO SWITCH(ES) ..... OFF
ELECTRICAL SWITCHES ..... OFF
AVIONICS ..... OFF
CIRCUIT BREAKERS ..... CHECK IN
BATTERY/MASTER SWITCH ..... ON
FLIGHT CONTROLS ..... CHECK
FUEL GUAGES ..... CHECK
ANNUNCIATOR PANEL LIGHTS ..... CHECK
EXTERNAL LIGHTS ..... ON/CHECK
PITOT HEAT ..... ON/CHECK
STALL WARNING HORN ..... CHECK
EXTERNAL LIGHTS ..... OFF
PITOT HEAT ..... OFF
BATTERY/MASTER ..... OFF
EMPTY SEAT BELTS ..... FASTEN
STAB/RUDDER TRIM ..... CHECK
FLAPS ..... SET 40°
WINDOWS/WINDSHIELD ..... CLEAR
TOW BAR/BAGGAGE ..... SECURE

PREFLIGHT INSPECTION

RIGHT WING

FLAPS/HINGES ..... CHECK
AIRLERON AND HINGES ..... CHECK
STATIC WICKS ..... CHECK
WING SURFACES ..... CHECK
WING TIPS AND LIGHTS ..... CHECK
LEADING EDGE ..... CHECK
FUEL TANK ..... CHECK QUANTITY
FUEL VENT ..... CLEAR
FUEL TANK SUMP ..... DRAIN
TIE DOWN/CHOCK ..... REMOVE
MAIN GEAR STRUT ..... APROX 4.5”
TIRE/BRAKEPAD/DISC ..... CHECK
FRESH AIR INLET ..... CLEAR
DOOR HINGES ..... CHECK
WINDSHIELD ..... CHECK

NOSE SECTION RIGHT SIDE

ENGINE COMPARTMENT ..... CHECK
ENGINE BAFFLE SEALS ..... CHECK
OIL ..... CHECK 6-8 QUARTS
COWLING INTERIOR ..... CHECK
COWLING ..... CLOSE AND SECURE
PROP AND SPINNER ..... CHECK
AIR INLETS ..... CLEAR
ALTERNATOR BELT ..... CHECK TENSION
LANDING LIGHT ..... CHECK
NOSE GEAR STRUT ..... APPROX. 3.25” INFLATION
NOSE WHEEL TIRE ..... CHECK
CHOCKS ..... REMOVE

NOSE SECTION LEFT SIDE

ENGINE COMPARTMENT ..... CHECK
ENGINE BAFFLE SEALS ..... CHECK
HOSES/WIRING ..... SECURE
COWLING ..... CLOSE AND SECURE
GASCOLATOR ..... DRAIN
WINDSHIELD ..... CHECK
TEMP PROBE ..... CHECK

LEFT WING

FRESH AIR INLET ..... CLEAR
MAIN GEAR STRUT ..... APROX 4.5”
TIRE/BRAKEPAD/DISC ..... CHECK
TIE DOWN/CHOCK ..... REMOVE
FUEL TANK SUMP ..... DRAIN
FUEL VENT ..... CLEAR
FUEL TANK ..... CHECK QUANTITY
LEADING EDGE ..... CHECK
PITOT MAST ..... UNOBSTRUCTED
TEMP PROBE ..... CHECK
STALL WARNING ..... CHECK
WING TIP AND LIGHTS ..... CHECK
WING SURFACES ..... CHECK
STATIC WICKS ..... CHECK
AILERON AND HINDGES ..... CHECK
FLAPS AND HINGES ..... CHECK

FUSELAGE LEFT SIDE

GENERAL CONDITION ..... CHECK
ANTENNAS ..... CHECK
UNDERBELLY ..... CHECK

EMPENNAGE

GENERAL CONDITION ..... CHECK
FRESH AIR INLET ..... CHECK
RUDDER ..... CHECK
STABILATOR ..... CHECK
ANTISERVO TAB ..... CHECK
TIE DOWN ..... REMOVE AND CHECK

FUESLAGE RIGHT SIDE

GENERAL CONDITION ..... CHECK
ANTENNAS ..... CHECK
UNDERBELLY ..... CHECK

NORTH STAR AVIATION **PA-28-161/181 WARRIOR III/ARCHER II**

START UP CHECKLIST

BEFORE STARTING ENGINE

FLAPS ..... RETRACT
PARKING BRAKE ..... SET
PASSENGER BRIEFING ..... COMPLETE
SEAT BELTS ..... FASTEN
CIRCUIT BREAKERS ..... CHECK IN
FUEL SELECTOR ..... DESIRED TANK
AVIONICS/ELECTR SWITCHES ..... OFF
CARB HEAT /ALT AIR ..... OFF
E-BATT ..... ARM
*E VOLTS ..... VERIFY 23.3
FUEL QUANTITY ..... CHECK

***If E-volts are less than 23.3, the voltage can be checked again at the end of the GROUND CHECK. E-volts must not be less than 23.3 prior to flight.**

NORMAL START

BATTERY/MASTER SWITCH ..... ON
*PFD ..... VERIFY CORRECT SOFTWARE
ALTERNATOR SWITCH ..... ON
**STANDBY ALTERNATOR ..... ON
ELECTRIC FUEL PUMP ..... ON
STROBE LIGHTS ..... ON
PROP AREA ..... CLEAR

CARBURETED

MIXTURE ..... RICH
THROTTLE ..... 0.25” OPEN
PRIMER ..... AS REQUIRED
STARTER ..... ENGAGED

FUEL INJECTED — COLD

LEFT/RIGHT MAGNETOS ..... ON
THROTTLE ..... 0.25” OPEN
MIXTURE ..... PRIME THEN CUT OFF
STARTER ..... ENGAGED
MIXTURE ..... ADVANCE

FUEL INJECTED — HOT

LEFT/RIGHT MAGNETOS ..... ON
THROTTLE ..... 0.5” OPEN
MIXTURE ..... CUT OFF
STARTER ..... ENGAGED
MIXTURE ..... ADVANCE

THROTTLE 1000RPM
OIL PRESSURE ..... CHECK
ELECTRIC FUEL PUMP ..... OFF
FUEL PRESSURE ..... CHECK
ANNUCIATOR PANEL ..... LGTS OUT
AMMETER ..... CHECK

WARM UP

THROTTLE 800-1200RPM

ENGINE START FLOODED

BATTERY/MASTER SWITCH ..... ON
*PFD ..... VERIFY CORRECT SOFTWARE
ALTERNATOR ..... ON
**STANDBY ALTERNATOR ..... ON
ELETRIC FUEL PUMP ..... OFF
STROBE LIGHTS ..... ON
MIXTURE ..... IDLE CUTOFF
THROTTLE ..... OPEN FULL
PROP AREA ..... CLEAR
STARTER ..... ENGAGE
MIXTURE ..... FULL RICH
THROTTLE 1000RPM
OIL PRESSURE ..... CHECK
ANNUCIATOR PANEL ..... LGTS OUT
AMMETER ..... CHECK

*ONLY IN GLASS AIRCRAFT
**ONLY IF STANDBY ALTERNATOR INSTALLED

BEFORE TAXI CHECK

BATT MASTR SWITCH ..... VERIFY ON
AVION MASTER SWITCH ..... ON
CIRCUIT BREAKERS ..... CHECK IN
MFD ..... CHECK DATABASE CURRENCY
FUEL TOTALIZER ..... SYNC OR MANUAL
FUEL SELECTOR ..... SWITCH TANKS
CAS MESSAGES ..... CHECK
PFD ANNUNCIATORS ..... CHECK
MSG SOFTKEY ..... CHECK
STANDBY INSTRUMENTS ..... CHECK
LIGHTS ..... AS REQUIRED
CABIN HEAT ..... AS REQUIRED
ATIS/AWOS ..... OBTAIN
GPS/NAV/RADIOS ..... SET
ALTIMETER ..... SET
STANDBY ALT ..... SET
TRANSPONDER ..... ALT
HEADING INDICATOR ..... SET
MFD SET ..... AIRPORT DIAGRAM
TAXI BRIEF ..... COMPLETE
PARKING BRAKE ..... RELEASE

TAXI CHECK

PARKING BRAKE ..... RELEASE
TAXI AREA ..... CLEAR
THROTTLE ..... ADVANCE SLOWLY
BRAKES/STEERING ..... CHECK
***FLIGHT INSTRUMENTS ..... CHECK

*****CHECK FLIGHT INSTRUMENTS ONLY WHEN CLEAR OF RAMP AREA**

RUN UP/GROUND CHECK

BRAKES ..... SET/HOLD
FLIGHT CONTROLS ..... FREE &CORRECT
MIXUTRE ..... FULL RICH
THROTTLE ..... 2000 RPM
ENGINE GAUGES ..... IN LIMITS
MAGNETOS ..... MAX DROP 175 RPM
..... MAX DIFFERENCE 50 RPM
CARB HEAT/ALT AIR ..... CHECK(~75 RPM)
*VACUUM ..... 4.8" - 5.2"
*IF EQUIPPED WITH VACUUM

IF E-VOLTS WERE LESS THAN 23.3:
E-VOLT CHECK

BATT MASTER ..... OFF
ALTERNATOR SWITCH ..... OFF
E-VOLTS ..... CHECK
BATT/ALTERNATOR SWITCHES ..... ON

STANDBY ALTERNATOR CHECK(IF EQUIPPED)

ALTERNATOR ..... OFF
ALT INOP ANNUNCIATOR ..... VERIFY ON
STBY ALT ANNUNCIATOR ..... VERIFY ON
THROTTLE ..... 1000 RPM
ALTERNATOR ..... ON
STBY ALT ANNUN. ..... VERIFY OUT
STANDBY INST ..... CHECK

RUN UP/GROUND CHECK CON'TD

ANNUN. LIGHTS ..... PRESS TO TEST
THROTTLE ..... IDLE
RPM/OIL PRESSURE ..... CHECK
**AUX VACUUM ..... CHECK
THROTTLE ..... 1000 RPM
ALTERNATE STATIC ..... CHECK
TAKE OFF BREIFING ..... COMPLETE
DOOR/WINDOW ..... CLOSED
IFR CLEARANCE(IF REQUIRED) ..... ACQUIRE

**IF EQUIPPED WITH AUX VACUUM

BEFORE TAKE OFF CHECK

FLIGHT INSTRUMENTS ..... RE-CHECK/SET
ELECTRIC FUEL PUMP ..... ON
FUEL SELECTOR ..... FULLEST TANK
LANDING LIGHT ..... ON
RECOG LIGHT ..... ON
PITOT HEAT ..... AS REQUIRED
ENGINE GAUGES ..... IN LIMITS
CARB HEAT/ALT AIR ..... OFF
FLAPS ..... SET
TRIM ..... SET
MIXTURE ..... FULL RICH
TRANSPONDER ..... CODE/ALT VERIFY
TIME OFF ..... NOTE
TAKE OFF CLEARANCE ..... OBTAIN
FINAL APPROACH AREA ..... CLEAR

CLIMB CHECK—ABOVE 1000' AGL

FLAPS ..... VERIFY RETRACTED
ELECTRIC FUEL PUMP ..... OFF
CRUISE CLIMB AIRSPEED 87KIAS
DEPARTURE AREA ..... CLEAR

CRUISE CHECK

CRUISE POWER ..... SET
MIXTURE ..... AS REQUIRED
LANDING LIGHT ..... OFF
RECOG LIGHT ..... OFF
HEADING INDICATOR ..... SET
VERIFY FUEL PUMP ..... OFF

PRE-MANUEVER CHECK

MIXTURE ..... SET
ELECTRIC FUEL PUMP ..... ON
FUEL ..... FULLEST TANK
LANDING LIGHT ..... ON
RECOG LIGHT ..... ON
MINIMUM SAFE ALT ..... VERIFY
CLEARING TURNS ..... COMPLETE
RADIO CALL ..... COMPLETE

POST-MANUEVER CHECK

LANDING LIGHT ..... OFF
RECOG LIGHT ..... OFF
FUEL ..... FULLEST TANK
ELECTRIC FUEL PUMP ..... OFF
ENGINE GAUGES ..... CHECK

IN RANGE CHECK—15NM OR LESS

WEATHER ..... OBTAIN
INSTRUMENTS ..... SET
RADIOS ..... SET
ENVIRONMENT ..... BRIEF

DESCENT CHECK—10NM OR LESS

SEATBELTS ..... SECURE
FUEL SELECTOR ..... FULLEST TANK
MIXTURE ..... RICH
LANDING LIGHTS ..... ON
RECOG LIGHTS ..... ON
DESCENT POWER ..... AS REQUIRED

BEFORE LANDING CHECK

ELECTRIC FUEL PUMP ..... ON
FUEL ..... VERIFY FULLEST TANK
MIXTURE ..... RICH
SEATBELTS ..... FASTENED
CARB HEAT/ALT AIR ..... AS REQUIRED

AFTER LANDING CHECK

RADIO CALL ..... REPORT CLEAR
FLAPS ..... RETRACT
CARB HEAT/ALT AIR ..... OFF
ELECTRIC FUEL PUMP ..... OFF
LANDING LIGHT ..... AS REQUIRED
RECOG LIGHT ..... AS REQUIRED
PITOT HEAT ..... OFF
TRANSPONDER ALT/1200
FLIGHT PLAN ..... CLOSED
TAXI CLEARANCE ..... OBTAIN

ENGINE SHUTDOWN

BRAKES ..... SET/HOLD
THROTTLE ..... 1000 RPM
AVION MASTER ..... OFF
LANDING LIGHT ..... OFF
RECOG LIGHT ..... OFF
NAV LIGHT ..... OFF
ELECTRICAL EQUIPMENT ..... OFF
EMER BATT ..... OFF
*THROTTLE ..... IDLE
*MAGNETOS ..... GROUND CHECK
*THROTTLE ..... 1000 RPM
MIXTURE ..... IDLE CUT-OFF
THROTTLE ..... IDLE
MAGNETOS ..... OFF
STROBE LIGHTS ..... OFF
ALTERNATOR ..... OFF
STBY ALTERNATOR ..... OFF
BATTERY/MASTER ..... OFF
STANDBY INSTRUMENT ..... VERIFY OFF
PARKING BRAKE ..... RELEASE

*ONLY IN WARRIOR

SECURING AIRCRAFT

HOBBS/TACH ..... RECORD
CABIN INTERIOR ..... CLEAN
MIXTURE ..... CUT OFF
MASTER ..... OFF
MAGS ..... OFF
DOOR/WINDOW ..... CLOSE
CHOCK ..... INSERT
TIEDOWNS ..... SECURE
OIL HEATER ..... PLUG IN
BLANKET ..... ON
POST-FLIGHT INSPECTION ..... COMPLETE

EMEREGENCY PROCEDURES

ENGINE FIRE DURING START

STARTER ..... CRANK ENGINE
MIXTURE..... IDLE CUT-OFF
THROTTLE ..... OPEN
ELECTRIC FUEL PUMP ..... OFF
FUEL SELECTOR..... OFF

ABONDON AIRCRAFT IF FIRE CONTINUES

EXTERNAL FIRE EXTINGUISHER..... USE

ENGINE POWER LOSS DURING TAKEOFF

If sufficient runway remains for a normal landing, land straight ahead.

If insufficient runway remains, maintain a safe air-speed. Make only shallow turns to avoid obstacles and land. Set flaps as the situation requires.

If sufficient altitude has been gained to attempt a restart:

AIRSPEED ..... PITCH FOR V_G
FUEL SELECTOR..... SWITCH TANK
ELECTRIC FUEL PUMP ..... VERIFY ON
MIXTURE..... VERIFY FULL RICH
CARB HEAT/ALT AIR..... ON

If power is not restored, proceed with power off landing.

ENGINE FIRE IN FLIGHT

FUEL SELECTOR..... OFF
THROTTLE ..... CLOSED
MIXTURE..... IDLE CUT-OFF
ELECTRIC FUEL PUMP ..... OFF
CABIN HEAT ..... OFF
DEFOSTER..... OFF

IF FIRE PERSISTS

EMERGENCY DESCENT..... INITIATE

Proceed with power off landing.

ELECTRICAL FIRE/SMOKE IN FLIGHT

EMER BATT ..... VERIFY ARM
BATTERY MASTER..... OFF
ALTERNATOR ..... OFF
*STANDBY ALTERNATOR ..... OFF
*STANDBY ATTITUDE..... VERIFY ON
VENTS..... OPEN
CABIN HEAT ..... OFF
FIRE EXTINGUISHER..... IF NEEDED

IF FIRE PERSISTS

EMERGENCY DESCENT..... INITIATE

*IF EQUIPPED

ENGINE POWER LOSS DURING FLIGHT

AIRSPEED ..... V_G
LANDING AREA ..... BEST SUITABLE
RESTART..... ATTEMPT
FUEL ..... SWITCH TO TANK WITH FUEL
ELECTRIC FUEL PUMP ..... ON
MIXTURE ..... RICH
CARB HEAT/ALT AIR..... ON
ENGINE GAUGES..... CHECK
THROTTLE..... CHECK FOR POWER

If power has not been restored:

IGNITION SWITCH..... L, R, THEN BOTH
THROTTLE & MIXTURE..... TRY DIFFERENT
MAYDAY..... 121.5/SQ 7700
SECURE ..... Perform Power Off Landing Checklist

If power is restored:

CARB HEAT..... OFF
ELECTRIC FUEL PUMP ..... OFF

POWER OFF LANDING

When committed to landing:

MAGNETOS..... OFF
FUEL SELECTOR..... OFF
BATTERY/MASTER..... OFF
ALTERNATOR ..... OFF
STBY ALTERNATOR..... OFF
ELECTRIC FUEL PUMP ..... OFF
MIXTURE..... IDLE CUT-OFF
THROTTLE ..... CLOSE
SEATBELTS ..... TIGHT
CABIN DOOR ..... UNLATCH/OPEN

Landing:

AIRSPEED 63KIAS
FLAPS ..... FULL

STARTER ENGAGED

ON GROUND

THROTTLE ..... REDUCE
ENG START CIRCUIT BREAKER..... PULL
ENGINE ..... SHUTDOWN

IN FLIGHT

THROTTLE ..... REDUCE
ENG START CIRCUIT BREAKER..... PULL

Land as soon as possible.

FAILURE OF PFD

INDICATION: PFD GOES BLANK

STANDBY INSTRUMENT .....VERIFY ON(NO FLAG)

IF TIME PERMITES:

PFD BRIGHTNESS CONTROL..... ADJUST TO FULL
PFD CIRCUIT BREAKER .....PULL AND RESET
REVERSIONARY MODE (IF EQUIPPED).....ACTIVATE

IF PFD SCREEN CANNOT BE RESTORED:

SECONDARY CDI SOURCE.....ULTILIZE
ENGINE INSTRUMENTS..... REFER TO MFD

NOTE

Maintain attitude, airspeed, and heading control using standby instruments, magnetic compass and other directional indicators. (GPS NAV page group).

LAND AS SOON AS PRACTICAL

LOSS OF PFD ENGINE DATA

ENGINE INSTRUMENTS..... REFER TO MFD

LAND AS SOON AS PRACTICAL

LOSS OF MFD (G1000)

REVERSIONARY MODE.....ACTIVATE

EXIT/AVOID IFR. LAND AS SOON AS PRACTICAL

INVALID AIR DATA

INDICATION: AIRSPEED/ALTIMETER/VSI REPLACED WITH RED Xs

Maintain aircraft control by referring to standby instruments

PFD CIRCUIT BREAKER .....PULL AND RESET

IF AIR DATA STILL INVALD:

REFER TO STANBY INSTRUMENTS

LAND AS SOON AS PRACTICAL

INVALID HEADING DATA

INDICATION: HSI REPLACED WITH RED Xs

Maintain aircraft control by referring to standby instruments. Maintain heading using secondary heading source such as magnetic compass or GPS NAV page group

PFD CIRCUIT BREAKER .....PULL AND RESET

LAND AS SOON AS PRACTICAL

FAILURE OF AIR DATA, ATTITUDE, AND HEADING REFERENCE SYSTEM

INDICATION: AIRSPEED, ATTTUDE, HEADING AND ALTITUDE REPLACED WITH RED X'S

STANDBY INSTRUMENT..... VERIFY ON (NO FLAG)

IF TIME PERMITS:

NON G1000

PFD CIRCUIT BREAKER..... PULL AND RESET

G1000 EQUIPPED

ADAHRS BREAKER ..... PULL AND RESET

IF ADAHRS INITIALIZATION DOES NOT OCCUR:

SECONDARY CDI SOURCE .....UTILIZE
ENGINE INSTRUMENTS .....REFER TO MFD

NOTE

Maintain attitude, airspeed, and heading control using standby instruments, magnetic compass and other directional indicators. (GPS NAV page group).

LAND AS SOON AS PRACTICAL

INVALID ATTITUDE AND HEADING DATA

INDICATION:ATTITUDE AND HEADING DATA RE-MOVED AND REPLACED WITH RED X'S

STANDBY INSTRUMENT..... VERIFY ON (NO FLAG)

Maintain attitude control using standby attitude indicator.

IF TIME PERMITS:

PFD CIRCUIT BREAKER..... PULL AND RESET

Maintain attitude, airspeed, and heading control using standby instruments, magnetic compass and other directional indicators. (GPS NAV page group).

LAND AS SOON AS PRACTICAL

ELECTRIC TRIM RUNAWAY

CONTROL WHEEL ..... GRASP FIRMLY
ATTITUDE INDICATOR .....CROSS CHECK
TRIM INTERUPT..... PRESS AND HOLD
PITCH TRIM CIRCUIT BREAKER .....PULL
PITCH TRIM ..... RETRIM MANUALLY

COMM 1 AND 2 FAILURE

AUDIO MKR CIRCUIT BREAKER.....PULL

NOTE

If power is lost to the audio panel a fail-safe communications path becomes available between the pilot's headset/microphone and COM1.

EXIT/AVOID IFR AS SOON AS PRACTICAL

LOSS OF HEADING ACCURACY

INDICATIONS: DIFFICULTY MAINTAINING CDI COURSE, EXCESSIVE DIFFERENCE BETWEEN HEADING AND TRACK, ATC INDICATES THE AIRCRAFT IS ON THE WRONG HEADING, EXCESSIVE DEVIATION BETWEEN PFD AND MAG COMPASS.

IF HEADING DIFFERS MORE THAN 10° FROM COMPASS, USE THE MAG COMPASS FOR PRIMARY HEADING INFORMATION.

TOTAL LOSS OF ENGINE INSTRUMENTS

NON G1000

DAU CIRCUIT BREAKER .....PULL AND RESET

G1000 EQUIPPED

GEA CIRCUIT BREAKER.....PULL AND RESET

IF SPECIFIC ENGINE DATA IS STILL INVALID:

NOTE

THE FOLLOWING ENGINE MESSAGE(S) WILL BE DISPLAYED ON THE MFD FOR THE INVALID PARAMETER

- CHECK OIL TEMP
- CHECK OIL PRESS
- CHECK RPM
- CHECK CHT
- CHECK EGT

IF FAILURE OCCURS DURING TAKEOFF:

MIXTURE.....RICH
THROTTLE.....FULL
RETURN FOR LANDING

IF FAILURE OCCURS DURING CLIMB OR LANDING:

MIXTURE.....RICH
THROTTLE.....AS REQUIRED
LAND AS SOON AS PRACTICAL

IF FAILURE OCCURS AFTER SETTING CRUISE POWER AND MIXTURE:

POWER ..... MAINTAIN POWER SETTING
LAND AS SOON AS PRACTICAL

IF FAILURE OCCURS PRIOR TO OR DURING DESCENT:

MIXTURE.....RICH
THROTTLE..... SET FOR 500 FPM PITCH FOR A/S
..... DESCEND AT DESIRED A/S OR 126 KTS
LAND AS SOON AS PRACTICAL

CROSS CHECK MONITOR

YELLOW CROSSCHECK ATTITUDE ANNUN. ON PFD.

STRAIGHT, LEVEL, UNACCEL FLIGHT ..... ESTABLISH AIRCRAFT ATTITUDE ..... REFERENCE STANDBY

LOSS OF OIL PRESSURE

Monitor engine temperature gauges.
Land as soon as practical and investigate cause.
Prepare for power off landing.

HIGH OIL TEMPERATURE

MIXTURE.....RICH
THROTTLE ..... REDUCE
PITCH ..... REDUCE TO INCREASE AIRLOW
Land at nearest airport and investigate the problem.
Prepare for power off landing.

LOSS OF FUEL PRESSURE/FLOW

ELECTRIC FUEL PUMP ..... ON
FUEL..... SWITCH TO TANK WITH FUEL
Land as soon as practical.

ENGINE ROUGHNESS

CARB HEAT/ALT AIR..... ON
If roughness continues after one minute:
CARB HEAT ..... OFF
MIXURE..... ADJUST FOR SMOOTHNESS
ELETRIC FUEL PUMP ..... ON
FUEL SELECTOR.....SWITCH TANK
ENGINE GUAGES.....CHECK
MAGNETOS..... L, R, THEN BOTH

NOTE: If operation is satisfactory on either magneto, continue on that magneto at reduced power and mixture full RICH to nearest airport. **Prepare for power off landing.**

CARBURETOR ICING

CARB HEAT ..... ON
MIXTURE..... ADJUST FOR SMOOTHNESS

NOTE: Partial carb heat may be worse than no heat at all. It may melt some of the ice which will refreeze in the intake system. When using carb heat, always use full heat. When ice is removed, return the control to the full off position.

OPEN DOOR

TO CLOSE DOOR IN FLIGHT:

AIRSPEED ..... BELOW 89KTS
CABIN VENTS.....CLOSE
STORM WINDOW.....OPEN
IF UPPER LATCH IS OPEN.....LATCH
IF SIDE LATCH IS OPEN .....PULL ON ARMREST
.....CLOSE LATCH
IF BOTH LATCHES ARE OPEN .....LATCH SIDE
.....THEN TOP

NOTE

IF BOTH UPPER AND LOWER LATCHES ARE OPEN, THE DOOR WILL TRAIL SLIGHLY OPEN AND AIRSPEEDS WILL BE REDUCED.

SPIN RECOVERY

POWER.....IDLE
AILERONS.....NEUTRAL
RUDDER .....FULL OPPOSITE
ELEVATOR ..... FORWARD TO BREAK STALL
Smoothly pull out of dive and return to level flight.

CO DETECTOR WARNING

CO RST SOFT KEY..... PRESS
IF WARNING CONTINUES
CABIN HEAT .....OFF
FRESH AIR SOURCE.....OPEN
Land as soon as possible.

ALTERNATOR FAILURE WITHOUT STANDBY

ALT ANNUNCIATOR LIGHT ILLUMINATED:

AMMETER ..... CHECK TO VERIFY
IF AMMETER SHOWS ZERO:
ALTERNATOR SWITCH .....OFF
REDUCE ELECTRICAL LOAD TO MINIMUM:
ALTERNATOR FIELD CIRCUIT BREAKER.....
..... CHECK/RESET
ALTERNATOR SWITCH .....ON
IF POWER IS NOT RESTORED:
ALTERNATOR SWITCH .....OFF

NOTE

If alternator output cannot be restored, reduce electrical loads and land as soon as practical. The battery is the only remaining source of electrical power. Reference the aircraft POH for specific load shedding techniques.

Execute Complete Electrical Failure Checklist if battery is depleted.

FAILURE OF PRIMARY ALTERNATOR

INDICATIONS: ALT INOP ANNUNCIATOR, STBY ALT ON ANNUNCIATOR, ZERO AMMETER OUTPUT

STBY ALT.....VERIFY ON
ENGINE RPM .....INCREASE TO 2500
ELETRICAL LOAD.....REDUCE BELOW 20 AMPS

NOTE

- If STBY ALT ON is flashing, reduce electrical loads until annunciator no longer flashes.
- The standby alternator is limited to 20 amperes continuous output. Transient operations of greater than 20 amperes for no more than 5 consecutive minutes may be conducted

ALTERNATOR..... OFF
ALT FIELD CIRCUIT BREAKER..... CHECK AND RESET
ALTERNATOR..... ON
If primary alternator power is not restored:
ALTERNATOR..... OFF
Land as soon as practical.

FAILURE OF STANDBY ALTERNATOR

STANDBY ALTERNATOR..... OFF
STBY ALT FIELD CIRCUIT BREAKER.....
..... CHECK AND RESET
STBY ALT SENSE CIRCUIT BREAKER.....
..... CHECK AND RESET
STANDBY ALTERNATOR..... ON
If standby alternator power is not restored:
STANDBY ALTERNATOR..... OFF
If the standby alternator has failed or cannot provide adequate power, the electrical power is dependent on available battery storage.
Execute Complete Electrical Failure Checklist when battery depleted.

Reduce electrical loads by switching OFF or pulling circuit breakers for all non-essential equipment to include the following:

- Reduce PFD/MFD Brightness
- Pitot heat
- Landing light
- Cabin lights
- Strobe lights
- Nav lights
- No. 2 nav/com/GPS

Land as soon as practical.

ELECTRICAL OVERLOAD (ALTERNATOR OVER 20 AMPS ABOVE KNOWN ELECTRICAL LOAD.)
ALTERNATOR SWITCH..... ON
BATTERY MASTER SWITCH ..... OFF

IF ALTERNATOR LOADS ARE REDUCED:
ELECTRICAL LOAD..... REDUCE TO MINIMUM

LAND AS SOON AS PRACTICAL

IF ALTERNATOR LOADS ARE NOT REDUCED:
BATTERY MASTER SWITCH ..... ON
ALTERNATOR SWITCH..... OFF

LAND AS SOON AS POSSIBLE

IF EQUIPPED WITH STANDBY ALTERNATOR
STBY ALTR..... VERIFY ON/CHECK AMMETER

NOTE
If STBY ALTR ON annunciator is flashing then reduce electrical loads until the annunciator no longer flashes.

If the standby alternator has failed or cannot provide adequate power, then electrical power is dependent on available battery storage. Duration of battery power available will be dependent on electrical load and battery condition prior to failure. Execute **COMPLETE ELECTRICAL FAILURE** checklist when battery is depleted.

WARNING
Compass errors may exceed 10° with both alternators inoperative.

CAUTION
Any power interruption will result in loss of attitude information from the PFD until the unit can be reinstated on the ground.

NOTE
LOW BUS VOLTAGE annunciator will be illuminated. Anticipate complete electrical failure. Duration of battery power available will be dependent on electrical load and battery condition prior to failure.

Reduce electrical loads by switching OFF or pulling circuit breakers for all non-essential equipment to include the following:

- Reduce PFD and MFD brightness as part of overall electrical system management
- Pitot heat (unless Required)
- Landing light
- Cabin lights
- Strobe lights
- Nav lights
- No. 2 nav/com/GPS

LAND AS SOON AS PRACTICAL AND ANTICIPATE COMPLETE ELECTRICAL FAILURE

EMERGENCY BATTERY VOLTAGE INDICATION

NOTE
Complete electrical failure is imminent. Use sound ADM to determine the best location for landing.

COMPLETE ELECTRICAL FAILURE
STANDBY INSTRUMENT ..... VERIFY ON

CAUTION
The STBY PWR annunciator will rapidly flash for approximately one minute when aircraft power is lost. STBY PWR must be selected, otherwise the standby attitude indicator will auto shutdown after approximately one minute. Maintain aircraft control with reference to the standby airspeed, altimeter, and attitude indicators.

EMER BATT ..... ARM
BATTERY MASTER SWITCH..... OFF
ALTERNATOR ..... OFF

PRIOR TO DESCENT:
MIXTURE..... RICH
THROTTLE .....SET FOR 500 FPM DESCENT
..... AT DESIRED SPEED OR 126KTS
LAND AS SOON AS PRACTICAL

SEE APPROVED AIRCRAFT POH FOR THE FOLLOWING CHECKLISTS:
ERRONEOUS/LOSS OF CAS MESSAGES
DUAL GPS FAILURE
AVIONICS COOLING FAN FAILURE
ELECTRIC TRIM FAILURE
PITOT HEAT FAILURE

PIPER SEMINOLE CHECKLIST

NOTE

Prior to beginning the preflight walk around, check oil fuel and notify line service if needed.

COCKPIT INSPECTION

AIRCRAFT DOCUMENTS..... VERIFY
TOW BAR/BAGGAGE.....SECURE
CONTROL YOKE.....RELEASE
PARKING BRAKE.....SET
COMPASS DEV CARD .....CHECK
CIRCUIT BREAKERS..... CHECK IN
PITOT/STATIC..... DRAIN
ALTERNATE STATIC .....NORMAL
LANDING GEAR SELECTOR..... DOWN
MAGNETO SWITCHES ..... OFF
ELECTRICAL SWITCHES..... OFF
AVIONICS..... OFF
COWL FLAPS ..... OPEN
FUEL SELECTORS..... ON
BATTERY/MASTER ..... ON
FUEL QUANITITY GUAGES.....CHECK
LANDING GEAR LIGHTS..... 3 GREEN
ANNUN PANEL LIGHTS.....CHECK
FLAPS.....EXTEND/40°
EXTERNAL LIGHTS/PITOT HEAT..... ON/CHECK
PITOT HEAT..... OFF
EXTERNAL LIGHTS..... OFF
BATTERY/MASTER ..... OFF
EMPTY SEATS.....FASTEN BELTS
WINDOWS/WINDSHEILD .....CHECK/CLEAN
EMERGENCY EXIT ..... CHECK SECURE

CAUTION

Heated pitot tube becomes very hot. Ground operation should be limited to 3 minutes to avoid damage the heating elements.

CAUTION

If the emergency exit is unlatched in flight, it may separate and damage the exterior of the airplane.

NOTE

Set the parking brake by first pressing and holding the toe brake pedals and the pulling out the PARK BRAKE knob. The static drains are located on the lower left sidewall adjacent to the pilot.

PREFLIGHT INSPECTION

RIGHT WING/RIGHT ENGINE

FUEL SUMPS .....DRAIN
FLAPS & HINGES..... CHECK
AILERONS & HINGES ..... CHECK
STATIC WICKS ..... CHECK
WING SURFACES..... CHECK
WING TIP AND LIGHTS ..... CHECK
LEADING EDGE..... CHECK
OIL QUANTITY.....CHECK(6-8QTS)
FUEL TANK .....CHECK QUANTITY
FUEL VENTS..... CLEAR
SCUPPER DRAIN..... CLEAR
TIE DOWN/CHOCK .....REMOVE
GEAR WELL/DOORS ..... CHECK
GEAR LINES AND SWITCHES..... CHECK
MAIN GEAR STRUT..... APPROX 2.6”
TIRE..... CHECK
BRAKE PAD AND DISC ..... CHECK
CRANKCASE BREATHER TUBE ..... CLEAR
PROP AND SPINNER..... CHECK
ALTERNATOR BELT..... CHECK TENSION
DOOR HINGES..... CHECK

NOSE SECTION

GENERAL CONDITION ..... CHECK
AIR INLETS..... CLEAR
HEATER AIR INLET/EXHAUST..... CHECK
BATTERY VENTS ..... CHECK
GEAR WELL AND DOORS..... CHECK
GEAR LINES AND SWITCHES..... CHECK
NOSE WHEEL TIRE..... CHECK
NOSE GEAR STRUT ..... APPROX 2.7”
CHOCK .....REMOVE

LEFT WING/LEFT ENGINE

OIL QUANITITY.....CHECK(6-8QTS)
ALTERNATOR BELT..... CHECK TENSION
PROP AND SPINNER..... CHECK
FUEL TANK .....CHECK QUANTITY
SCUPPER DRAIN..... CLEAR
BRAKE PAD & DISC..... CHECK
TIRE..... CHECK
MAIN GEAR STRUT..... APPROX 2.6”
GEAR LINES & SWITCHES ..... CHECK
GEAR WELL & DOORS ..... CHECK
CRANKCASE BREATHER TUBE ..... CLEAR
TIEDOWN/CHOCK.....REMOVE
FUEL VENTS..... CLEAR
LEADING EDGE..... CHECK
STALL WARNING VANES ..... CHECK
PITOT/STATIC MAST.....UNOBSTRUCTED

NORTH STAR AVIATION PA-44-180 SEMINOLE

LEFT WING/LEFT ENGINE CONTINUED

WING TIP & LIGHTS.....CHECK
WING SURFACES.....CHECK
AILERON & HINGES.....CHECK
STATIC WICKS .....CHECK
FLAP & HINGES .....CHECK

NOTES

Eight quarts of oil are required for maximum range flights.

FUSELAGE (LEFT SIDE)

GENERAL CONDITION .....CHECK
EMERGENCY EXIT.....CHECK
ANTENNAS.....CHECK
FRESH AIR INLET .....CHECK
UNDERBELLY.....CHECK

EMPENNAGE

GENERAL CONDITION .....CHECK
FRESH AIR INLET ..... CLEAR
RUDDER.....CHECK
STABILATOR AND TRIM TRAB .....CHECK
STATIC WICKS .....CHECK
TAIL CONE & SKID.....CHECK FOR DAMAGE
TIE DOWN..... REMOVE

FUSELAGE (RIGHT SIDE)

GENERAL CONDITION .....CHECK
BAGGAGE DOOR.....CHECK
CABIN DOOR.....CHECK

STARTING ENGINE

BEFORE STARTING ENGINE

PREFLIGHT CHECK .....COMPLETED
FLIGHT PLANNING.....COMPLETED
PASSENGER BRIEFING ..... COMPLETE
CABIN DOOR ..... CLOSED & LATCHED (UPPER & LOWER)
SEATS ..... ADJUSTED & LOCKED
SEAT BELTS..... FASTEN
PARK BRAKE ..... SET
GEAR .....DOWN
THROTTLES.....IDLE
PROP .....FULL INCREASE
MIXTURES .....CUT-OFF
FRICTION HANDLE ..... AS DESIRED
CARB HEAT/ALT AIR .....OFF
COWL FLAPS.....OPEN
STAB & RUDDER TRIM..... SET
FUEL SELECTORS .....ON
LEFT/RIGHT ALTR SWITCHES .....ON
EMER BATT.....ARM
*VERIFY E VOLTS >23.3
AVION MASTER SWITCH.....OFF
DAY/NIGHT SWITCH ..... AS REQUIRED
STROBE LIGHTS ..... FIN STROBE
ALL OTHER ELECTRICAL SWITCHES.....OFF
CABIN HEAT SWITCH .....OFF
CIRCUIT BREAKERS ..... CHECK

NOTES

The EMERG BATT should remain ON after check for proper bus operation, allowing the PFD to remain powered for engine start. Avoid delays between this check and engine starting to reserve emergency battery power.

** If the EBATT VOLTS indication is less than 23.3 VOLTS, the voltage should be checked again at the end of the GROUND CHECK checklist (after being charged for some time by the primary electrical system). If EBAT VOLTS is still less than 23.3 volts, refer to Section 2.27 prior to flight.*

ENGINE START—GENERAL

WARNING

The L START ENGD or R START ENGD warning CAS message will illuminate after 30 seconds of continuous engine cranking. If the CAS message illuminates after engine is running, stop the engine and determine the cause.

NOTE

When starting at ambient temperatures +20°F and below, operate first engine started with alternator ON (at max charging rate not to exceed 1500 RPM) for 5 minutes minimum before initiating start on second engine.

NOTE

Starter manufacturer recommends starter cranking periods be limited to 10 seconds with a 20 second rest period between cranking attempts. Maximum of 6 starts periods allowed. If a start is not achieved on the 6th attempt, allow starter to cool for 30 minutes before attempting additional starts. Do not engage the starter immediately after releasing it. This practice may damage the starter mechanism.

NORMAL START

BATT MASTR SWITCH ..... ON
GEAR POSITION INDICATORS ..... 3 GREEN
PROPELLERS ..... FULL INCREASE
PROPELLER AREA ..... CLEAR
FUEL PUMPS ..... ON
MAGS LEFT/RIGHT ..... ON

Carbureted

THROTTLE ..... 0.25" OPEN
MIXTURE ..... RICH
PRIMER ..... AS REQ'D
STARTER ..... ENGAGED

Fuel Injected — Cold

THROTTLE ..... 0.25" OPEN
MIXTURE ..... PRIME THEN CUT OFF
STARTER ..... ENGAGE
MIXTURE ..... ADVANCE

Fuel Injected — Hot

THROTTLE ..... 0.5" OPEN
MIXTURE ..... CUT OFF
STARTER ..... ENGAGE
MIXTURE ..... ADVANCE

IF ENGINE DOES NOT START ..... PRIME

THROTTLE 1000RPM
OIL PRESSURE ..... CHECK
REPEAT FOR SECOND ENGINE

NOTE

When the engine starts, adjust the throttle and monitor oil pressure. If no oil pressure is indicated within 30 seconds, shut down the engine and have it checked. In cold weather it may take longer for an oil pressure indication.

AFTER START

VOLTS ..... CHECK
ALTR AMPS ..... CHECK
ANNUNCIATOR PANEL LIGHTS ..... OUT
GYRO VACUUM ..... 4.8 TO 5.2 IN
HEATER ..... AS REQUIRED
FUEL PUMPS ..... OFF

ENGINE START WHEN FLOODED

NORMAL START CHECKLIST EXCEPT:
THROTTLE ..... FULL OPEN
MIXTURE ..... CUT OFF
FUEL PUMPS ..... OFF
STARTER ..... ENGAGE

WARM– UP

THROTTLES ..... 1000—1200 RPM

BEFORE TAXIING

EXTERNAL POWER SOURCE ..... VERIFY REMOVED
BATT MASTR SWITCH ..... VERIFY ON
FUEL SELECTORS ..... X-FEED(30 SECONDS)
AVION MASTER SWITCH ..... ON
MFD ..... CHECK DATABASE CURRENCY
FUEL TOTALIZER ..... SYNC OR MANUAL
CAS/PFD MESSAGES ..... CHECK
MSG SOFTKEY ..... CHECK
MASTER WARN & CAUTION ..... TEST
STANDBY INSTRUMENTS ..... CHECK
LIGHTS ..... AS REQUIRED
CABIN HEAT ..... AS REQUIRED
AUTOPILOT ..... VERIFY SELF TEST/MANUALLY TEST
FUEL SELECTORS ..... ON
ATIS/AWOS ..... OBTAIN
GPS/NAV/AP ..... SET
TAXI BRIEF ..... COMPLETE
ALTIMETER ..... SET
STANDBY ALT ..... SET
TRANSPONDER ..... ALT
MFD SET ..... AIRPORT DIAGRAM
PARKING BRAKE ..... RELEASE

TAXIING

TAXI AREA ..... CLEAR
THROTTLES ..... APPLY SLOWLY
BRAKES ..... CHECK
STEERING ..... CHECK
INSTRUMENTS ..... CHECK

NOTE

During taxi, if the VOLTS indication decreases into the warning range, increase engine RPM (if possible) to retain adequate battery charging.

GROUND CHECK

PARKING BRAKE ..... SET
MIXTURES ..... FULL RICH
PROPELLERS ..... FULL INCREASE
ENGINE INSTRUMENTS ..... CHECK
THROTTLES ..... 1500 RPM
PROPELLERS ..... FEATHER CHECK (500 MAX DROP)
THROTTLES ..... 2000 RPM
LEFT/RIGHT MAG ..... CHECK
MAX DROP ..... 175 RPM
MAX DIFFERENCE ..... 50 RPM
PROPELLERS ..... EXERCISE(3x)
GOVERNOR CHECK ..... FIRST FLIGHT OF DAY
CARB HEAT/ALT AIR ..... CHECK
THROTTLES ..... IDLE CHECK
FUEL PUMPS ..... ON
THOTTLES ..... 1000 RPM
FRICTION HANDLE ..... SET
TAKE OFF BRIEF ..... COMPLETE

NOTE

Avoid prolonged ground operation with the carburetor heat ON as the air is unfiltered.

IF E-VOLTS WERE LESS THAN 23.3:

E-VOLT CHECK

BATT MASTER ..... OFF
ALTERNATOR SWITCH ..... OFF
E-VOLTS ..... CHECK
BATT/ALTERNATOR SWITCHES ..... ON

BEFORE TAKEOFF

FLIGHT CONTROLS ..... FREE AND CORRECT
FLIGHT/ENGINE INSTRUMENTS ..... CHECK
FUEL QTY ..... SUFFICIENT
PROPELLERS ..... FULL INCREASE
MIXTURES ..... FULL RICH
CARB HEAT/ALT AIR ..... OFF
COWL FLAPS ..... OPEN
FLAPS ..... CHECK & SET
STAB AND RUDDER TRIM ..... SET
FUEL SELECTORS ..... ON
CAS MESSAGES ..... CHECK
CONTINUED IN NEXT COLUMN….

PFD ANNUCIATIONS ..... CHECK
MSG SOFTKEY ..... CHECK
TRANSPONDER ..... ALT/CODE SET
GPS/NAV/AP ..... CHECK/SET
FUEL PUMPS ..... ON
PITOT HEAT ..... AS REQUIRED
STROBE LIGHTS ..... ON
LANDING/RECOG LIGHTS ..... ON
DOOR ..... UPPER/LOWER LATCHED
TIME OFF ..... NOTE
FINAL APPROACH AREA ..... CLEAR
PARKING BRAKE ..... RELEASE

CAUTION

Prior to take off, verify that the autopilot servos are disengaged and that flight controls move freely.

CAUTION

Fast taxi turns immediately prior to take off should avoided to prevent unporting fuel feed lines.

NOTE

Adjust mixture prior to takeoff at high elevations. Do not overheat engines. Adjust mixture enough to obtain smooth engine operation.

NORMAL TAKEOFF

BRAKES ..... HOLD
THROTTLE ..... 2000 RPM
ENGINE GAUGES ..... IN LIMITS
THROTTLE ..... FULL
BRAKES ..... RELEASE
ROTATE ..... 75 KIAS
CLIMB ..... 88 KIAS
POSITIVE RATE ..... GEAR UP
FLAPS ..... UP

NOTE

TAS aural alerts will be muted when GPS altitude is lower than 400 FT AGL.
Takeoff should not be attempted with ice or frost on the wings.

SHORT FIELD PERFORMANCE TAKEOFF

FLAPS ..... UP
STAB/RUDDER TRIM ..... CHECK/SET
BRAKES ..... HOLD
PROPELLERS ..... 2700 RPM
THROTTLE ..... FULL
ENGINE GAUGES ..... CHECK
MIXTURE ..... FULL RICH (OR SET FOR ALT)
BRAKES ..... RELEASE
ROTATE ..... 70 KIAS
CLIMB ..... 82 KIAS
GEAR (POSITIVE RATE) ..... UP
OBSTACLE CLEAR 88KTS

CLIMB CHECK—ABOVE 1000' AGL

GEAR.....UP
FLAPS.....RETRACTED
CLIMB POWER ..... 25"MP/2500 RPM
CRUISE CLIMB AIRSPEED..... 105 KIAS
GPS/AUTOPILOT .....ENGAGE
AREA..... CLEAR

CRUISE CHECK

CRUISE POWER .....SET
PROPELLERS..... RPM SET
MIXTURES..... LEAN AS REQUIRED
FUEL PUMPS..... OFF
LANDING LIGHT ..... OFF
RECOG LIGHT..... OFF
COWL FLAPS .....AS REQUIRED
HEADING INDICATOR.....CHECK

PRE-MANUEVER CHECK

MIXTURES.....SET
FUEL PUMPS..... ON
LANDING LIGHT ..... ON
RECOG LIGHT..... ON
MIN. SAFE ALT ..... VERIFY
AREA..... CLEARING TURNS
RADIO CALL.....COMPLETE

POST MANUEVER CHECK

LANDING LIGHT ..... OFF
RECOG LIGHT..... OFF
MIXTURES.....AS REQUIRED
ENGINE GUAGES.....CHECK

IN—RANGE CHECK/DESCENT

WEATHER .....OBTAIN
INSTRUEMNTS.....SET
RADIOS .....SET
ENVIRONMENT..... BRIEF
ALTIMETER .....SET
HEADING INDICATOR.....SET
MIXTURE.....AS REQUIRED
CARB HEAT/ALT AIR.....AS REQUIRED
LANDING LIGHTS ..... ON
RECOG LIGHTS..... ON
DESCENT POWER.....SET

APPROACH AND LANDING

SEAT BACKS..... ERECT AND LOCKED
SEAT BELTS/HARNESSES .....FASTENED
FUEL PUMPS .....ON
FUEL SELECTORS .....VERIFY ON
GEAR.....DOWN
GEAR DOWN INDICATORS ..... 3 GREEN
NOSE GEAR .....VERIFY DOWN IN MIRROR
MIXTURES.....FULL RICH
PROPELLERS.....FULL FORWARD
CARB HEAT/ALT AIR ..... AS REQUIRED
COWL FLAPS .....OPEN
AUTOPILOT .....DISCONNECTED ABOVE 200' AGL

FINAL GEAR CHECK

500' AGL ..... GEAR VERIFIED DOWN

NORMAL LANDING

FLAPS.....0° TO FULL
AIRSPEED (FLAPS UP).....80-90 KIAS
AIRSPEED (FLAPS DOWN).....75-85 KIAS
TRIM ..... AS REQUIRED
THROTTLES ..... AS REQUIRED
TOUCHDOWN .....MAIN WHEELS
BRAKING ..... AS REQUIRED

SHORT FIELD PERFORMANCE LANDING

FLAPS ..... VERIFY FULL DOWN
AIRSPEED .....75 KIAS
TRIM ..... AS REQUIRED
THROTTLES ..... IDLE
TOUCHDOWN .....MAIN WHEELS
BRAKING .....MAXIMUM WITHOUT SKIDDING

GO—AROUND

MIXTURES.....FULL RICH
PROPELLERS.....FULL FORWARD
THROTTLES ..... FULL OPEN
PITCH 88KTS
FLAPS ..... RETRACT INCREMENTALLY
GEAR (POSITIVE RATE) .....UP
COWL FLAPS .....OPEN

NORTH STAR AVIATION PA-44-180 SEMINOLE

AFTER LANDING CHECK

RADIO CALL..... REPORT CLEAR
FLAPS ..... RETRACT
COWL FLAPS ..... AS REQUIRED
CARB HEAT/ALT AIR.....OFF
FUEL PUMPS .....OFF
LANDING LIGHT ..... AS REQUIRED
RECOG LIGHT ..... AS REQUIRED
PITOT HEAT.....OFF
HEATER .....
..... FAN 2 MINUTES (IF ON FOR LANDING)
FLIGHT PLAN .....CLOSE
TRANSPONDER ..... ALT
MFD .....AIRPORT DIAGRAM
TAXI CLEARANCE..... OBTAIN

ENGINE SHUTDOWN

HEATER (IF ON).....FAN 2 MIN THEN OFF
VENT FAN.....OFF
ENGINE TACH TIME MFD .....RECORD
AVION MASTER.....OFF
EMERG BATT.....OFF
LEFT/RIGHT ALTR .....OFF
LEFT/RIGHT FUEL PUMP .....VERIFY OFF
ALL OTHER ELETRICAL EQUIP.....OFF
MIXTURES..... CUT OFF
THOTTLES .....IDLE
PANEL LIGHTS .....OFF
LEFT/RIGHT MAG SWITCHES.....OFF
BATT MASTER .....OFF
STANDBY INSTRUMENT .....
..... VERIFY SHUTDOWN

NOTE

The flaps must be fully retracted for them to be safe to step on for aircraft exit.

In case the Aspen EFD-1000 standby instrument remains "ON" due to improper shutdown, the EFD-1000 switches to internal battery and depletes it. To turn off the EFD-1000, press the "SHUT DOWN" command from the Main Menu page 6 or hold the red "REV" button for 20 seconds.

SECURING AIRCRAFT

HOBBS/TACH.....RECORD
FLIGHT CONTROLS.....SECURE
CABIN INTERIOR.....CLEAN
MIXTURE .....CUT OFF
MASTER SWITCHES ..... OFF
MAGS ..... OFF
DOOR/WINDOW .....CLOSED/LATCHED
TIE-DOWNS/CHOCKS.....SECURE
BLANKET.....ON
POST—FLIGHT INSPECTION.....COMPLETE

EMERGENCY PROCEDURES

AIRSPEEDS FOR SAFE OPERATION

V_{MC} ..... 56 KIAS
V_{XSE} ..... 82 KIAS
V_{YSE} ..... 88 KIAS
V_A(3800lbs) ..... 115 — 135 KIAS
V_{NE} ..... 202 KIAS

ENGINE FAILURE BEFORE TAKEOFF (BELOW 75 KIAS)

THROTTLES ..... CLOSE IMMEDIATELY
BRAKES ..... AS REQUIRED
STOP STRAIGHT AHEAD

IF INSUFFICIENT RUNWAY REMAINS

MIXTURES ..... CUTOFF
FUEL SELECTORS ..... OFF
MAGNETO SWITCHES ..... OFF
BATT MASTER ..... OFF
MAINTAIN DIRECTIONAL CONTROL TO AVOID OBSTACLES

ENGINE FAILURE DURING TAKEOFF (ABOVE 75 KIAS) - GEAR DOWN

DIRECTIONAL CONTROL ..... MAINTAIN
THROTTLES ..... CLOSE IMMEDIATELY
LAND STRAIGHT AHEAD
BRAKES ..... AS REQUIRED

ENGINE FAULURE DURNING TAKEOFF (ABOVE 75 KIAS) - GEAR UP/IN TRANSIT

WARNING

In many combinations of aircraft configuration, ambient conditions, and speed, negative climb performance may result. Refer to Climb Performance Chart—One Engine Operating—Gear Up, Figure 5-19.

PITCH ..... 88 KIAS
DIRECTIONAL CONTROL ..... MAINTAIN
MIXTURES ..... FULL FORWARD
PROPS ..... FULL FORWARD
THROTTLES ..... FULL FORWARD
LANDING GEAR ..... CHECK UP
FUEL PUMPS ..... ON
FLAPS ..... FULL UP
FUEL SELECTORS ..... ON
INOP ENGINE ..... IDENTIFY AND VERIFY
THROTTLE (INOP) ..... CLOSE
PROP(INOP) ..... FEATHER
MIXTURE(INOP) ..... CUTOFF
BANK ..... 2° TO 3° TOWARD OPERATIVE ENGINE
TRIM ..... ADJUST FOR ZERO SIDESLIP

ENGINE SECURING

THROTTLE ..... CLOSE
PROPELLER ..... FEATHER
MIXTURE ..... CUT OFF
COWL FLAPS(INOP) ..... CLOSE
ALT SWITCH(INOP) ..... OFF
MAG SWITCHES(INOP) ..... OFF
FUEL PUMP(INOP) ..... OFF
FUEL SELECTOR(INOP) ..... OFF
ELECTRICAL LOAD ..... REDUCE
CROSSFEED ..... AS REQUIRED
LAND AS SOON AS PRACTICAL AT NEAREST AIRPORT

ENGINE FAILURE DURING FLIGHT

INOP ENGINE ..... IDENTIFY
THROTTLE ..... AS REQUIRED
AIRSPEED ..... AT LEAST 88 KIAS
FUEL PUMP ..... ON
MIXTURE ..... FULL RICH
FUEL QUANTITY ..... CHECK
CARB HEAT/ALT AIR ..... ON
OIL PRESSURE ..... CHECK
OIL TEMPERATURE ..... CHECK
MAG SWITCHES ..... CHECK
AIR START ..... ATTEMPT
If engine does not start, complete **ENGINE SECURING.**
LAND AS SOON AS PRACTICAL AT NEAREST AIRPORT

ONE ENGINE INOP LANDING

INOP ENGINE ..... SECURED
SEATBELT/HARNESS ..... SECURED
FUEL SELECTOR(OP ENGINE) ..... ON
MIXTURE(OP ENGINE) ..... FULL RICH
PROP(OP ENGINE) ..... FULL FORWARD
FUEL PUMP(OP ENGINE) ..... ON
COWL FLAP(OP ENGINE) ..... AS REQUIRED
ALTITUDE/AIRSPEED ..... MAKE NORMAL APPROACH

WHEN LANDING ASSURED:

LANDING GEAR ..... DOWN
FLAPS ..... 25°
FINAL APPROACH SPEED ..... 90 KIAS
POWER ..... RETARD SLOWLY AND FLARE AIRPLANE
TRIM ..... AS POWER IS REDUCED AIRPLANE WILL YAW IN DIRECTION OF OPERATIVE ENGINE

WARNING

Under many conditions of loading and density altitude a go-around may be impossible and in any event a sudden application of power during one engine inoperative operation makes control of the airplane more difficult.

NORTH STAR AVIATION PA-44-180 SEMINOLE

ONE EINGINE INOP GO-AROUND

MIXTURE ..... FOWARD
PROP ..... FOWARD
THROTTLE ..... T/O POWER
FLAPS ..... RETRACT SLOWLY
LANDING GEAR ..... RETRACT (POSITIVE RATE)
AIRSPEED ..... 88 KIAS
TRIM ..... ADJUST 2°-3°
COWL FLAP(OP) ..... AS REQUIRED

EMERGENCY DESCENT

THROTTLES ..... CLOSED
PROPELLERS ..... FULL INCREASE
MIXTURES ..... AS REQUIRED
GEAR ..... DOWN BELOW 140KTS
AIRSPEED 135KTS

UNFEATHERING PROCEDURE(ACCUMULATOR)

FUEL SELECTOR(INOP) ..... ON
MAG SWITCHES(INOP) ..... ON
FUEL PUMP(INOP) ..... ON
MIXTURE ..... FULL RICH
THROTTLE ..... OPEN 1/4 INCH
PROP ..... FULL FORWARD
THROTTLE ..... REDUCE POWER UNTIL ENGINE IS WARM
ALTERNATOR ..... ON

NOTE

Starter assist is required if the propeller is not windmilling freely with 5-7 seconds after to prop control has been moved forward.

When prop unfeathering occurs, it may be necessary to retard the prop control slightly to not overspeed the prop.

UNFEATHERING PROCEDURE(STARTER ASSIST)

FUEL SELECTOR(INOP) ..... ON
MAG SWITCHES(INOP) ..... ON
FUEL PUMP(INOP) ..... ON
MIXTURE ..... FULL RICH

Carbureted

THROTTLE ..... TWO FULL STROKES THEN OPEN 1/4 INCH

Fuel Injected

THROTTLE ..... OPEN 1/4 INCH

PROP ..... FORWARD
STARTER ..... ENGAGE UNTIL PROP WINDMILLS
THROTTLE ..... REDUCE UNTIL ENGINE IS WARM
If engine does not start, prime as required.

ALTERNATOR ..... ON

ENGINE ROUGHNESS

NOTE

Partial carburetor heat may be worse than no heat at all, since it may melt part of the ice which will refreeze in the intake system. Therefore, when using carburetor heat always use full and, when ice is removed, return the control to the full cold position.

CARB HEAT/ALT AIR ..... ON
If roughness continues after one minute:
CARB HEAT ..... OFF
MIXTURE ..... ADJUST FOR SMOOTHNESS
FUEL PUMP ..... ON
ENGINE GUAGES ..... CHECK
MAG SWITCHES ..... CHECK

If operation is satisfactory on either magneto, continue on that magneto at reduced power and full rich mixture to the first airport.

ENGINE OVERHEAT

COWL FLAPS ..... OPEN
MIXTURE ..... ENRICHEN
POWER ..... REDUCE
AIRSPEED ..... INCREASE ALTITUDE PERMITTING

HIGH OR LOW OIL PRESSURE

OIL PSI ..... VERIFY LOSS & AFFECTED ENGINE
THROTTLE ..... MINIMUM REQUIRED
PROPELLER ..... DECREASE
IF REQUIRED
ENGINE ..... SECURING CHECKLIST

CO DETECTOR WARNING

CO RST SOFT KEY ..... PRESS
IF WARNING CONTINUES
CABIN HEAT ..... OFF
FRESH AIR SOURCE ..... OPEN
Land as soon as possible.

ENGINE FIRE DURING START

If engine has not started:

MIXTURE.....CUTOFF
THROTTLE.....FULL OPEN
STARTER ..... CONTINUE CRANKING

If engine has already started and is running, continue operating to try pulling the fire into the engine.

If fire continues:

FUEL SELECTORS..... OFF
FUEL PUMPS..... OFF
MIXTURES.....CUTOFF
THROTTLES.....FULL OPEN
EXTERNAL FIRE EXTINGUISHER..... USE
AIRPLANE..... EVACUATE

NOTE

If fire continues, shut down both engines and evacuate

ENGINE FIRE IN FLIGHT

FUEL SELECTOR(AFFECTED ENGINE)..... OFF
THROTTLE(AFF ENG)..... IDLE
PROP(AFF ENG).....FEATHER
MIXTURE(AFF ENG)..... CUT-OFF
COWL FLAP(AFF ENG)..... OPEN

If fire persists:

EMERGENCY DESCENT.....INITIATE

If fire goes out:

AFFECTED ENGINE ..... SECURING CHECKLIST

Land as soon as possible at nearest airport.

ELECTRICAL FIRE

FLASHLIGHT(NIGHT) .....LOCATE
EMERG BATT.....ARM
BATT MASTER..... OFF
ALT SWITCHES ..... OFF
ALL ELECT SWITCHES ..... OFF
AVION MASTER SWITCH..... OFF
VENTS.....CLOSED
CABIN HEAT ..... OFF

If fire persists, locate and, if practical, extinguish with portable fire extinguisher located on the console just aft of the two front seats.

CONTINUED ON NEXT COLUMN

ELETRICAL FIRE (CONTINUED)

BUS TIE CIRCUIT BREAKERS

- BOTH MAIN BUS ..... PULL
- NON-ESSENTIAL BUS..... PULL
- AVIAONICS BUS #1..... PULL
- AVIONICS BUS #2 ..... PULL
- L. ALTERNATOR..... PULL
- R. ALTERNATOR..... PULL

ALL MAIN BUS CIRCUIT BREAKERS..... PULL
ALL AVIONICS BUS CIRCUIT BREAKERS..... PULL

NOTE

At this point, the pilot must decide if the flight can be safely continued without electrical power. If so, land at the nearest airport and have the electrical system repaired.

If electrical power is required for the safe continuation of the flight:

WARNING

The following procedure may reenergize the faulty system. Reset the circuit breakers one at a time. Allow a short time period between the resetting of each circuit breaker. If the faulty system is reinstated, its corresponding circuit breaker must be immediately pulled.

ONE MAIN BUS TIE CIRCUIT BREAKER.....IN
BATT MASTER ..... ON
L. OR R. ALT CIRCUIT BREAKER.....IN
L. OR R. ALT FIELD CIRCUIT BREAKER .....IN
ALT SWITCH ..... ON
MAIN BUS CIRCUIT BREAKERS

- ELECTRIC TACHOMETER.....IN
- GEAR INDICATOR .....IN
- AVIONICS BUS #1 .....IN
- AVIAONICS BUS #2.....IN

AVION MASTER SWITCH ..... ON

- COMPASS.....IN
- AUDIO .....IN
- COMM #1.....IN
- NAV #1 .....IN

VENTS ..... OPEN(IF FIRE EXTINGUISHED)
Land as soon as practical.

WARNING

LANDING GEAR MUST BE LOWERED USING EMERGENCY GEAR EXTENSION PROCEDURE.

NORTH STAR AVIATION PA-44-180 SEMINOLE

ONE ENGINE INOP FUEL MANAGEMENT

Using fuel tank same side as operating engine:

FUEL SELECTOR(OPERATIVE) .....ON
FUEL SELECTOR(INOPERATIVE).....OFF
ELECTRUC FUEL PUMPS .....OFF

Using fuel from tank opposite operating engine:

FUEL SELECTOR(OPERATIVE) ..... CROSSFEED
FUEL SELECTOR(INOPERATIVE).....OFF
ELECTRIC FUEL PUMPS.....OFF

NOTE

Use cross feed in level cruise flight only.

LANDING

FUEL SELECTOR(OPERATIVE) .....ON
FUEL SELECTOR(INOPERATIVE).....OFF

ENGINE DRIVE FUEL PUMP FAILURE

ELECTRICAL FUEL PUMP(AFF ENG) .....ON

FUEL QUANTITY

IF ONE TANK HAS LOW FUEL QUANTITY:

FUEL SELECTOR.....XFEED
LAND AS SOON AS PRACTICAL

IF BOTH TANKS HAVE LOW FUEL QUANTITY

FUEL SELECTORS.....ON
LAND AS SOON AS POSSIBLE

LANDING GEAR UNSAFE WARNINGS

Red light indicates gear in transit.
Recycle gear if indication continues.
Light will illuminate and gear horn sounds when the gear is not down and locked if throttles are at low settings or wing flaps are in second or third notch position.

MANUAL GEAR EXTENSION

Check following before extending gear manually:

NAV LIGHTS .....OFF

OR

DAY/NIGHT SWITCH..... DAY
CIRCUIT BREAKERS.....CHECK IN
MASTER SWITCH.....ON
ALTERNATORS ..... CHECK

TO EXTEND:

AIRSPEED ..... REDUCE (100 KIAS MAX)
GEAR SELECTOR.....DOWN
EMERG. GEAR EXTEND KNOB ..... PULL
INDICATOR LIGHTS.....3 GREEN
LEAVE EMERGENCY GEAR EXTENSION KNOB OUT

SINGLE ALTERNATOR FAILURE

NOTE

Anytime total ties bus voltage is below 12.5Vdc, the LO BUS voltage annunciator will illuminate.

VERIFY FAILURE ..... CHECK AMMETERS
ELECTRICAL LOAD (IF LO BUS ILLUMINATED)
Reduce electrical load until load is less than 60 amps & voltage annunciator is extinguished

FAILED ALT SWITCH..... OFF
FAILED ALT CIRCTUIT BREAKER .....
..... CHECK AND RESET
FAILED ALT SWITCH(AFTER OFF AT LEAST 1 SECOND)
..... ON

If power not restored:

FAILED ALT SWITCH..... OFF
AMMETER ..... MONITOR
MAINTAIN BELOW 60 AMPS

DUAL ALT FAILURE

VERIFY .....AMMETERS
ELECTRIC LOAD..... REDUCE TO MINIMUM
ALT SWITCHES..... OFF
ALT CIRCUIT BREAKERS .....CHECK/RESET
AS REQUIRED
ALT SWITCHES..... ON
(One at a time and off for at least one second)

If only one alternator resets:

OPERATING ALT SWITCH..... ON
FAILED ALT SWITCH..... OFF
ELECTRIC LOAD.....REDUCE BELOW 60 AMPS
AMMETER ..... MONITOR

If neither resets:

BOTH ALT SWITCHES..... OFF
EMER BATT.....VERIFY ARM
Continue flight on reduced electrical load on battery power only.

Land as soon as practical. Anticipate complete electrical failure. Duration of Battery power available will be dependent on electrical load and battery condition prior to failure. **Consult the aircraft POH for load shedding procedure.**

WARNING

If the battery is depleted, the landing gear must be lowered using the emergency gear extension procedure. The gear position lights will be inoperative.

COMPLETE ELECTRICAL FAILURE

CAUTION

The emergency battery is designed to provide electrical power to all items on the emergency bus for a minimum of 30 minutes.

NOTE

The VOLTS indication on the EIS window automatically changes to the emergency bus voltage (E VOLTS) when operating on the emergency battery.

NOTE

Cooling air for the PFD is lost when operating on the emergency bus as indicated by the PFD FAN FAIL CAS Advisory message.

EMERG BATT SWITCH..... VERIFY ARM
STANDBY FLIGHT INST..... VERIFY OPERATIONAL
AIRCRAFT CONTROL .....USE PFD AND STANDBY
BATT MASTR SWITCH .....OFF
ALTR LEFT/RIGHT SWITCHES.....OFF

PRIOR TO LANDING:

LANDING LIGHT .....INOPERATIVE
GEAR.....MANUAL GEAR EXTENSION

APPROXIMATELY 30 MINUTES OF ELECTRICAL POWER IS AVAILABLE, *LAND AS SOON AS POSSIBLE.*

EMERGENCY BATTERY VOLTAGE

WARNING

COMPLETE ELECTRICAL FAILURE IS IMMINENT

LAND AS SOON AS POSSIBLE

PFD FAILURE

STANDBY INSTRUMENT..... VERIFY OPERATIONAL
AIRCRAFT CONTROL .....USE STANDBY
DISPLAY BACKUP (RED BUTTON) ..... PUSH
AIRCRAFT CONTROL ..... USE MFD AND STANDBY
COM 2.....ACTIVATE AND TUNE
NAV 2.....ACTIVATE AND TUNE
COM2/MIC .....SELECT
DME.....SELECT NAV2 IN DME TUNING WINDOW

EXIT AND AVOID IMC AS SOON AS PRACTICAL

NOTE

If the PFD fails, the MFD will remain in normal display mode. Pushing the DISPLAY BACKUP button on the audio panel puts the MFD in reversionary mode, which depicts primary flight instruments, engine and systems information on a single display format. Certain map functions will be lost in reversionary mode.

NOTE

If the PFD failure occurs while operating on NAV1 DME, the NAV 1 DME information will still be available. If however, the pilot selects NAV2 DME, NAV1 DME may not be re-selected.

PFD FAILURE CONT'D

NOTE

The following features will become inoperative if the PFD fails:

- Com 1 (red x'd but 121.5 MHz remains available)
- Nav 1
- GPS 1
- Traffic
- GFC700 Autopilot

MFD FAILURE

DISPLAY BACKUP on audio panel .....PUSH

EXIT AND AVOID IMC AS SOON AS PRACTICAL

NOTE

The PFD will automatically revert to reversionary mode.

NOTE

The following features will become inoperative with MFD failure:

- Com 2 (red x'd but 121.5 MHz remains available)
- Nav 2
- GPS 2
- GDL 69 (Garmin Datalink - XM)
- DME
- ADF
- ESP

NOTE

If the GFC700 autopilot was engaged prior to MFD failure, it will remain engaged in its current lateral and vertical modes. The modes cannot be changed and if the autopilot is disengaged, it cannot be re-engaged.

ATTITUDE HEADING REFERENCE SYSTEM (AHRS) FAILURES

AHRS TOTAL FAILURE

ON GROUND:

PFD ADVISORIES.....CONSIDER
AHRS Circuit Breaker .....RESET
IF AHRS DATA STILL INVALID:

IFR OPERATIONS NOT AUTHORIZED

IN FLIGHT:

STANDBY INSTRUMENT.....
..... VERIFY NO FAILURE INDICATIONS
ATTITUE AND HEADING..... USE STANDBY

NOTE

The course pointer will point upwards at all times, but the CDI can still be used for navigating in GPS and VOR/LOC modes.

COURSE..... SET USING CRS KNOB ON PFD
PFD MESSAGE ADVISORIES .....CONSIDER
AHRS Circuit Breaker .....RESET

IF AHRS DATA STILL INVALID:

EXIT AND AVOID FLIGHT IN IMC

NOTES FOR THIS CHECKLIST FOUND AT TOP OF NEXT PAGE...

NORTH STAR AVIATION PA-44-180 SEMINOLE

NOTE

The autopilot (including ESP and USP) will be inoperative if AHRS remains inoperative.

NOTE

Traffic (TAS) symbols will not be displayed on the moving map, however TAS information remains available on the TAS page.

NOTE

For partial AHRS failures, a red-x and amber text will appear over the affected indication(s)

AIR DATA COMPUTER (ADC)FAILURES

ADC TOTAL FAILURE

ON GROUND:

PFD MESSAGE ADVISORIES ..... CONSIDER
ADC Circuit Breaker.....RESET
IF ADC DATA STILL INVALID:

IFR OPERATIONS NOT AUTHORIZED

IN FLIGHT:

STANDBY INST.....VERIFY AIR DATA INDICATIONS
AIRSPEED, ALTITUDE, AND V/S .....USE STANDBY
PFD MESSAGE ADVISORIES ..... CONSIDER
ADC Circuit Breaker.....RESET

NOTE

During failure of ADC, Traffic Avoidance System (TAS) and GFC700 autopilot will be inoperative.

IF ADC DATA STILL INVALID

EXIT AND AVOID FLIGHT IN IMC

ERRONEOUS INDICATION OR LOSS OF ENGINE AND FUEL DISPLAYS

NOTE

Erroneous information should be suspected when indications do not agree with other system information. Erroneous indications may be identified by comparing a display with other system information.

1. Set power based on throttle lever position, engine sound and speed.
2. Monitor other indications to determine the health of the engine.
3. Use known power settings from POH power setting tables for approximate fuel flow values.
4. Use other system information, such as annunciator messages, fuel totalizer quantity and flow, to safely complete the flight.

IF INDICATIONS FOR ANY OF THE FOLLOWING ARE INVALID:

- All Engine Parameters
- VOLTS
- ALTR AMPS
- BATT AMPS
- FUEL QTY

GEA Circuit Breaker..... RESET

IF ALL ENGINE PARAMETERS ARE STILL UNAVAILABLE, LAND AS SOON AS PRACTICAL.

ERRONEOUS OR LOSS OF WARNING/CAUTION CAS MESSAGES

1. If a yellow-x is placed over the CAS message window, special attention should be placed on all engine and airframe related indications. The Master Warning and Master Caution indicators will not function, therefore a failure of a particular system can go undetected.
2. If a CAS message appears that is not expected, treat it as if the condition exists.
3. If an abnormal condition exists but the CAS system has not been activated, use other available information to confirm the condition exists. If it cannot be determined that the condition does not exist, treat the situation as if the condition does exist and take appropriate action.

NOTE

CAS messages are inhibited for many parameters on the engine information system display (EIS) of the MFD. The Master Warning and Master Caution indicators and associated chimes are still activated whenever any indicated parameter enters the red or amber color bands.

IF A RED X APPEARS OVER THE CAS MESSAGE WINDOW, LAND AS SOON AS PRACTICAL.

COMMUNICATIONS (COM1 AND COM2) FAILURE

NOTE

No matter what the cause of a Com failure, removing power from the audio panel actuates a fail-safe connection between the pilot's headset/microphone and COM1.

AUDIO MKR Circuit Breaker .....PULL

EXIT AND AVOID IMC AS SOON AS PRACTICAL

DUAL GPS FAILURE

NAVIGATION.....USE ALT. SOURCE

IF NO ALTERNATE NAV SOURCES ARE AVAILABLE

Dead Reckoning (DR) mode—Is active when in Enroute mode (the airplane is greater than 30NM from the destination airport in flight plan).

NAVIGATION..... USE MFD AND AMBER CDI ON HIS

WARNING

In DR mode, the estimated position becomes increasingly unreliable over time and should not be used as a sole means of navigation. In DR mode the CDI is initially displayed in amber, but is removed after 20 minutes.

TAWS is Inoperative

DR mode uses heading, airspeed and last known GPS position to estimate the airplanes current position. All maps with an airplane symbol show a ghosted airplane and a "DR" label.

NOTE

Traffic Information System (TIS) and Traffic Advisory System (TAS) are not dependent on GPS information. Therefore, the position of displayed traffic relative to the airplane symbol on the map is still accurate.

Loss of integrity (LOI) Mode — Is active when GPS integrity is insufficient for the current phase of flight.

NAVIGATION.....USE OTHER SOURCES

NOTE

All information derived from GPS or DR is removed from the displays.

The airplane symbol is removed from all maps. The map will remain centered at the last known position. "NO GPS POSITION" is shown in the center of the map. TAWS and TAS are inoperative.

AUTOPILOT MALFUNCTION

CONTROL WHEEL.....GRASP FIRMLY
ATTITUDE INDICATORS..... CROSSCHECK
A/P DISC SWITCH..... DEPRESS AND HOLD
PITCH TRIM.....RETRIM
AUTOPILOT Circuit Breaker ..... PULL
AUTOPILOT.....DO NOT RE-ENGAGE

AUTOMATIC AUTOPILOT DISCONNECT

A/P DISC SWITCH.....DEPRESS AND RELEASE
PITCH TRIM.....RETRIM AS NECESSARY

NOTE

The autopilot disconnect may be accompanied by a red boxed PTCH (pitch), ROLL, or PTRM annunciation on the PFD, indicating the axis which has failed. The autopilot cannot be re-engaged with any of these annunciations present.

ELECTRIC PITCH TRIM FAILURE

NOTE

Loss of the electric pitch trim servo will not cause the autopilot to disconnect. Monitor pitch attitude for unusual behavior. Be alert to possible autopilot out-of-trim conditions (see AUTOPILOT OUT OF TRIM procedure) and expect residual control forces upon disconnect. The autopilot will not re-engage after disconnect with failed pitch trim.

AUTOPILOT..... DISCONNECT

ELECTRIC PITCH TRIM RUNAWAY

NOTE

After the autopilot is disengaged, it can not be re-engaged until the electric pitch trim system regains functionality.

CONTROL WHEEL .....GRASP FIRMLY
ATTITUDE INDICATORS..... CROSSCHECK
A/P DISC SWITCH..... DEPRESS AND HOLD
PITCH TRIM Circuit Breaker ..... PULL
PITCH TRIM.....RETRIM MANUALLY

AUTOPILOT OVERSPEED RECOVERY

NOTE

This autopilot mode is activated whenever the aircraft actual or projected airspeed exceeds V_{NE}.

THROTTLE..... REDUCE POWER
AUTOPILOT PITCH REFERENCE .....RESET
AUTOPILOT..... DISCONNECT

NOTE

Overspeed recovery mode provides a pitch up command (to a maximum level flight altitude) to decelerate the airplane below VNE. The autopilot must be engaged for it to follow the pitch-up commands of the flight director Overspeed recovery is not active in altitude hold (ALT), glideslope (GS) of glidepath (GP) modes. The speed reference cannot be adjusted while in overspeed recovery mode.

AUTOPILOT UNDERSPEED RECOVERY

NOTE

This autopilot mode is active whenever the autopilot is engaged and the airspeed has decreased below a minimum threshold.

THROTTLE.....INCREASE POWER
FLAPS POSITION .....CONSIDER
LANDING GEAR POSITION .....CONSIDER

AUTOPILOT OUT-OF-TRIM

CAUTION

Do not attempt to overpower the autopilot in the event of a mistrim. The autopilot servos will oppose pilot input and will trim opposite the direction of pilot input (pitch axis only). This could lead to a significant out-of –trim condition. Disconnect the autopilot using the A/P DISC / TRIM INTER switch if manual control is desired.

IF AIL → OR ← AIL annunciation..... VERIFY SLIP
.....SKID INDICATOR CENTERED
IF ↑ ELE OR ↓ ELE ANNUNCIATION.....
.....SUSPECT ELECATOR TRIM ISSUE
CONTROL WHEEL .....GRASP FIRMLY

CAUTION

Be prepared to apply a sustained control force in the direction of the annunciation arrow. For example, an arrow pointing to the right with AIL annunciation indicates that sustained right wing down control wheel force will be required upon autopilot disconnect.

AP DISC SWITCH ..... DEPRESS
AFFECTED TRIM SYSTEM .....RETRIM
AUTOPILOT.....RE-ENGAGE IF AVAILABLE
If mistrim indication re-occurs, disconnect autopilot for the remainder of the flight or until the offending condition is resolved.

ABNORMAL FLIGHT DIRECTOR MODE TRANSITIONS

NOTE

Upon loss of a selected mode, the system will revert to the default mode for the affected axis, either ROL or PIT

LOSS OF VERTICAL MODE:

AUTOPILOT .....SELECT DIFFERENT MODE
IF ON AN INSTRUMENT APPROACH
AUTOPILOT..... DISCONNECT

LOSS OF LATERAL MODE:

AUTOPILOT.....SELECT DIFFERENT MODE
IF ON AN INSTRUMENT APPROACH
AUTOPILOT..... DISCONNECT

AUTOPILOT PREFLIGHT TEST FAILURE

AUTOPILOT Circuit Breaker .....PULL
PITCH TRIM Circuit Breaker .....PULL
AUTO PILOT AND PITCH TRIM .....RESET

LOSS OF NAVIGATION INFORMATION

AUTOPILOT.....SELECT ANOTHER LATERAL MODE
NAV SOURCE .....SELECT A VALID SOURCE
AUTOPILOT..... SELECT NAV

IF ON AN INST. APP.

MISSED APPROACH ..... EXECUTE

COOLING FAN FAILURES

IF FAILURE OCCURS ON THE GROUND

DO NOT FLY UNTIL ISSUE IS RESOLVED

IF FAILURE OCCURS IN FLIGHT

FIX ISSUE PRIOR TO NEXT FLIGHT

PITOT HEAT

PITOT HEAT..... ON

IF "PITOT HEAT FAIL" SHOWS:

PITOT HEAT..... OFF
PITOT HEAT Circuit Breaker .....RESET
PITOT HEAT ..... ON

IF PITOT HEAT IS STILL INOPERATIVE:

IMC/ICING CONDITIONS..... EXIT/AVOID

HYDRAULIC PUMP FAILURES

HYDRAULIC PUMP WILL NOT DEACTIVATE:

GEAR PUMP Circuit Breaker .....PULL

PRIOR TO LANDING

GEAR PUMP Circuit Breaker .....PUSH

IF CIRCUIT BREAKER POPS

MANUAL GEAR EXTENSION .....COMPLETE

HYDRAULIC PUMP WILL NOT ACTIVATE:

GEAR..... RETURN TO ORIGINAL POSITION
GEAR PUMP Circuit Breaker .....RESET
GEAR..... RESELECT

IF LANDING GEAR REMAINS UP

MANUAL GEAR EXTENSION .....COMPLETE

IF LANDING GEAR REMAINS DOWN

AIRSPEED.....BELOW 140 KIAS

STARTER ENGAGED

IF ON THE GROUND:

THROTTLE..... REDUCE
ENG START Circuit Breaker .....PULL
ENGINE .....SHUTDOWN

IF IN FLIGHT:

THROTTLE..... REDUCE
ENG START Circuit Breaker .....PULL
LAND AS SOON AS POSSIBLE

SPIN RECOVERY (INTENTIONAL SPINS PROHIBITED)

NOTE

FAA Regulations do not require spin demonstration of multi-engine airplanes; spin tests have not been conducted. The recovery technique presented is based on the best available information.

THROTTLES ..... IDLE
RUDDER ..... FULL OPPOSITE SPIN
CONTROL WHEEL ..... FULL FORWARD
AILERONS ..... NEUTRAL
RUDDER ..... NEUTRAL WHEN SPIN STOPS
CONTROL WHEEL ..... SMOOTH AFT
TO RECOVER FROM DIVE

OPEN DOOR

To close door in flight:

AIRSPEED ..... SLOW TO 82 KIAS
CABIN VENTS ..... CLOSE
STRM WINDOW ..... OPEN
TOP LATCH(IF OPEN) ..... LATCH
SIDE LATCH(IF OPEN) ..... PULL AND LATCH

If both latches are open:

SIDE LATCH ..... LATCH
THEN LATCH TOP LATCH

PROP OVERSPEED

THROTTLE(AFF ENG) ..... RETARD
OIL PRESSURE(AFF ENG) ..... CHECK
PROP CONTROL(AFF ENG) ..... DECREASE
THEN SET IF ANY CONTROL AVAILABLE
AIRSPEED ..... REDUCE
THROTTLE(AFF ENG) ..... AS REQUIRED

EMERGENCY EXIT

PLASTIC COVER ..... REMOVE
EMERGENCY EXIT HANDLE ..... PULL
WINDOW ..... PUSH OUT

HEATER OVERHEAT

CABIN HEAT ..... OFF

SUMMARY OF FACTORS AFFECTING SINGLE ENGINE OPERATIONS

SIGNIFICANT CLIMB PERFORMANCE PENALTIES CAN RESULT FROM LANDING GEAR, FLAP, OR WINDMILLING PROPELLER DRAG. THESE PENALTIES ARE APPROXIMATED AS FOLLOWS:

LANDING GEAR EXT./FLAPS UP ..... -250FPM
FLAPS EXTENDED 25°/GEAR DOWN ..... -490FPM
FLAPS EXTENDED FULLY/GEAR DOWN ..... -525FPM
INOP ENG. WINDMILLING (GEAR AND FLAPS UP) .....
..... -200FPM

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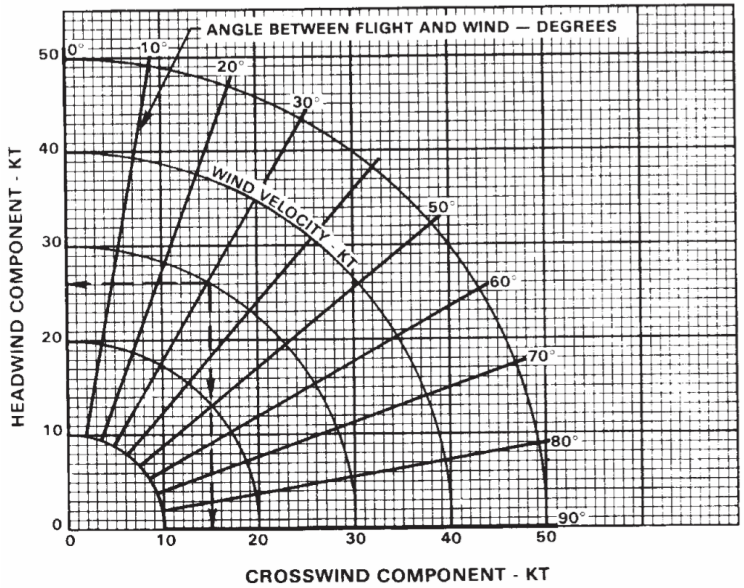
Appendix A
Wind Component/Light Gun Signals



ATC LIGHT GUN SIGNALS FOR AIRCRAFT

COLOR & TYPE	GROUND	AIR
STEADY GREEN	Cleared for takeoff	Cleared to land
FLASHING GREEN	Cleared for taxi	Return for landing (to be followed by steady green)
STEADY RED	STOP!	Give way to other aircraft and continue circling
FLASHING RED	Taxi clear of runway in use	Airport unsafe, do not land
FLASHING WHITE	Return to starting point on airport	N/A
ALTERNATING RED/GREEN	Exercise extreme caution	

Appendix B
Maneuver Sheets

Piper Seminole Flight Maneuvers

North Star Aviation
Minnesota State University, Mankato

Slow Flight (Landing Configuration)
Altitude.....Recovered by 3000' AGL Minimum
Throttles.....Below 15" MP
Pitch to Maintain Altitude
Below 140 KIAS.....Gear Down
Below 111 KIAS.....Flaps 10°
Below 100 KIAS.....Props Forward
Below 90 KIAS .....Flap 25 °
Below 90 KIAS .....Flap 40 °
Power.....Increase to Maintain Altitude
Pitch.....Maintain Stall Speed +10/-0
(Target 60 KIAS)
Trim.....Adjust as Necessary
Recovery:
Smoothly Reduce Pitch
Power.....Increase to Max.
Flaps.....25°
Pitch for minimal loss of altitude
Positive Rate.....Gear Up
.....Flaps 10°
.....Flaps 0°
Accelerate.....V_Y (88 KIAS)

Power-Off Stall (Landing Configuration)
Altitude..... Recovered by 3000' AGL Minimum
Power.....Below 15" MP
Pitch to Maintain Altitude
Below 140 KIAS.....Gear Down
Below 111 KIAS.....Flaps 40°
(one notch at a time)
Below 100 KIAS.....Props Forward
Enter Normal Descent to Land
.....Throttles to Idle
Maintain Altitude to Induce a Stall
Recovery: (Initiated at the first indication for commercial)
Smoothly Reduce Pitch
Power.....Increase to Max.
Flaps.....25°
Pitch for minimal loss of altitude
Positive Rate.....Gear Up
.....Flaps 10°
.....Flaps 0°
Accelerate to Cruise Flight .....110 knots

Slow Flight (Takeoff Configuration)
Altitude.....Recovered by 3000' AGL Minimum
Power.....Below 15" MP
Pitch to Maintain Altitude
Below 100 KIAS.....Props Forward
Power.....Increase to Maintain Altitude
Pitch.....Maintain Stall Speed +10/-0
(Target 62 KIAS)
Trim.....Adjust as Necessary
Recovery:
Smoothly reduce pitch
Power.....Increase to Max.
Positive Rate.....Verify Gear Up
.....Verify Flaps 0°
Accelerate to Cruise Flight .....110 knots

Power-On Stall (Takeoff Configuration)
Altitude.....Recovered by 3000' AGL Minimum
Power.....Below 15"MP
Pitch to maintain altitude
Below 100 KIAS.....Props Forward
82 KIAS.....Power to 20" MP
Smoothly Increase Pitch to Induce a Stall
Recovery:(Initiated at the first indication for commercial)
Smoothly reduce pitch
Power.....Increase to Max.
Pitch for minimal loss of altitude
Positive Rate.....Verify Gear Up
.....Verify flaps 0°
Accelerate to Cruise Flight .....110 knots

Steep Turns
Altitude.....3000' AGL Minimum
Power.....18"MP and 2300-2500RPM
Airspeed.....110 KIAS
Bank.....50°
Power.....Increase to Maintain Airspeed
Trim .....Roll Aft to Relieve Pressure
Roll Out.....Initial Heading
Execute a 360° turn in the opposite direction

Revised: 8/27/2018 Piper Seminole Flight Maneuvers 1

Accelerated Stall
Altitude.....Recovered by 3000' AGL Minimum
Throttles.....Below 15" MP
Pitch to Maintain Altitude
Below 100 KIAS.....Props Forward
Bank.....45°
Throttles.....Idle
Maintain altitude to induce stall
Recovery: (Initiated at the first indication for commercial)
Smoothly reduce pitch
Bank.....Wings Level
Power.....Increase to Max.
Pitch for minimal loss of altitude
Positive Rate.....Verify Gear Up
.....Verify flaps 0°
Accelerate to Cruise Flight 110 knots

Drag Demonstration
Altitude.....4000' AGL Minimum
Throttles.....Below 15" MP
Cowl Flaps.....As Required
Pitch to Maintain Altitude
Below 100 KIAS.....Props Forward
Airspeed - 88 KIAS
Operating Engine.....Max Power
Inoperative Engine.....Sim. Feather
(11.5" MP, 2000 RPM)
Airspeed 88kts. (V_{YSE}).....Note Performance
Airspeed 78kts.....Note Performance
Airspeed 98kts.....Note Performance
Airspeed 88kts (V_{YSE})
Gear Down.....Note Performance
Flaps 10°.....Note Performance
Flaps 25°.....Note Performance
Flaps 40°.....Note Performance
Inoperative Engine (windmilling)
Prop.....Forward
Throttle.....Idle
.....Note Performance
Flaps 25°.....Note Performance
Flaps 10°.....Note Performance
Flaps 0°.....Note Performance
Gear Up.....Note Performance
Inoperative Engine.....15" MP (warm-up CHT)
Accelerate to Cruise Flight .....110 knots

V_{MC} Demonstration
Altitude.....Recovered by 4000' AGL Minimum
Throttles.....Below 15" MP
Below 100 KIAS.....Props Forward
Airspeed – 92 KIAS
Left engine.....Throttle to Idle
Right engine.....Throttle to Full
Pitch.....Increase to Lose 1kt Per Second
Recover at the **first indication** of a stall

Or

Red Radial Line 56kts (V_{MC})

Or

Loss of Directional Control

Recovery:
Right Engine.....Reduce to Regain Dir. Control
Reduce Pitch (min. loss of alt.)
Directional Control Regained
Right Engine.....Increase power to full
Pitch for Minimal loss of Altitude
Accelerate.....V_{YSE} (88 KIAS)
Inoperative Engine.....15" MP (warm-up CHT)
Accelerate to Cruise Flight .....110 knots

Ground Reference Maneuvers
Altitude.....600-1000'AGL
Pre-Maneuver Check.....Complete
Area.....Clear of Obstructions
Airspeed.....110 KIAS
Enter Maneuver on Downwind Heading
Perform to Applicable Test Standards

V-Speeds
V_Y = 88 KIAS --- Best Rate of Climb
V_{YSE} = 88 KIAS --- Singe Engine Best Rate of Climb
V_X = 82 KIAS --- Best Angle of Climb
V_{XSE} = 82 KIAS --- Single Engine Best Angle of Climb
V_{SSE} = 82 KIAS --- Min. Intentional One Engine Inop.
V_{SO} = 55 KIAS --- Stall Speed (Landing Configuration)
V_S = 57 KIAS --- Stall Speed (Clean Configuration)
V_{MC} = 56 KIAS --- Minimum Control
V_{FE} = 111 KIAS --- Maximum Flaps Extended
V_{LE} = 140 KIAS --- Maximum Landing Gear Extended
$V_{LO\ Down}$ = 140 KIAS --- Max. Landing Gear Extension
$V_{LO\ UP}$ = 109 KIAS --- Max. Landing Gear Retraction
V_{NO} = 169 KIAS --- Maximum Structural Cruising
V_{NE} = 202 KIAS --- Never Exceed
V_O = 115 – 135 KIAS --- Maneuvering Speed (V_A)

Piper Warrior Flight Maneuvers

North Star Aviation
Minnesota State University, Mankato

Slow Flight (Landing Configuration)
Altitude.....2000' AGL Minimum
Pre-Maneuver Check.....Complete
Throttle.....1700RPM
Pitch to Maintain Altitude
Below 103 KIAS.....Flaps 40°
(One Notch at a Time)
Throttle.....Increase to Maintain Altitude
(1800-2000 RPM)
Pitch.....Maintain Stall Speed +10/-0
(Target 49 KIAS)
Trim.....Adjust As Necessary
Recovery:
Smoothly Reduce Pitch
Throttle.....Max Power
Flaps.....25°
Pitch for minimal loss of altitude
Positive Rate.....Flaps 10°
.....Flaps 0°
Accelerate.....V_Y
Return to Cruise Flight 90 KIAS

Slow Flight (Takeoff Configuration)
Altitude.....2000' AGL Minimum
Pre-Maneuver Check.....Complete
Throttle.....1500 RPM
Pitch to Maintain Altitude
Throttle.....Increase to Maintain Altitude
(1800-2000RPM)
Pitch.....Stall Speed +10/0
(Target 55 KIAS)
Trim.....Adjust as Necessary
Recovery:
Smoothly Reduce Pitch
Throttle.....Max Power
Pitch for minimal loss of altitude
Positive Rate.....Verify Flaps 0°
Accelerate.....V_Y
Return to Cruise Flight 90 KIAS

Ground Reference
Altitude.....600-1000'AGL
Pre-Maneuver Check.....Complete
Area.....Identify Pos. Landing Area
Airspeed.....90 KIAS
Enter Maneuver on Downwind Heading
Perform to Applicable Test Standards

Power Off Stalls (Landing Configuration)
Altitude.....2000' AGL Minimum
Pre-Maneuver Check.....Complete
Throttle.....1700RPM
Pitch to Maintain Altitude
Below 103 KIAS.....Flaps 40°
(One Notch at a Time)
Enter Normal Descent to Land
.....Throttle to Idle
Maintain Altitude to Induce a Stall
Recovery:
Smoothly Reduce Pitch
Throttle.....Max Power
Flaps.....25°
Pitch for minimal loss of altitude
Positive Rate.....Flaps 10°
.....Flaps 0°
Accelerate.....V_Y
Return Original Altitude & Airspeed 90 KIAS

Power On Stall (Takeoff Configuration)
Altitude.....2000' AGL Minimum
Pre-Maneuver Check.....Complete
Throttle.....1500 RPM
Pitch to Maintain Altitude
63 KIAS.....Max Power
Smoothly Increase Pitch to Induce a Stall
Recovery:
Smoothly Reduce Pitch
Throttle.....Max Power
Pitch for minimal loss of altitude
Positive Rate.....Verify Flaps 0°
Accelerate.....V_Y
Return to Cruise Flight 90 KIAS

Steep Turns
Altitude.....2000' AGL Minimum
Pre-Maneuver Check.....Complete
Throttle.....2300-2400RPM
Airspeed.....90 KIAS
Bank.....Commercial (50°)
Private (45°)
Trim.....Roll Aft to Relieve Back Pressure
Power.....Increase to Maintain Airspeed
Roll Out.....Initial Heading+/- 10°
Repeat Procedure in the opposite direction as necessary
Return to Cruise Flight 90 KIAS

Eights on Pylons
Airspeed.....90 KIAS
Pre-Maneuver Check.....Complete
Area.....Clear of Obstructions
Pivotal Altitude.....$GS^2/11.3$
Enter 45° to Downwind
Pitch.....Maintain Pivotal Altitude
Perform 2 revolutions, one around each point

Lazy Eights
Altitude.....2000' AGL Minimum
Pre-Maneuver Check.....Complete
Airspeed.....90 KIAS
(Increasing Pitch, Increasing Bank)
45° Point.....Max Pitch Up, 15° Bank
(Decreasing Pitch, Increasing Bank)
90° Point.....Level Pitch, 30° Bank
(Decreasing Pitch, Decreasing Bank)
135° Point.....Max Pitch Down, 15° Bank
(Increasing Pitch, Decreasing Bank)
180° Point
Straight and Level
Initial Heading +/- 10°
Initial Altitude +/- 100'
Initial Airspeed +/- 10 KIAS
Repeat in Opposite Direction

Chandelles
Altitude.....2000' AGL Minimum
Pre-Maneuver Check.....Complete
Airspeed.....90 KIAS
Bank.....30°
Throttle.....Max Power
Pitch.....Gradually Increase
90° Point.....Max Pitch Up
Maintain Pitch, Gradually Decrease Bank
180° Point
Roll Out.....+/- 10° Heading
Pitch.....Maintain Without Stalling
Airspeed.....Maintain Just Above Stall
Slowly decrease pitch to accelerate while holding altitude
Return to Cruise Flight 90 KIAS

Steep Spirals
Altitude.....4000' AGL Minimum
(Altitude enough to complete three turns. Consider DA)
Pre-Maneuver Check.....Complete
Airspeed.....90 KIAS
Begin Maneuver on Downwind Heading
Prior to being abeam the reference point
Throttle.....Idle
Pitch.....V_G
Bank.....Up to 60°
(Maintain Equal Radius)
Each Upwind Heading - Clear the engine by adding power slowly up to 1700 RPM
After 3rd Turn:
Wings Level
Heading +/- 10°
Recovery
Return to Cruise Flight
Or
Climb As Assigned
Or
Proceed With Simulate Power-Off Landing
(No Lower than 500' AGL)

Warrior V-Speeds
V_R = 55 KIAS --- Rotate
V_Y = 79 KIAS --- Best Rate of Climb
V_X = 63 KIAS --- Best Angle of Climb
V_{SO} = 44 KIAS --- Stall Speed (Landing Configuration)
V_S = 50 KIAS --- Stall Speed (Clean Configuration)
V_{FE} = 103 KIAS --- Maximum Flaps Extended Speed
V_{NO} = 126 KIAS --- Maximum Structural Cruising Speed
V_{NE} = 160 KIAS --- Never Exceed Speed
V_A = 88 – 111 KIAS --- Maneuvering Speed
V_G = 73 KIAS --- Best Glide Speed

Archer V-Speeds
V_R = 60 KIAS --- Rotate
V_Y = 76 KIAS --- Best Rate of Climb
V_X = 64 KIAS --- Best Angle of Climb
V_{SO} = 45 KIAS --- Stall Speed (Landing Configuration)
V_S = 50 KIAS --- Stall Speed (Clean Configuration)
V_{FE} = 102 KIAS --- Maximum Flaps Extended Speed
V_{NO} = 125 KIAS --- Maximum Structural Cruising Speed
V_{NE} = 154 KIAS --- Never Exceed Speed
V_A = 98 – 113 KIAS --- Maneuvering Speed
V_G = 76 KIAS --- Best Glide Speed

Takeoff and Landing Procedures

North Star Aviation
Minnesota State University, Mankato

Piper Warrior/Archer

Normal Takeoff
Flaps.....0°
Line up on runway centerline:
Brakes.....Hold
Rwy/Compass/DG.....Verify aligned ("33,33,33" etc.)
Brakes.....Release
Throttle.....Full Power
Engine Gauges.....Verify in the green
"Airspeed Alive"
"V_R".....Rotate"
Pitch.....V_Y
Trim.....Adjust for V_Y
Above 1000' AGL and Clear of Pattern.....Climb Check

Soft-Field Takeoff
Before Taking Runway
Flaps.....25°
Flight Controls.....
.....Full Aft Line up on runway centerline without stopping
Rwy/Compass/DG.....Verify aligned ("33,33,33" etc.)
Throttle.....Full Power
Engine Gauges.....Verify in the green
"Airspeed Alive"
Lift-Off.....As soon as possible
Reduce Pitch to Remain in Ground Effect
Accelerate to V_X.....Initiate Climb
200' AGL.....Flaps 10°, Pitch V_Y
300' AGL.....Flaps 0°

Short-Field Takeoff
Before Taking Runway.....Flaps 25°
Use maximum available runway, line up on centerline:
Brakes.....Hold
Throttle.....Full Power/ Verify Max. RPM
Engine Gauges.....Verify in the green
Brakes.....Release
"Airspeed Alive"
Warrior
"50 Knots".....Rotate"
Archer
"55 Knots".....Rotate"
Accelerate Vx
200' AGL (clear of obstacle).....Flaps 10°
Pitch.....V_Y
300' AGL.....Flaps 0°

Soft-Field Landing
Final Approach Speed.....70 KIAS
Touchdown softly, while holding the nose wheel off the ground as long as possible. Avoid use of the brakes as it will cause weight to be transferred to the nose wheel. Continue holding the controls full aft as if taxiing on a soft surface.

Short-Field Landing
Final Approach Speed.....65 KIAS
Slow to 65 KIAS after turning final and adding full flaps. Keep a constant angle of descent to the touchdown point while slowing the airplane to allow for a touchdown with minimal floating. After touchdown, apply maximum effective braking. If simulating a short field, announce "Simulated Max. Braking" and apply normal braking.

Traffic Pattern
Downwind --..... 90 KIAS
Perform Memory Item.....BC-GUMPS
Before Landing Checklist.....Complete
(Abeam the Landing Point):
Power.....1700 RPM Below
Below 103 KIAS.....Flaps 10°
Pitch & Trim for .....90 KIAS
Base.....Flaps 25°
Pitch & Trim for.....80 KIAS
Final.....Flaps 40°
Pitch & Trim for.....Final Approach Speed

Go Around/Missed Approach
Cram.....Max Power
Climb.....Pitch V_Y Clean
(when landing with use of flaps)
Flaps .....25°
Positive Rate at V_Y.....10°
Flaps .....0°
Cool.....Carb. Heat Off
Call.....Go around/Missed Approach

Piper Seminole

Normal Takeoff

Flaps.....0°
Line up on runway centerline:
Brakes.....Hold
Rwy/Compass/DG.....Verify aligned ("33,33,33" etc.)
Throttles.....2000 RPM
Engine Gauges.....Verify in the green
Brakes.....Release
Throttles.....Max Power
"Airspeed Alive"
"75 Knots".....Rotate"
Positive Rate.....Gear Up
Pitch.....V_Y
Trim.....Adjust for V_Y
After Reaching 500' AGL
Throttles.....25" MP
Props.....2500 RPM
Above 1000' AGL and Clear of Pattern.....Climb Check

Short-Field Takeoff

Flaps.....0°
Use maximum available runway, line up on centerline:
Brakes.....Hold
Throttles.....2000 RPM
Engine Gauges.....Verify in the green
Throttles.....Max Power
.....Verify Max. RPM
Brakes.....Release
"Airspeed Alive"
"70 Knots".....Rotate"
Positive Rate.....Gear Up
Pitch.....V_X
Clear of obstacle.....Pitch V_Y
Trim.....Adjust for V_Y
After Reaching 500' AGL
Throttles.....25" MP
Props.....2500 RPM
Above 1000' AGL.....Climb Check

Short-Field Landing

Final Approach Speed.....75 KIAS
Slow to 75 KIAS on short final. Keep a constant angle of descent to the touchdown point while slowing the airplane to allow for a touchdown with minimal floating. After touchdown, apply maximum effective braking. If simulating a short field, announce "Simulated Max. Braking" and apply normal braking.

Traffic Pattern

Downwind ..... 100 KIAS
Perform Memory Item.....BCC-GUMPS
Before Landing Checklist.....Complete Abeam
Landing Point:
Power.....Reduce
Below 111 KIAS.....*Flaps 10°
Pitch & Trim for.....100 KIAS
Base.....*Flaps 25°
Pitch & Trim for.....90 KIAS
Final.....*Flaps 40°
Pitch & Trim for.....Final Approach Speed
500' AGL .....Final Gear Check
(Announce Safe to Land)

Single Engine Traffic Pattern (Simulated)

Downwind --- 100 KIAS (88 KIAS if needed)
Before Landing Checklist.....Complete
Abeam Landing Point.....Gear Down
Power.....Reduce/As Required
Pitch & Trim for.....100 KIAS
Base.....*Flaps 10°
Pitch & Trim for.....90 KIAS
Final.....*Flaps 25°
Pitch & Trim for.....90 KIAS
500' AGL .....Both props fwd. [1]
Committed to Land and Runway Made
Reduce power slowly and flare airplane.

Go Around/Missed Approach (All Engines)

Cram.....Mixture, Prop, Throttle Full fwd.
Climb.....Pitch for V_Y
Clean.....Flaps 25°
Positive Rate.....Gear Up, Flaps 10°
.....Flaps 0°
Cool.....Cowl Flaps As Req./Carb. Heat Off
Call.....Go around/Missed Approach

Go Around/Missed Approach (Single Engine)

Above Committed to Land Altitude
Cram.....Mixture/Prop/Throttle - Full Forward
Climb.....Pitch for V_Y
Clean.....Flaps 25°
.....Positive Rate Gear Up
.....Flaps 10°
Cool.....Cowl Flaps As Req./Carb. Heat Off
Call.....Go around/Missed Approach

*When adding flaps in the Seminole, the pilot will announce and verify:
"Three green, one in the mirror"

1: This is done in the event that an actual go-around using both engines becomes necessary while performing single engine approaches/landings for training purposes.

Instrument Flight/Approach Procedures

North Star Aviation
Minnesota State University, Mankato

The 5 T's

Will be executed and verbalized each time when initiating a turn; intercepting a course, crossing a fix/NAVAID, etc.

Turn (turning to heading ....)
Time (start/note/stop as needed)
Twist (hdg. bug, CDI, HSI, etc.)
Throttle (adjust for alt./airspeed)
Talk (radio call/report as required)

WIRE Checklist

Weather.....Obtain
Instruments.....DG/Altimeter Set
Radios.....Set
(Load freq.'s needed for appch.)
Environment.....Approach Brief

Final Approach Fix Checklist

Time.....(Start if needed)
Gear.....Down (Seminole Only)
Power.....Reduce for descent
Tower*.....Announce Position
Light.....Airport Lights (7 Clicks)
Lights.....Aircraft Lights On
Lights.....3 Green (Seminole Only)
Flaps.....10°
*When not in radar contact, you would report FAF inbound with ATC. If in radar contact, you are not required to make this report. If approaching a non-towered airport, report aircraft position on the CTAF.

IAF Memory Checklist

B – Boost Pumps (fuel)
C – Carb Heat
C – Cowl Flaps (Seminole)
G – Gas (Fuel Selector)
U – Under Carriage
M – Mixture
P – Prop Controls
S - Seatbelts

Selecting and Tuning a NAVAID

Tune.....Appropriate Frequency
Select.....VLOC*
Twist.....Course on CDI/HSI
Steer.....To intercept course
Identify.....Verify correct identifier

Selecting the GPS for Navigation

Tune.....Enter "Direct To", etc
Select.....GPS*
Twist.....Course on CDI/HSI
Steer.....To intercept course
*Use the "CDI" button on the GPS to select the nav. source. If using an aircraft with a glass display, select the appropriate source on the PFD.

Standard Call Outs

These standard call outs help build habits that increase situational awareness. The use of these call outs has been shown to reduce the risk of pilots falling behind the airplane in the IFR environment.

Departure

Taking the Runway for Takeoff
Verbally verify the DG, compass, and runway numbers are aligned. (i.e. The pilot looks at the heading indicator, compass, and runway numbers and says ***"33, 33, 33"***, verifying the correct indications.

Airspeed Alive
When the airspeed indicator needle comes off the wall, the pilot will call ***"Airspeed Alive"***.

Rotation
Example: ***"55 knots, rotate"***

Climb/Descent

Approaching Assigned Altitude
"1000 To Go" "500 To Go" "100 To Go"

Approach

"Localizer Alive/Final Approach Course Alive"
"Glideslope Alive"

Approach Mode
Before reaching the final approach fix, the pilot will verify that the GPS has sequenced into approach mode. This will happen when within 2nm of the final approach fix.

Approaching MDA/DA
The pilot will make the ***1000', 500', and 100' to go*** calls when approaching the MDA/DA
"Minimums" – The pilot will announce arrival at the MDA/DA.
"Runway in sight"- The pilot will make this call upon seeing one of the visual references listed in 91.175 in sight.
"Missed Approach" – The pilot will announce when initiating a missed approach.

Piper Seminole Instrument Approach Procedures

Straight-In Approach to Landing (All Engines)
Before Reaching IAF.....WIRE Checklist Complete[1]
Final Approach Speed.....100 KIAS
Before Reaching FAF
.....Before Landing Check Complete
At FAF.....Final Approach Fix Checklist[1]
Runway Environment in Sight[2,3]
.....Flaps 25°, Pitch 90 KIAS
.....Flaps 40°, Pitch 80 KIAS

Circling Approach to Landing (All Engines)
Procedures are the same as a straight in approach to landing until.....
FAF……..Leave Flaps 0° Until Downwind
Runway Environment in Sight
Position for circling approach
Enter a normal traffic pattern if practical
*Maintain MDA **and intercept PAPI/VASI** before beginning final descent.*
After intercepting PAPI/VASI
.....Flaps 25°, Pitch 90 KIAS, begin descent
Final.....Flaps 40°, Pitch 80 KIAS

Straight-In Approach to Landing (Single Engine)
Before IAF.....WIRE Checklist Complete[1]
Final Approach Speed.....100 KIAS
(88 KIAS if needed for performance)
Before FAF
.....Before Landing Check Complete
At FAF.....Final Approach Fix Checklist[1]
Runway Environment in Sight[2,3]
.....Flaps 25°, Pitch 90 KIAS
Committed to Land and Runway Made
Both props fwd. (when using sim. feather)[4]
Reduce throttle slowly and flare airplane

Circling Approach to Landing (Single Engine)
Single engine circling approaches should be avoided if possible. If necessary to perform a circling approach, enter a normal traffic pattern after the runway environment is in sight and perform the normal procedures for a single engine traffic pattern. This includes the procedures for extension of the gear and flaps. For performance purposes, it may be required to delay extension of the gear until beginning descent below MDA. Extra caution must be taken in this case to ensure the gear is down and locked prior to landing.

Piper Warrior Instrument Approach Procedures

Straight-In Approach to Landing
Before Reaching IAF.....WIRE Checklist Complete[1]
Final Approach Speed.....90 KIAS
Before Reaching FAF
.....Before Landing Check Complete
At FAF.....FAF Check Complete[1]
Runway Environment in Sight[2,3]
.....Flaps 25°, Pitch 80 KIAS
.....Flaps 40°, Pitch 70 KIAS

Circling Approach to Landing
Procedures are the same as a straight in approach to landing until.....
FAF……..Leave Flaps 0° Until Downwind
Runway Environment in Sight
Position for circling approach
Enter a normal traffic pattern if practical
*Maintain MDA **and intercept PAPI/VASI** before beginning final descent.*
After intercepting PAPI/VASI
.....Flaps 25°, Pitch 80 KIAS, begin descent
Final.....Flaps 40°, Pitch 70 KIAS

FAR 91.175 Descent Below MDA or DA/DH
Three things required for descent below MDA/DA.
1. ***Normal maneuvers to landing*** and a normal rate of descent to the intended runway.[3]
2. ***Flight visibility*** not less than that listed in the approach procedure.
3. ***Runway environment in sight***, including one of the following references:
---Runway end identifier lights (REILs)
---Visual approach slope indicator
---Runway/Runway markings and lights
---Threshold/Threshold markings and lights
---Touchdown zone/TDZ markings and lights
---Approach Lights
- Allows descent to 100 ft. above TDZE
-Descent below 100 ft. allowed if red terminating bars or red side row bars are in sight.

[1]See FAF Fix/WIRE Checklist on previous page. For approaches in the Seminole, the landing gear will be extended at the FAF.
[2]When flying a precision approach, stay on the electronic glide path until it is necessary to descend below.
[3]When flying a non – precision approach, maintain MDA until intercepting the PAPI/VASI to ensure normal maneuvers to landing.
[4]This is done in the event that an actual go-around using both engines becomes necessary while performing single engine approaches for training purposes.

Appendix C
Contact Information

North Star Aviation, Inc.

North Star Aviation, Inc.
3030 Airport Road North
Mankato, MN 56001

Phone Directory.....(507)625-6006
Fax.....(507)625-6130
Web.....www.flymankato.com

Flight School

Chief Flight Instructor
Christopher Plasek
Office.....(507)625-6006 ext. # 343
Cell .....(218)251-0205
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Assistant Chief Flight Instructors
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Ethan Plunkett
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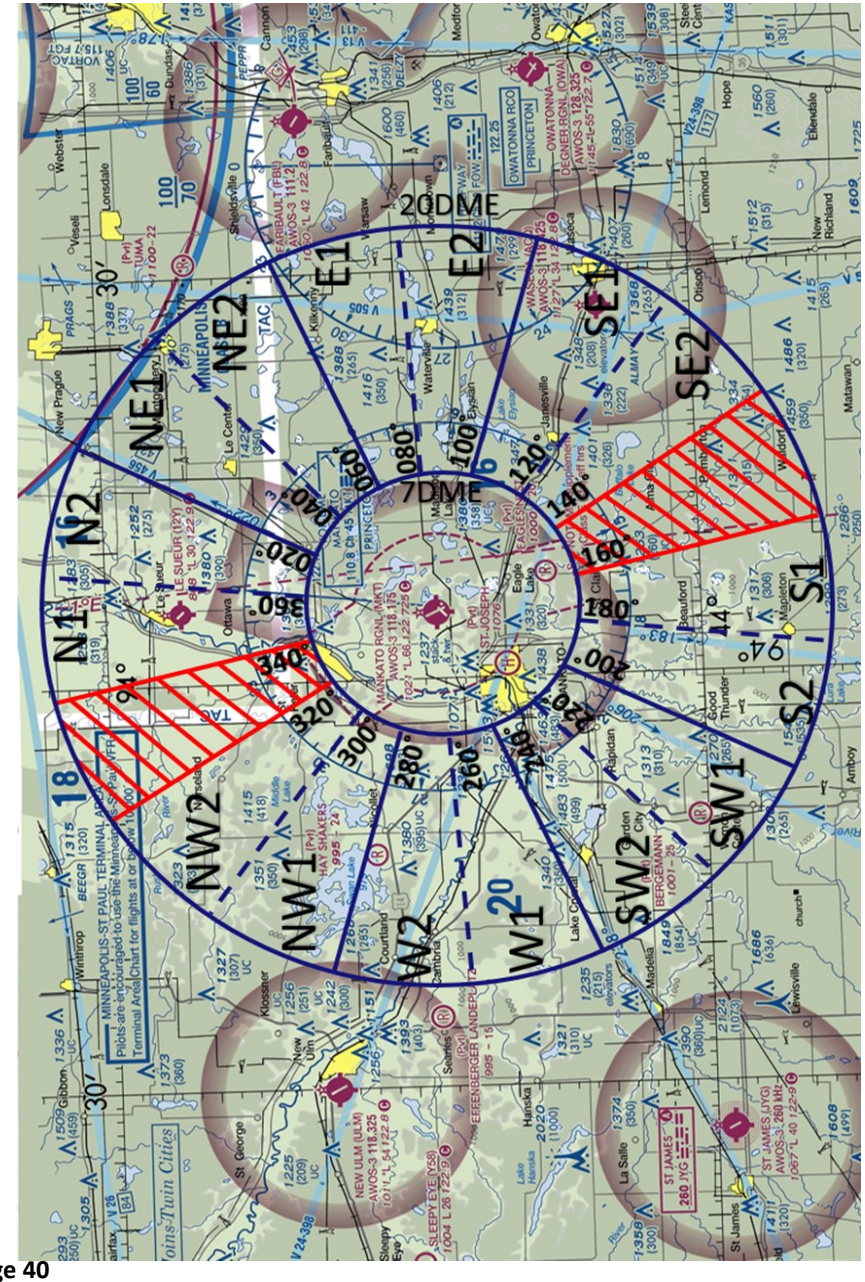
Chief Dispatcher
Cody Howe
Cell .....(507)621-0440
Email.....dispatch@flymankato.com

Appendix D

Practice Areas



Appendix E

Briefings

Passenger

Seatbelt Use
Opening and Closing Door
Emergency Exits
Emergency Equipment (ELT, Fire Extinguisher)
Help Watch for Traffic
Sterile Cockpit Taxi, Takeoff, and Landing

Taxi

Runway in Use
Runway Length Available/Required
Route to Runway and Runup
Location of Hot Spots
Who Will Be PIC
Positive Exchange of Flight Controls

Takeoff Briefing (PA-28)

-Type of Takeoff (Normal, Soft or Short)
-Rotate____ Climb Out____
-Problem on Takeoff Roll – Abort
-Problem After Take Off Below 500' AGL—Land Straight Ahead and Obstacles to Consider are _____
-Problem After Take Off Below 1000' Turn No More than 90
-Problem After Take Off 1000' and Above—Land Where Practical

Takeoff Briefing (PA-44)

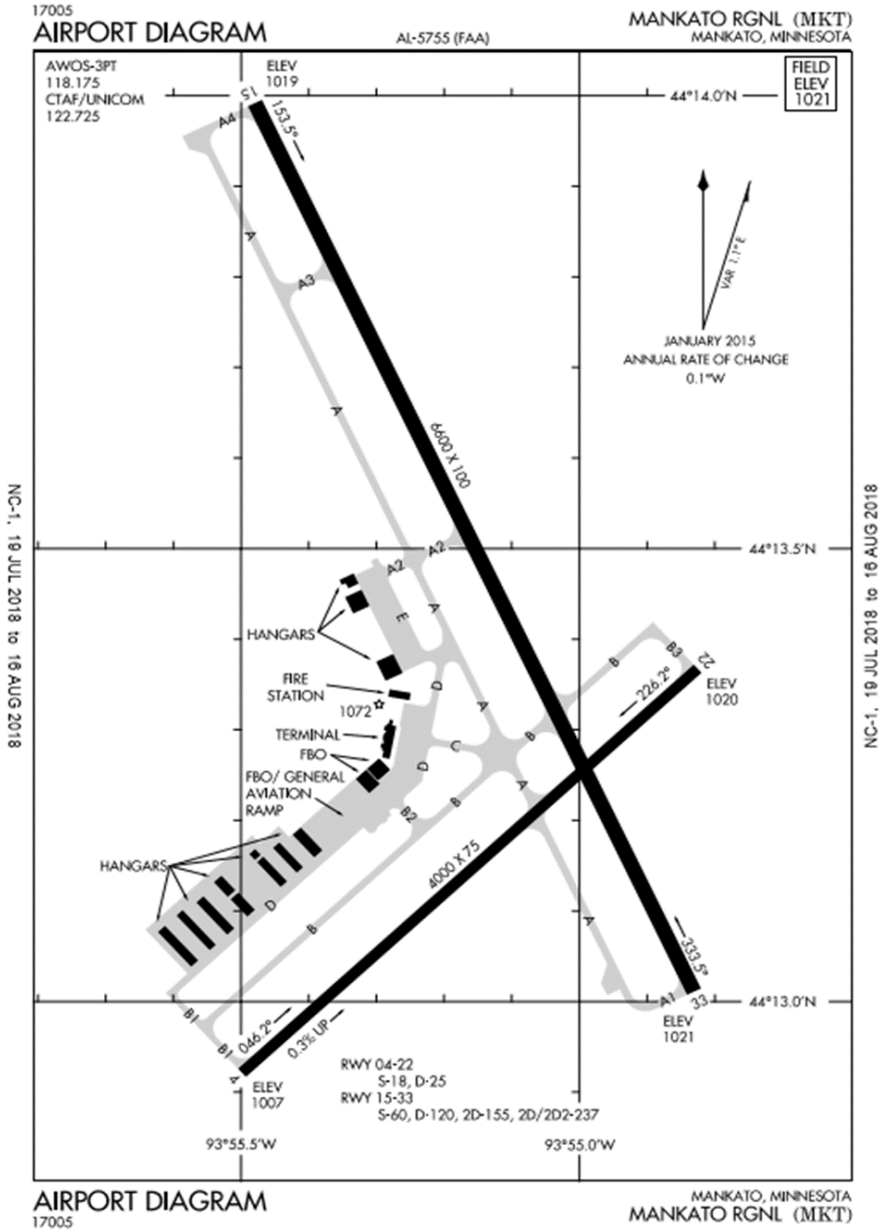
-Type of Takeoff (Normal or Short)
-Rotate____ Climb Out____
-Problem on Takeoff Roll – Abort
-Engine Failure after Takeoff – Gear Extended
  Maintain V_{YSE} – 88 kts
  Land Straight Ahead
-Engine Failure After Takeoff – Gear Retracted
  Maintain V_{YSE} – 88 kts
  Attempt return for Landing Runway_____
  Committed to Land Altitude Today _____

Instrument Takeoff Briefing

Initial Heading/Altitude
Airspeed Limits if Any
Departure Procedures
Emergency Return Plan

Appendix F

Airport Diagram



Appendix G

Misc. Charts

PIVITOL ALTITUDE CHART (GS^2/11.3)	
GROUNDSPEED	PIVOTAL ALTITUDE
70	434
80	566
90	717
100	885
110	1071
120	1274
130	1496