



G1000 Transition Course Study Guide

Applicable Aircraft

172S

182T

T182T

206H

T206H

Cessna Pilot Training



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GROUND TRAINING MODULE ONE

DISPLAY OVERVIEW

Airspeed Indication

- 30 knots above and below current airspeed always displayed
- Indication begins at 20 KIAS
- Magenta 6-second trend vector
- RED low airspeed warning range (20KIAS – V_{SO})
- “Barber pole” starts at V_{NE}
- Reference speed bugs for V_Y , V_X , V_R , V_G are pilot adjustable
- TAS displayed below airspeed tape

Altitude Indication

- Displayed in 20ft. increments
- 300 feet above and below current altitude always displayed
- Magenta 6-second trend vector
- Barometric pressure setting displayed below altitude tape
- Altitude select box displays altitude selected for altitude reference bug and GFC-700.
 - if aircraft is > 1000' from selected altitude or within 200', box appears black with light blue text
 - if aircraft is within 1000' from selected altitude, box appears light blue with black text
 - if aircraft deviates > 200' from selected altitude, box appears black with yellow text

Vertical Speed Indication

- Displayed in 50ft. increments

Primary Attitude Indication

- Roll scale graduated at 10, 20, 30, 45 and 60°
- Pitch scale graduated in 2.5° increments with every 10° marked
- Red chevrons are attached to 50° pitch up and 30° pitch down marks directing pilot back to level flight during unusual attitudes.
- Unusual attitudes exceeding 30° pitch up, 20° pitch down or 65° of bank, result in an automatic decluttering of the primary flight display.

Horizontal Situation Indicator

- Azimuth surrounds course deviation indicator (CDI).
- CDI displays course for Nav 1, Nav 2, or active GPS waypoint.
- Course window displays course selected for CDI.
- Heading window displays selected heading for bug (input to autopilot).
- Bearing pointers can be displayed on HSI for Nav 1, Nav 2, or active GPS waypoint.
- Track bug is shown on the HSI to indicate aircraft track.
- Trend vectors display heading a/c will reach in 6 seconds based on current rate.
- Tick marks are placed at 9 and 18 degrees and are used with trend vector to make half standard and standard rate turns.

Primary Flight Display

COLOR CODING:

- Light blue – Pilot adjustable
- GREEN – Active
- YELLOW – Caution
- RED – Warning
- MAGENTA – GPS information

OPERATIONAL BASICS

It is recommended most tuning be accomplished in the central tuning area.

NAV/COM Tuning

Verify the location of the light blue tuning box before using any of the NAV or COM controls.

Data Entry

1. Requires a Flashing Cursor
2. If needed, Press FMS Knob to activate cursor
3. Large FMS knob – Changes cursor location
4. Small FMS knob – Changes data OR allows you to view other options
5. Press ENTER key to complete data entry

MFD Navigation

Flight Management System (FMS) knob on MFD should be used to navigate through pages and page groups.

- Make sure the cursor is not active (blinking) prior to twisting the FMS knob.
- The large, outer FMS knob will navigate through the page groups.
- The small, inner FMS knob will navigate through the pages within the page group.
- Press and hold CLR key to return to Map page 1.
- Refer to softkeys to select options.
- For additional options, select the MENU key.

FLIGHT DIRECTOR / AUTOPILOT INTRODUCTION

GFC – 700 Automatic Flight Control System

- Two-axis, attitude-based autopilot
- Default modes include PIT mode (current aircraft pitch attitude is commanded) and ROL mode (current aircraft bank attitude is commanded – note: commands wings level if bank is less than 6 degrees when selected)

Limitations

- The preflight test must be successfully completed prior to use of the autopilot, flight director, or manual electric trim.
- A pilot, with the seat belt fastened, must occupy the left pilot's seat during all autopilot operations.
- The autopilot must be off during all takeoffs and landings.
- Autopilot Maximum Engagement Speed - 165 KIAS
- Autopilot Minimum Engagement Speed - 70 KIAS
- Electric Trim Maximum Operating Speed - 175 KIAS
- Maximum Fuel Imbalance with autopilot engaged - 90 pounds.
- The autopilot must be disengaged below 200 feet AGL during approach operations and below 800 feet AGL during all other operations.
- ILS approaches using the autopilot flight director are limited to Category 1 approaches only.
- Use of the autopilot is prohibited when the audio panel is inoperative.
- Use of the autopilot is prohibited when conducting missed approach procedures until an established rate of climb that ensures all altitude requirements of the procedure will be met.

Operational Tips

To Engage the Flight Director:

1. Press the FD mode select key.
 - command bars will default to PIT and ROL modes
2. Press ANY autopilot mode select key.
 - command bars will command mode selected
3. Press control wheel steering (CWS) button on pilot's yoke.
 - command bars will command current aircraft attitude
4. Press go-around button.
 - command bars will command 7 degree pitch up and ROL mode

To Disengage the Flight Director:

1. Press the FD mode select key.

To Engage the Autopilot:

1. Press the AP mode select key.

To Disengage the Autopilot:

1. Press red AP disconnect/trim interrupt button on pilot's yoke.
2. Engage the Manual Electric Trim (MET).
3. Re-press AP key after autopilot has been engaged.
4. Press the Go-around button.
5. Press and hold CWS button (autopilot will not be engaged while this button is held down).
6. Pull autopilot circuit breaker.
7. Turn off Avionics bus 2.
8. Turn off Master Switch.

NAV mode annunciations vs. APR mode annunciations

GPS	GPS (GP armed)
LOC	LOC (GS armed)
VOR	VAPP

GROUND TRAINING MODULE TWO

EXPANDED MULTI FUNCTION DISPLAY

(G1000 Pilot's Guide, Section 8, Multi Function Display)

SITUATIONAL AWARENESS TOOLS

Navigation Map

- All features of the Navigation map are controlled through the map set-up menu.

Traffic Information Service

- Map page 2 is the dedicated traffic page
- Displays aircraft location, altitude relative to the user in hundreds of feet and anticipated track.
- Traffic alerts appear when a target aircraft is projected to be within ± 500 feet and $\frac{1}{2}$ mile in the next 34 seconds.
- Traffic icon will appear circular and yellow, traffic annunciator will appear left of the roll scale and the audible caution, "Traffic, Traffic" will sound.

Limitations

- Up to 8 intruder aircraft, within 7 nm radius up to 3500 feet above, down to 3000 feet below can be displayed
- Secondary radar targets only (Mode A, C and S transponder equipped)
- Traffic Alerts (TA), but no Resolution Advisories (RA)
- Must be within 55 nm radius of primary radar site (most class B and C airspaces)

For additional information consult the Airman's Information Manual 4-5-8.

Wx-500 Stormscope (182/206 only)

- Map page 3 is the dedicated stormscope page
- Displays lightning strikes as detected
- Cell mode only displays higher intensity strikes associated with a cell, while strike mode will pick up any electrical activity

- **Stormscope Symbology**

- Bold lightning bolt for 6 Seconds after detection
- Normal lightning bolt from 6 seconds to 1 minute
- Bold “Plus Sign” after 1 minute
- Normal “Plus Sign” after 2 minutes

Garmin DataLink

- Map page 4 (3 for CE-172) is the dedicated datalink page.
- Overlay weather services using softkeys
- Legend softkey displays a legend for all selected weather services.
- XM weather and radio available in the 48 conterminous states

For additional information refer to www.wxworx.com.

Terrain Awareness

- Map page 5 (4 for CE-172) is the dedicated terrain page.
- Red indicates the aircraft is below or within 100ft of terrain.
- Yellow indicates the aircraft is within 1000ft of the terrain.
- G1000 topography and terrain data are stored on a Secure Digital (SD) Card provided by Garmin.

For additional operational information on the MFD refer to the [G1000 Pilot's Guide and Reference](#).

INSTRUMENT APPROACH PROCEDURES/WAAS

WAAS

WAAS is a GPS-based navigation and landing system that provides enhanced accuracy and integrity to the basic GPS signal.

The WAAS broadcast message improves GPS signal accuracy from 20 meters to approximately 2 meters in both horizontal and vertical dimensions.

GPS Approaches with WAAS

LNAV

- Non-precision approach
- Descend at desired rate to MDA
 - Fly level at MDA until landing is appropriate or
 - Fly level to MAP and begin Missed Approach Procedure

LNAV+V

- Non-precision approach
- Descend along WAAS ADVISORY glide path to MDA
 - Fly level at MDA until landing is appropriate or
 - Fly level to MAP and begin missed approach procedure

LNAV/VNAV

- Approach with vertical guidance (APV)
- Descend along WAAS glide path until DA
- At DA make a decision
 - Land if appropriate or
 - Execute missed approach procedure

LPV (Localizer Performance with Vertical Guidance)

- Approach with vertical guidance (APV)
- Descend along WAAS glide path until DA
- At DA make a decision
 - Land if appropriate or
 - Execute missed approach procedure

Note: if WAAS signal is lost GP will not be displayed and pilot must use LNAV minima.

SYSTEM COMPONENTS

GDU 1044B - Garmin Display Unit

- Primary Flight Display (PFD) - Multi-function Display (MFD)
- Liquid Crystal Display (LCD) units which crossfill information through an Ethernet-like bus
- Reversionary capabilities – if one display fails, remaining display goes to reversionary mode.

GRS 77 – Garmin Reference System

- Attitude and Heading Reference System (AHRS)
- Presents attitude, heading, slip/skid and rate of turn information
- Initializes on the run, i.e. in-flight with bank angles up to 20° and pitch up to 5°
- Located in tailcone avionics bay

GDC 74A – Garmin Data Computer

- Air Data Computer
- Presents all pitot static indications – airspeed, altitude, vertical speed
- Presents E6-B calculations – TAS, TAT, OAT, wind vector, etc.
- Receives analog pitot static information from static ports and pitot tube
- Located in tailcone avionics bay in CE-172 and behind MFD in CE-182 and 206

GEA 71 – Garmin Engine and Airframe

- Engine and Airframe Unit
- Presents engine indications and provides system integrity monitoring
- Located behind MFD

GIA 63W – Garmin Integrated Avionics Units

- Dual GPS, COM and NAV functions
- **WAAS enabled**
- Very similar to Garmin 530A without the display interface
- 16 Watt output, 8.33 kHz spacing capability (25 kHz for use in U.S.)
- Located in tailcone avionics bay

GDL 69A – Garmin Data Link

- XM Satellite radio/weather receiver
- Provides near, real-time weather information and digital audio entertainment
- Located in tailcone avionics bay in CE-172S and behind MFD in CE-182 and 206

GTX 33 – Garmin Transponder

- Mode S capability – allows for reception of Traffic Information Service (TIS)
- Automated activation feature - at 30 knots groundspeed enters altitude mode from ground mode and vice versa
- Located in tailcone avionics bay

GMU 44 – Garmin Magnetometer Unit

- Provides magnetic field information to the AHRS
- Replaces flux valve, but is still located in left wing

GMA 1347- Garmin Audio Panel

- Selecting Com 1 or Com 2 selects the audio source. The audio source can be selected independently of the active microphone source.
- When the MKR/MUTE key is selected, the audio signal can be heard over the headsets.
- When the MAN SQ key is selected, pressing the VOL/SQ knob toggles between volume and squelch adjustment modes. When the unit is in volume adjustment mode, the VOL inscription on the lower left of the VOL/SQ knob is annunciated and volume can thus be adjusted.

- **PLAY- Clearance Recorder**
Records COM signal blocks of up to 2 ½ minutes
Press MKR/Mute key to end playback
Transmissions over the Com frequency end the playback
- **ICS Isolation –**
PILOT Mode – the pilot can hear the selected radios, co-pilot and passengers only communicate with each other
COPLT Mode – the co-pilot is isolated from everyone
CREW mode – Both Pilot and Co-pilot can hear selected radios

Refer to table 6A.3.3 in G1000 Pilot's Guide and Reference for further information.

SYSTEMS MALFUNCTIONS

Message Advisories

This level of alert provides general information to the pilot.

- The advisory label will appear over the alerts softkey and flash until acknowledged.
- Acknowledge the advisory by pressing the softkey and the alerts window will appear.
- The presence of a scroll bar in the right margin indicates that there are more than 3 advisories present.
- Use the large FMS knob to scroll through the advisories in the window.
- Pressing either the alerts softkey or the CLR key will remove the window.
- If the alerts softkey has black text and white background the advisory is still valid.

Cautions

This level of alert indicates the existence of abnormal conditions on the aircraft that may require pilot intervention.

- The caution label will appear over the alerts softkey and one tone will sound.
- The annunciation window containing the caution will appear automatically.
- Pressing the softkey to acknowledge the caution allows you to view message advisories.

Warnings

This level of alert requires immediate pilot attention.

- The warning label will appear on the alerts softkey and a tone will sound every 2 seconds.
- The annunciation window containing the warning will appear automatically.
- Pressing the softkey to acknowledge the warning allows you to view cautions and message advisories and silences the tone.

System Annunciators

Warnings

- Oil Pressure - < 20 psi
- Low Volts - < 24 Volts
- High Volts - > 32 Volts
- CO Level High - > 50 ppm
- Pitch Trim - Test Mode, Runaway Trim

Cautions

- Low Vacuum - < 3.5 in. Hg
- Low Fuel Left/Right –
182/206 - < 8 gals. After 60 seconds
- Standby Battery - Drawing > 0.5 amps
- Prop Heat Yellow - Detect Failure (turbo-charged aircraft only)

Status Annunciator

- Prop Heat Green - System ON (turbo-charged aircraft only)

Component Failures

(G1000 Pilot's Guide, Section 2, System Overview)

(POH Section 3, Emergency Procedures)

Electrical System Failure

- Reference the appropriate checklist.
- Ensure the standby battery is in the ARM position.
- If annunciation does not extinguish, begin load shedding on the Main Battery.
- Standby battery will power the essential bus in the event the alternator and main battery fail to keep main bus voltage above 20 VDC (if switched to the ARM position) for at least 30 minutes.

Essential Bus:

- Standby Battery Charged From Essential Bus above 26 VDC
- Primary Flight Display (PFD)
- Attitude / Heading Reference System (AHRS)
- Air Data Computer (ADC)
- Engine / Airframe Unit (GEA)
- Navigation 1
- Communication 1
- Standby Instruments Internal Lighting (Compass, O2 Light-T182/T206)

Display Failure

- If one display fails, the operational display automatically displays reversionary mode.
- Flight and engine instruments will be available. Along with the Inset Map.
- If PFD fails, access to GIA 63 #1 (Nav 1, Com 1, GPS 1) is unavailable.
- If MFD fails, access to GIA 63 #2 (Nav 2, Com 2, GPS 2) is unavailable.
- Red display backup button on the bottom of the audio panel can be pressed to place any operational display in reversionary mode.

AHRS Failure

- Loss of attitude, heading, slip/skid and rate of turn information
- Refer to Emergency Procedures checklist
 - Loss of AP and FD

ADC Failure

- Loss of airspeed, altimeter and vertical speed indications
- Loss of OAT, TAT, TAS and wind vector
- Loss of reliable track vector
- Refer to Emergency Procedures checklist
 - FD still available for G/S, PIT, all lateral modes and go-around. Loss of AP

AHRS/ADC Failure

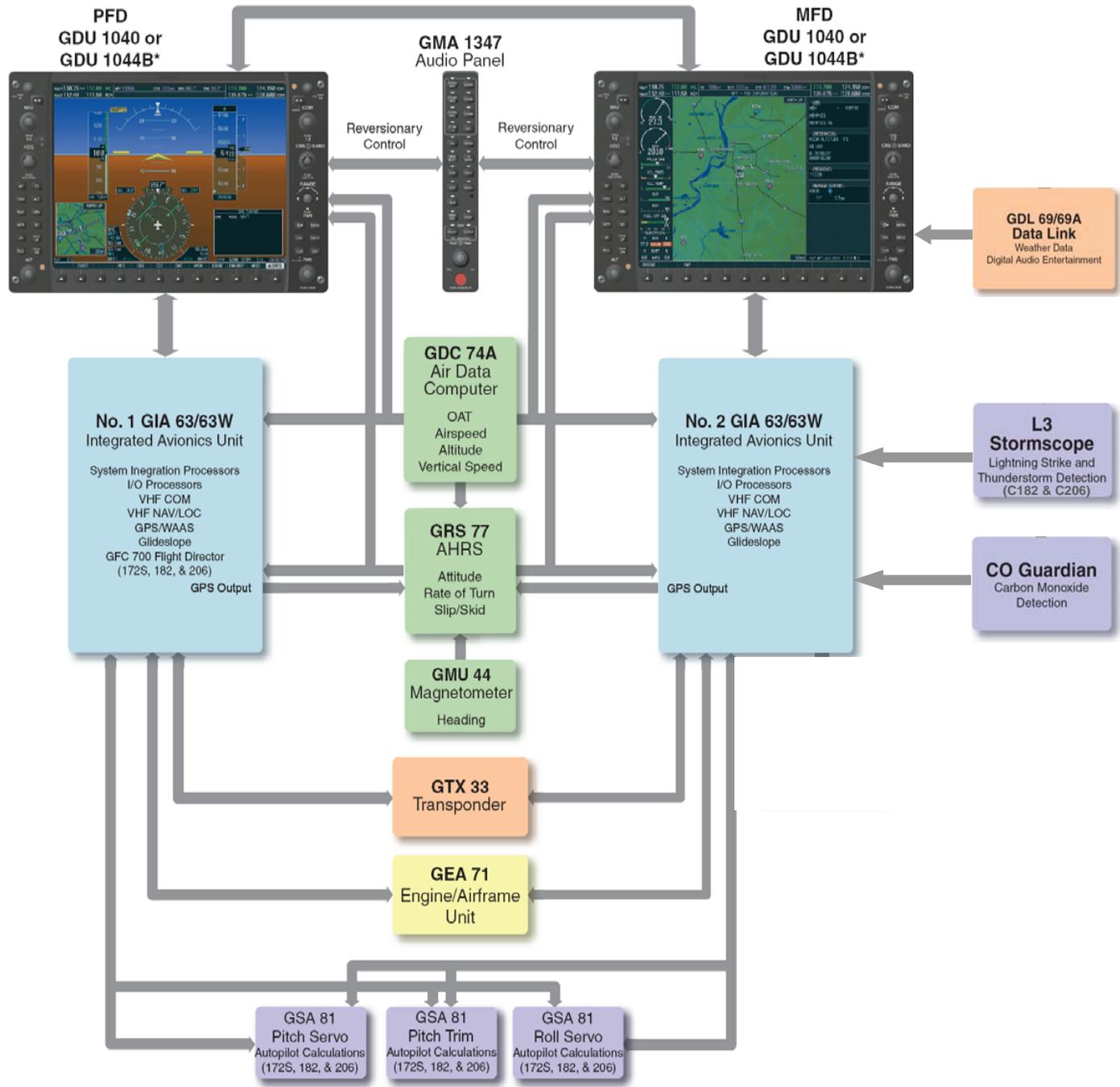
- Loss of all primary flight indications
- Refer to Emergency Procedures checklist
 - Loss of AP and FD

Magnetometer Failure

- Loss of heading indication and azimuth
 - Gradual loss of HDG mode only

Audio Panel Failure

- Digital audio panel has a backup analog mode, which, during a failure, would connect the left pilot position directly to Com 1 without intercom function.
- This analog mode would be available during electrical system failure while operating on standby battery.



Map Setup Groups



Map Group Defaults

MAP SETUP

GROUP
Map

ORIENTATION	North up
AUTO ZOOM	All On
MAX LOOK FWD	30min
MIN LOOK FWD	5min
TIME OUT	0min
LAND DATA	On
TRACK VECTOR	Off 60 sec
WIND VECTOR	Off
NAV RANGE RING	Off
TOPO DATA	Off 1500NM
TOPO SCALE	Off
TERRAIN DATA	Off 2000NM
OBSTACLE DATA	Off 20NM
FUEL RNG (RSV)	Off 00:45

Press the FMS CRSR knob to return to base page

Map Group Suggestions

MAP SETUP

GROUP
Map

ORIENTATION	HDG up
AUTO ZOOM	Off
MAX LOOK FWD	30min
MIN LOOK FWD	5min
TIME OUT	0min
LAND DATA	On
TRACK VECTOR	On 2 min
WIND VECTOR	On
NAV RANGE RING	On
TOPO DATA	On 1500NM
TOPO SCALE	Off
TERRAIN DATA	On 2000NM
OBSTACLE DATA	On 30NM
FUEL RNG (RSV)	On 01:00

Press the FMS CRSR knob to return to base page

Weather Group Defaults

MAP SETUP

GROUP
Weather

STRMSCP LTNG < Off >
STRMSCP MODE Cell
STRMSCP SMBL 300NM
NEXRAD DATA < Off > 2000NM
NEXRD CELL MOV < Off >
XM LTNG < Off > 2000NM

Press the FMS CRSR knob to
return to base page

Weather Group Suggestions

MAP SETUP

GROUP
Weather

STRMSCP LTNG < Off >
STRMSCP MODE Cell
STRMSCP SMBL 300NM
NEXRAD DATA < Off > 2000NM
NEXRD CELL MOV < On >
XM LTNG < Off > 2000NM

Press the FMS CRSR knob to
return to base page

Aviation Group Defaults

MAP SETUP		
GROUP		
Aviation		
	TEXT	RNG
ACTIVE FPL		200NM
ACTIVE FPL WPT	Med	200NM
LARGE APT	Lrg	200NM
MEDIUM APT	Med	150NM
SMALL APT	Med	50NM
SAFETAXI		3NM
RWY EXTENSION		Off
INT WAYPOINT	Med	15NM
NDB WAYPOINT	Med	15NM
VOR WAYPOINT	Med	150NM
CLASS B/TMA		200NM
CLASS C/TCA		200NM
CLASS D		150NM
RESTRICTED		200NM
MOA (MILITARY)		200NM
OTHER/ADIZ		200NM
TFR		500NM

Press the FMS CRSR knob to return to base page

Aviation Group Suggestion

MAP SETUP		
GROUP		
Aviation		
	TEXT	RNG
ACTIVE FPL		200NM
ACTIVE FPL WPT	Med	200NM
LARGE APT	Lrg	500NM
MEDIUM APT	Med	300NM
SMALL APT	Small	100NM
SAFETAXI		3NM
RWY EXTENSION		30NM
INT WAYPOINT	Med	15NM
NDB WAYPOINT	Med	15NM
VOR WAYPOINT	Med	150NM
CLASS B/TMA		200NM
CLASS C/TCA		200NM
CLASS D		150NM
RESTRICTED		200NM
MOA (MILITARY)		200NM
OTHER/ADIZ		200NM
TFR		500NM

Press the FMS CRSR knob to return to base page

Land Group Defaults

MAP SETUP

GROUP
Land

	TEXT	RNG
LAT/LON	Small	Off
FREEWAY		300NM
NATIONAL HWY		30NM
LOCAL HWY		15NM
LOCAL ROAD		8NM
RAILROAD		15NM
LARGE CITY	Med	800NM
MEDIUM CITY	Med	100NM
SMALL CITY	Med	20NM
STATE/PROV	Lrg	800NM
RIVER/LAKE	Small	200NM
USER WAYPOINT	Med	150NM

Press the FMS CRSR knob to return to base page

Land Group Suggestions

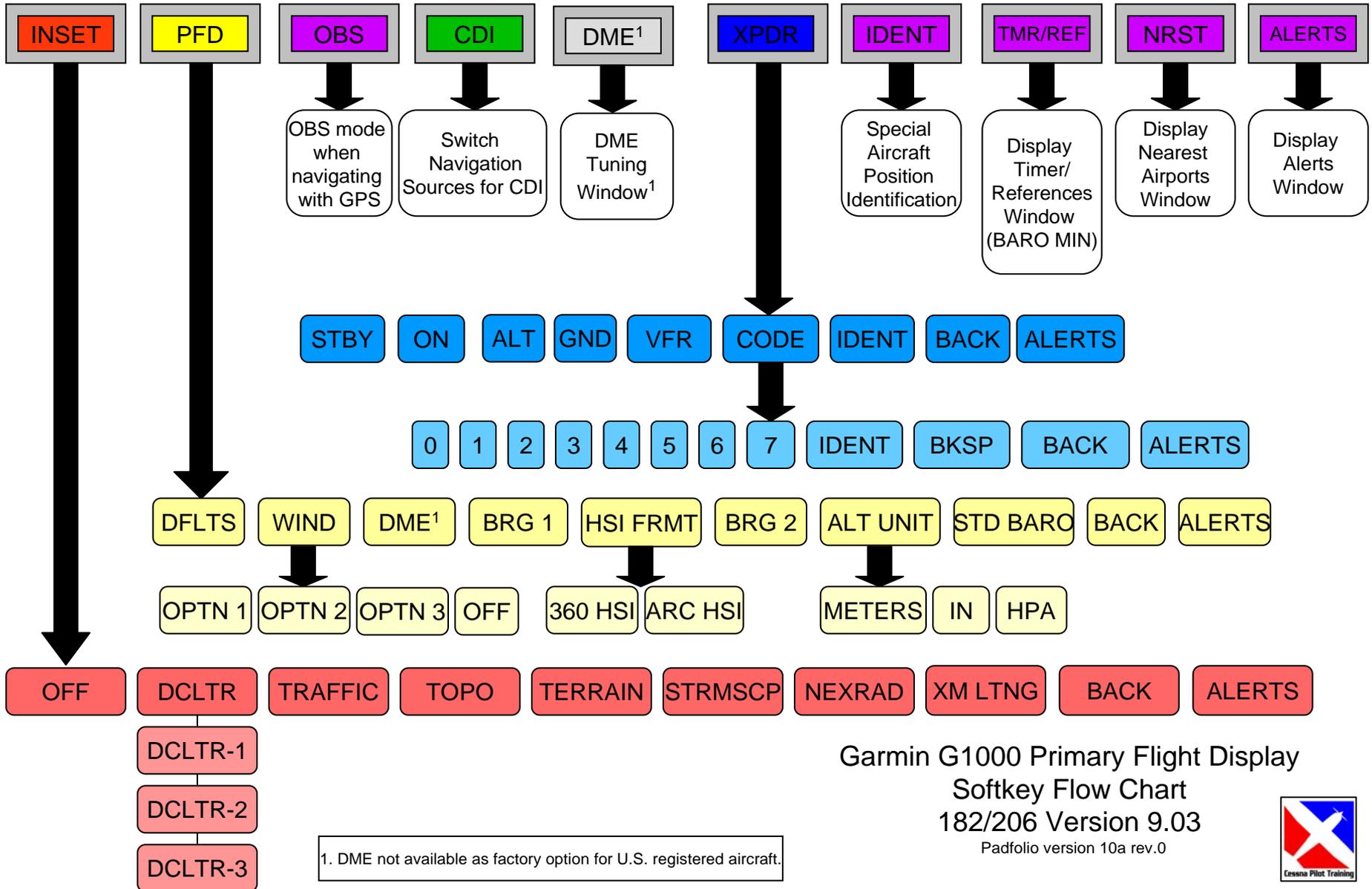
MAP SETUP

GROUP
Land

	TEXT	RNG
LAT/LON	Small	Off
FREEWAY		300NM
NATIONAL HWY		30NM
LOCAL HWY		15NM
LOCAL ROAD		8NM
RAILROAD		15NM
LARGE CITY	Small	800NM
MEDIUM CITY	Small	100NM
SMALL CITY	Small	20NM
STATE/PROV	Med	1500NM
RIVER/LAKE	None	200NM
USER WAYPOINT	Med	150NM

Press the FMS CRSR knob to return to base page

PFD Softkey Flow Chart

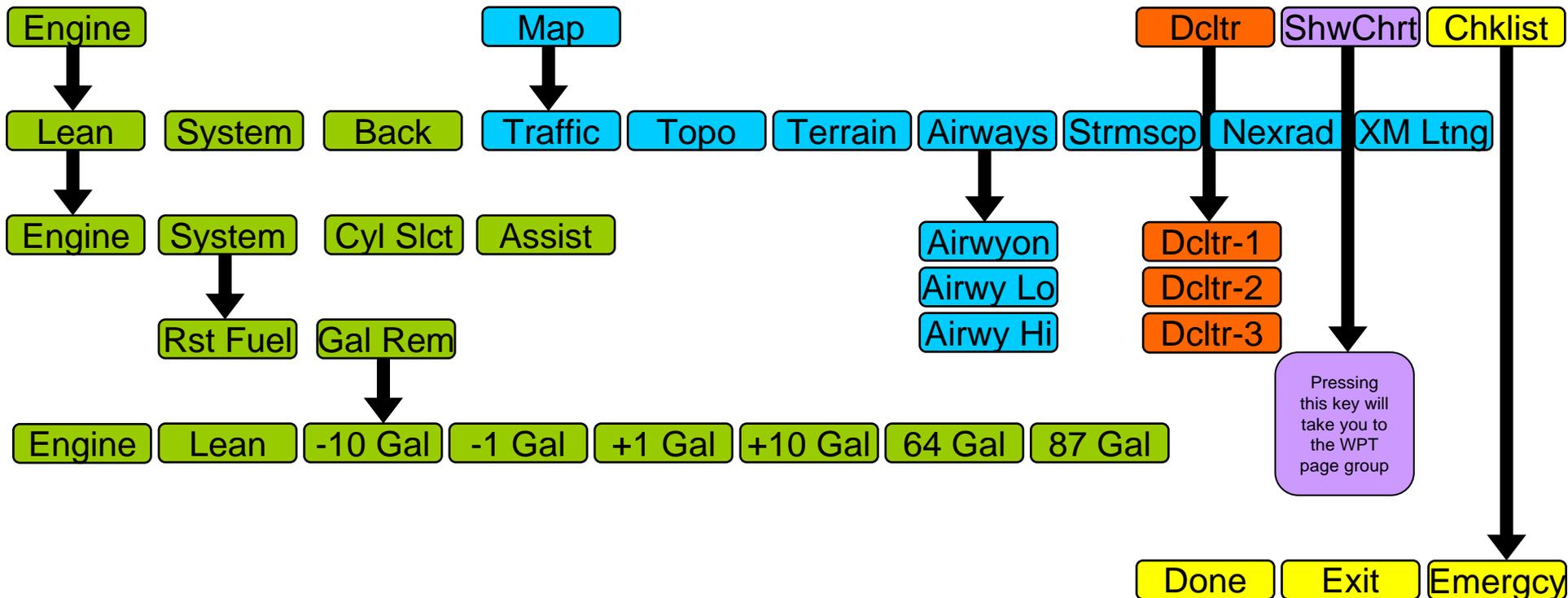


1. DME not available as factory option for U.S. registered aircraft.



MFD Soft Key Flow Chart

Map Group Page 1-MAP

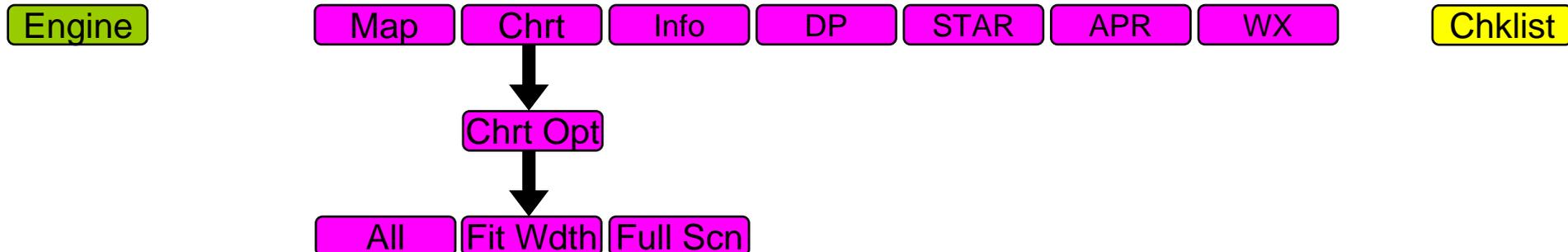


The **Engine** and **Chklist** softkeys are visible on all pages

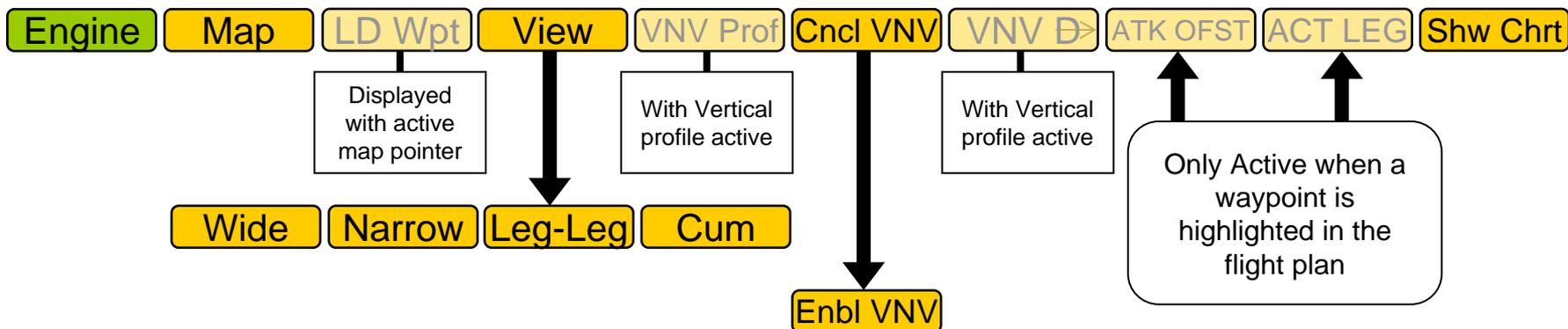


MFD Soft Key Flow Chart

WPT Group Page 1 –Airport Information



FLT Plan Group Page 1 –Active Flt Plan



The **Engine** and **Chklist** softkeys are visible on all pages

Garmin G1000 Primary Flight Display
 Softkey Flow Chart
 182/206 Version 9.03
 Padfolio version 10a rev.0

