Carenado DA62

F1 GTN 750 Implementation

March 2019

Carenado DA62 v1.2 GTN 750 Implementation

This is a Flight1 GTN750 implementation for the Carenado DA62 v1.2 for FSX, FSX_SE and P3D. It replaces the virtual cockpit MFD with the GTN 750 touchscreen, while retaining the Engine, Systems and Fuel sidebars. It features:

- Flight1 GTN750 MFD integration in the 3D COCKPIT, with functional on-screen GTN menus.
- Three EIS screens, Engine, System, and Fuel sidebars, accessible thru the PF1 softkey in the bottom frame of the MFD.
- Aileron and elevator trim popup window on the sidebar enabled by the PF2 softkey, or automatically by flaps and or gear extension.
- PF3 softkey provides a shortcut for 2D Autopilot gauge based on the Garmin GFC700.
- GTN 650 popup using the bottom bezel's PF4 softkey.
- G1000 MFD popup, with the shortcut moved to the lower bezel of the MFD (PF5 thru PK12 softkeys) or SHIFT + 2, thereby clearing the top bezel for access to the GTN 750 radio screen buttons hidden beneath the top frame.
- Handling for XPDR, COM and NAV radios is possible in the virtual cockpit GTN750 by pressing hidden buttons under the top bezel.
- Enhanced Autopilot functions, including Alt Hold before selected altitude capture, saving the VS and/or FLC profile settings for resuming the climb/descent, AP auto disconnect based on airspeed, vertical navigation, altitude and extreme attitudes.
- Enhanced fuel display pages in the EIS, including separate gauges for main tanks and auxiliary tanks (visible when aux pumps are activated), as well as separate fuel tank quantity readouts. Fix for the auxiliary pump switches on the console has been properly coded to enable tank selection.
- Shortcut to the GTN 750 2D gauge, using the triangular button on the left bezel MFD or SHIFT + 3.
- GTN Direct-To shortcut using the Direct-to button on right MFD bezel.
- Functional original G1000 MFD radio, heading and altitude knobs are retained, as are left bezel autopilot buttons and radios (freq. swap and GTN popup).
- Three alternatives for the panel.cfg are provided:
    - **DA62_LowerBar_Panel.cfg**- displays the map screen and bottom status bar.
    - **DA62_TopBar_Panel.cfg**- displays the lower buttons of the radio bar as well as the full map.
    - **DA62_Both_Bars_Panel.cfg** - displays the map screen with the radio and status bars.
- A batch file (**Original_Panel.bat**) is provided for reverting to your saved original panel.cfg.

What you give up in the virtual cockpit:

- The G1000 MFD in the virtual cockpit is replaced with a new gauge. For aircraft systems information and Navigraph functionality you must rely on the 2D G1000 MFD popup, which is unaffected. The lower softkey buttons, except as noted, and right bezel G1000 flight plan buttons are disabled for the VC G1000 MFD.
- The GTN750 HOME button, as well as the radio and volume knobs and buttons, are not accessible on the virtual cockpit.
- For the virtual cockpit GTN 750 you have access to all main screen buttons, and while not visible, you can access the bottom row of the Radios Bar on the top bezel of the G1000 MFD (COM, XPDR and NAV buttons), plus Intercom and COM monitor can be pressed to enable their respective screen popups.
- In the **Both_Bars** option the bottom status line is not visible, so as to maintain a reasonable aspect ratio of the Map screen, particularly the compass rose. The Radios top bar option flattens the rose circle a bit on the map, but it might be a compromise you might want to live with. These images are from a 3440 by 1440 monitor, so your results might vary.
- If you want to retain full Navigraph functionality, I would recommend setting a different panel configuration for the GTN Mod, as running the two navigation engines simultaneously will lead to CTD's.

These panels have been tested with Windows 10 64bit, Prepar3D v.4.4 The Carenado DA 62 is full FSX, P3D v2, v3, v4, and Steam compatible, so this mod should work with these versions.

If you have any questions, PM me at *jfrexach@yahoo.com*.

Jorge Rexach
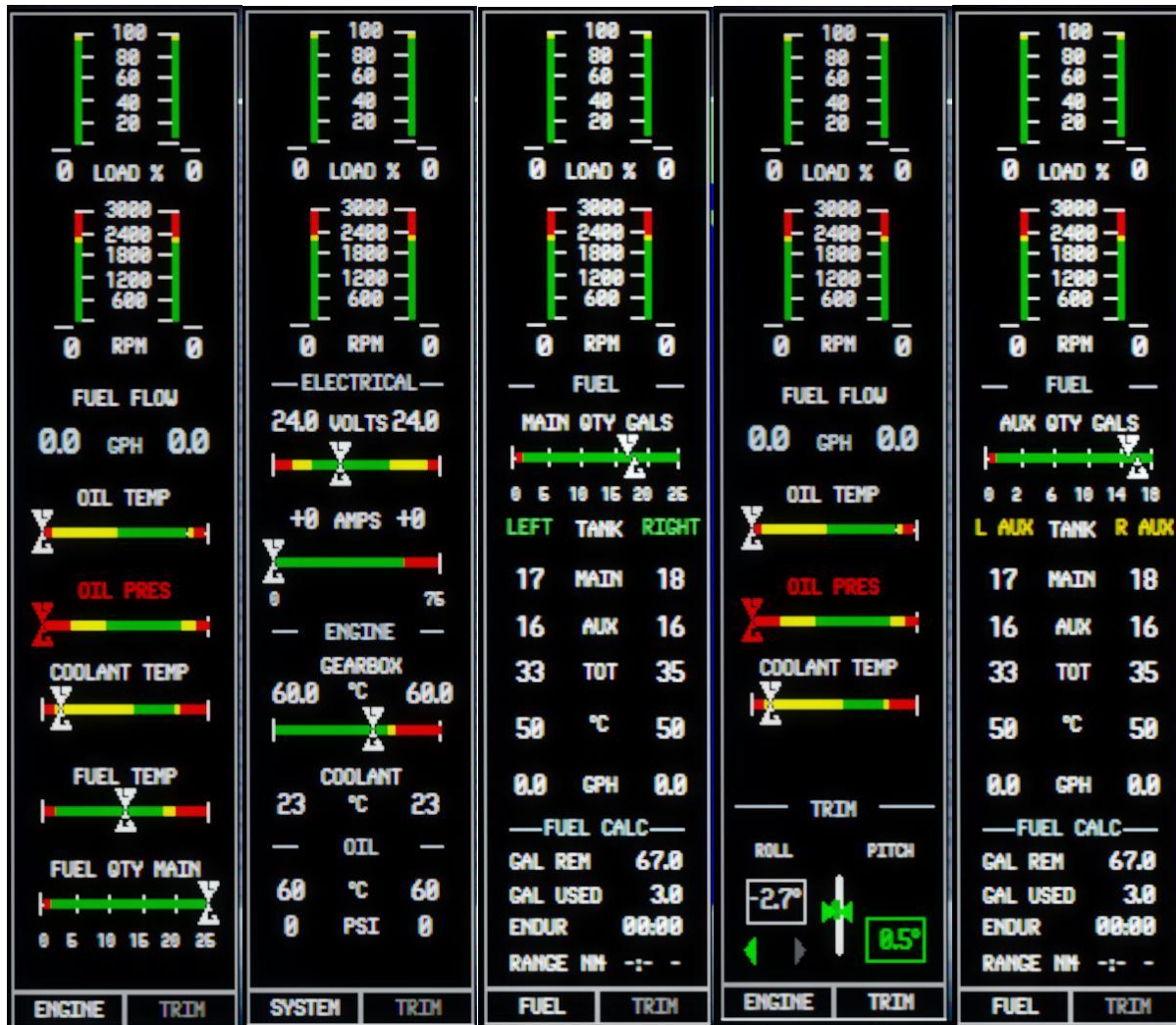
ENGINE INFORMATION SYSTEMS (EIS) PANELS

HOW TO INSTALL

You should have the following files:

- ....\P3D-FSX\simobjects\Airplanes\Carenado DA62\Panel\

  - DA62_TopBar_Panel.cfg
  - DA62_LowerBar_Panel.cfg
  - DA62_Both_Bars_Panel.cfg
  - Original_Panel.bat
  -

  - DA62_TopBar_Panel.bat
  - DA62_LowerBar_Panel.bat
  - DA62_Both_Bars_Panel.bat

- ....\P3D-FSX\simobjects\Airplanes\Carenado DA62\Panel\ DA62_G1000\

  - GTN_MFDDA62VC.spb
  - DA62_INITIALIZATION_MODS.xml
  - DA62EIS_INIT.bmp
  - audio_button_on.bmp
  - Gauge_AUTOPILOT_ON_DG.bmp
  -

- ....\P3D-FSX\simobjects\ Airplanes\Carenado DA62\Panel\DA62\

  - iconpanel_background.bmp
  - ToggleAUTOPILOT.xml
  - ToggleCARG10080.xml
  - ToggleCLEAR.xml
  - ToggleFPL.xml
  - TogglePROC.xml
  - ToggleGTN750.xml
  -

  - ToggleENTER.xml
  - ToggleCAR14401.xml
  - ToggleDirectTo.xml
  - ToggleCOM_SWAP.xml
  - ToggleMENU.xml
  - ToggleGTN650.xml

- ....\P3D-FSX\simobjects\Airplanes\Carenado DA62\Panel\DA62_AP_GAUGE\

  - AUTOPILOT_DA62.bmp
  - Gauge_AUTOPILOT_ON_DG.bmp
  - Gauge_AUTOPILOT_ON_LVL.bmp
  - Gauge_AUTOPILOT_ON_DG.bmp
  - Gauge_AUTOPILOT_WARN _DG.bmp
  - Toggle_AP_10030.xml
  -

- This readme file.

All changes in this modification are contained in the DA62 panel subfolders, and in no way affect the stock aircraft gauges. Should you wish to uninstall this mod, delete the *DA62_G1000, DA62 and DA62_AP_GAUGE* subfolders in the panel folder, and restore the original *panel.cfg* file.

Top Bar Option

Both Bars Option

Bottom Bar Option

A. EASY INSTALL PROCESS

This is a very straight forward, easy installation for the GTN 750. Note that the "Carenado DA62" is the DA62 folder in the default installation. You must substitute with your aircraft root folder if different, however the subfolders for the **DA62_G1000, DA2_AP_GAUGE** and **DA62** gauges should not be renamed.

1. Copy your panel.cfg in the …\Carenado DA62\panel folder, and paste it in the same folder. Rename the resulting "panel - Copy.cfg" as "**Original_Panel.cfg**". This backs up your current configuration, and allows use of the provided batch (.bat) file to automate the restoring of your original configuration. Note: "Carenado DA62" is the default name of the Carenado DA62 aircraft root folder, yours might be different.

2. Copy your current installation's …\Carenado DA62**panel** folder and call it **panel.bkup**. You can never have enough backups.

3. Copy the entire files from the provided GTN750 Carenado DA62 files into your Carenado DA62 root folder.
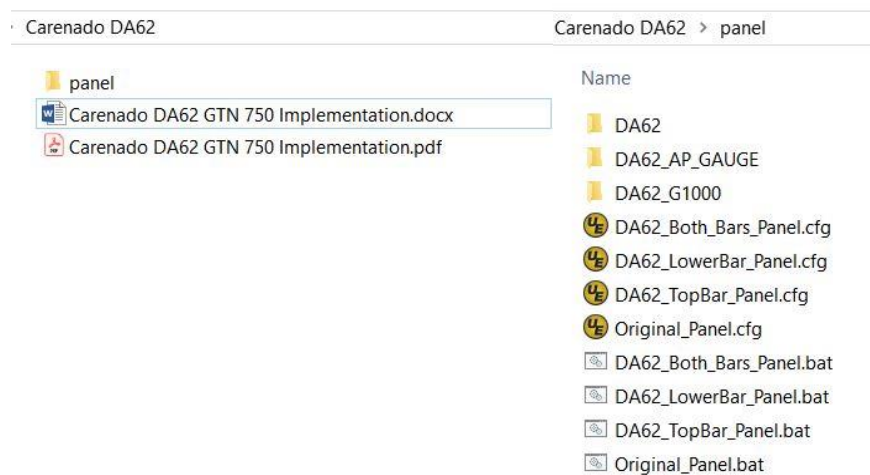
This action will copy into your Carenado DA62 root folder all the required files and folders without affecting your existing files and folder structure.

4. You should have 5 *.cfg files in your main panel folder *'DA62_Both_Bars_Panel.cfg'*, *'DA62_LowerBar_Panel.cfg'*, *'DA62_TopBar_Panel.cfg'* as well as your *'Original_Panel.cfg'* and **panel.cfg**.

5. Batch files have been provided to create the desired panel.cfg. These overwrite the panel.cfg residing in this folder without any confirmation prompts. If you have altered your original panel.cfg file, **make sure you have backup copies (reread Step 1)** before overwriting with these batch files, and have updated these changes to the remaining panel configuration files, or your work might be lost.

6. You must create the desired option for panel.cfg, as at this point you have your original panel.cfg. Execute the appropriate batch file (double click) to create the panel.cfg file of your choice. These are:

   - DA62_TopBar_Panel.bat   :   copies the *DA62_TopBar_Panel.cfg* to panel.cfg
   - DA62_LowerBar_Panel.bat :   copies the *DA62_LowerBar_Panel.cfg* to panel.cfg
   - DA62_Both_Bars_Panel.bat :   copies the *DA62_Both_Bars_Panel.cfg* to panel.cfg
   - Original_Panel.bat   :   restores the Original_Panel.cfg you renamed in Step 1.

7. Verify that all folders and files within the '\Carenado DA62\Panel' folder have been created into new folders '**DA62_G1000**' folder and '**DA62**' folder.

8. You must have also configured the GTN 750 into your aircraft so that the F1GTN.ini (in the aircraft's root folder) and the F1GTNSTACK.ini (in the panel folder) are present. If not, run the F1TGTNConfigP3D or F1TGTNConfigFSX first. You might also copy these files from a previous aircraft GTN 750 installation.

9. That's it. Go fly. If you don't see any changes, recheck the panel.cfg file.

To switch between the alternative GTN displays, use the batch files provided.   Remember, if you modify your panel.cfg file, you should manually update these changes to the other GTN config files (*DA62_TopBar_Panel.cfg, DA62_LowerBar_Panel.cfg,* and *DA62_Both_Bars_Panel.cfg*) to ensure these are not lost if you overwrite in the future.

To revert to your original configuration file, use the *Original_Panel.bat* to copy the 'Original_Panel.cfg'. Alternatively, you can manually copy the backup copy from the 'panel.bkup' folder to the 'panel' folder, overwriting the current panel.cfg. The gauges subfolders '**DA62_G1000**' and '**DA62**' will not interfere with your original installation.

B.   MULTIPANEL INSTALL PROCESS

This involves creating a different panel folder for each panel version, if you want to load a preset panel for the DA62 without the need to change the panel.cfg before loading the aircraft. You can retain the default Navigraph panel and add a separate GTN panel subfolder. Before you start, follow steps 1 and 2 above to back up your existing files and configuration.

1. Make a backup copy of the AIRCRAFT.CFG in your aircraft root folder (e.g. "Original_aircraft.cfg").

2. Copy your panel.cfg in the\Carenado DA62\panel folder, and paste it in the same folder. Rename the resulting "panel - Copy.cfg" exactly as "**Original_Panel.cfg**". This backs up your current configuration, and allows use of the provided bat file to restore your original panel configuration.

3. From your aircraft root folder, make a copy of the current panel folder for as many variations as you might need, e.g. :

    ...\Carenado DA62 \panel\   (this is the default, do not change)
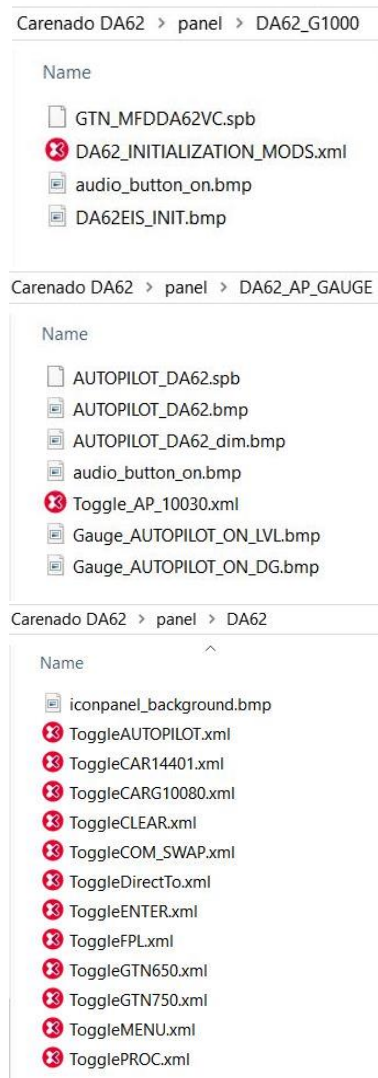   ...\Carenado DA62 \panel.GTN\
    ...\Carenado DA62 \panel.GTN2\

4. Verify that you have the F1GTN.ini file in the Carenado DA62\ root folder. This file was created when you install the Flight1 GTN 570 software to the Carenado DA62. If you have not installed the GTN to this airplane, make a copy from another of your aircraft, or run the F1 GTN configuration utility.

5. Open the aircraft.cfg file using notepad, and at the beginning of the file is the section of the different liveries of your aircraft. Copy the [fltsim.X] section for your selected livery and paste it below last one. Then change number X in [fltsim.X] and use next in sequence. Then change the title to identify GTN version and add gtn to panel line. If you don't need the aircraft selected with the original G1000 you can just modify panel line to panel=gtn for that aircraft.

Example:

```
//*****************************************************
// CARENADO DA62 FSX/P3D
// Copyright @ Carenado 2018 - All Rights Reserved
//*****************************************************
[fltsim.XX]                          ---> change XX to next number
title=Carenado DA62 WHITE GTN        ---> change title to identify aircraft modification
sim= DA62
model=
panel=GTN       ---> add folder suffix (for panel.GTN folder add GTN after '=' sign (no spaces)
sound=
texture=
visual_damage=1
```

6. Verify that you have the F1GTNSTACK.ini file in the **\Carenado DA62\panel** folder, or copy it from another aircraft with GTN 750 installed.

7. Unzip the attached panel.zip files into a temporary folder, open the panel subfolder, highlight all folders and files, right-click and copy all to the newly created **panel.GTN** in your installed Carenado DA62 folder.

Carenado DA62 > panel > DA62_G1000

Name

- GTN_MFDDA62VC.spb
- DA62_INITIALIZATION_MODS.xml
- audio_button_on.bmp
- DA62EIS_INIT.bmp

Carenado DA62 > panel > DA62_AP_GAUGE

Name

- AUTOPILOT_DA62.spb
- AUTOPILOT_DA62.bmp
- AUTOPILOT_DA62_dim.bmp
- audio_button_on.bmp
- Toggle_AP_10030.xml
- Gauge_AUTOPILOT_ON_LVL.bmp
- Gauge_AUTOPILOT_ON_DG.bmp

Carenado DA62 > panel > DA62

Name

- iconpanel_background.bmp
- ToggleAUTOPILOT.xml
- ToggleCAR14401.xml
- ToggleCARG10080.xml
- ToggleCLEAR.xml
- ToggleCOM_SWAP.xml
- ToggleDirectTo.xml
- ToggleENTER.xml
- ToggleFPL.xml
- ToggleGTN650.xml
- ToggleGTN750.xml
- ToggleMENU.xml
- TogglePROC.xml

Open your flight simulator and select the aircraft with the GTN panel (remember the title change in the [fltsim.x] section of the aircraft.cfg file.

8. If you don't see your GTN aircraft livery:

    - Check the aircraft.cfg file. Your "panel=XXX" must have a corresponding "panel.XXX" folder
    - Check panel folder structure and naming for correctness.
    - Check panel.cfg file version, you might not have overwritten the original config file.
    - Check folders to ensure they contain the required files.

9. To restore to the original files:

    a) Check that you have the backup panel folder and files within

        ...\simobjects\Airplanes\Carenado DA62\panel.bkup"

    b) Check that a backup copy of the aircraft.cfg exists in

        ...\simobjects\Airplanes\Carenado DA62\aircraft - Copy.cfg

    c) If you confirmed a) and b):

        1) Delete or rename the aircraft.cfg file and then rename the aircraft - Copy.cfg to aircraft.cfg.
        2) Delete the panel folder and all its files.
   3) Rename the "panel.bkup" folder to "panel".

10. If you experienced problems with this last installation process, I would recommend you follow the easy steps which do not require creating different folder structures for panels, nor modifications to the configuration file. In this case, to revert to the original panel all you need to replace is the original panel.cfg file.

C. CLICKABLE MOUSE AREAS

All knobs on the DA62da G1000 MFD bezel are enabled, as well as the buttons on the left bezel. On the right side, the COM Swap button is enabled, and the DirectTo button is configured to open the DTO popup window in the GTN 750.
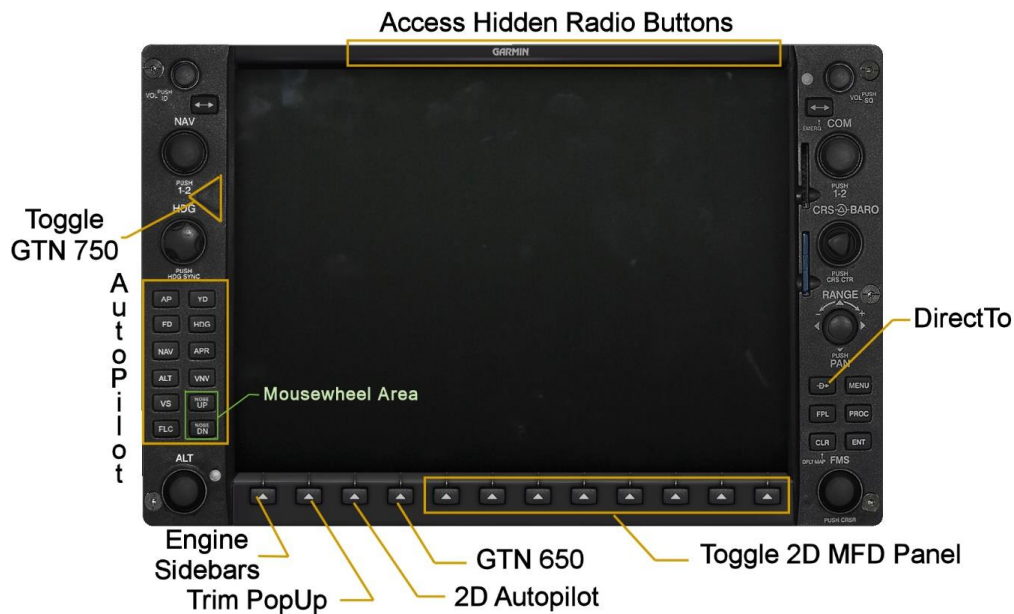
The MENU, FPL, PROC, CLR and ENTER buttons on the right lower bezel are clickable dummy buttons for possible future shortcuts to Home, Flt Plan, Proc, Map and other GTN750 screens as soon these input codes become available.

The 2D G1000 MFD toggle has been moved to the bottom bezel, clearing the top bezel for access to the hidden radio rows.

The Autopilot buttons are fully functional and work as in the original G1000 MFD. The Nose UP and Nose DN clickable areas control speed in FLC mode and FPM rate in VS mode. The entire area comprised by these two buttons control, via the mouse wheel, FPM rate when in VS mode and pitch degrees when in Attitude Hold. In addition, when in FLC mode, the area tooltip will show the pitch angle changes.

D. DA62 INITIALIZATION MODS File

This gauge address the following issues that users in the various forums have found with the DA62 aircraft systems. All the DA62_INITIALIZATION_MODS.xml fixes have been incorporated into the GTN_MFDDA62VC.spb gauge and the file is no longer required as part of the GTN panel mod. However, it can be used to patch the stock DA62 in the standard MFD (Navigraph) configuration.

The Pitot Heat switch, as well as the tank selectors, are always ON at startup in the stock DA62. This gauge set the switches off and the tank selectors and levers in the OFF position.

A not so minor annoyance is the throttle alarm chirping off on a fast descent from 12,000 ft. with the throttles below the 25% setting. This gauge lowers the threshold for the alarm to below 10% throttle setting and below 2,000 ft AGL.

Other changes incorporated in this gauge include a Yaw dampener disconnect upon gear and or flap extension and while on the ground. This Yaw Dampener function is originally disabled in this aircraft due to loss of rudder authority on the ground, but can be enabled by the **aircraft.cfg** file in the root DA62 directory. Edit the following line in the AUTOPILOT section:

yaw_damper_gain=**1**   // default is = 0

This gauge also fixes the non-functioning Auxiliary Fuel Pump switches in the center console. The correct variables have been identified and programmed to open and close the auxiliary tanks. While in the real aircraft these pumps transfer to the main tanks, FSX/P3D do not natively provide a transfer feature. So either leave these tanks as a reserve, or deplete them first, then switch to the main tanks. I prefer the last option so as to delay the flashing red fuel gauges warnings on the the PFD CAS until the very end of the flight.

Finally, this gauge provides for autopilot auto-disconnect (1) below 800 ft. terrain altitude, except for glide slope approaches, or departure climb (4 degree pitch or more). In those cases the autopilot will disconnect at 200 ft. terrain altitude or less than 4 degree pitch angle.

To use this file in the Carenado Navigraph configuration, create a subfolder named **DA62_MODS** inside your stock panel folder, and copy the DA62_INITIALIZATION_MODS.xml there (…\panel\DA62_MODS\ DA62_INITIALIZATION_MODS.xml files). Then add the line below to the [Vcockpit02] section in the original **panel.cfg** file as follows:

gauge*nn*=DA62_MODS!DA62_INITIALIZATION_MODS, 2,2,5,5

where *nn* is the next gauge number.

If you don't want to enable the modifications on this gauge, just delete or rename the *DA62_INITIALIZATION_MODS.xml* file or change the file extension to .OFF.

E. Autopilot Operation

The autopilot code has been rewritten to incorporate features available on Garmin GFC700 flight control unit. These include intermediate altitude hold before reference altitude capture, saving the VS and or FLC profile settings for resuming the climb/descent. Multiple holds might be made before reaching the cruising altitude, and continuance of the climb or descent can be reinitiated by pressing the desired VS or FLC key. You can also mix VS and FLC in different segments of the climb. These profiles are reset upon reaching the dialed reference altitude. The FLC algorithm has been revised to improve the accuracy of hold speed vs actual airspeed, both in climbs as well as descent, within two knots. It is important that a *reference altitude be set before* engaging FLC, as it needs to know whether it's a climb or a descent to operate properly. To clear a malfunction of the FLC if no altitude was selected before engaging it, turn the FLC off.

To engage FLC with AP off, set the target altitude first, then engage the flight director and the navigation mode, establish a stabilized climb or descent at the desired speed, and engage the FLC button. This will capture the speed and pitch, and also turn the Autopilot on. You can see the FLC pitch changes by hovering the cursor over the Nose UP/DN buttons as the tooltip will indicate the pitch angles.

With the Autopilot On and Altitude On, turn off the ALT mode off and hand fly to the desired pitch and speed, then engage the FLC.

To set VS mode, there is no need to turn the Alt mode off. Just set the VS button and set the FPM rate. As in the FLC mode, a reference altitude must be select before engaging, or the FPM rate will remain at zero.

The climb or descent profiles will be saved until the selected Altitude is captured. If an intermediate altitude hold is requested by ATC, pressing the ALT button at the before the requested altitude (within +/- 50 ft.) will suspend the VS or FLC modes, and the ALT annunciator will be shown in the PFD. The Airspeed Hold readout in the PFD ribbon will change to selected cruise speed hold, if speed control is enabled.

To resume the climb or descent, press the corresponding VS or FLC button. The FLC will resume showing the FLC speed and restore the last pitch angle, while the VS will resume the climb or descent at the previously set FPM rate. Pressing the FLC or the VS buttons OFF directly will reset the saved climb and descent parameters for the FLC or VS mode.

To completely reset the autopilot turn both the AP and FD buttons OFF. This will clear all the autopilot variables and functions.

The Nose UP and Nose DN buttons have been reconfigured for use of the mouse wheel when in VS mode (FPM increase/decrease), or in Attitude (PIT) Hold mode (pitch degrees up/down). The wheel area includes both buttons and space between them. The click areas of the buttons operate as in the original DA62 MFD (speed up/down or FPM up/down). If FLC is active, the tooltip for this area will show the pitch angle adjustments.

An auto-disconnect feature is enabled in the Autopilot for certain conditions specified By Garmin for their GFC700 series. These include:

- no AP operation below 800' except for climb pitch greater than 5 degrees, or ILS vertical nav LOC / GS, which will disconnect at or below 200'.
- Indicated airspeed is below 85 knots or above 195.
- Extreme attitudes bank over 65 degree, climb angle over 30 degrees or descent angle over 20 degrees.

Other than that, the autopilot keys function the same as the original AP. All the coding related to the autopilot functions under Navigraph module have been retained, including the VNAV routines. A caveat, I have not tested these with the Carenado Navigraph engaged in the 2D MFD. The GTN and Carenado Navigraph FMC autopilot keys both interface with the autopilot engine in P3D/FSX, so running them together might not be a good idea.

The 2D Autopilot can be opened from the virtual cockpit with softkey # 3 in the MFD bottom bezel, or Shift+4 keys. A hidden toggle area has been defined in the upper left corner to close the 2D Autopilot window.
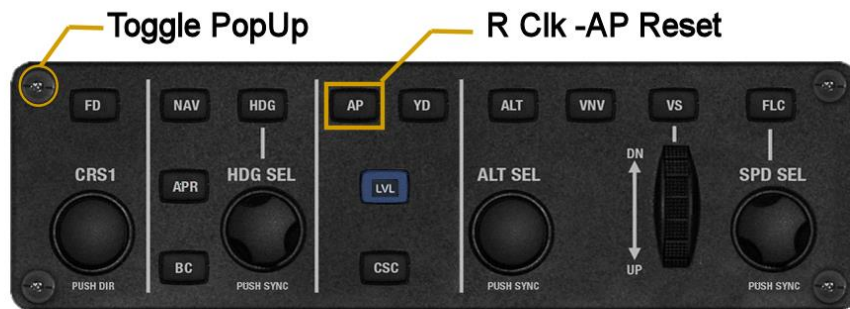
The 2D Autopilot is convenient when flying in IMC condition with turbulence effects on, as the VC AP buttons in the MFD are small and hard to use. The LED lights on the buttons also provide immediate confirmation of the functions engaged. It has the same functionality as the MFD autopilot, with added benefit of separate knobs for FLC speed adjustments.

The CSC (Cruise Speed Control) is fully functional should you desired to enable autothrottle in the aircraft's *aircraft.cfg* file (i.e. autothrottle_available= 1 ; default is 0). I prefer it off, as the DA62 aircraft does not have ample power to quickly make changes without throttling to full power.

As for the LVL key, it is programmed with basic level flight capabilities, but it will not expediently recover from extreme attitudes.