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CNX80 User Newsletter

Fifth Edition for the CNX80
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In this special edition for Oshkosh:

1. Procedures to Update Your CNX80 To V2.0
2. Review of CNX80 V2.0 New Features

Software V2.0 New Feature Review

We'll spend this newsletter reviewing all the new features coming to you in V2.0 in the CNX80. There will be more information coming to you in your upgrade Service Bulletin and new Pilot's Guide, but we'll cover the changes and give you a heads up in this newsletter. When certification for V2.0 is complete, Garmin will change the name of the product from the CNX80 to the GNS480. We remain steadfast in our commitment to this product and will position the GNS480 between the GNS430 and GNS530 in our popular line of integrated panel-mount avionics.

Upgrading Your CNX80

Your CNX80 may be upgraded to V2.0 in the field by any authorized Garmin dealer with an FAA approved repair station certificate. The Service Bulletin and upgrade kit will be provided free of charge to existing CNX80 owners. This Service Bulletin does not require any aircraft hardware or wiring modifications if installed per the installation manual.

Upon receiving the Service Bulletin and kit, owners should have your CNX80 upgrade performed by the repair station in accordance with the Service Bulletin instructions.

Upon completion you should have an airframe logbook entry made to note the upgrade and remove and replace the existing Airplane Flight Manual Supplement, and the new Pilot's Guide. You will also receive a new product CD with current manuals and Computer Based Training (CBT) on it, and the amended STC certificate.

New Feature List

Glideslope guidance for LNAV/VNAV (Gamma 2) and LPV (Gamma 3) approaches, and advisory vertical guidance for other non-precision approaches with vertical path data associated with them.

We've discussed this feature in the newsletter before and here are some nuts and bolts. All LNAV/VNAV and LPV approaches as well as non-precision approaches with defined vertical paths will have vertical guidance displayed on your HSI or CDI. This will drive the CDI and VDI and they will behave as they would during an ILS approach. Vertical guidance for all approaches that are supported will become active when the final approach fix becomes the active waypoint. The type of approach (LNAV, LNAV/VNAV or LPV) will be annunciated at the bottom of the moving map or on the new NAV page.

All approaches with vertical guidance may be flown to either the MDA or DA as appropriate to the individual approach. For precision approaches such as the LPV approach, procedurally there is nothing different to do vs. flying an ILS with the exception that no tuning or identification of the ILS is required. The CNX80 will automatically determine if the Horizontal Position Limit (HPL) and Vertical Position Limit (VPL) are within tolerance for the approach.

Selecting LPV or LNAV/VNAV approaches is no different than selecting a GPS approach on your CNX80 today. However you will notice new data fields and the indication of LPV, LNAV/VNAV or LNAV on the approach selection page.

<u>Reversionary Modes on the Approach</u>

If the HPL or VPL exceed required minimums for the precision approach, then you will receive a message stating the LPV is not available and the system will revert to an LNAV non-precision approach and flag the vertical guidance. This will occur within a minute prior to checking the final approach fix. As always review both your precision and non-precision minimums.

A marginal GPS nav solution will be shown as an amber LPV indication on the moving map or NAV page. A green indication shows the GPS nav solution is adequate to support a precision approach. Reverting to a non-precision LNAV approach relaxes the HPL requirement to the standard 0.3 NM maximum. In the event the HPL cannot maintain less than 0.3 NM, the system will advise the approach must be aborted and revert to terminal mode with an HPL of 1 NM, which is permissible for navigation to the missed approach point.

LNAV/VNAV approaches function in an identical fashion to the LPV, but have higher minimums as they are considered non-precision approaches. However, they do have HPL and VPL requirements equivalent to the LPV approach, and in the event those values are exceeded, the system will revert to an LNAV only approach as mentioned previously.

Approaches that have advisory vertical guidance are designed to reach MDA at the VDP shown on the profile view of the approach plate. You have the option to check the FAF and "dive and drive" or follow the advisory vertical guidance to the VDP. In essence you may fly the majority of your approaches in the same fashion as you would an ILS, simply treating the MDA as a DA, bearing in mind that MDA's are still hard altitudes unlike DA/DH. Upon reaching the MDA/VDP you may either begin climbing to the missed approach altitude or continue to the MAP at MDA. In either case the CNX80 will guide you to the MAP prior to sequencing to the first leg of the missed approach. The technique used is dependent upon personal preference, type of aircraft, approach speed, and length of runway.

This feature will provide vertical guidance on approximately 1800 approaches in the CNX80 database, with new approaches being added regularly. You may see a demonstration of an LPV approach on the CNX80 in flight demonstration DVD. If you have not obtained a copy of the DVD, please contact us.

SUSPend key function

In V1.X of the CNX80 software, the system went into suspend mode at the FAF for all approaches. This was due to a TSO requirement based upon the limitations of other GPS navigators.

Since the CNX80 supports all leg types and provides those to the pilot, this becomes an unnecessary keystroke for the pilot to remember at the FAF. We have worked this issue with FAA and eliminated this in V2.0, and you no longer have to remind yourself to press SUSP at the FAF.

For a VTF approach you will continue to see the suspend annunciator on until you are inbound on the final approach course and are within 45 degrees of the FAF. It will then automatically extinguish.

New interfaces to Garmin GTX 330/33/320/32 Mode S/C transponders.

New software interfaces have been added to allow the CNX80 to interface to Garmin's line of Mode C and Mode S panel mount and remote mount transponders. The GTX 330 and GTX 33 will allow the CNX80 to display Traffic Information Services (TIS) traffic data as do the GNS 430 and 530. The GTX 33 may be remote mounted and will feed both the CNX80 and MX20 displays with TIS traffic data.

New interface to display traffic data from L-3 Avionics Systems Skywatch

The CNX80 may also control and display data from an L-3 Com Skywatch System. This system is similar or equivalent to a TCAS 1 system (installation dependent) which independently interrogates transponder equipped aircraft in range of your aircraft and provides traffic alerts. This system may display traffic data on both the CNX80 and the MX20 as well.

New "NAV" page with a full compass rose CDI display.

We have created a new NAV page with basic navigation information in larger font sizes with a mini-HSI. This can display both CDI and VDI data driven by GPS (indicated by a magenta CDI), or VHF nav radio data (indicated by a green CDI).

Switching between the two nav sources is done in harmony with the main navigation output, which in most installations is normally driving your primary HSI/CDI. If your main nav output is GPS then the NAV page will be GPS data as well, and consequently if the

main nav output is driven by the nav radio, so will the mini-HSI. This is a supplementary navigation page, and may not be used for primary navigation.

The HSI is oriented to aircraft GPS track up, and automatically slews the CDI course to the appropriate course for the active leg of your flight plan. You may manually set the CDI course in OBS mode, or in VHF nav radio mode by slewing the course on your CDI/HSI.

Flight planning page enhancements.

If you select the flight plan page in V2.0 you will automatically be shown the active leg of the flight plan (highlighted in green), which will be indicated by a magenta arrow in the center of the page.

Vectors to final legs are also enhanced with larger fonts showing "VECTORS" for easy verification of your flight plan modifications after the insertion of an approach.

Arinc 743A compliant serial data output.

If you have other displays or equipment on board that require GPS position data to function correctly, you may tie these devices to this output. Typically devices that use this type of output are Terrain Advisory Warning Systems (TAWS) or EFIS / Multifunction Displays requiring an Arinc 429/743A GPS position data.

Guardian carbon monoxide indicator interface

You may also interface the CNX80 to a Guardian CO monitor in V2.0. This will allow the CNX80 to display the level of CO in the cabin on one of the configurable data fields in map pages 2-4. Alerting will be accomplished by the Guardian CO monitor unit.

Dual CNX80 flight plan updating

In V2.0 we have added a system crosstalk feature which will allow flight plan changes made in one CNX80 to be automatically linked into the active flight plan of the second CNX80 with no pilot action required. If desired, this feature may be disabled in the ground maintenance software.

Message tone volume control

In version 1.X the volume of the message tones was controlled by the AMA (Audio Message Alerting) volume along with the other aural messages such as "localizer alive." In V2.0 the control of the message tones has been separated and may be controlled on the feature configuration page. There are four volume selections for the aural tones allowing pilot optimization of the volume. The aural messages will still be controlled via the AMA volume control.

Ability to manually select WAAS corrections off and on.

To support European, Australian, or other areas outside of WAAS coverage, the ability to manually select WAAS corrections off and on has been provided. This forces the WAAS engine to revert to a fault detection and exclusion method of determining satellite health. This does not affect the CNX80's ability to be utilized as a primary navigation device.

The engine will perform this reversion automatically under normal operations; however by manually selecting WAAS corrections off in marginal areas of WAAS coverage or areas with no WAAS coverage at all, the GPS sensor will be allowed to select satellites in better view of your aircraft.

Ability to calculate RAIM when out of WAAS coverage

In the event that you are operating in an area where there is no WAAS coverage or WAAS corrections are unavailable for any reason, you may predict RAIM availability at any waypoint by using this feature, which you can find at the bottom of the waypoint INFO pages.

Simply select the waypoint in your flight plan or database and press the INFO key. At the bottom there is a new button labeled "RAIM". Selecting this allows you to predict RAIM availability at that waypoint. The default date/time selection is your ETA at the waypoint (for flight plan waypoints,) or if a waypoint is selected from the database, the ETA based upon flying direct to the waypoint from your present position.

You may also use the Cursor to highlight the date and time fields to manually select the time and date for the prediction. This CNX80 based tool may be used in lieu of the PC based prediction tool provided on the product CD for FAR 91 operators. Other operators should consult with their civil aviation authorities.

New Nav data output Autoswitch feature.

When flying an ILS approach, a new feature to automatically transition from GPS data to Localizer/GS data has been incorporated. This may be manually overridden by using the CDI button on the bezel or you may turn the feature off entirely on the user configuration page and make all CDI output changes manually.

The FAF must be the active waypoint and the ILS must be tuned, and localizer inputs received by the CNX80. Once the localizer comes alive, the CNX80 will begin blending the GPS and localizer data together to avoid any autopilot bumps during the transition. An annunciation that the autoswitch is occurring will be shown in the message field at the bottom of the CNX80 display. The CNX80 requires about 20 seconds to complete the transition. The output of the CDI will then switch to the VHF nav radio and the indication on the CNX80 will change appropriately. If you are using an external source annunciator, this will change as well.

Once the CNX80 has transitioned to the ILS you may fly the approach normally. If a missed approach is required, the system will automatically transition back to GPS data for missed approach guidance, eliminating pilot button pushing at low altitude. There is no blending during this transition back to GPS guidance.

Automatic frequency checking for ILS, backcourse, and VOR approaches.

When an ILS, backcourse, or VOR approach is selected in the CNX80 flight plan, the system will perform a frequency check automatically when entering the destination airport terminal area. A blue message will pop up if the active frequency is incorrect for the approach loaded into the flight plan. If the frequency is correct, you will not receive a message.

You will have the option of either pressing the Enter key to load the frequency into the nav radio active frequency, or you may disregard the message and press CLR if you are using the active frequency for other navigation purposes.

Notification of navigation to non-WGS-84 compliant waypoints in the active flight plan.

The CNX80 contains worldwide navigation waypoints, some of which are not complaint to WGS-84 datum standards. Typically these waypoints are found in remote areas outside the United States, Canada, Europe, or Australia.

If such a waypoint is found in your flight plan, you will be notified by the CNX80. It is the pilot's responsibility to be aware of the source of the navigation data and any limitations associated with it. Check with local authorities, or other approved navigation information for any limitations with waypoints with unknown datums or datums other than WGS-84.

Ability to manually select maximum CDI scaling.

The CNX80 automatically scales the CDI according to phase of flight. The requirements are 2 NM for enroute navigation, 1 NM for terminal area operations, and 0.3 for non-precision approaches. Precision approaches are automatically scaled and are not affected by this feature.

You may manually select the maximum CDI scale to 2, 1, or 0.3 NM in V2.0 using this feature on the CNX80 feature configuration page. This has proven to be helpful to those installations with older autopilots that wander with the CDI scaling set too high for the autopilot to track adequately. Reducing this scaling factor may eliminate any autopilot wandering you may be experiencing.

VFR Squawk Code selection

For those pilots operating in other countries that use a VFR squawk code other than 1200, you may choose your default VFR squawk code in the feature configuration page to some other value. When you press the VFR button on the transponder control mode, this code will be used.

Other Topics

As of this writing the majority of V2.0 flight-testing has been successfully completed with FAA flight test indicating very positive comments about the new functions and capabilities. We hope to have the balance of flight-testing and documentation completed shortly, but the big hurdles have been passed. We hope you enjoy the fruit of our efforts.

Please let us know if you have any questions or comments. Several of you have and we do appreciate the feedback allowing us to directly address your questions, concerns, and providing you with the best customer service we can.

Please feel free to contact us by visiting www.garmin.com and send your comments to the technical support group (support.salem@garmin.com): Attention Paul Damschen, Flight Test.

This Newsletter along with the first four editions can be found on the web at: www.garmin.com/products/cnx80/