GARMIN®

CONTENT

PUT BETTER DECISION-MAKING TOOLS AT YOUR FINGERTIPS WITH GARMIN HELICOPTER AVIONICS

The versatility that helicopters bring to the world of aviation is reflected in the wide range of missions they fly: emergency medical services, law enforcement, offshore logistics, search and rescue, aerial touring, heavy-lift, executive transport, pilot training and many more. Each has its own operational challenges. And for some, these challenges have grown — as busier airspace and ever-more-demanding flight environments have increased the focus on safety, industry wide. An FAA task force identified three primary areas where operational risks for helicopters need special attention: 1) inadvertent flight into instrument meteorological (IMC) conditions, 2) night operations, and 3) controlled flight into terrain (CFIT). Many ongoing studies have reinforced these findings. And in response, many operators are now asking for technologies that can proactively (and affordably) help address these safety issues.

To that end, Garmin is focusing our decades of experience in aviation safety technology on the specialized needs of today's helicopter community. And we're proud to offer a robust array of systems and solutions designed specifically for helicopters — many of which you'll find featured on these pages. Whether it's high-resolution terrain/obstacle graphics with HTAWS alerting and voice call-outs of altitude when descending below 500 feet, or worldwide datalink weather with NEXRAD imagery or all-digital radar altimetry or HSVT™ synthetic vision technology that renders terrain-alerting data into a realistic 3-D "virtual reality" landscape on the primary flight display — whatever it takes, just know that Garmin is serious about helicopter safety.

For added versatility and convenience, G500H TXi lets you use familiar knobs and/or touchscreen inputs to quickly access the functions, screen views and other flight information you want to see. When paired with our GTN™ 750Xi/650Xi series GPS navigators, the G500H displays provide full touchscreen continuity between the navigation, communication and flight display functions in your helicopter.

G500H TXi FLIGHT DISPLAY

Providing the latest in electronic glass cockpit instrumentation on bright, crisp 10.6" and 7" LCD touchscreen displays, Garmin G500H TXi brings new levels of reliability, adaptability and affordability to helicopter operations. The displays' clean-sheet design, dual-core processing power and proven ADAHRS attitude/heading reference all build on the proven capabilities of our original G500H series to offer a vastly expanded array of features, options and panel layout possibilities. The 10.6" horizontal format can accommodate primary flight display (PFD) information and a multifunction display (MFD) side-by-side within the same unit. The display is pilot-selectable for PFD or PFD/MFD presentation. And the PFD/MFD option is configurable, allowing it to be split 60% PFD and 40% MFD — or 40% PFD and 60% MFD to allocate more room for maps or other features you want to see most prominently, Similarly, the 7" portrait format displays can be individually dedicated to PFD (with HSI map) or MFD functions. Another option, where panel space is limited, allows the 7" landscape format display to serve

as a dedicated PFD with instrument tapes, a half-arc HSI and our optional Garmin HSVT™ 3-D synthetic vision. For added situational reference, the display puts an MFD-like perspective map view within the HSI portion of your PFD. In addition to the geographical map, the HSI map view can also support the overlay of NEXRAD imagery and weather inputs from ADS-B and SiriusXM® datalinks. Additional overlays include SafeTaxi® airport diagrams, WireAware™ power line avoidance, traffic, terrain and more. HSI map control and on-screen navigation are a snap, thanks to a Garmin innovation that lets you zoom in or out on the map by using a simple and natural single-finger swipe gesture. Plus, the TXi screens are also provisioned for night vision goggle (NVG) compatibility. And to further reduce pilot workload, G500H TXi offers full integration with the Garmin GFC 600H digital flight control system, as well as other Garmin or 3rd party navigators, radios, and related equipment. There are also multiple input options that enable the TXi multifunction display to serve as a FLIR, live-cam monitor or other video source*.

Compared to the 3-color shading graphics used for fixed-wing Terrain Proximity displays, the crisp 5-color shading scheme featured on Garmin helicopter systems yields additional elevation reference data for pilots who routinely fly lower and closer to the ground.

Providing multiple inputs for optional video, G500H TXi supports a variety of camera configurations and locations — enabling the MFD to function as a FLIR, tail-cam or live video monitor.

Garmin WireAware™ wire-strike avoidance technology combines with optional HTAWS terrain alerting to provide a comprehensive hazard avoidance solution for low-level helicopter operations.

With navigation inputs, G500H TXi can put an MFD-like perspective map view within the HSI portion of your primary flight display. This HSI map can incorporate NEXRAD imagery and weather data as well as SafeTaxi® diagrams, traffic, terrain alerting and more.

HSVT™ SYNTHETIC VISION TECHNOLOGY

Specially adapted to the needs of helicopter operators, Garmin's HSVT synthetic vision technology brings a unique graphical perspective to "glass cockpit" instrumentation. Available on G500H TXi as an option, HSVT can make a world of difference when visibility deteriorates. Using sophisticated computer modeling to recreate a virtual topographic landscape from the system's terrain-alerting database, HSVT gives helicopter pilots a clear depiction of ground and water features, airports, obstacles, traffic and more – all shown in 3-D perspective on the primary flight display. Garmin's HSVT graphics look so real, it's almost like having a clear-day "out-the-window" view of your flight situation – even in the darkest nighttime VFR or other degraded visibility environments (DVE). Although synthetic vision is not intended to replace traditional attitude and directional cues as one's primary flight reference, it clearly does augment the pilot's view of this data, by giving it a realistic visual frame of reference. For example, when flying in areas where rising terrain may pose a hazard, Garmin HSVT uses its database to "paint" the landscape with amber or red overlays showing where potential CFIT risks exist. As with Garmin's HTAWS alerting, this HSVT "paint" feature offers user-selectable Reduced Protection to accommodate low-level operations without excessive terrain alerts. Towers or obstacles that may encroach upon one's flight path are also color-highlighted with hazard-appropriate symbology. So, when it comes to maintaining situational awareness, it's easy to see that Garmin HSVT is great technology to have.

Operations into unfamiliar airports are easier with Garmin HSVT. Airport identifiers, runway surfaces, numbers and thresholds are all clearly depicted.

Garmin HSVT helps pilots look out for non-terrain structural hazards. Color-coded 3-D symbols show structures that may encroach the flight path.

3-D traffic depiction on HSVT helps pilots see if traffic targets are above or below their altitude. As intruders get closer, the symbols get larger.

*Camera not included.

¹Database currently covers North America and Western Europe only.

The Garmin GTN Xi Series of touchscreen avionics are provisioned to enable helicopter pilots to join their fixed-wing counterparts in the world of WAAS/SBAS navigation. These satellite "augmentation" systems use enhanced GPS signals to enable IFR flight and vertical glidepath approaches into non-ILS-equipped runways and heliports. A special helicopter-specific Garmin aviation database lets GTN Xi operators easily navigate to more than 7,000 heliports, without having to create their own user waypoints at those locations. What's more, on the comm side, a helpful recall function allows often-used radio frequencies to be stored in memory for quick access during flight. An optional switch on the control stick enables pilots to remotely select from these stored frequencies – and activate them via "flip-flop" entry – without removing their hands from the flight controls.

GTN™ Xi SERIES TOUCHSCREEN AVIONICS

Combining the latest in moving map and graphical features with touchscreen data entry and integrated radio tuning, the new-generation Garmin GTN Xi series brings unprecedented levels of convenience, efficiency and situational awareness to the helicopter industry's latest GPS/Nav/Comm/MFD suite.

To maximize space-limited avionics stacks, the compact GTN 650Xi model fits in a 2.65" tall slot — while the GTN 750Xi bezel stands 6" high and features an MFD-like 6.9" display. Both versions meet stringent environmental and vibration standards for helicopters. And configurations with built-in, night-vision goggle compatibility are also available.

Featuring high-speed processors that cut boot-up time by 50% over earlier GTN models, the GTN Xi series provides quick access to frequencies, flight plan data, database updates and more. The added processing power also supports faster graphics rendering and smoother panning, plus convenient smartphone-like swipe and pinch-to-zoom gestures to align and scale the map view on the screen. The super high-resolution display has a wider viewing range and almost double the pixel count of earlier GTN models — making it one of the highest-resolution displays ever offered in this class of avionics.

Incorporating a complete range of GPS- and VHF-guided navigation capabilities, the GTN Xi series makes it easy to create routes, load flight plans and fly all types of arrival, departure and approach procedures. The SBAS/WAAS-certified navigator allows you to fly GPS-guided LPV glidepath instrument approaches down to as low as 200', greatly expanding your low-visibility landing options. What's more, when operating in VFR conditions, the GPS can also provide advisory vertical approach guidance based either on a published glidepath angle or by generating a 3-degree vertical flight path from the runway threshold down to pilot-selectable minimums — while taking terrain and obstacle clearance into account. With this advisory guidance, you're able to fly more consistent and more precise vertical glidepaths into any airport published in the database.

To further simplify navigation, you can easily transfer several common waypoints at a time, using the SD card slot or by directly entering them via multiple common lat/long formats or VOR radials. These can be marked as airports to help limit excessive terrain alerts.

For added protection against powerline incidents, WireAware™ wire-strike avoidance technology is an available option. The basic helicopter database includes all hazardous obstacle transmission, or HOT, lines that span rivers and canyons in areas that can prove treacherous to low-flying pilots. With WireAware these lines are clearly identified on the map page, with detailed information (including MSL and AGL line heights) available at the press of each wire segment on the display. For even more protection, adding HTAWS to the system enables both audible and visual alerting to call attention to wire hazards in proximity to the flight path.

Easily integrated with other Garmin avionics, the GTN Xi series can support a wide array of optional weather, lightning and traffic system inputs for overlay on the moving map — as well as exclusive workload-reducing features such as Telligence™ voice command technology.

If your mission calls for search and rescue operations, GTN Xi provides an optional selection of four common search pattern types (Orbit Search, Parallel Line Search, Expanding Square and Sector Search) for easy entry into your flight plan. Other features include FastFind predictive logic to suggest airport and waypoint entries using current GPS position; streamlined frequency entry; customizable checklists; airspace altitude overlays on the moving map page; shortcut access to frequently used data fields, functions, pages, and more. The GTN 750Xi and 650Xi series can provide control/display for optional remote-mount transponders. And the larger GTN 750Xi series also offers support for optional remote audio panel control.

When installed with remote switches on the cyclic or collective, the GTN Xi series can further reduce cockpit workload by allowing pilots to create flyover mark-on-target waypoints or remotely tune frequencies, all without letting go of the controls. Additionally, other key GTN Xi interfaces can support TAS/TCAS traffic systems, datalink weather and radar altimeter inputs for enhanced HTAWS alerting. In effect, these multiple interface options let pilots utilize the GTN Xi touchscreen as a virtual flight management system.

Then, for even more touchscreen convenience, you can add a Garmin Flight Stream wireless gateway[1] to your system, enabling select Connext-capable apps such as Garmin Pilot™ — as well as aviation portables from our aera® series — to stream data to/from your GTN Xi series avionics via a Garmin Connext® link. With Connext onboard, you can preload flight plans — including your own waypoints — onto your iPad® (or other compatible device) for quick and easy uploading into your avionics. And you can also use the Connext wireless connectivity to load and keep all your databases in sync with Database Concierge automatic updating. Additionally, the link provides more robust GPS position data (streamed from the GTN Xi) for apps such as Garmin Pilot and FltPlan Go on your device, as well as the option to display weather, traffic and backup attitude information — so your tablet essentially becomes an extra control/display in the cockpit.
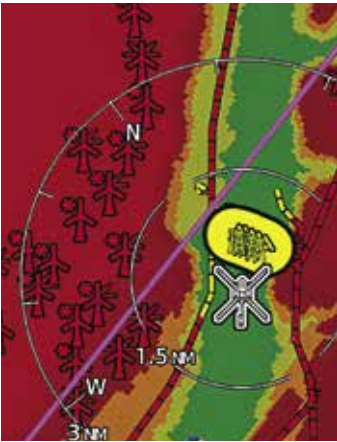
Garmin HTAWS terrain alerting, designed specifically for helicopters, is optionally available with GTN Xi series touchscreen avionics. It's also available as an upgrade to existing GNS 530W/430W series navigators. It uses an expanded database containing more than 30,000 more structures, obstacles and oil rigs than the Garmin fixed-wing aviation versions.

Garmin WireAware™ technology combines with optional HTAWS (Helicopter Terrain Awareness and Warning System) data to provide a comprehensive hazard and wire-strike avoidance solution. The basic helicopter obstacle database includes all identified hazardous obstacle transmission (HOT) lines — typically those that span rivers, canyons, valleys, etc. — with AGL/MSL elevation provided on individual line segments. Coverage includes the U.S., as well as some power distribution lines in Canada and Mexico.

HTAWS TERRAIN ALERTING OPTION

Providing visual and aural advisories to help keep pilots separated from hazardous terrain, this safety-enhancing technology is engineered specifically for helicopter flight regimes. When optionally installed in select Garmin WAAS/SBAS GPS navigators, the HTAWS offers "forward looking" terrain avoidance (FLTA) capability to predict in advance where potential hazards may exist — and allow time for the pilot to take corrective action. WAAS/SBAS GPS position information is compared with the navigation system's internal terrain/obstacles/airport databases to determine conflict scenarios. If one's helicopter has inadequate terrain and/or obstacle clearance ahead, based on the system's projected flight path, HTAWS caution and warning alerts are issued to the pilot. Accompanying FLTA voice alerts also indicate the relative threat level, with messages such as "Caution, Obstacle, Obstacle" or "Warning, Terrain, Terrain." In addition to terrain and obstacle alerting (with 5-color Terrain Proximity display for helicopters), Garmin HTAWS also features voice call-outs, or VCOs, which audibly announce the helicopter's height above terrain when descending below 500 feet. VCO altitude call-outs operate in all HTAWS modes, and Garmin

technology allows the pilot to select multiple call-out menus, in 100' intervals, descending from 500' down to 100' (or down to 50' with an installed GRA 55 radar altimeter). To minimize "nuisance" alerts, Garmin HTAWS offers pilot-selectable options to: 1) suppress an active audible caution alert (while still displaying visual annunciations), or 2) use a "reduced protection" or "RP" mode, which allows for low-level operations and off-airport landings with reduced alerting, while continuing to provide protection from terrain and obstacles. A third option inhibits HTAWS alerting altogether – but still allows voice call-outs to audibly annunciate the aircraft's height above terrain when descending to 500' or below. Garmin developed a special helicopter obstacle database for its HTAWS option, adding more than 30,000 lower-height structures to its existing software – and enabling the system to depict some 25% more obstacles that might pose a hazard to helicopter operations. Customers with existing Garmin GNS 430W/530W series navigators may opt to easily upgrade their units with HTAWS capability by contacting an Authorized Garmin Service Center for an on-site upgrade.

GFC™ 600H FLIGHT CONTROL SYSTEM

For helicopter operators, the GFC 600H represents a breakthrough in cost-effective, safety-enhancing technology that can help reduce pilot workload, fatigue and stress levels in busy airspace or marginal weather conditions. Advanced AHRS-based flight control reference, developed by Garmin, combines with redundant cross-checking sensors and robust "smart" servos to provide a superior level of smoothness, precision and response. The system's advanced digital automation features include a stability augmentation system (SAS), hover assist, overspeed and low speed protection, automatic LVL mode, Flight Director (FD) command cues and more. Plus, cyclic-mounted controls allow easy engagement of the flight control system and its primary functions without taking a hand off the controls or going "eyes-down" in the cockpit.

The GFC 600H system's architecture supports full pitch-and-roll axis control capabilities, plus an available 3rd axis servo can provide for optional yaw damp capability — supplementing tail rotor pedal input by the pilot to help maintain heading and keep the helicopter in smooth, coordinated flight. The system can operate as a standalone flight control system or easily integrate with a variety of Garmin flight displays and navigation sources (as well as 3rd party equipment) for additional capability. With pitch and roll cues provided on a compatible flight display such as our G500H or G500H TXi flight displays, you can hand-fly the cues to intercept and maintain a flight path defined by your selected heading, navigation, altitude and airspeed parameters. In Coupled (CPL) mode, GFC 600H provides the necessary control inputs to achieve the desired flight path.

For procedures such as approaches, the system uses guidance from a compatible WAAS-enabled navigation source — such as our GTN™ 750Xi/650Xi series of touchscreen avionics — to automatically fly the helicopter along a desired lateral and vertical flight path. The attitude hold (ATT) mode, activated via the mode controller or cyclic-mounted control, will maintain the commanded pitch, roll or heading; however, while activated, the pilot can easily "fly through" the flight control inputs for smooth hand-flown maneuvers. In addition, GFC 600H includes stability augmentation (SAS) inputs to help stabilize the helicopter and improve its basic handling characteristics. Another safety-enhancing feature, standard with GFC 600H, is our Helicopter Electronic Stability and Protection system, or H-ESP™. This technology serves to help the pilot easily maintain safe attitude and speed limits when hand-flying the helicopter. H-ESP functions independently of the system — although it uses the same control servos — to assist in maintaining a safe, stable flight condition whether the system is engaged or not. To further enhance safety in potentially disorienting situations, a dedicated level mode (LVL) can be engaged by the pilot to automatically initiate recovery from unusual attitudes and return the helicopter to straight-and-level flight. As needed, H-ESP can be manually disabled to allow for tactical flight maneuvers. And when the system detects that you're hovering, the hover assist feature will automatically provide flight control inputs to help maintain that position over the ground. It will also hold heading in hover when equipped with the available yaw axis control.
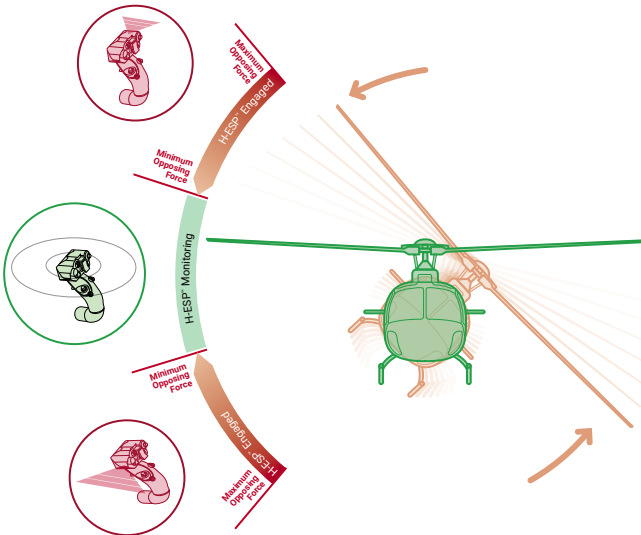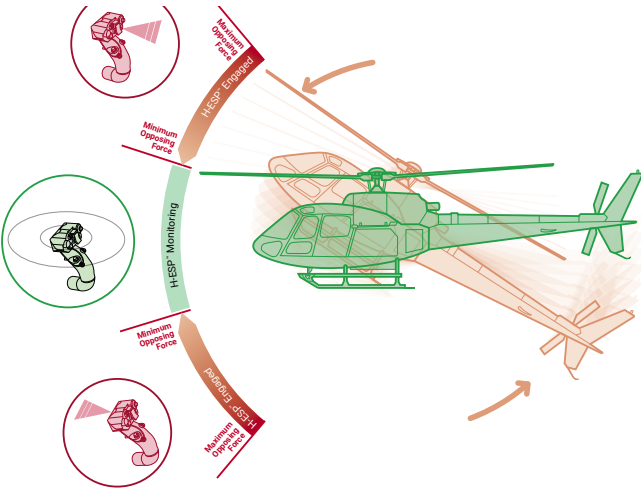
Garmin H-ESP™ (Helicopter Electronic Stability and Protection) comes standard with the GFC 600H flight control system. Using the servos of the GFC 600H, H-ESP applies a corrective force on the controls to assist the pilot in maintaining the aircraft in a safe, flight-stable condition whenever pitch, roll or speed deviations exceed the recommended limits.

The Garmin GNC 255 series nav/comm radios offer full 200-channel VOR/LOC/GS capability and your choice of 10 or 16 watts of comm transmit power. The companion GTR 225 series comm-only transceiver offers the same choice of VHF power output configurations. And both the GNC and GTR radios are available in versions that can be set for 25 or 8.33 kHz spacing – providing up to 2,280 channels with 8.33 spacing to meet the comm compliance rules for Europe. (Note: the GTR base model offers 25 kHz spacing only.)

GNC 255/GTR 225 NAV/COMM RADIOS

Incorporating a first-in-class frequency lookup database, these GTR/GNC series "smart" radios from Garmin bring whole new levels of efficiency and convenience to helicopter cockpit management. For example, with the units' handy "frequency lookup" function, you can simply enter the navaid or airport identifier to find the frequency (or frequencies) associated with that location: Tower, Ground, ATIS, Clearance Delivery and so on. Moreover, with a

compatible GPS input, the lookup function can automatically provide the station identifier once you've dialed in the frequency. So it's easy to verify who you're talking to. Frequency presets, which can be accessed via a remote switch, enable you to tune a comm frequency into the standby display and then activate it via "flip-flop" entry – without removing your hands from the flight controls. In addition, standby frequency monitoring enables you to listen to ATIS or

other transmissions without leaving the active frequency. It's almost like having two radios in one. Special heli-optimized versions of the GTR/GNC series radios are available with NVG compatible displays. And other handy features include an internal two-place intercom, a built-in course deviation indicator (CDI) on the nav side, storage/recall for up to 15 of your most often-used frequencies and automatic storage for the last 20 comm frequencies you've called.

With Garmin 3-D audio processing, sound reception in your stereo headset can have a directional effect. For example, Comm 1 may sound as if it's coming from your 11 o'clock position; Comm 2 from your 1 o'clock; copilot intercom from 3 o'clock and so on. The 3-D feature can be enabled/disabled to suit your preference.

GMA™ SERIES DIGITAL AUDIO CONTROL

Advanced audio switching technology from Garmin can do even more to help you stay focused on flying when things get busy in the cockpit. With the helicopter-robust GMA 350Hc digital audio panel, a patented Telligence™ voice control feature lets you activate certain key audio functions by using spoken commands. So, you can simply press a push-to-command button on the handgrip and say "Comm One" (or Two, or whatever) to select the radio you want — all without lifting a finger from the controls.

You can also verbally select the call playback mode: Just say "Read back" to get an instant replay of the last ATC transmission. Plus, our unique "3-D Audio" technology works to spatially separate inputs coming into each headset – helping you identify which ones to focus on. This 3-D audio capability is also available on the GMA™ 345 audio panel. This Bluetooth®-enabled unit combines rich "home theater" quality sound with wireless connectivity that makes it easy for you to pair your smartphone or other compatible

device with the audio system — so you can make and receive calls in the cockpit, as well as stream audio entertainment through your headsets. Both the GMA 350Hc and GMA 345 audio panels include ambient noise level sensing for enhanced auto-squelch. The GMA 350Hc adds night vision goggle (NVG) compatibility with green annunciation and backlighting — plus it offers three-comm radio support and corresponding split-comm modes (1/2, 1/3 or 2/3) to accommodate a third radio.

FLIGHT STREAM 110/210 WIRELESS GATEWAYS

connext™

As part of the Garmin Connext™ family of flight connectivity solutions, the Flight Stream 110/210 series of small Bluetooth® gateways provides an easy way to stream information between your iPad® (or other compatible tablet/mobile devices) and your helicopter's avionics[1]. Thus, the touchscreen on your smart device can now become a true cockpit interface – capable of transferring flight plans, streaming GPS and attitude information to your Garmin Pilot™ app's 3-D synthetic vision display, graphically depicting ADS-B linked traffic and weather, controlling your SiriusXM™ system's audio entertainment channels and much more. With the wireless mobility that your Flight Stream device provides, you'll enjoy more freedom in everything from preflight planning to inflight decision-making. The Flight Stream 110 model is designed to be paired directly with a GDL 84H or GDL 88H ADS-B datalink or a GDL 69/GDL 69A SiriusXM™ satellite receiver – to provide the benefits of these products without the need for an installed display in the cockpit. The Flight Stream 210 adds connectivity with your GTN 750Xi/650Xi, GTN 750/650 or GNS 530W/430W series navigators, enabling your tablet's Garmin Pilot app to access graphical weather, traffic, GPS and backup attitude input, for even more situational display capability in your cockpit. Keeping flight plans in sync between your device and your avionics is a cinch. It's seamless. It's time-saving. And everything syncs automatically. So, there's no duplication of effort on your part when it comes to managing your flight data. That's data sharing with Garmin Flight Stream: It's all about bringing greater efficiency and work-saving convenience to your cockpit management.

SIRIUSXM™ SATELLITE WEATHER

A great tool for helping helicopter pilots avoid inadvertent flight into adverse weather or low visibility conditions, SiriusXM Satellite Weather service is available with the installation of a Garmin GDL 69 datalink receiver (SiriusXM subscription required). With this option, high-resolution NEXRAD imagery, METARs, TAFs, TFRs, winds aloft, echo tops, surface precipitation, lightning strikes, storm cell data and other weather updates for the entire U.S. can be accessed from your G500H TXi flight

display or GTN Xi series touchscreen. SiriusXM's geo-synchronous satellites over the east and west coasts of the continental U.S. enable this weather coverage to be accessed from any altitude. And for added entertainment value, there's also a user interface with the GDL 69A that offers inflight access to hundreds of channels of digital-quality SiriusXM Satellite Radio programming (additional service fee required).

GSR 56H GLOBAL WEATHER/VOICE/TEXT

In today's time-critical world, maintaining connectivity on the go has become a high priority for many companies. To help helicopter operators meet this need, Garmin has developed the GSR 56H, an Iridium-based satellite transceiver that's part of the Garmin Connext ecosystem. Through a constellation of low-earth orbiting (LEO) satellites, this flight service, powered by the Iridium network, offers virtually seamless global coverage.

Your Garmin Connext datalink may be used to send and receive text messages using your smartphone, and even make calls through your headset, using your device's contact list. Furthermore, Garmin Connext enables a range of datalink services – including automatic position reporting and access to graphical weather, METARs, TAFs, Winds Aloft, PIREPs and more, on a worldwide basis.[2]

GTS SERIES ACTIVE TRAFFIC

For help in "seeing and avoiding" other aircraft in busy airspace, nothing beats having an extra set of electronic eyes in the cockpit. That's why smart helicopter pilots are looking to the Garmin GTS™ Series of traffic surveillance systems. Featuring exclusive Garmin CLEAR CAS™ (Correlated Location Enhanced ADS-B Receiver Collision Avoidance System) technology, these affordable TAS and TCAS I systems combine both active and passive surveillance, including dual link 978 and 1090 MHz ADS-B "In" from a GTX 345 all-in-one ADS-B transponder, to correlate target data and pinpoint traffic threats. Three distinct product configurations are available: GTS 800, GTS 825 and GTS 855. The GTS 800 system offers up to 22 nm of interrogation range, while the GTS 825 and GTS 855 TCAS I systems offer up to 40 nm and 80 nm of interrogation range, respectively. All three systems use surveillance data from nearby transponder-equipped aircraft to generate expanded audio alerts in an ATC-like spoken format: "Traffic. 10 O'clock.

High (or Low or Same Altitude). Two miles." If bearing information is not available, "Traffic, No Bearing" is spoken. Passive surveillance of aircraft equipped with ADS-B "extended squitter" capability enables the system to more accurately derive the target aircraft's range, bearing and relative altitude. With traffic data graphically displayed on the GTN Xi, GTN and GNS series and GNS series navigators and G500H TXi MFD (and also on the PFD with optional HSVT enabled), pilots can track specific flight trajectories of other aircraft in their vicinity – gaining a much clearer picture of their overall flight situation. Using familiar TCAS-defined symbology, up to 75 traffic targets can be tracked simultaneously on the GTS 825/855 (it's 45 on the GTS 800) — with up to 30 intruder threats being displayed at a time. What's more, with expanded voice alerts, pilots know where to look outside for called traffic — thus saving vital time when traffic is converging quickly.

Garmin traffic system alerting provides both visual and spoken audio advisories to help helicopter pilots maintain safe separation from other aircraft in busy airspace.

GARMIN ADS-B SOLUTIONS

You deserve to see tangible benefits from your ADS-B investment. That's why you'll want to equip with Garmin. We've taken a leading role in providing an affordable pathway to ADS-B compliance for the FAA's Next Generation airspace system – as well as fulfilling the needs of other international ADS-B initiatives. These capable ADS-B "Out" solutions automatically transmit aircraft flight ID, position, altitude, velocity, climb/descent and heading information to provide precise dynamic reference to Air Traffic Control, as well as to other ADS-B equipped aircraft sharing the airspace. Plus, they incorporate exclusive features to provide you with traffic and subscription-free weather information on a wide variety of Garmin displays, including G500H TXi and G500H flight displays, GTN 750Xi/650Xi series, GTN 750/650 series navigators and GNS 530W/430W navigators.

For example, Garmin TargetTrend™ relative motion display offers a faster, more intuitive way of judging target trajectories and closure rates in relation to your helicopter's flight path. Spoken audio alerts ("Traffic. Two o'clock. High. Two miles.") also tell you where to look for potential threats, so you can stay "eyes out" to scan for traffic. Likewise, in the airport environment, our exclusive TerminalTraffic™ technology displays geo-referenced ADS-B-equipped targets, including taxiing aircraft and ground service vehicles, on a SafeTaxi® surface diagram; ADS-B-equipped aircraft in-flight are easily distinguished from ground vehicles and taxiing aircraft, which are displayed using distinct colors and symbols. Plus, nuisance alerts are minimized and abbreviated while performing unique helicopter maneuvers such as hovering. And when paired with a GTN or GTN Xi series, they also offer On-Scene mode — a traffic surveillance tool that minimizes nuisance traffic alerts in-flight when intentionally operating near other helicopters during operations such as Electronic News Gathering.

[2]See Garmin.com/Connext for special pricing on comprehensive rate plans that provide weather, voice and texting.

GTX SERIES OF ALL-IN-ONE ADS-B TRANSPONDERS

The Garmin family of GTX series transponders brings ATC aircraft surveillance to new levels of precision, reliability and performance. The GTX 345 and GTX 335 transponders meet ADS-B "Out" compliance standards as certified 1090 MHz ADS-B solutions when paired with a compatible WAAS position source or upgraded to include an internal GPS position source, and, when paired with an active traffic system, they combine passive and active targets to display the most comprehensive traffic picture available.

The GTX 345 all-in-one ADS-B transponder offers ADS-B "Out" with options for dual-link ADS-B "In" to display subscription-free weather and advanced ADS-B traffic. What's more, the GTX 345 provides, via Bluetooth® and Connext wireless technology, ADS-B traffic, weather, GPS position data and back-up attitude information to Garmin aera 660/796/795 portables and Garmin Pilot™, FltPlan Go and ForeFlight Mobile apps. And the GTX 345 comes in an attractive size and form factor, making it easy to replace the most populartransponders in the industry. Remote-mount options are available.

The GTX 335 ADS-B transponder provides cost-effective ADS-B "Out" only. It also comes in an attractive size and form factor, making it easy to replace your old transponder, and remote-mount options are also available.

GDL® 88H ADS-B DATALINK

Paired with your existing transponder, the GDL 88H satisfies the FAA's ADS-B "Out" criteria, but it also lets you take immediate advantage of the ADS-B network's subscription-free weather and traffic data uplinks. Available with (or without) a built-in WAAS GPS navigation receiver, the dual-link GDL 88H provides reception on both ADS-B approved frequencies (1090 ES and 978 UAT), so it can correlate air-to-air with any of the available formats — and show you on a GTN Xi, GTN or GNS series navigator or G500H flight display a complete picture of all other transmitter-equipped aircraft in the vicinity, regardless of your proximity to an ADS-B ground relay station. Plus, the Garmin GDL 88H can automatically synchronize with your transponder for its squawk code, providing a single point of data entry.

GDL® 84H ADS-B DATALINK

The Garmin GDL 84H is designed to let you use an iPad® (or other compatible tablet/mobile device) to serve as your cockpit display for the system's weather and traffic capabilities. With this solution, you get full "Out" functionality to meet the requirements for ADS-B equipage, but, better still, you're also given access to the ADS-B "In" benefits of subscription-free weather and traffic without the need (and cost) of a permanent installed display in the cockpit. Instead, the GDL 84H comes with an included Flight Stream Bluetooth® wireless gateway, which enables it to stream the weather and traffic information to your Garmin Pilot™ or ForeFlight-equipped iPad or other mobile device.

Like the GDL 88H, the GDL 84H also offers a built-in WAAS/SBAS GPS receiver to serve as your position source for aircraft location, track and groundspeed, and its self-interrogation feature allows wireless interface with a wide range of GA transponders – to automatically synchronize squawk code and ident, so there's no need for expensive control system or transponder upgrades to eliminate duplication of entries.

GDL® 82 ADS-B DATALINK

With the easy-to-install GDL 82 remote-mount datalink, Garmin offers U.S. helicopter owners a low-cost way to meet the basic requirements for ADS-B "Out" compliance. It's a small, lightweight, non-intrusive datalink device that is designed to work with your existing transponder and transponder antenna, using patented AutoSquawk technology to automatically sync the datalink with your transponder. Offering 978 MHz universal access (UAT) output, the GDL 82 offers a "no frills" ADS-B solution that enables NextGen flight operations in controlled U.S. airspace below 18,000 feet.

Combining an all solid-state transmitter with high-sensitivity receiver and digital signal processing, the Garmin GWX 75H offers superior weather detection technology compared to earlier magnetron-based radars. A variety of compatible MFDs, including GTN 750Xi series touchscreens, can double as your radar display – providing an overlay of the weather picture on your graphical moving map.

GWX™ 75H DIGITAL WEATHER RADAR

Meeting the tough environmental and vibration criteria for helicopter operations, the "H" version of the popular GWX 75H all-digital radar combines exceptional range and adjustable scanning profiles with precision target definition to bring you the best in real-time weather awareness. Pilot-adjustable horizontal scan angles of up to 120° enable you to focus scanning on the areas you want to watch, while vertical scanning helps you analyze storm tops, gradients and cell buildup at various altitudes. In addition, Weather Attenuated Color Highlight (WATCH™) technology can help identify areas beyond the radar's capability that may contain even more hazardous areas of precipitation. With its advanced solid-state transmitter design eliminating the need for life-limited magnetron tubes, the Garmin GWX 75H comprises the very latest and most reliable technology in onboard weather radar. You can choose from 10", 12", or 18" antenna sizes to fit your requirements. What's more, a feature called "Altitude Compensated Tilt" helps streamline cockpit workload by eliminating the need to reset the antenna tilt with any altitude change. And when interfaced with your aircraft's analog gyro or AHRS system, the GWX 75H offers full stabilization to 30 degrees of pitch and roll. The radar's lightweight 40-watt transmitter and high-sensitivity receiver combine to optimize the use of radar energy in weather detection. And unlike conventional magnetron tubes, which degenerate over time, the solid-state technology used in the GWX 75H will maintain a consistent weather picture over a much longer interval – with no periodic maintenance required. The net result: Longer life and higher efficiency with no compromise in radar performance. Better still, a handy Ground Mapping mode lets you use the GWX 75H to scan terrain features for visual navigation. And optional advanced features, enabled via software, include Doppler turbulence detection and ground clutter suppression.

Designed to work with the GI 205 standalone indicator, as well as compatible glass flight displays, the GRA 55 radar altimeter offers a complete and accurate height-above-terrain tracking solution at a value price. Its simple installation also eliminates the need for long lengths of antenna cabling, thus achieving further savings in system weight and cost.

GRA™ 55 RADAR ALTIMETER

Utilizing the same patented technology as our higher-end GRA 5500, the affordable GRA 55 system offers a great value in digital radar altimetry for most light helicopters. When paired with the stand-alone GI 205 Radar Altimeter Indicator, the GRA 55 provides a reliable, highly accurate radar altimeter solution without the need to equip your cockpit with a complete glass flight display system. However, if you do plan to install such a system – or if you already have one — the GRA 55 will also integrate with the G500H TXi and G500H flight displays, GTN Xi and GTN series touchscreens and other industry-standard compatible displays as well. Yet, no matter which display option you choose, the GRA 55 conveniently puts your AGL readout right where you need it for optimum visibility in high-workload landing situations. The GRA 55 is designed to work in a full range of demanding environments – allowing you to go from rough terrain to tree canopies, from sand to choppy water, while always knowing precisely how much room you have to maneuver.

Its flexible capabilities make it an optimal solution for those equipping for NVG operations. And thanks to patented self-testing technology that continuously monitors incoming data and system integrity, you can be assured that the altitude provided is accurate, even in low-visibility conditions. What's more, in most installations this self-testing technology substantially reduces the need for pilot input or interaction with the GRA 55 in any way. It simply provides a smooth, reliable, highly accurate altitude readout to help keep your AGL awareness as safe and dependable as you'd want it to be.

GSB™ 15 USB CHARGER

This dual-port USB hub can power and charge two electronic devices in the cockpit or cabin, including tablets and phones. So you can have the power to access flight plans, moving maps, charts, weather data, manuals and more on your mobile device — while your passengers can access entertainment, messaging and all types of productivity apps. The dual USB Type-A hub provides up to 18-watt output to each device, while the dual USB Type-C and USB Type-A/Type-C hubs offer the latest portables — including iPad Pro® tablets from 2018 or later — up to 27-watt output, plus USB Power Delivery technology to provide optimal power for each device. All slimline GSB 15 hubs measure just over 1.5" square and stand less than an inch deep. Two formats are available: either rear or side wiring connections to simplify installation in tight spots. The hub fits in a 1" hole and can be mounted into a standard instrument hole in the panel with an optional 2.25" or 3.125" adapter.

MISSION SUPPORT WITH FLTPLAN.COM

With aviation support services from the industry-leading FltPlan.com team at Garmin, helicopter pilots and fleet owners can now streamline their operations with a full suite of web-based logistics solutions. These offerings range from flight planning, filing and pre-departure clearances to advanced trip support, flight tracking, airport and FBO information, weather briefings, navigation logs, safety/risk management tools and more.

As one of the largest and most trusted electronic flight planning services in the U.S., FltPlan.com files more flight plans per year than any other provider. The FltPlan Go electronic flight bag app is seamlessly integrated and wirelessly integrates with Garmin avionics. The Garmin Pilot™ app provides additional integration and wireless connectivity. By creating a free FltPlan.com account and syncing it with Garmin Pilot, users can easily create flight plans and routings — then wirelessly transfer the data from their mobile device to their avionics, saving valuable time prior to any flight. To save even more

time between filing and takeoff, pilots can also take advantage of FltPlan's FAA-approved pre-departure clearances, which allow them to skip clearance delivery entirely — and receive their flight plan approval wirelessly, approximately 20-30 minutes prior to the filed departure time.

Other premium support services include FltPlan Manager for fleet management and flight tracking data, as well as a FltPlan safety management system. These options provide the tools and documentation to help managers stay ahead of complex record-keeping requirements and run their operations more efficiently. For missions such as executive transport or other high-security missions, there's even a privacy dot-com service that provides a randomly generated call sign for each flight as part of the normal flight planning and filing process — so your aircraft shows up on public flight tracking websites with a generic FltPlan identifier, instead of your registered tail number or company name.
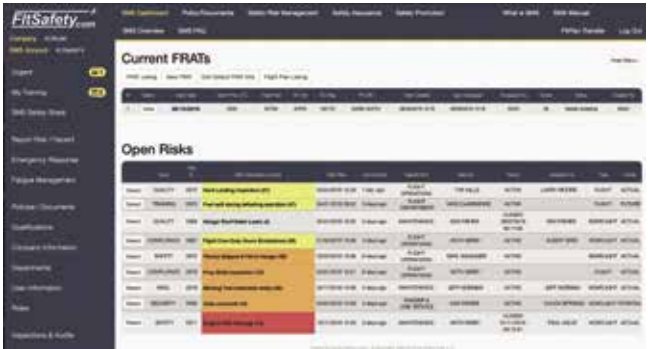
Safety Management
Premium support services such as our FltPlan safety management system assist operators in complying with documentation requirements while tracking and mitigating risks to their flight departments.
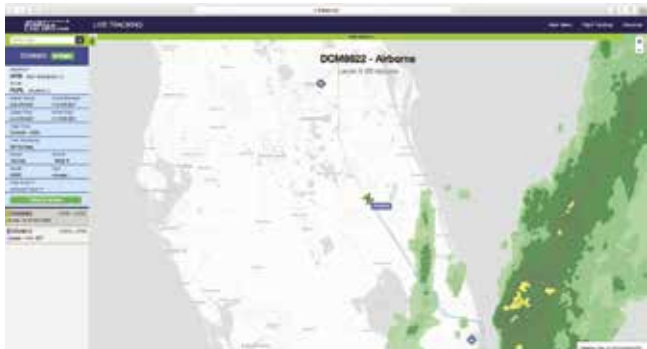
Flight Tracking
FltPlan.com support services include an affordable flight tracking solution that continuously monitors aircraft status en route. For privacy and security, operators can opt to have their aircraft tail numbers blocked from public online view.

GARMIN HELICOPTER SYSTEM SPECIFICATIONS

G500H TXi FLIGHT DISPLAY

Display Features

10.6" or 7" diagonal color LCD options
RGB backlighting technology
High resolution
  GDU 1060 - 1280 pixels (W) x 768 pixels (H)
  GDU 700P - 480 pixels (W) x 800 pixels (H)
  GDU 700L - 800 pixels (W) x 480 pixels (H)
Direct sunlight readable
Auto, manual, or lighting bus inputs for dimming
Field upgradable software
Available as 10.6" landscape, 7" portrait, or 7" landscape configurations

Physical - GDU 1060

Unit Size:	7.25 inches high
	11.4 inches wide
	3 inches deep
	6.49 lbs. (without integral ADAHRS),
	7.25 lbs. (with integrated ADAHRS)

Physical - GDU 700P

Unit Size:	7.25 inches high
	5.5 inches wide
	3 inches deep
	3.99 lbs. (without integral ADAHRS),
	4.45 lbs. (with integrated ADAHRS)

Electrical - GDU 1060

10-40 VDC, reverse polarity protected
70 watts typical

Electrical - GDU 700P

10-40 VDC, reverse polarity protected
42 watts typical

System Architecture

Position Source: Requires external SBAS/WAAS GPS, such as GTN 750Xi/650Xi, GTN 750/650 or GNS 430W/530W, or 430W/530W series unit
Supported interfaces include: GDL 69/69A XM datalink weather; GRS 56 for global connectivity/WX; GTX 345, GTX 335 transponder; GDL 88 ADS-B datalink, GRA 55, GRA 5500 radar altimeters; various traffic sensors, and more
Supported AHRS GRS 77, GSU 75H, GRS 79
Supported ADC GDC 74, GSU 75H, GDC 72
Electrical 10-40 VDC, reverse polarity protected
55 watts typical

Environmental

-20C to +55C operating temp
-55C to +85C storage temp
2 degrees C per minute temp variation
95% at 50C humidity
35,000 feet max altitude
Internal cooling, external cooling not required

Certification Candidates

STC via Approved Model List (AML) for popular makes/models
TSO-C2d, TSO-C8e, TSO-C10b, TSO-C34e, TSO-C36e, TSO-C40c, TSO-C41d, TSO-C43c, TSO-C63d, TSO-C87a, TSO-C106, TSO-C110a, TSO-C113a, TSO-C118a, TSO-C147a, TSO-C157b, TSO-C165a, TSO-C195b, TSO-C198, TSO-C201

GWX 75H DIGITAL WEATHER RADAR

Physical

Unit Size:	Base: 9.8 in (24.9 cm) x 8.3 in (21.082 cm)
	Depth: 7.076 in. (17.9 cm)
	Antenna: 10 in. or 12 in. diameter flat-plate
Unit Weight:	12-inch Antenna: 10.4 lbs. (4.72 kg)
	10-inch Antenna: 10.2 lbs. (4.63 kg)

Environmental

Operating temperature range:	-55 Degrees C to +70 Degrees C
Humidity:	95% non-condensing
Altitude Range:	-1,500 feet to 55,000 feet
TSO Compliance:	C63e, Class C, and A, B, D (Equipment is capable of Class A, B, and D when used with an enhanced feature software unlock card)
Environmental Category:	RTCA DO-160F

Electrical

Power Requirements:	28 VDC; 2.5A
Transmitter Power:	40 Watts nominal, 36 Watts minimum

Output

Frequency Range:	X-Band (9.3 to 9.5 GHz)
Pulse Width:	2.23, 7.25, and 15.87 microseconds
STC Logic:	At all ranges
Extended STC:	80 nm to 320 nm (Modifies targets from end of STC to maximum range)
Stabilization:	The radar always maintains a scan that is relative to the earth's horizon (subject to mechanical limits of the radar)
Max. Altitude:	55,000 feet (unpressurized)
Target Alert:	Indicates the presence of heavy precipitation outside of selected range
Interface:	Garmin HSDB; ARINC 429/453

GTN 750Xi/650Xi SERIES AVIONICS

Awareness

Emergency Search: 25 nearest airports, VORs, NDBs, intersections, and user waypoints; 5 nearest ARTCC and FSS frequencie
Alarms: Terrain and HTAWS (optional); Airspace messages at 10 minutes, 2nm, and inside airspace; Arrival timers

Pilot Customization:

Waypoints: 1000 user-defined
Flight Plans: 99 reversible; up to 100 waypoints each

Physical

Unit Size:	GTN 650Xi, 2.65"h x 6.25"w x 11.25"d (6.7 x 15.9 x 28.6 cm)
	GTN 750Xi, 6.00"h x 6.25"w x 11.25"d (15.2 x 15.9 x 28.6 cm)
	Depth is behind panel, including mounting rack and connectors
Unit Weight:	GTN 650Xi, 7.6 lb (3.46 kg); GTN 750Xi, 10.2 lb (4.63 kg) with mounting rack and connectors
Display:	Color TFT LCD; sunlight readable
Power:	11-33 VDC

Performance

GPS:	TSO-C146e, Class 3, ETSO-C146e
VOR:	TSO-C40c, ETSO-2C40c
LOC:	TSO-C36e, ETSO-2C36f
GS:	TSO-C34e, ETSO-2C34f
VHF COMM:	25 kHz and 8.33 kHz channel spacing

Transmitter	TSO-C169a, Class 3, 4, 5 and 6; ETSO-2C169a
Receiver	TSO-C169a, Class C, E, H1 and H2
Stuck mic	TSO-C128a
Transmit Power:	10 watt or 16 watt (optional)
GPS Receiver:	15 channel, including 3 GPS/WAAS/SBAS
Acquisition Time:	TTFF 1:45 minute typical (cold), 10sec reacquisition
Update Rate:	5 per second
Accuracy:	<1.25 meter RMS horizontal; <2 meter vertical with WAAS
Dynamics:	1000 knots max

Nav Features: Navigation with flight plans and direct-to waypoints, Airway navigation, approach navigation using published approaches stored in flash memory, terminal navigation using DPs and STARs, closest point of flight plan, arrival and departure frequencies, turn advisories and arrival annunciations, electronic charts on GTN 750Xi series. NVIS-B compatible versions optionally available

Planning Features: Trip and fuel planning, true air speed, density altitude, winds aloft, flight timers, trip statistics, sunrise and sunset, RAIM availability, advisory vertical navigation (VCALC)

Interfaces: ARINC 429, ARINC 453/708, RS-232, HSDB, CDI/HSI, RMI (digital), altitude input (serial: Icarus, Shadin- Rosetta); fuel sensor, fuel / air data, radar altimeter, DME, GDL 69/69A XM, GTX 32/327/33/33D/330/330D, GTS 800/820/850, GDL 88/88D, GWX 68/70, GSR 56, G500/G600, GMA 35, L-3 Stormscope, L-3 Skywatch, Avidyne TAS, GAD 42, Flight Stream 210, and others.

Map Datums:	WGS-84

GTS SERIES TRAFFIC SYSTEMS

GTS 800 Remote Processor

Unit Size:	6.25"W x 2.7"H x 12.7"D (15.87 x 6.86 x 32.25 cm)
Weight:	11.3 lb (5.13 kg) LRU; Vert. Rack 1.35 lb (0.61 kg); Horiz. Rack 1.94 lb (0.88 Kg) excludes connectors
Temperature:	-55°C to +70°C
Operating Altitude:	To 55,000 feet
Power Input:	14 or 28 VDC
	40 watts max. (GTS 800)
Cooling Input:	Integrated
Environmental Compliance:	RTCA DO-160F (contact dealer for installation options on specific aircraft)
Software Compliance:	RTCA DO-178B Level C
Hardware Compliance:	RTCA DO-254, Level C
TSO Compliance:	GTS 800 TAS: TSO-C147, TSO-C166a, RTCA DO-197A, RTCA DO-260A

GTS 825/855 Remote Processor

Unit Size:	6.25"W x 3.42"H x 12.7"D (15.87 x 8.69 x 32.25 cm)
Weight:	11.3 lb (5.13 kg) LRU; Vert. Rack 1.05 lb (0.48 kg); Horiz. Rack 1.94 lb (0.88 Kg) excludes connectors
Temperature:	-55°C to +70°C

Operating Altitude:	To 55,000 feet
Power Input:	14 or 28 VDC
	84 watts max. (GTS 825, 855)
Cooling Input:	Integrated
Environmental Compliance:	RTCA DO-160F (Contact dealer for installation options on specific aircraft)
Software Compliance:	RTCA DO-178B Level B
Hardware Compliance:	RTCA DO-254, Level B
TSO Compliance:	GTS 825 TAS: TSO-C147, TSO-C166b, RTCA DO-197A, RTCA DO-260B
	GTS 855 TCAS I: TSO-C118, TSO-C166b, RTCA DO-197A, RTCA DO-260B

GA 58 Directional Antenna

Unit Size:	4.03"W x 2.97"H x 5.63"D (10.24 x 7.54 x 14.30 cm)
Weight:	0.82 lb (0.37 kg) with QMA connectors
	0.85 lb (0.39 kg) with TNC connectors

Omni-Directional Antenna (optional)

Unit Size:	0.98"W x 3.30"H x 4.00"D (2.49 x 8.38 x 10.16 cm)
Weight:	0.24 lb (0.10 kg); excludes connectors

GTX 345 TRANSPONDER

Physical

Unit Size:	1.65" x 6.30" x 10.07" (42 x 160 x 256 mm)
Display type:	Digital
Weight:	3.1/3.2 lbs (1.41/1.45 kg) (unit, rack, connectors)
Voltage range:	14/28 VDC (18/20 W Max)
Transmit power:	1200 W minimum
Temperature:	-40° C to +70° C
Operating altitude:	To 55,000 ft (16,800 m)
Cooling input:	Not required
Environmental compliance (TSO Approved):	DO-160G
Software compliance (TSO Approved):	DO-178 Levels B, C, D, E
Hardware compliance (TSO Approved):	DO-254 Level C
TSO Compliance: (Approved)	TSO-C88b (w/opt. alt. encoder; TSO-C112e (Class 1, Level 2els; TSO-C154c (Class A1S); TSO-C157a (Class 1); TSO-C166b (Class A1S); TSO-C195a (Class C1,C2,C3,C4)
Mount type:	Panel
Transponder type:	Mode A/C, S and ES
Squawk code selection:	Push-button
Traffic Information Services (TIS) alerts compatible:	Yes

Transponder Features

Solid state transmitter:	Yes (more efficient, longer life)
Aural alerts:	Yes
Total Air Temperature (TAT):	Yes
Pressure altitude readout:	Yes
Altitude monitor function:	1200 W minimum
Density altitude readout:	Yes
Built-in timers:	Yes
Automatic ALT/GND mode:	Yes

Wireless connectivity to portable device using Garmin Pilot, ForeFlight or compatible

Garmin portable:	Yes
Subscription-free weather and traffic:	Yes
Internal AHRS (non-certified):	Yes
1090 MHz ADS-B Out:	Yes

Dual-link 1090MHz and 978MHz UAT

ADS-B In:	Yes

Displays on G500/G600, GTN 750Xi/650Xi series, GTN 650/750, GNS 430W/530W,

and other:	Yes

Pressure altitude encoder module (mounts to connector backplate): Optional

TAS/TCAS traffic integration with

ADS-B In:	Yes

GTX 335 TRANSPONDER

Physical

Unit Size:	1.65" x 6.30" x 10.07" (42 x 160 x 256 mm)
Display type:	Digital
Weight:	2.8/2.9 lbs (1.27/1.32 kg) (unit, rack, connectors)
Voltage range:	14/28 VDC (15/17 W Max)
Transmit power:	200 W minimum
Temperature:	-40° C to +70° C
Operating altitude:	To 55,000 ft (16,800 m)
Cooling input:	Not required
Environmental compliance (TSO Approved):	DO-160G
Software compliance (TSO Approved):	DO-178 Levels B, C, D
Hardware compliance (TSO Approved):	DO-254 Level C
TSO Compliance: (Approved)	TSO-C88b (w/opt. alt. encoder); TSO-C112e (Class 1, Level 2els); TSO-C166b (Class B1S)
Mount type:	Panel
Transponder type:	Mode A/C, S and ES
Squawk code selection:	Push-button
Traffic Information Services (TIS) alerts compatible:	Yes

Transponder Features

Solid state transmitter:	Yes (more efficient, longer life)
Aural alerts:	Yes
Total Air Temperature (TAT):	Yes
Pressure altitude readout:	Yes
Altitude monitor function:	Yes
Density altitude readout:	Yes
Built-in timers:	Yes
Automatic ALT/GND mode:	Yes
1090 MHz ADS-B Out:	Yes

Built in GPS/WAAS

receiver:	Optional

Displays on G500/G600, GTN 750Xi/650Xi series, GTN 650/750, GNS 430W/530W,

and other:	Yes

Pressure altitude encoder module (mounts to connector backplate): Optional

Night vision

compatible:	Optional

GDL 88H ADS-B DATALINK RECEIVER

Features

Dual-link receiver (1090 MHz and 978 MHz)
UAT Transmitter (978 MHz)
ADS-B Traffic and FIS-B weather to GTN 750Xi/650Xi, GTN 750/650 or GNS 430W/530W
Traffic Correlation with TAS/TCAS and TCAD systems
TargetTrend™ relative motion tracking

Physical

Unit Size:	1.75"W x 6.17"H x 7.45"D (4.44 x 15.67 x 18.92 cm) Includes mounting rack and connectors
Weight:	GDL 88H, 3.75 lb (1.70 kg); GDL 88H Diversity, 3.87 lb (1.76 kg); GDL 88 with WAAAS GPS, 4.13 lb (1.87 kg); GDL 88H Diversity with WAAS GPS, 4.25 lb (1.93 kg). Includes mounting rack and connectors
Temperature:	-55°C to +70°C
Operating Altitude:	To 55,000 feet
Power Input:	14 or 28 VDC 20 watts max.
Cooling Input:	Integrated
Environmental Compliance:	DO-160F
Software Compliance:	DO-178 Level C and Level B
Hardware Compliance:	DO-254 Level C
TSO Compliance:	GDL 88H: TSO-C145c (B2), TSO-C154c (A1S/A1H), TSO-157A, TSO-C166b (A1/A1S), TSO-C195a (C1,C2,C3,C4)

GDL 69/69A DATALINK RECEIVER

Features

Delivers SiriusXM™ Satellite Weather to Garmin navigation systems; audio available with the GDL 69A (SiriusXM subscription required)
Coverage at any altitude across continental U.S.
Detailed NEXRAD imagery and textual and graphic METARS data
Current reports on precipitation, lightning, winds aloft, echo tops, TFRs and more

Physical & Performance

Unit Size:	6.15"W x 1.05"H x 7.20"D (15.62 x 2.66 x 18.28 cm) Includes mounting rack and connectors
Unit Weight:	1.86 lbs. (0.84 kg) unit, 3.06 lbs. (1.39 kg) unit and rack (Note: These are weights for GDL 69A, which is 0.14 lbs. heavier than the GDL 69)

Environmental

Temperature:	-55° C to +70° C (Operating) -55° C to +85° C (Storage)
Humidity:	95% non-condensing
Altitude range:	-15,000 ft. to +55,000 ft.
Power requirements:	9 to 33 VDC input 4.2 watts maximum

Other Specifications

Satellite receiver frequency:	2332.5 to 2345 MHz
Downlink data rate:	38.4K bits per second
Software Certification:	RTCA DO-178B Level D
Environmental Certification:	RTCA DO-160D

GSB 15 USB CHARGER

Charging Port Types:

Dual USB Type-A
USB Type-A/USB Type-C
Dual USB Type-C

Input Voltage:

14V, 28V

Output Voltage

Dual USB Type-A: 5-12V
USB Type-A/USB Type-C: 3.6V-12V / 5-12V
Dual USB Type-C: 5-12V

Power Consumption

Max (while charging):
40W (Dual USB Type-A Only), 60W
Min (not charging): 500mW

Maximum Power Output per Port:

Dual USB Type-A: 18W
USB Type-A/USB Type-C: 27W
Dual USB Type-C: 27W

Required Circuit Breaker Size:

28v Input: 5A
14v Input: 7.5A (USB Type-A/ USB Type-C and Dual USB Type-C Units Only)

Dimensions:

Side Connector: 1.50" x 1.55" x 0.84"
Rear Connector: 1.50" x 1.50" x 0.92"
Weight: 0.16 lbs

Certifications:

TSO-C71
Qualcomm® Quick Charge™ Technology (USB Type-A Ports Only)

GARMIN HELICOPTER SYSTEM SPECIFICATIONS

GDL 82 ADS-B DATALINK RECEIVER

Physical		Environmental compliance (TSO Approved):	DO-160G
Unit Size:	3.39" x 1.48" x 9.22" (8.6 x 3.8 x 23.42 cm) including connectors	Software compliance (TSO Approved):	DO-178 Level D and Level B
Weight:	1 lb 4 oz (0.57 kg) with WAAS GPS	Hardware compliance (TSO Approved):	DO-254 Level C
Temperature:	-45°C to +70°C	TSO compliance (Approved):	TSO-C145d (B2), TSO-C154c (B1S)
Power Input:	14 or 28 VDC (8 W max.)		
Transmitter output:	46 dBm (40 W)		

FLIGHT STREAM 110/210 GATEWAYS

Physical		Other Specifications	
Unit Size:	2.74"W x 0.92"H x 3.93"D (7.0 x 2.3 x 10.0 cm)	Effective Range:	Unimpeded, 33 feet (10 m)
Weight:	0.156 lb (0.07 kg) excluding connector kit	Environmental Compliance:	DO-160F
	0.27 lb (0.12) including connector kit	Software Compliance:	DO-178B Level E
		TSO Compliance:	TSO-C157, DO-267A
Environmental			
Temperature:	-30°C to +70°C		
Power Input:	14 or 28 VDC (9.5 to 33.0 VDC		
Transmitter Output:	4 dBm (2.5 mW)		

GMA 350H DIGITAL AUDIO PANEL

Features		Environmental	
Telligence voice command switching		Temperature:	-45° C to +70° C (Operating)
3-D Audio processing		Altitude range:	to +55,000 ft. MSL unpressurized
Advanced auto-squelch			
3 comm radio support		Power Requirements:	11 to 33 VDC input
Split comm mode			
Physical & Performance		Other Specifications	
Unit Size:	6.25"W x 1.30"H x 7.80"D (15.9 x 3.3 x 19.8 cm)	Transceiver inputs:	3
	Includes mounting rack and connectors	Additional Receiver Inputs:	5
Unit Weight:	2.4 lbs. (1.1 kg)	TSO Compliance:	TSO-C50c, TSO-C35d

GSR 56H SATELLITE TRANSCEIVER

Physical		Other Specifications	
Unit Size:	2.31"W x 7.02"H x 12.96"D (5.87 x 17.83 x 32.91 cm)	Satellite receiver frequency:	1616 to 1626.5 MHz
	Depth is with connectors	Downlink data rate:	2.4 kilobits per second
Unit Weight:	2.45 lb.	Software Certification:	RTCA DO-178B Level E
Environmental		Environmental Certification:	RTCA DO-160E
Temperature:	-15° C to +70° C (Operating);		
	-55° C to +85° C (Storage)		
Humidity:	95% non-condensing		
Altitude range:	-1,500 ft. to +55,000 ft		
Power requirements:	14 or 28 VDC input; 16 watts maximum		

GRA™ 55 RADAR ALTIMETER

Physical		Altitude Range:	-20 - 2550 ft AGL
Unit Size:	3.99"h x 3.02"w x 11.62"d (10.13 x 7.67 x 29.52 cm)	Altitude Alert Outputs Range:	0 - 2500 ft AGL
	Includes mounting rack	Altitude Output Time Constant:	0.1 second maximum
Unit Weight:	3.5 lb. (1.59 kg) with mounting rack	Transmitter Output:	Frequency: 4.25 - 4.35 GHz "Gated" FMCW; Power: 1.0 W nominal
		Horizontal Velocity:	0 - 200 knots maximum
Environmental		Vertical Velocity:	20 ft/sec maximum (up to 100 ft AGL); 25 ft/sec maximum (above 100 ft AGL)
Temperature:	-55° C to +85° C (Operating);		
Altitude Range:	25,000 ft maximum	Pitch Angle:	± 20° maximum
Power requirements:	14 or 28 VDC input; 13.75 watts maximum	Roll Angle:	± 20° maximum (with published altitude accuracy limits); ± 20° to ± 30° (with ± 20 % altitude accuracy limits throughout entire altitude range)
Other Specifications			
Altitude Accuracy:	± 1.5 ft (3 - 100 ft AGL); ± 2 % (> 100 - 2500 ft AGL)		

GTR 225/GNC 255 VHF RADIO

Navigation Radio Features

(GNC 255 NAV/COMM)

200 channel Nav with VOR/Localizer and Glideslope receivers.

Built-in VOR/Localizer converter.

Database lookup of frequencies using navaid ID

VOR receiver displays to/from and radial.

Digitally decoded OBS setting.

Sunlight readable full alphanumeric display.

Automatic display of station ID by decoding Morse code.

Interfaces to most CDI (w/resolver), HSI, and autopilot systems.

NVIS-B compatible versions optionally available

Navigation Radio Performance

VOR:	TSO-C40c, ETSO-2C40c
LOC:	TSO-C36e, ETSO-2C36f
GS:	TSO-C34e, ETSO-2C34f

Accepts 9 to 33 VDC input.

Physical

(GNC 255 NAV/COMM)

Unit Size:	1.65"H x 6.25"W x 11.23"D (4.19 x 15.88 x 28.5 cm)
Unit Weight:	3.02 lbs (1.37 kg) unit only; 3.96 lbs (1.80 kg) with mounting rack and connectors

Comm Radio Features

(GTR 225 and GNC 255)

Active and standby flip-flop frequencies

One-touch 121.5 emergency channel tuning

Comm frequency monitor function (listens to standby while monitoring the active)

Recall of frequency from database by facility name and type

Database reverse lookup of frequencies providing station ID and frequency use (TWR, ATIS, etc.)[1]

Volume control bar graph display

Alphanumeric display of frequency types (ATIS, GRND, TWR, etc.)

High-visibility alphanumeric LCD display

Transmit status indicator

Backlit keypad controls

Automatic and manual, pilot-selectable displayintensity control

Built-in, two-place voice activated intercom

Frequency memory and recall

Stores/recalls 15 user defined frequencies

Stores/recalls previous 20 frequencies used

Squelch test function

Stuck mic time-out

12 watt audio amplifier

NVIS-B compatible versions optionally available

Comm Radio Performance

760 communication channels (w/ 25 kHz spacing); 2280 channels (w/ 8.33 kHz spacing)

Frequency range 118.000 to 136.992 MHz (w/ 8.33 kHz spacing)

Transmit power: 10 or 16 watts output (by model)

Input voltage range 9 to 33 VDC

Transmit Power:	10 watt or 16 watt (optional)
TSO Certification:	Transmitter TSO-C169a, Class 3, 4, 5 and 6; ETSO-2C169a
	Receiver TSO-C169a, Class C, E, H1 and H2
	Stuck mic TSO-C128a

Physical

(GTR 225 COMM)

Unit Size:	1.65"H x 6.25"W x 11.23"D (4.19 x 15.88 x 28.5 cm)
Unit Weight:	3.06 lbs (1.39 kg) with mounting rack

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