Helicopter solutions

Garmin technology brings enhanced safety and mission effectiveness to helicopter operations worldwide.
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). A number of 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 callouts 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.

Put better decision-making tools at your fingertips with Garmin helicopter avionics.
Garmin G500H flight display.

Garmin 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 the G500H as an option, HSVT can make a world of difference when visibility deteriorates. Using sophisticated graphics 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 low-visibility conditions such as whiteouts or brownouts. 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.

In addition, geo-referenced SafeTaxi® diagrams come preloaded on the system, providing easy directional orientation on hundreds of U.S., Canadian, and European airports. A trial version of Garmin FliteCharts® is included as well. There’s also a choice of U.S. AOPA or AC-U-KWIK worldwide airport directories. And you can also add a video input option that lets the MFD function as a FLIR live-cam monitor or other video source.

Garmin HSVT™ synthetic vision technology.

Engineered for safety and reliability in today’s helicopter environment, Garmin’s G500H “glass cockpit” suite provides a versatile flight solution to significantly enhance pilot situational awareness. Proven AHRS attitude/heading reference delivers high-precision spatial sensing for the G500H digital instrumentation – replacing old-style gyros. And dual 6.5-inch LCD screens, mounted side-by-side in a single bezel, put Primary Flight Display (PFD) and Multi-Function Display (MFD) capabilities right in front of the pilot for easy scanning and interpretation. The PFD screen shows attitude, airspeed, climb rate, altitude and course/heading information – while the MFD provides detailed moving-map graphics depicting the helicopter’s current position in relation to ground features, chart data, navaid, flight plan routings, and more. Optional Garmin HSVT™ synthetic vision capability adds a 3-D virtual perspective view of terrain, traffic, airports and obstacles to the pilot’s PFD.
Garmin GTN™ series touchscreen avionics

Combining the latest in moving map and graphical features with touchscreen data entry and integrated radio tuning, Garmin’s GTN 750/650 series of GPS/NavComm avionics offer a true revolution in pilot efficiency and situational awareness. They meet stringent environmental and vibration standards for rotorcraft. Plus, they’ve been optimized for helicopter operators with available right-seat installation. They’re more than justnav/comm radios, however—elevated features of the GTN 750/650 series include: enhanced WAAS (Wide Area Augmentation System) functionality, providing improved GPS accuracy; preloaded approach and instrument landing system (ILS) databases; Garmin’s seamless electronic charting; and support for Garmin’s traffic advisory system. The GTN 750/650 series also provides the ability to stream detailed VTAS (Vertical Traffic Advisory System) and TCAS II (Traffic Alert and Collision Avoidance System) data to provide a comprehensive, real-time picture of their overall flight situation. Using familiar TCAS-defined symbology, tracks, and colors, flight crews can easily interpret the information displayed on the GTN and GNS series navigators or G500H MFD in the cockpit. Other features incorporated with the GTN software upgrade include FastFind predictive logic to suggest airport and waypoint entries using current GPS position; simplified database updating and synchronization; WireAware (wire-strike avoidance technology); streamlined frequency entry; customizable checklists; airspace attitude overlays on the moving map page, shortcut access to frequently used data fields, functions, pages, and more. Both the GTN 750 and 650 models can provide control/display for optional remote-mount transponders. And the larger GTN 750 display also offers support for optional remote audio panel control. When installed with remote switches on the cyclic or collective, the GTN system can further reduce cockpit workload by allowing pilots to create fly-over Mark on Target waypoints or remotely tune frequencies, all without letting go of the controls. Additionally, other key GTN 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 touchscreen as a virtual flight management system.

IRNSS/ISARG GPS navigation: Garmin’s GTN 750/650 series of touchscreen avionics, as well as its legacy GNS 530W/430W units, are preprogrammed to enable helicopter pilots to join the fixed-wing counterparts in the world of WAAS/IRNSS navigation. These satellite “augmentation” systems use enhanced GPS signals to enable FPL and vertical guidance approaches with RNAV4 capability, receive position accuracy, and display on the moving map of the flight deck. In essence, the system improves on WAAS/SBAS by providing better and faster corrections, and increases safety of flight for pilots. Features include: Garmin’s WireAware technology for the GTN 750/650 series combines with optional H1005 (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 (HOST) lines—typically those that span rivers, canyons, valleys, etc.—with AGA/MSL elevation provided on individual line segments. Coverage includes the U.S., as well as some proven distribution lines in Canada and Mexico.

European obstacles in their databases. Versions are also available with built-in night vision goggle (NVG) compatibility. Plus, a series of software/feature enhancements have added such GTN innovations as Garmin Connect™ cockpit connectivity (via the Flight Stream™ 210 Bluetooth® gateway, sold separately), which supports wireless flight-plan transfer between your avionics and compatible tablet/mobile devices using the Garmin Pilot™ app. With Connect onboard, you can pre-load flight plans—including airways—onto your iPad® (or other compatible device) for quick and easy uploading into your avionics. Additionally, the wireless link provides more robust GPS position data from the GTN, as well as the option to display weather, traffic and backup altitude information on your tablet—so it basically becomes an extra control/display in the cockpit. Other features incorporated with the GTN software upgrade include FastFind predictive logic to suggest airport and waypoint entries using current GPS position; simplified database updating and synchronization; WireAware (wire-strike avoidance technology); streamlined frequency entry; customizable checklists; airspace attitude overlays on the moving map page, shortcut access to frequently used data fields, functions, pages, and more. Both the GTN 750 and 650 models can provide control/display for optional remote-mount transponders. And the larger GTN 750 display also offers support for optional remote audio panel control. When installed with remote switches on the cyclic or collective, the GTN system can further reduce cockpit workload by allowing pilots to create fly-over Mark on Target waypoints or remotely tune frequencies, all without letting go of the controls. Additionally, other key GTN 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 touchscreen as a virtual flight management system.

Garmin traffic systems

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 Garmin’s 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 1090 MHz ADS-B “In”, 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 and GNS series navigators or G500H MFD (and also on the PFD with optional HOVT 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 Garmin’s expanded voice alerts, pilots know instantly 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 alerts to help helicopter pilots maintain safe separation from other aircraft in busy airspace.

Garmin wireless technology for the GTN 750/650 series combines with optional H1005 (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 (HOST) lines—typically those that span rivers, canyons, valleys, etc.—with AGA/MSL elevation provided on individual line segments. Coverage includes the U.S., as well as some proven distribution lines in Canada and Mexico.
Garmin GMA™ series digital audio control

Now, 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 350H digital audio panel, Garmin’s 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, 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. Garmin’s unique “3-D Audio” technology works to spatially separate inputs coming into each headset – helping you identify which ones to focus on. Other highlights include: ambient noise level sensing for automatic volume adjustment, enhanced auto-squelch, and night vision goggle (NVG) compatibility with green annunciation and backlighting – as well as three-comm radio support and corresponding split-comm modes (1/2, 1/3 or 2/3) to accommodate a third transceiver.

Garmin HTAWS terrain alerting option

Providing visual and aural advisories to help keep pilots safely 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 (Helicopter Terrain Awareness and Warning System) 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 new 5-color Terrain Proximity display for helicopters), Garmin’s HTAWS system also features voice callouts, or VCOs, which audibly announce the helicopter’s height above terrain when descending below 500 feet. VCO altitude callouts operate in all HTAWS modes, and Garmin’s technology allows the pilot to select multiple callout menus, in one hundred foot intervals, descending from 500 down to 100 feet (or down to 50 feet with an installed GMA 555 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 callouts to audibly announce the aircraft’s height above terrain when descending to 300 feet or below. Garmin developed a special helicopter obstacle database for its HTAWS option, adding over 30,000 lower-height structures to its existing software – and enabling the system to depict some 25 percent more obstacles that might pose a hazard to helicopter operations. Customers with existing Garmin GNS 530W/430W series navigators may opt to easily upgrade their units with HTAWS capability by taking it to an Authorized Garmin Service Center for an on-site upgrade.
In today’s time-critical world, the ability to maintain connectivity on the go has become a high priority for many companies. To help helicopter operators meet this need, Garmin has developed the GSR 56, an Iridium-based satellite transceiver. Through a constellation of low-earth orbiting (LEO) satellites, this flight service, powered by the Iridium network, offers virtually seamless global coverage, enabling the Garmin Iridium transceiver to provide a wide range of 2-way communication and datalink services – including the ability to make and receive phone calls, send and receive text messages and emails, provide automatic position reporting, plus have access to graphical weather, METARs, TAFs, Winds Aloft, PIREPs and more, on a worldwide basis.

Garmin Flight Stream 110/210 wireless gateways. As part of the Garmin Connct™ family of flight connectivity solutions, the Flight Stream 110/210 series of small Bluetooth® gateways provide an easy way to stream information between your iPad® or other compatible tablet/mobile device(s) and your helicopter’s avionics. 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 receiver 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™ 750/650 or GNS 430W/530W 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. It’s fast. It’s easy. It’s seamless. And, even better, keeping flight plans in sync between your device and your avionics is a cinch: You enter the data on one device, and with a tap or two, your entries are automatically transferred to the other. So, there’s no duplication of effort on your part when it comes to keeping everything in sync. 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 Garmin’s GDL 69 datalink receiver (SiriusXM™ subscription required). With this option, high-resolution NEXRAD imagery, METARs, TAFs, TFRs, winds aloft, surface precipitation, lightning strikes, storm cell data, and other weather updates for the entire U.S. can be accessed from your G500H flight display or GTN 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 over 140 channels of digital-quality SiriusXM satellite radio programming (additional service fee required).

In-flight voice calling and data services. In today’s time-critical world, the ability to maintain connectivty on the go has become a high priority for many companies. To help helicopter operators meet this need, Garmin has developed the GSR 56, an Iridium-based satellite transceiver. Through a constellation of low-earth orbiting (LEO) satellites, this flight service, powered by the Iridium network, offers virtually seamless global coverage, enabling the Garmin Iridium transceiver to provide a wide range of 2-way communication and datalink services – including the ability to make and receive phone calls, send and receive text messages and emails, provide automatic position reporting, plus have access to graphical weather, METARs, TAFs, Winds Aloft, PIREPs and more, on a worldwide basis.
Garmin GDL 88H ADS-B datalink.

You deserve to see tangible benefits from your ADS-B investment. That’s why you’ll want to equip with Garmin’s GDL 88H. (You’ll need to do so by December 31, 2019, to meet the deadline for ADS-B equipage in the U.S.) Not only does the GDL 88H satisfy the FAA’s criteria for aircraft operating below 18,000 feet, but it also lets you take immediate advantage of the ADS-B network’s subscription-free weather and traffic data uplinks to your cockpit.

As a lower-cost solution for ADS-B compliance, the Garmin GDL 84H is an iPad® (or other compatible tablet/mobile device) designed to let you use an iPad® (or other compatible tablet/mobile device) as a lower-cost solution for ADS-B compliance, the Garmin GDL 84H is a do-it-all ADS-B solution for NextGen compliance at minimal cost.

Garmin GDL 84H ADS-B datalink.

GPS receiver to serve as your position source for aircraft location, track and groundspeed. The GDL 84H also supports Garmin’s TargetTrend™ relative motion traffic target display and SURF technology for ground ops, along with exclusive Airport Area Alerting that serves to intelligently filter out irrelevant traffic alerts in busy airport environments and, thus, help enhance safety while minimizing audio/visual distractions in the cockpit. In addition, Garmin’s patented self-interrogation feature allows wireless interface with a wide range of GA transponders – to automatically synchronize squawk code and identify, so there’s no need for expensive control system or transponder upgrades to eliminate duplication of entries. The Garmin GDL 84H is your do-it-all ADS-B solution for NextGen compliance at minimal cost.

GWX™ 70H digital weather radar

Meeting the tough environmental and vibration criteria for rotorcraft operations, the GWX™ 70H 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-limiting magnetron tubes, the Garmin GWX 70H comprises the very latest and most reliable technology in onboard weather radar. You can choose from 10-, 12-, or 18-inch 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 70H 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 70H 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 70H to scan terrain features for visual navigation. And optional advanced features, enabled via software, include Doppler turbulence detection and ground clutter suppression.
Utilizing the same patent-pending 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 standalone GI 205 RadAlt 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 such popular Garmin flight displays as the G500, G500H and G600 systems — plus the GTN touchscreen series 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 night vision goggle (NVG) operations. And thanks to patent-pending self-testing technology that continuously monitors incoming data and system integrity, you can be assured that the altitude provided is supremely accurate, even in low-visibility conditions. What’s more, in most installations this self-testing technology virtually eliminates 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.

Garmin GRA™ 55 radar altimeter.
Utilizing the same patent-pending 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 standalone GI 205 RadAlt 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 such popular Garmin flight displays as the G500, G500H and G600 systems — plus the GTN touchscreen series 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 night vision goggle (NVG) operations. And thanks to patent-pending self-testing technology that continuously monitors incoming data and system integrity, you can be assured that the altitude provided is supremely accurate, even in low-visibility conditions. What’s more, in most installations this self-testing technology virtually eliminates 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.
### Garmin Helicopter System Specifications

#### GNS® 600H Flight Display Specifications
- **Power Input**: 14-32 VDC, 8 watts max. (GTS 825, 830)
- **Cooling Input**: 14-32 VDC, 8 watts max. (GTS 825, 830)
- **Environmental Compliance**: FED A-168F (contact dealer for radiation options on specific aircraft)
- **GFI**: FED A-177-LEVEL C
- **HSDB**: FED A-177-LEVEL B
- **GPS**: 15 channel, including WAAS, EGNOS and MSAS
- **Navigation Radio**: 200 channel Nav with VOR/Localizer and GLS 280
- **Weight**: 4.13 lb (1.87 kg) with mounting rack and connectors

#### GTN™ 750/650 SERIES AVIONICS SPECIFICATIONS
- **Temperature**: -20°C to 55°C (storage temp), 15°C to 32°C (operating temp)
- **Temperature**: Humidity: 95% at 40°C (storage temp), 70% at 40°C (operating temp)
- **Power Input**: 14-32 VDC, 8 watts max. (GTS 825, 830)
- **Environmental Compliance**: FED A-168F (contact dealer for radiation options on specific aircraft)
- **GFI**: FED A-177-LEVEL C
- **HSDB**: FED A-177-LEVEL B
- **GPS**: 15 channel, including WAAS, EGNOS and MSAS
- **Navigation Radio**: 200 channel Nav with VOR/Localizer and GLS 280
- **Weight**: 4.13 lb (1.87 kg) with mounting rack and connectors

#### GARMIN ADF ANTENNA SPECIFICATIONS
- **Frequency**: 1,600 kHz to 11,000 kHz
- **Gain**: 18 dB
- **Directional**: Omniguard (E, C, B, A)
- **Weight**: 0.82 lb (0.37 kg)

#### GDL 88H ADS-B DATA LINK SPECIFICATIONS
- **Power Input**: 10-32 VDC, 2.4 watts max. (GDL 88H)
- **Environmental**: Temperature: -55°C to +70°C
- **Height**: 14 x 289 x 20 inches
- **Weight**: 3.02 lbs (1.37 kg)
### FLIGHT STREAM 110/210 GATEWAYS SPECIFICATIONS

**Physical & Performance**

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<tr>
<th>Unit Size</th>
<th>6.15&quot;W x 1.07&quot;H x 3.70&quot;D (156.2 x 27.1 x 94.0 cm)</th>
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<tr>
<td>Weight</td>
<td>3.86 lbs (1.75 kg) with rack and rack</td>
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<td>Includes</td>
<td>Including rack and connectors</td>
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**Environmental**

| Temperature | -30°C to +70°C (Operating) | -55°C to +85°C (Storage) |
| Humidity    | 95% non-condensing         |

**Other Specifications**

- Distance: 1,200 ft (366 m) from gateways
- Ground speeds: 30 to 90 mph
- Wind speeds: 20 to 50 mph
- Height: 0 to 250 feet

### GARMIN 35H DIGITAL AUDIO PANEL SPECIFICATIONS

**Features**

- Telligence voice command switching
- 3-D Audio processing
- Advanced auto-annunciation
- 3 enhanced stereo speakers
- Built-in comm recorder

**Physical & Performance**

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>6.25&quot;W x 1.30&quot;H x 7.80&quot;D (120 x 33 x 20 cm)</th>
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<tr>
<td>Weight</td>
<td>2.4 lbs (1.1 kg)</td>
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**Environmental**

| Temperature | -45°C to +70°C (Operating) |
| Altitude Range | 500 to 25,000 ft (AGL) |

**Other Specifications**

- Transceiver inputs: 1
- Additional receiver inputs: 5
- TSO Compliance: TSO-C152, TSO-C156

### GDL 69/69A DATALINK RECEIVER SPECIFICATIONS

**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.
- Continental NEXRAD imagery and textual and graphic METARS data

**Physical & Performance**

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<tr>
<th>Unit Size</th>
<th>2.74&quot;W x 0.92&quot;H x 3.93&quot;D (7.0 x 2.3 x 10.0 cm)</th>
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<tbody>
<tr>
<td>Weight</td>
<td>0.156 lb (0.07 kg) excluding connector kit</td>
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<tr>
<td></td>
<td>0.27 lb (0.12) including connector kit</td>
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</table>

**Environmental**

| Temperature | -30°C to +70°C (Operating) |
| Altitude Range | 0 to 33,000 ft (AGL) |

**Other Specifications**

- Effective Range: Unimpeded, 33 feet (10 m)
- Environmental Compliance: DO-160F
- Software Compliance: DO-178B Level E
- TSO Compliance: TSO-C157, DO-267A

### GSR 56H SATELLITE TRANSCEIVER SPECIFICATIONS

**Physical**

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<th>Unit Size</th>
<th>3.99&quot;H x 3.02&quot;W x 11.62&quot;D (10.13 x 7.67 x 29.52 cm)</th>
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<tbody>
<tr>
<td>Weight</td>
<td>3.5 lb. (1.59 kg) with mounting rack</td>
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**Environmental**

| Temperature | -55° C to +70° C (Operating); -55° C to +85° C (Storage) |
| Humidity    | 95% non-condensing |

**Other Specifications**

- Effective Range: Unimpeded, 33 feet (10 m)
- Environmental Compliance: DO-160F
- Software Compliance: DO-178B Level E
- TSO Compliance: TSO-C157, DO-267A

### GMA 35H SATELLITE TRANSCEIVER SPECIFICATIONS

**Physical**

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<th>Unit Size</th>
<th>2.31&quot;W x 7.02&quot;H x 12.96&quot;D (5.87 x 17.83 x 32.91 cm)</th>
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<tr>
<td>Weight</td>
<td>2.45 lb.</td>
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**Environmental**

| Temperature | -15°C to +70°C (Operating); -55° C to +85° C (Storage) |
| Humidity    | 95% non-condensing |

**Other Specifications**

- Effective Range: Unimpeded, 33 feet (10 m)
- Environmental Compliance: DO-160F
- Software Compliance: DO-178B Level E
- TSO Compliance: TSO-C157, DO-267A

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**Garmin.com/helicopter**