Experimental

ADS-B Transponders

Spec	Model	
	GTX 35R	GTX 45R
Physical & Performance		
Physical Dimensions (unit, rack, connectors)	1.65"x 6.30"x9.9" (42x160x224mm)	1.65"x 6.30"x9.9" (42x160x224mm)
Weight (unit, rack, connectors)	2.5/2.6lbs (1.13/1.18kg)	2.8/2.9lbs (1.27/1.32kg)
Voltage range	14/28VDC (15/17W Max)	14/28VDC (18/20W Max)
Transmit power	200W minimum	200W minimum
Temperature	-45°C to +70°C	-45°C to +70°C
Operating altitude	To 55,000ft (16,800m)	To 55,000ft (16,800m)
Environmental Compliance (TSO Approved)	DO-160F	DO-160G
Software compliance (TSO Approved)	DO-178 Levels B, C, D	DO-178 Levels B, C, D, E
Hardware compliance (TSO Approved)	DO-254 Level C	DO-254 Level C
TSO compliance (Approved)	TSO-C88b (w/opt. alt. encoder); TSO-C112e (Class 1, Level 2els); TSO-C166b (Class B1S)	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	Remote	TSO-C112e (Class 1, Level 2els);
Transponder type	Mode A/C, S and ES	TSO-C154c (Class A1S); TSO-C157a
Squawk code selection	Remote entry via G3X Touch display	(Class 1); TSO-C166b (Class A1S);
Traffic Information Services (TIS) alerts compatible	Yes	TSO-C195a (Class C1,C2,C3,C4)
Transponder Features	Solid state transmitter (more efficient, longer life): Yes Aural alerts: Yes Automtatic ALT/GND mode: Yes 1090 MHz ADS-B Out: Yes	Solid state transmitter (more efficient, longer life): Yes Aural alerts: Yes Automtatic ALT/GND mode: Yes 1090 MHz ADS-B Out: Yes

Have ADS-B Questions?

To learn about Garmin ADS-B solutions that match your particular airplane, your budget, and your needs, call our AdviceLine team at **844-GET-ADSB (844-438-2372)** or email **ADSB@garmin.com**.

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ADS-B Solutions

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In 2020, the technology we use to keep aircraft safely separated in ATC airspace will complete a significant transformation. Instead of relying on ground-based radar as the primary means of identifying and monitoring aircraft, this NextGen operational environment adopts a system where aircraft use GPS-based datalinks to perform this tracking function more accurately, reliably and affordably.

Called ADS-B ("Automatic Dependent Surveillance – Broadcast"), this satellite-derived system will allow ATC to handle a larger volume of airplanes more efficiently, while providing broader coverage over areas that were not possible (or practical) to support via radar service before.

The "dependent" part of ADS-B means that each aircraft will transmit its own WAAS/SBAS-level GPS position, as well as track, speed, altitude and climb/descent rate, to air traffic controllers and other nearby aircraft. To make that happen, NextGen rulemaking provides that all aircraft operating in controlled U.S. airspace where a Mode C or Mode S transponder is now required will need to be equipped with ADS-B "Out" capability by December 31, 2019.

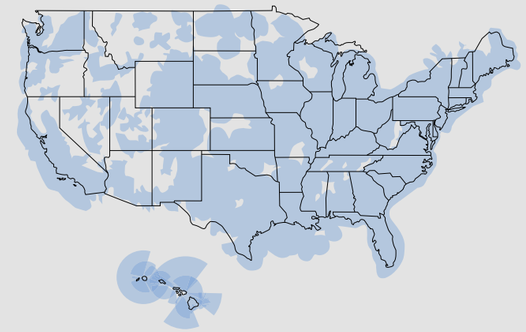
For many pilots, the minimal solution for meeting this ADS-B "Out" requirement is a certified WAAS GPS receiver and 1090 MHz transponder with ES (or "extended squitter") capability for transmitting their position-tracking data into the network.

ADS-B "In"

You can also receive valuable information in flight if your aircraft is equipped to receive it with ADS-B "In" capability. "Traffic Information Service – Broadcast" (TIS-B) aircraft tracking data allows you to view, on a compatible cockpit display or portable device, the same basic traffic picture that controllers monitor on their scopes.

In addition, adding ADS-B "In" can also provide you access to uplinked (and subscription-free) aviation weather. The weather content available on this FIS-B ("Flight Information System – Broadcast") uplink is comparable to the basic services offered by leading commercial satellite weather providers. However, these ADS-B "value added" weather features can only be accessed with certain types of ADS-B "In" receivers: those that receive the 978 MHz Universal Access Transceiver (UAT) frequency.

The solution to receive all FIS-B weather and traffic (including that from both 1090 ES and UAT ADS-B "Out" equipped aircraft) is a "dual-link" ADS-B datalink. With Garmin's extensive line of dual-link solutions, you're able to receive all the benefits of ADS-B "In" to get a more complete situational picture—for added confidence in all phases of flight.



Ground-Linked Traffic With ADS-B "In"

As aircraft owners work to equip their aircraft to meet ADS-B requirements by the 2020 deadline, the FAA is bridging the transition period by providing TIS-B ("Traffic Information System – Broadcast") services, which use ATC-derived radar surveillance uplinked from the ground to the cockpit displays of aircraft outfitted with a ADS-B "In" solution that receives the 978 MHz UAT frequency.

Tower locations are approximate, and coverage is based on typical airborne reception at approximately 1,500 feet AGL. Your signal reception range may vary depending on your altitude and any intervening physical obstructions to line of sight uplink.

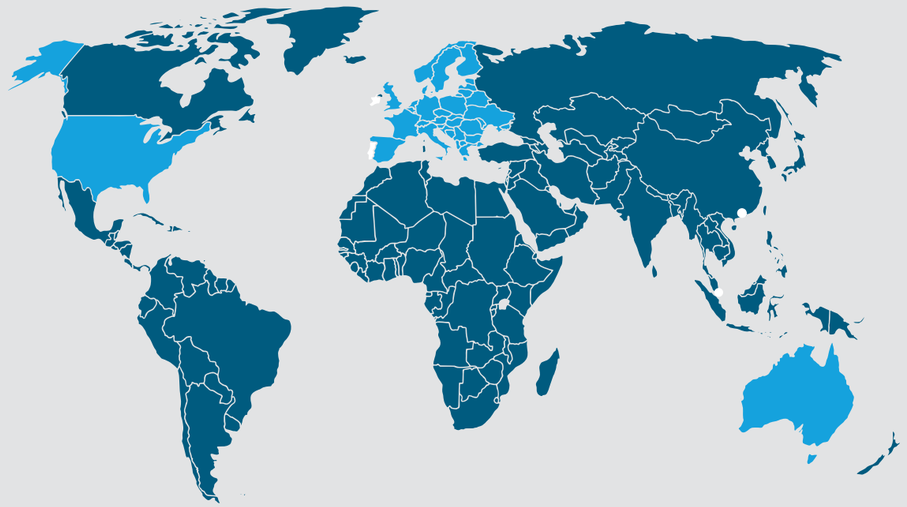
Learn more about ADS-B.

For a more detailed look at ADS-B, including how the NextGen air traffic system works, the difference between 1090 ES and 987 UAT frequencies, traffic and weather products available via ASD-B "In," and much more, visit our ADS-B Academy link at **Garmin.com/ads-b**.

Leading the Way to ADS-B

Garmin has been advancing the design of modern avionics for more than 25 years, including playing a significant role in developing ADS-B. So you're not just getting an ADS-B solution, you're getting a unique set of technologies that provide a better state of situational awareness and that is scalable to your needs, all from the company with the most installed ADS-B solutions flying today.

- All-in-one ADS-B technology pairs a 1090 ES transponder with an optional WAAS position source and ADS-B "In" receiver, so you meet all the requirements and get all of the benefits of ADS-B in a single device that fits the same footprint as most existing transponders.
- Dual-link technology allows Garmin ADS-B "In" solutions to receive on both 978 MHz and 1090 MHz frequencies. Not only does this provide the most complete ADS-B traffic picture from ground stations and aircraft transmitting on either frequency, but it also allows you to receive in-flight weather, so you have valuable situational awareness.
- Garmin ADS-B solutions are compatible with popular active traffic systems. By correlating traffic from both sources, you get a truly comprehensive traffic picture; targets are merged onto the same display, and when a single target is provided by both sources, the source with the best integrity is used to display it.
- TerminalTraffic™ technology provides you with the most comprehensive picture of ADS-B-equipped aircraft and ground vehicles in the airport environment. ADS-B-equipped ground vehicles and taxiing aircraft are easily distinguished from aircraft in-flight with distinct colors and symbols, all presented to the pilot on a simple, easy to understand SafeTaxi® diagram with reference to runways, taxiways, hangar locations and more. Audible traffic alerts further enhance situational awareness to ensure traffic conflicts are not overlooked throughout critical operations such as takeoff and landing.
- TargetTrend™ relative motion technology depicts ADS-B traffic on your panel display, portable and tablet running Garmin Pilot or ForeFlight Mobile apps. In addition to hearing audio alerts—"Traffic: 10 o'clock low, 2 miles"—you'll see traffic descending, climbing and cruising in your vicinity, and easily recognize which aircraft is trending in your direction, which helps take the guesswork out of your decision making.
- Subscription-free weather allows you make informed decisions about trends with uplinked weather content that's continuously broadcast from a network of ground stations. You can view graphical NEXRAD radar, METARs, TAFs, SIGMETs, AIRMETs, NOTAMs, TFRs and more, so you feel confident you're flying into safer skies.
- AutoSquawk technology in our ADS-B datalinks automatically communicates with any transponder installed in your aircraft, without an upgrade, to provide a single point for data entry for ADS-B "Out." Program your squawk code once, and our technology works seamlessly behind the scenes to transmit your aircraft information without requiring extensive modifications to your panel.



Global ADS-B Requirements

United States – All aircraft operating in designated U.S. airspace must be equipped with ADS-B "Out" functionality (either through the 1090 ES or 978 UAT frequency) by Jan. 1, 2020. However, those that equip now with an ADS-B "In" solution can start taking advantage of the network's datalink traffic and subscription-free weather services right away.

Australia – All Australian aircraft operating at or above FL 290 must have been equipped with 1090 ES ADS-B "Out" functionality by Dec. 12, 2013. All aircraft that operate in Class A, C, or E airspaces extending 500 nm to the north and east of Perth Airport must have been ADS-B "Out" capable by Feb. 4, 2016. Any IFR-capable aircraft placed on the Australian aircraft register on or after Jan. 1, 2014 needed to be compliant by Feb. 6, 2014, and any aircraft placed on the Australian aircraft register before Feb. 6, 2014 will need to be compliant by Feb. 2, 2017. Any aircraft operation IFR within Australia must be ADS-B equipped by February 2, 2017

Europe – Beginning June 8, 2016, all new aircraft weighing greater than 5,700 kg (12,500 lbs.) or having max cruise speed greater than 250 kts TAS in European airspace need 1090 ES ADS-B "Out" with diversity. Beginning June 7, 2020, all existing aircraft weighing greater than 5,700 kg (12,500 lbs.) or having max cruise speed greater than 250 kts TAS in European airspace need 1090 ES ADS-B "Out" with diversity.

Hong Kong – Since December 12, 2013, all aircraft flying along PBN routes L642 or M771 at or above FL290 and within the Hong Kong FIR need a complaint 1090 ES ADS-B "Out" solution. Since Dec. 12, 2014, all aircraft operating in Hong Kong airspace at and above FL290 need 1090 ES ADS-B "Out."

Singapore – Since December 12, 2013, aircraft that operate on select airways and within a select region of the Singapore FIR at FL290 or above need a compliant 1090 ES ADS-B "Out" solution and operational approval from the State of Registry. For details on these requirements visit the CAAS website.

Vietnam – Since December 12, 2013, aircraft that operate on airways L625, M771, N892, L642, M765, M768, N500 and L628 at FL290 or above need 1090 ES ADS-B "Out."

Indonesia – Since December 12, 2013, all aircraft that operate in Indonesia airspace at and above FL290 need 1090 ES ADS-B "Out."

Taiwan – Since December 12, 2013, all aircraft flying airways B576 and B591 at and above FL 290 need 1090 ES ADS-B "Out." And since December 12, 2014, all aircraft operating in Taiwan airspace at and above FL290 need 1090 ES ADS-B "Out."

*Note: In all countries requiring ADS-B equipage, each participating aircraft will also need a compliant GPS position source capable of providing highly accurate WAAS/SBAS-level navigation data.

A snapshot of Garmin ADS-B solutions

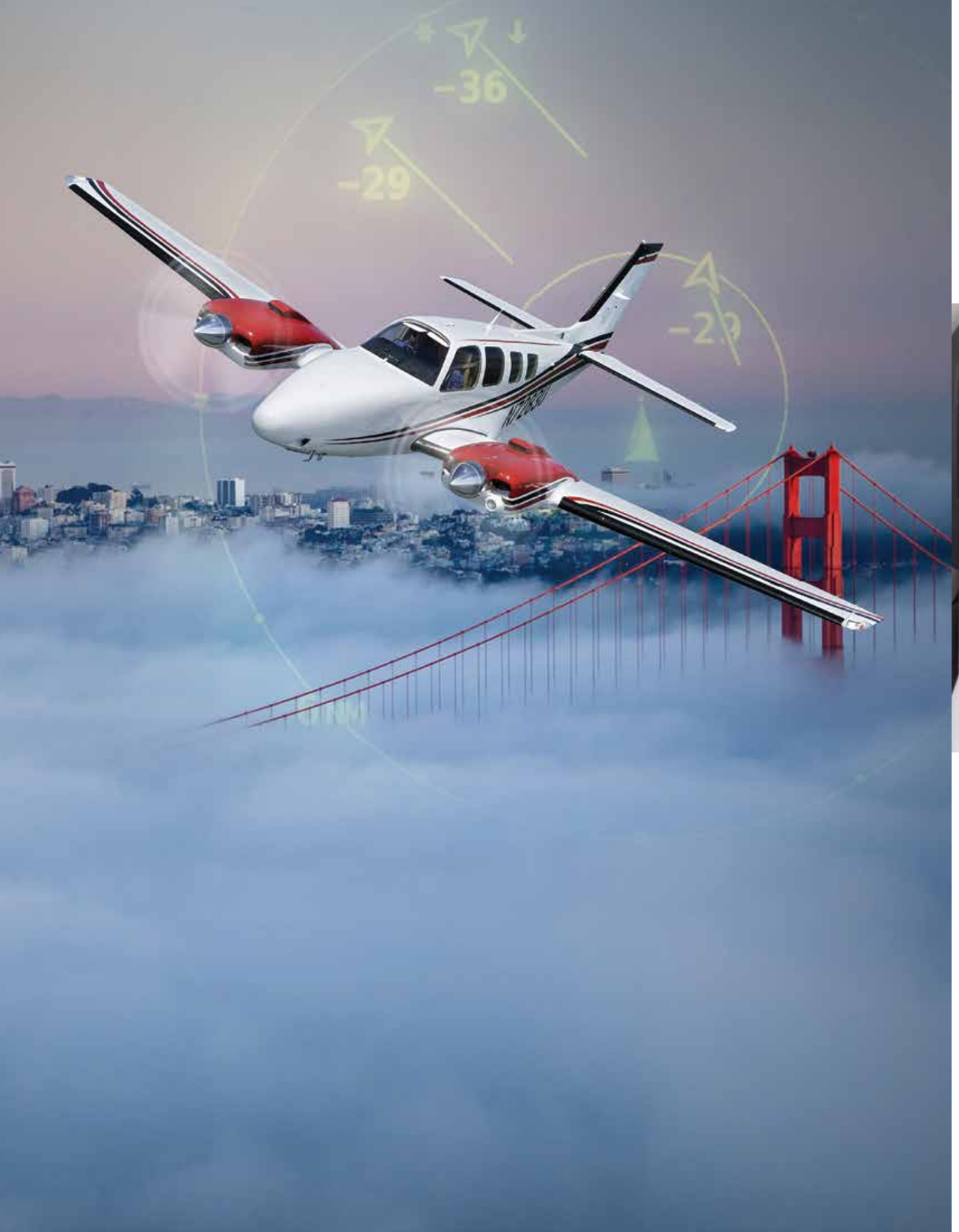
Garmin offers a comprehensive suite of ADS-B products—all designed to help you make the easiest, safest, most affordable transition to NextGen airspace. From all-in-one ADS-B transponders that easily replace your existing transponder to the most complete dual-link transmit/receive/display applications and integrated TAS/TCAS traffic alerting systems, Garmin technology is leading the way into the future of air traffic management.

With a Garmin ADS-B option for most any budget or aircraft, you may even be closer to an ADS-B solution than you think, and it can be installed with minimum disturbance to your instrument panel. Plus, every Garmin product is backed by more than a decade of award-winning product support.

Product comparison:	GTX 35R	GTX 45R	GTX 335/335R	GTX 345/345R	GTX 3000+GDL 88	GDL 84/84H	GDL 88/88H	GTS 800/825/855	GDL 39 series
	Transponders for Experimental Aircraft		Transponders		Business and Transport Aircraft	UATs		Active Traffic Systems	Portables
ADS-B "Out"	X[2]	X[2]	X	X	X	X[1]	X[1]		
TargetTrend™ Traffic		X[2]		X[3]	X[3]	X[3]	X[3]		X[3]
TerminalTraffic™		X[2]		X[3]	X[3]	X[3]	X[3]		X[3]
AutoSquawk					X	X	X		
On Scene mode				X[3]			X[3]		
Active traffic surveillance								X	
Dual-link ADS-B receiver		X		X	X	X	X		X
978 UAT "Out" Altitudes Below 18,000' in the U.S.						X	X		
1090 ES "Out" Any Altitude/Global	X	X	X	X	X				
ADS-B "In"		X		X	X	X	X	Traffic Only	X

[1] When flying below 18,000 feet in 978 UAT frequency-compatible airspace
[2] For experimental aircraft with a G3X series flight display and WAAS position source
[3] With compatible displays

NOTE: Talk to your Authorized Garmin Dealer to confirm a compatible solution for your aircraft.



Garmin ADS-B Transponders

For 1090 MHz ADS-B "Out" signal delivery that meets worldwide ADS-B requirements—including current TSO-C166b standards in the U.S. for flight at any altitude (required above 18,000 feet)—Garmin all-in-one ADS-B transponders offer a logical, affordable pathway to NextGen compliance.

Garmin transponders are fully solid-state designs, delivering high power output while minimizing heat emissions and power consumption, to give you superior reliability and extra-long service life.

These transponders automatically transmit all essential traffic surveillance data, they offer built-in GPS position sources (or integrate with Garmin's GTN and WAAS GNS series navigators), and they receive ADS-B "In" with built-in datalinks., allowing you to see traffic and weather on a variety of compatible displays, portables and mobile devices.

Garmin GTX 345

The GTX 345 all-in-one ADS-B transponder includes optional WAAS GPS position source and dual-link ADS-B receiver so you have both ADS-B "Out" and "In" with a single installation.

The GTX 345 integrates on a wide variety of current and legacy Garmin displays, including GTN and GNS navigators and select G1000® integrated flight decks. For aircraft equipped with Synthetic Vision Technology (SVT™) traffic targets also appear on the PFD, and when paired with an active traffic system, the GTX 345 combines ADS-B traffic targets and active traffic targets to display a comprehensive traffic picture.

Plus, via Garmin Connext™ and Bluetooth® connectivity, it also displays ADS-B traffic, weather, GPS position data and back-up attitude information on the popular Garmin Pilot™ and ForeFlight Mobile apps and Garmin aera 796/795 and aera 660 portables.

Beyond the display, the GTX 345 may be integrated into the aircraft's audio panel to provide ATC-like audible alerts, such as "Traffic: 10 O'Clock, same altitude, two miles" to help pilots keep their eyes outside the cockpit when looking for traffic.

The GTX 345 comes in a popular size, making it easy to replace most transponders in the industry; remote options are also available for display and control compatibility with GTN™ 650/750 series navigators and G1000 integrated flight decks.

Garmin GTX 335

The Garmin GTX 335 ES transponder, an ADS-B "Out" only version of the GTX 345, satisfies equipage rules as quickly and cost-effectively as possible with an ideal one-box, one-swap solution. It's optionally available with a built-in WAAS GPS position source, so everything you need to meet compliance standards for a certified ADS-B "Out" solution can be provided with this simple all-in-one package installation. Remote options are also available for transponder-control compatibility with GTN™ 650/750 series navigators and G1000 integrated flight decks.

Suggested ADS-B Solution
General Aviation

With a GTN or GNS series navigator, you can get both ADS-B "Out" and "In" by adding a GTX 345 all-in-one ADS-B transponder.You can even stream advanced traffic and weather to a Garmin portable or mobile device running Garmin Pilot and ForeFlight Mobile apps. The GTX 345R remote-mount transponder also provides weather and traffic to select G1000 integrated flight displays and GTN series navigators, while saving panel space.

Garmin GTX 3000 ES

Created to meet the unique demands of transport category aircraft, the GTX 3000 Mode S ES remote transponder is certified to meet DO-260B/TSO C166b requirements and provides an affordable pathway to ADS-B "Out" compliance when installed alongside an approved WAAS/SBAS GPS position source, such as Garmin flight decks or GTN series navigators.

With the GTX 3000, the flight data you broadcast to ATC ground stations is also broadcast to all nearby TAS or TCAS equipped aircraft. The TAS or TCAS system enables them to see a similar traffic picture as ATC, which provides all ADS-B equipped aircraft in the vicinity a level of redundant tracking.

When combined with a TCAS II/ACAS II traffic system, such as Garmin's Change 7.1 compliant GTS 8000, and a radar altimeter, such as the GRA 5500, the GTX 3000 is an integral part of a complete TCAS II/ACAS II solution. When your traffic system detects an immediate conflict, it will use your GTX 3000 to communicate with the conflict's TCAS II/ACAS II system to determine the best course of action for both aircraft. Each pilot will then be given visual and aural Resolution Advisories (RAs) with separate but complimentary instructions—for example, one pilot may be told to climb while the other is told to descend.

GTX 45R ADS-B Transponder

The GTX 45R ADS-B transponder is designed for experimental and light sport aircraft (LSA), and it pairs with G3X series flight displays for remote operation, including squawk code entry. It offers 1090 MHz Extended Squitter ADS-B Out when paired with a GTN navigator or GPS 20A ADS-B position source, plus dual-link ADS-B receiver for ADS-B "In" traffic and weather on G3X Touch flight displays, GTN 650/750 series navigators, and GNS navigators with a single, behind-the-scenes installation. And when integrated into the aircraft's audio panel, it provides ATC-like audible alerts, such as "Traffic: 10 O'Clock, same altitude, two miles" to help you keep your eyes outside the cockpit when looking for traffic. Plus, with built-in Connext technology, the GTX 45R allows you to wirelessly stream ADS-B In benefits, including advanced traffic and weather, to Garmin GPS portables, such as the aera 796/795 and aera 660, as well as the most popular apps in the industry, Garmin Pilot and ForeFlight Mobile. Plus, GTX 45R provides attitude information to aera portables and Garmin Pilot to display GPS-derived airspeed, altitude and vertical speed overlaid on a rich 3D topographic landscape.

GTX 35R ADS-B Transponder

The GTX 35R transponder is designed for experimental and light sport aircraft (LSA), and it pairs with G3X series flight displays for remote operation, including squawk code entry. It offers a simple, remote-mount ADS-B "Out" solution when paired with a GTN navigator or GPS 20A ADS-B position source, so you can satisfy equipage rules as quickly and cost-effectively as possible.

Suggested ADS-B Solution
Experimental/LSA

To meet ADS-B "Out" requirements with your G3X Touch™, add a GTX 45R remote-mount transponder, which you can control through your flight display. And with an included datalink, it also displays ADS-B "In" advanced traffic and weather on your flight display, Garmin portable or mobile device running Garmin Pilot or ForeFlight Mobile apps.

Garmin ADS-B Datalinks

Featuring both ADS-B "In" and "Out" capabilities, certified Garmin ADS-B datalinks allow you to immediately start taking advantage of the FAA's U.S. uplink infrastructure using variety of display configurations. You'll receive the benefits of ADS-B weather and traffic—including air-to-air data on both 1090 ES and 978 UAT—enabling you to always see other ADS-B traffic in your vicinity, using TargetTrend™ and TerminalTraffic™ technologies, regardless of ground station coverage. Plus, they automatically synchronize with your on-board transponder's squawk code using AutoSquawk technology; not only does this provide a single point of data entry, but it also allows you to meet the new regulations without the need to replace or upgrade your existing transponder. Plus, installation is simple, and often possible during regularly scheduled maintenance.

Garmin GDL® 84

The GDL 84 provides an all-inclusive, convenient and minimally intrusive means to satisfy the requirements of NextGen at an affordable price for aircraft flying below 18,000 feet. It comes complete with an integrated WAAS GPS, installation kit, configuration module and GPS antenna, and the only panel modification required during installation is a single annunciator indicating ADS-B status.

Using Garmin Connext™—via the included Flight Stream 110/210 Bluetooth® wireless gateway—the GDL 84 will paint traffic and weather information on your Garmin portable, including the aera 796/795 and aera 660, or your iOS or Android mobile device running the Garmin Pilot or ForeFlight Mobile app, without the need for a multi-function display.

Garmin GDL® 88

The GDL 88 is your all-purpose "dual-link" installed solution for aircraft operating below 18,000 feet with compatible cockpit displays. Available with or without a built-in WAAS GPS receiver[1], the GDL 88 can interface with a variety of Garmin displays, including GNS and GTN navigators, select G1000 integrated flight displays, and G500/G600 flight displays. Plus, Garmin Connext™—via the included Flight Stream 110/210 Bluetooth® wireless gateway—allows you to display this safety information on your Garmin portable, including the aera 796/795 and aera 660, or your iOS or Android mobile device running the Garmin Pilot or ForeFlight Mobile app.

[1] Built-in GPS is not required on GDL 88 when another compliant WAAS position source (such as the Garmin GTN or WAAS GNS series) is installed in the aircraft.

Garmin aera Portables

Garmin aera portables feature enhanced traffic displays with TargetTrend™ relative motion technology and TerminalTraffic™ technology, as well as SafeTaxi® geo-referenced airport diagrams, which aid in situational awareness by identifying runways, taxiways, FBOs, hangars and more relative to your aircraft's position on the airport surface. Plus, they allow you to overlay subscription-free weather information, including NEXRAD, METARs, TAFs, TFRs and AIRMETs/SIGMETs right on the moving map.

The Garmin aera 796/795 offers a 7-inch touchscreen display, while the aera 660 offers a 5-inch touchscreen. Both utilize Garmin Connext™—via Bluetooth® wireless connectivity—to display ADS-B "In" traffic and weather from a variety of sources, including GDL® 39 series datalinks, Flight Stream 110/210 wireless gateways or the GTX 345 ADS-B transponder.

Garmin GDL® 39 Series

If you're looking for an easy and affordable way to bring all the free benefits of ADS-B "In" uplinks to your cockpit, the portable GDL 39 3D dual-link portable receiver allows you to connect with the subscription-free U.S. graphical weather and traffic information now available through the FAA's 978 MHz UAT ADS-B service.

You can view all this data on select Garmin portable units, including the aera 796/795 and aera 660, as well as your iOS or Android-based devices compatible with the Garmin Pilot and ForeFlight Mobile apps. This provides your device with the precision and performance you'd expect from Garmin's aviation-grade navigation products, combining WAAS-quality positioning accuracy with 5-times-per-second updating capability. You can even split the display on your tablet screen to show traffic and weather overlaid on the moving map above, while monitoring your backup AHRS attitude on Garmin's Panel Page instrument display below.

The GDL 39 is a non-certified receive-only product, and it does not provide ADS-B "Out" capability to satisfy NextGen requirements. Your aircraft must transmit ADS-B "Out" data to trigger FAA ground station uplink for TIS-B data reception in your aircraft.

Garmin GTS™ Traffic Systems

In busy, high-density airspace, you need every possible advantage when it comes to "seeing and avoiding" traffic conflicts. That's why Garmin developed the GTS™ family of ADS-B enhanced Traffic Advisory (TAS) and Traffic Collision Avoidance (TCAS I and II) Systems.

For aircraft flying outside ADS-B surveillance-enabled airspace, an active traffic system like the GTS series will remain the primary source available to display electronic traffic information. In addition, when paired with an ADS-B "In" solution like the Garmin GDL 88 datalink or Garmin GTX 345 all-in-one ADS-B transponder, the GTS series provides the most complete traffic picture possible: showing targets for all aircraft – including those not yet equipped for ADS-B "Out".

Featuring exclusive Garmin CLEAR CAS™ (Correlated Location Enhanced ADS-B Receiver Collision Avoidance System) technology, these attractively priced Garmin GTS 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 TAS system offers up to 22 nm of interrogation range, while the higher-power GTS 825 TAS and GTS 855 TCAS I systems reach even further (up to 40 nm of interrogation range with the GTS 825; up to 80 nm with the GTS 855).

All three systems use surveillance data from nearby transponder-equipped aircraft to generate expanded audio callouts of traffic in an ATC-like spoken format. The systems can also display traffic symbols and advisories on a variety of compatible navigation or multi-function display products. On the GTS 825/855 systems, up to 75 traffic targets can be tracked simultaneously, with up to 30 intruder threats displayed at a time. And, thanks to 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 Helicopter ADS-B Solutions

Garmin offers a variety of ADS-B products that are built to meet the unique and stringent demands encountered by helicopter operators and designed to provide a timely solution to meet airspace modernization initiatives. Garmin GTX 345 series all-in-one ADS-B transponders and GDL 84H and GDL 88H ADS-B datalinks all offer ADS-B "Out" solutions while also providing ADS-B "In" tools on compatible cockpit displays and mobile devices, while the GTX 335 ADS-B transponder provides a simple, easy-to-install ADS-B "Out" solution.

The GTX 345, GDL 84H and GDL 88H all provide the industry-leading ADS-B "In" technology provided by the fixed-wing models of these devices, such as GPS position source and a wide range of display choices, including Flight Stream connectivity to wirelessly transmit weather and traffic information on your Garmin portable, including the aera 796/795 and aera 660, or your mobile device running the Garmin Pilot or ForeFlight Mobile app. But they also offer safety-enhancing benefits specifically for helicopters.

Recognizing the unique operations performed by helicopters within the airport environment, TerminalTraffic™ for Helicopters has been optimized to minimize nuisance alerts while maintaining awareness of potential traffic conflicts. When operating in the airport environment, alerts from fixed-wing aircraft are minimized and abbreviated while performing unique helicopter maneuvers, such as hovering. These tailored alerts are accompanied by an abbreviated aural "traffic" alert when operating below 400 feet and 40 knots to minimize audio traffic in the cockpit during critical times.

And by pairing a GTX 345 or GDL 88H with Garmin GTN series touchscreen navigators, On Scene mode reduces nuisance alerts when intentionally operating in close proximity to other helicopters, such as during electronic news gathering, alerting you only when new threats are present.

Suggested ADS-B Solution
Helicopter

For a portable solution, pair a GTX 345 transponder or GDL 84H with a Garmin aera 660 or aera 796/795. You'll get both ADS-B "Out" and "In" with the dual-band datalink—so you'll meet the requirements and get subscription-free weather and advanced traffic—and you can keep your existing transponder.

If you have GTN or GNS series navigators, a GTX 345 transponder or GDL 88H datalink will display traffic and weather right on those screens. It even offers the option of a built-in GPS position source if you have an older non-WAAS GNS.

Finally, if your transponder needs replacing, the GTX 345 ADS-B transponder provides an all-in-one ADS-B "Out" and "In" solution—in place of a GDL 84H/88H datalink—with simple installation and the same footprint as most existing transponders.

ADS-B for Business and Transport-category Aircraft

Garmin offers a versatile ADS-B solution that addresses the airspace requirements of business and transport category aircraft and conveniently integrates with your existing equipment, such as TCAS/ACAS systems and transponder/radio control units, to reduce cost and streamline the installation process so that it can be accomplished during regularly scheduled maintenance. Approved STC installations are currently available for Gulfstream G150 and G200, Learjet 60, and 2002 and newer Hawker 750, 800XP, 850XP and 900XP aircraft. Certifications are expected soon for additional Hawker, Beechjet and Beechcraft Premier series jets.

Suggested ADS-B Solution
Business and Transport

The Garmin GTX 3000 Mode S Extended Squitter (ES) transponder utilizes highly accurate WAAS/SBAS position information provided by the GDL 88 ADS-B datalink to broadcast aircraft identity, state and intent data (DO-260B compliant) to air traffic control and other ADS-B "In" equipped aircraft using both approved ADS-B frequencies in the surrounding airspace—including smaller aircraft operating at airports where ADS-B ground stations may not be nearby.

GTX 345/335 Series

ADS-B Transponders

Spec	Model			
	GTX 335	GTX 335R	GTX 345	GTX 345R
Physical & Performance				
"Physical Dimensions (unit, rack, connectors) (For panel mounts, depth is measured from face of instrument panel)"	1.68"x6.30"x10.07" (42x160x256mm)	1.65"x6.30"x9.9" (42x160x224mm)	1.65"x6.30"x10.07" (42x160x256mm)	1.65"x6.30"x9.9" (42x160x224mm)
Display type	Digital	N/A	Digital	N/A
Weight (unit, rack, connectors)	2.8/2.9lbs (1.27/1.32kg)	2.5/2.6lbs (1.13/1.18kg)	3.1/3.2lbs (1.41/1.45kg)	2.8/2.9lbs (1.27/1.32kg)
Voltage range	14/28VDC (15/17W Max)	14/28VDC (15/17W Max)	14/28VDC (18/20W Max)	14/28VDC (18/20W Max)
Transmit power	200W minimum	200W minimum	200W minimum	200W minimum
Tempertaure	-40°C to +70°C	-45°C to +70°C	-40°C to +70°C	-45°C to +70°C
Operating altitude	To 55,000ft (16,800m)	To 55,000ft (16,800m)	To 55,000ft (16,800m)	To 55,000ft (16,800m)
Cooling input	Not required	Not required	Not required	Not required
Environmental Compliance (TSO Approved)	DO-160G	DO-160G	DO-160G	DO-160G
Software compliance (TSO Approved)	DO-178 Levels B, C, D	DO-178 Levels B, C, D	DO-178 Levels B, C, D, E	DO-178 Levels B, C, D, E
Hardware compliance (TSO Approved)	DO-254 Level C	DO-254 Level C	DO-254 Level C	DO-254 Level C
TSO compliance (Approved)	"TSO-C88b (w/opt. alt. encoder) TSO-C112e (Class 1, Level 2els) TSO-C166b (Class B1S)"	"TSO-C88b (w/opt. alt. encoder) TSO-C112e (Class 1, Level 2els) TSO-C145d (Class B2) TSO-C166b (Class B1S)"	"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)"	"TSO-C88b (w/opt. alt. encoder) TSO-C112e (Class 1, Level 2els) TSO-C145d (Class B2) TSO-C154c (Class A1S) TSO-C157a (Class 1) TSO-C166b (Class A1S) TSO-C195a (Class C1,C2,C3,C4)"
Mount type	Panel	Remote	Panel	Remote
Transponder type	Mode A/C, S and ES	Mode A/C, S and ES	Mode A/C, S and ES	Mode A/C, S and ES
Squawk code selection	Push-button	Remote entry	Push-button	Remote entry
Traffic Information Services (TIS) alerts compatible	✓	✓	✓	✓
Transponder Features				
Solid state transmitter (more efficient, longer life)	✓	✓	✓	✓
Aural alerts	✓	✓	✓	✓
Total Air Temperature (TAT)	✓		✓	
Pressure altitude readout	✓	N/A	✓	N/A
Altitude monitor function	✓	N/A	✓	N/A
Density altitude readout	✓	N/A	✓	N/A
Built-in timers	✓	N/A	✓	N/A
Automtatic ALT/GND mode	✓	✓	✓	✓
Wireless connectivity to portable device using Garmin Pilot, ForeFlight or compatible Garmin portable			✓	✓
Subscription-free weather and traffic			✓	✓
Internal AHRS (non-certified)			✓	✓
1090 MHz ADS-B Out	✓	✓	✓	✓
Dual-link 1090MHz and 978MHz UAT ADS-B In			✓	✓
Built in GPS/WAAS receiver	Optional	Optional	Optional	Optional
Displays on G500/G600, GTN 650/750, GNS 430W/530W, and others	✓	✓	✓	✓
"Pressure altitude encoder module (mounts to connector backplate)"	Optional	Optional	Optional	Optional
Night vision compatible (335NV specs same as 335)	Optional			
TAS/TCAS traffic integration with ADS-B In			✓	✓

Specifications are preliminary and subject to change without notice.

GDL Series

ADS-B Transponders

Spec	Model		
	GDL 88 Series	GDL 39 3D Antenna/Receiver	GDL 39R Antenna/Receiver
Physical & Performance			
"Physical Dimensions (unit, rack, connectors) (For panel mounts, depth is measured from face of instrument panel)"	1.75" x 6.17" x 7.12" (4.44 x 15.67 x 18.08 cm) including mounting rack and connectors	3.5" x 1.9" x 6.0" (8.89 x 4.83 x 15.24 cm)	1.65"x6.30"x10.07" (42x160x256mm)
Weight (unit, rack, connectors)	3.75 lbs (GDL 88) 3.87 lbs (GDL 88 with Diversity) 4.13 lbs (GDL 88 with WAAS GPS) 4.25 lbs (GDL 88 Diversity with WAAS GPS)	0.48 lb (0.22 kg)	3.1/3.2lbs (1.41/1.45kg)
Temperature	-55°C to +70°C	20°C to +60°C	-40°C to +70°C
Operating altitude	To 55,000ft (16,800m)	To 55,000ft (16,800m)	To 55,000ft (16,800m)
Power input	14 or 28 VDC, 20 W max.	10 to 32 VDC, 3.5 W max.	10 to 32 VDC, 3.5 W max.
Cooling input	Integrated	N/A	N/A
Environmental Compliance (TSO Approved)	DO-160F	N/A	N/A
Software compliance (TSO Approved)	DO-178 Level D and Level B	N/A	N/A
Hardware compliance (TSO Approved)	DO-254 Level C	N/A	N/A
TSO compliance (Approved)	TSO-C145c (B2), TSO-C154c (A1S/A1H), TSO-C157A, TSO-C166b (A1/A1S), TSO-C195a (C1,C2,C3)	N/A	N/A
Battery charge power	N/A	4.5 W max	4.5 W max
Total power while charging	N/A	8.0 W max	8.0 W max
Nominal operating velocity range	N/A	0 – 800 kts (411 m/s)	0 – 800 kts (411 m/s)
Optional Battery Assembly			
Battery Type	N/A	Lithium Ion Rechargeable Battery	Lithium Ion Rechargeable Battery
Unit dimensions, WxHxD	N/A	3.8" x 0.9" x 6.4" (9.65 x 2.29 x 16.26 cm)	3.8" x 0.9" x 6.4" (9.65 x 2.29 x 16.26 cm)
Output voltage	N/A	7.4 VDC	7.4 VDC
Charging voltage	N/A	10-32 VDC	10-32 VDC
Charge temperature	N/A	Unit may not charge at extreme temperatures below 0° C (32° F) or above 32° C (90° F)	Unit may not charge at extreme temperatures below 0° C (32° F) or above 32° C (90° F)
Operating temperature	N/A	-20° C to +60°C	-20° C to +60°C
Typical battery operating time	N/A	up to 4 hours	up to 4 hours