Latest Garmin Aviation Solutions

10. March 2018,

Fabian Kienzle, Aviation Sales Manager

GARMIN®

Today's Agenda

- Garmin Overview

- Panel Products Update
  - GTN Series
  - G5 for Certificated Aircraft
  - G500/G600 TXI

- Latest Garmin ADS-B Solutions
  - GTX 335/345

BREAK

- ADS-B
- CONNEXT
- Garmin Pilot (live demo)

- Garmin Aftermarket Autopilot
  - GFC 500
  - GFC 600
- Questions

GARMIN

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History, Culture, and Aviation Vision

GARMIN

Innovation as a Cornerstone

Garmin was founded in 1989 and is committed to designing products that fuel people's passions.

- We are ***innovators*** creating technology and utility that enriches the lives of our customers
- We are ***pioneers*** developing new markets for location and communications technology
- We are a ***multi-national*** company employing over 11,600 associates in over 30 countries
- We are a ***multi-faceted*** company serving five key market segments of Automotive, Aviation, Fitness, Marine, and Outdoor

North American Operations

Garmin has 17 offices and more than 4,400 associates in North America

The headquarters facility in Olathe, Kansas supports:

- Administration and marketing
- Aviation manufacturing
- Customer care and product repair for the Americas
- Warehouse and distribution
- Primary R&D Center

Certifications:

- ISO 9001: 2008
- AS 9100: Aerospace
- TS 16949: 2009 – Automotive
- ISO 14001: 2004 – Environmental Management
- FAA Approved Manufacturing and Part 145 Repair

EMEA Operations

Garmin has a large Europe, Middle East and Africa (EMEA) presence with a primary distribution and support center in the UK

- 24 European offices and more than 1,300 associates
- Distribution, sales and support in every European country
- ISO 9001 certified
- EASA Part 145 Repair Station

Research & Development facilities located in:

- Cluj, Romania
- Würzburg, Germany

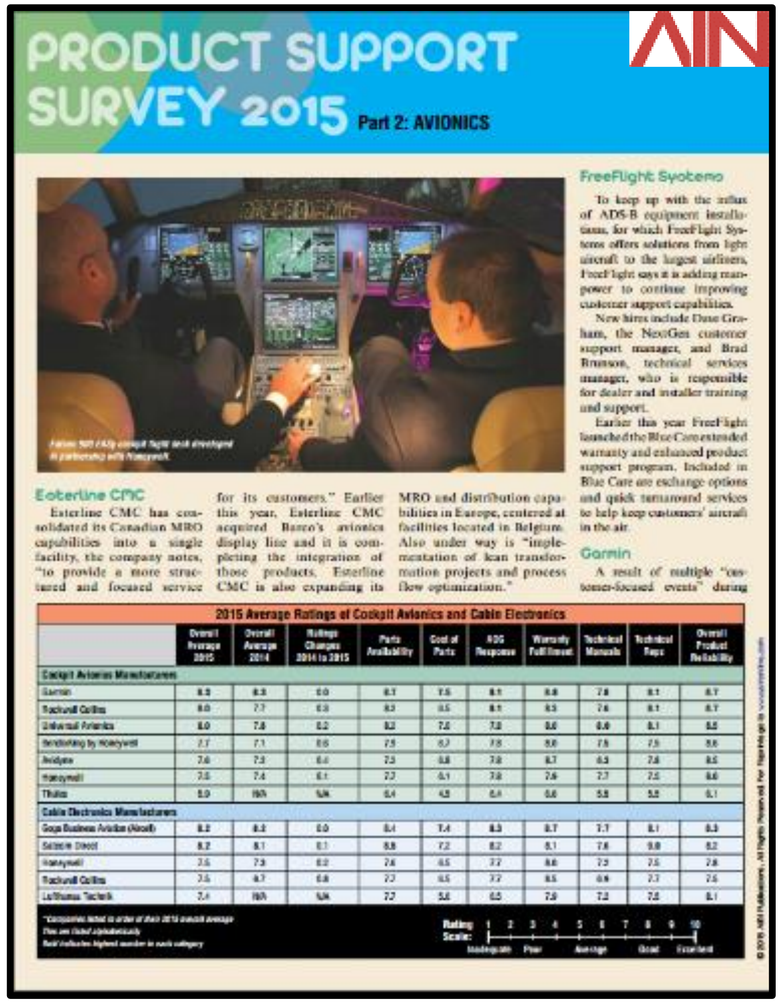
APAC Operations

Garmin currently has 13 offices and more than 5,700 associates in the Asia-Pacific region

Primary facilities are in Taiwan and include:

- Manufacturing & Production
- Quality Assurance
- Regional product development with language support
- Cartography development
- Sales, distribution, and support for the Pacific Rim

#1 in Avionics Support!



PRODUCT SUPPORT SURVEY 2015 Part 2: AVIONICS

AIN

FreeFlight Systems

To keep up with the influx of ADS-B equipment installations, for which FreeFlight Systems offers solutions from light aircraft to the largest airliners, FreeFlight says it is adding manpower to continue improving customer support capabilities.

New hires include Dane Graham, the NextGen customer support manager, and Brad Brunson, technical services manager, who is responsible for dealer and installer training and support.

Earlier this year FreeFlight launched the BlueCare extended warranty and enhanced product support program. Included in BlueCare are exchange options and quick turnaround services to help keep customers' aircraft in the air.

Garmin

A result of multiple "customer-focused events" during

Esterline CMC

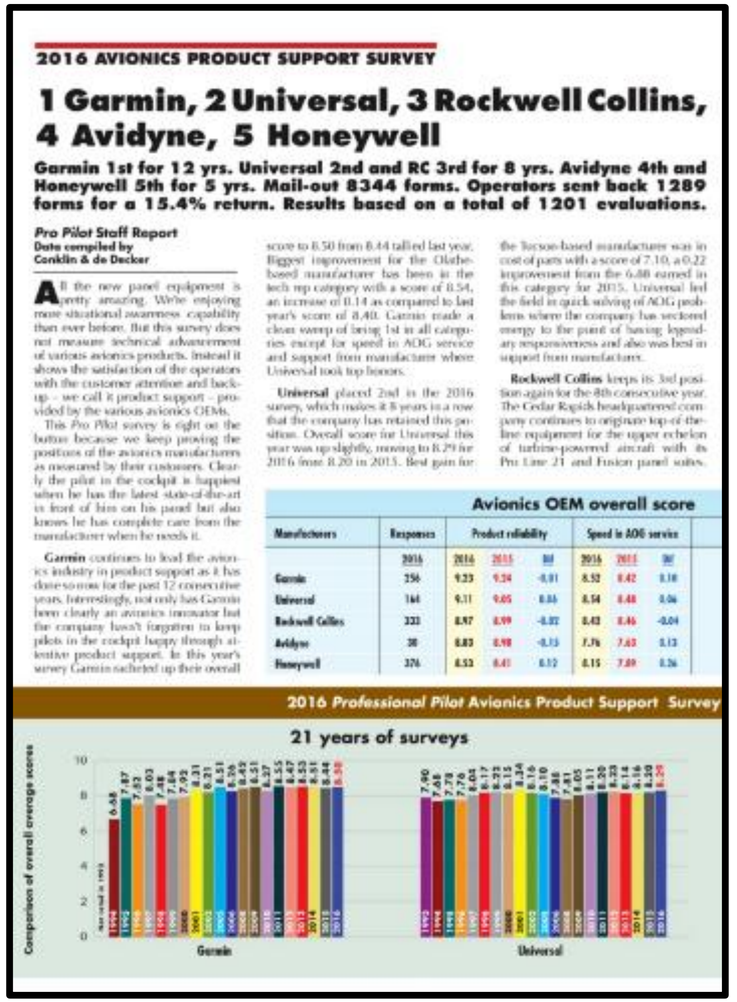
Esterline CMC has consolidated its Canadian MRO capabilities into a single facility, the company notes, "to provide a more streamlined and focused service for its customers." Earlier this year, Esterline CMC acquired Barco's avionics display line and it is completing the integration of those products. Esterline CMC is also expanding its MRO and distribution capabilities in Europe, centered at facilities located in Belgium. Also under way is "implementation of lean transformation projects and process flow optimization."

2015 Average Ratings of Cockpit Avionics and Cable Electronics

	Overall Average 2015	Overall Average 2014	Ratings Changes 2014 to 2015	Parts Availability	Cost of Parts	AOG Response	Warranty Fulfillment	Technical Manuals	Technical Reps	Overall Product Reliability
Cockpit Avionics Manufacturers										
Garmin	8.0	8.0	0.0	8.1	7.5	8.1	8.0	7.8	8.1	8.1
Rockwell Collins	8.0	7.7	0.3	8.3	6.5	8.1	8.5	7.6	8.1	8.1
Universal Avionics	8.0	7.8	0.2	8.2	7.0	7.8	8.0	8.0	8.1	8.0
Bendixking by Honeywell	7.7	7.1	0.6	7.5	6.7	7.8	8.0	7.5	7.5	8.0
Avidyne	7.6	7.3	0.3	7.3	6.8	7.8	8.1	6.5	7.8	8.5
Honeywell	7.5	7.4	0.1	7.2	6.1	7.8	7.6	7.7	7.5	8.0
Thales	6.9	N/A	N/A	6.4	4.5	6.4	6.6	5.8	5.8	8.1
Cable Electronics Manufacturers										
Gogo Business Aviation (Aircell)	8.2	8.2	0.0	8.4	7.4	8.3	8.1	7.7	8.1	8.3
Satcom Direct	8.2	8.1	0.1	8.8	7.2	8.2	8.1	7.8	8.0	8.2
Honeywell	7.5	7.3	0.2	7.6	6.5	7.2	8.0	7.3	7.5	7.8
Rockwell Collins	7.5	6.7	0.8	7.2	6.5	7.2	8.5	6.8	7.1	7.5
Lufthansa Technik	7.4	N/A	N/A	7.2	5.8	6.5	7.9	7.2	7.5	8.1

*Companies listed in order of their 2015 overall average. Ties are listed alphabetically.
Bold indicates highest number in each category.

Rating Scale: 1 2 3 4 5 6 7 8 9 10 — Inadequate, Poor, Average, Good, Excellent



2016 AVIONICS PRODUCT SUPPORT SURVEY

1 Garmin, 2 Universal, 3 Rockwell Collins, 4 Avidyne, 5 Honeywell

Garmin 1st for 12 yrs. Universal 2nd and RC 3rd for 8 yrs. Avidyne 4th and Honeywell 5th for 5 yrs. Mail-out 8344 forms. Operators sent back 1289 forms for a 15.4% return. Results based on a total of 1201 evaluations.

Pro Pilot Staff Report
Data compiled by Conklin & de Decker

All the new panel equipment is pretty amazing. We're enjoying more situational awareness capability than ever before. But this survey does not measure technical advancement of various avionics products. Instead it shows the satisfaction of the operators with the customer attention and back-up – we call it product support – provided by the various avionics OEMs.

This *Pro Pilot* survey is right on the button because we keep proving the positions of the avionics manufacturers as measured by their customers. Clearly the pilot in the cockpit is happiest when he has the latest state-of-the-art in front of him on his panel but also knows he has complete care from the manufacturer when he needs it.

Garmin continues to lead the avionics industry in product support as it has done so now for the past 12 consecutive years. Interestingly, not only has Garmin been clearly an avionics innovator but the company hasn't forgotten to keep pilots in the cockpit happy through attentive product support. In this year's survey Garmin notched up their overall score to 8.50 from 8.44 tallied last year. Biggest improvement for the Olathe-based manufacturer has been in the tech rep category with a score of 8.54, an increase of 0.14 as compared to last year's score of 8.40. Garmin made a clean sweep of being 1st in all categories except for speed in AOG service and support from manufacturer where Universal took top honors.

Universal placed 2nd in the 2016 survey, which makes it 8 years in a row that the company has retained this position. Overall score for Universal this year was up slightly, moving to 8.29 for 2016 from 8.20 in 2015. Best gain for the Tucson-based manufacturer was in cost of parts with a score of 7.10, a 0.22 improvement from the 6.88 earned in this category for 2015. Universal led the field in quick solving of AOG problems where the company has sectored energy to the point of having legendary responsiveness and also was best in support from manufacturer.

Rockwell Collins keeps its 3rd position again for the 8th consecutive year. The Cedar Rapids headquartered company continues to originate top-of-the-line equipment for the upper echelon of turbine-powered aircraft with its Pro Line 21 and Fusion panel suites.

Avionics OEM overall score

Manufacturers	Responses	Product reliability			Speed in AOG service		
	2016	2016	2015	Δ	2016	2015	Δ
Garmin	256	9.23	9.24	-0.01	8.52	8.42	0.10
Universal	164	9.11	9.05	0.06	8.54	8.48	0.06
Rockwell Collins	333	8.97	8.99	-0.02	8.43	8.46	-0.04
Avidyne	38	8.83	8.98	-0.15	7.76	7.63	0.13
Honeywell	376	8.53	8.41	0.12	8.15	7.89	0.26

2016 *Professional Pilot* Avionics Product Support Survey

21 years of surveys

Comparison of overall coverage scores

Garmin

Universal

- Parts Availability
- Cost of Parts
- AOG Responses
- Warranty Fulfillment
- Tech Publications
- Tech Rep
- Overall Reliability

GARMIN

Leader in Business & General Aviation

Garmin is a leading provider of forward fit (OEM), retrofit and portable avionics equipment to the Business and General Aviation market

Products in Service:

- Integrated Flight Decks – 15,000+
- FMS Navigators – 137,000+
- ADS-B Solutions – 18,500+
- Transponder Solutions – 122,000+

Growing performance in the markets that Garmin serves

- **Business jets** – strong share in light/mid business jets
- **Turboprops and Pistons** – excellent market share across aircraft manufacturers
- **Helicopters** – strong share in light and midsize
- **Retrofit business** – excellent share with a leading variety of aftermarket products

Moving Forward

Committed to growth into the business and transport market

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Panel Products Update

New Features Now Available via Software Update

GARMIN

COM / NAV

GTR / GNC SERIES

GARMIN

COM / NAV

GARMIN offers a breadth of solutions to comply the upcoming mandate but also to add further capabilities.

GTR 225 – reduce your workload

- 10 W or 16 W Comm with 25 kHz or 8.33 kHz spacing options
- Automatically displays tuned frequency's navaid or airport identifier
- Easy frequency lookup using an airport identifier
- Bright sunlight-readable display
- Advanced standby monitoring means you'll never miss an ATC call while listening to ATIS
- AML Minor Change available

GARMIN

GNC 255 –Powerful Nav/Com Capabilities

- 10 W or 16 W Comm and 200 channel Nav with VOR/localizer and glideslope receiver
- Automatically displays tuned frequency's navaid or airport identifier
- Automatically decodes Morse signals so you don't have to
- Advanced standby monitoring means you'll never miss an ATC call while listening to ATIS
- Bright sunlight-readable display
- AML Minor Change available

GARMIN

GTN Features

Airways	Standard
Garmin SafeTaxi	Standard
Obstacle Database	Standard
Terrain Alerting	TAWS-B & A (Optional)
10-Watt Comm	16-Watt (Optional)
Traffic	Via Compatible Traffic Source
Weather	Via GSR56 Iridium Weather
Remote Transponder	Via GTX 335R/345R
*Remote Audio Panel	Via GMA 35(C)
*Garmin FliteCharts	Jeppesen ChartView (Optional)

*Indicates a feature for GTN 7XX only

GTN Features

- Custom Holds over any waypoint
- Radius Defined (RF) Legs
- Fuel Range Rings
- Search and Rescue Patterns (Optional Upgrade)
- Animated Weather Radar
- Metric Units
- Database Sync
- Airspace Altitude overlay on map
- Jeppesen VFR Charts

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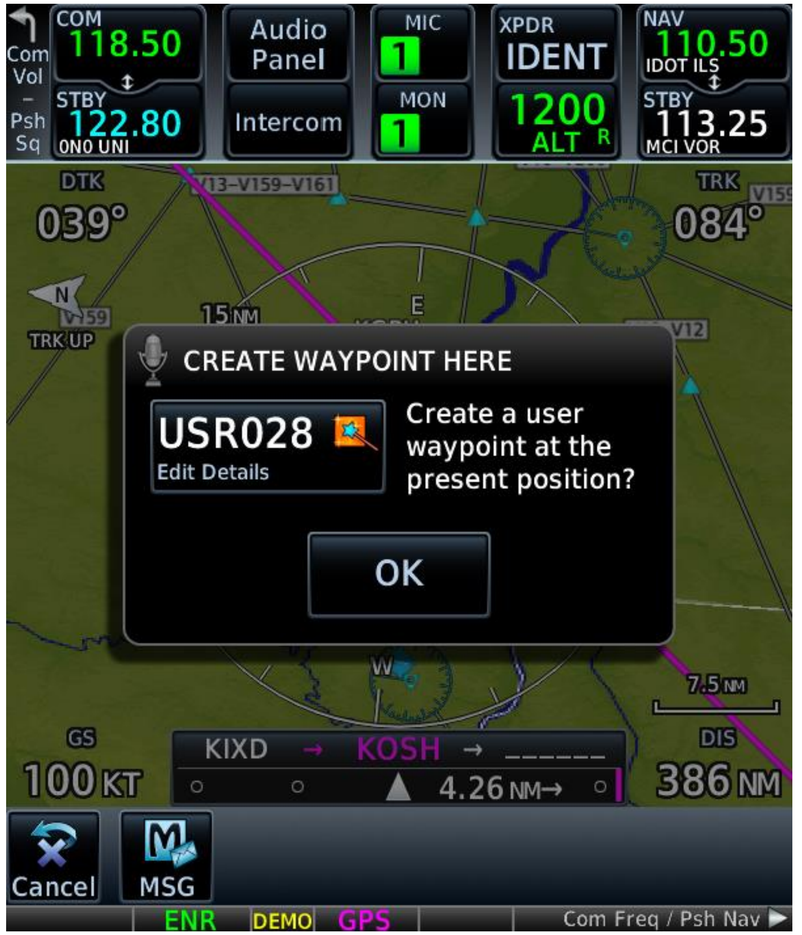
GTN Features

- Pinch to Zoom
  - Map, Traffic, Terrain Pages
- Telligence Voice Commands
- Flight Stream 510 Support
- Database Sync/Chart Streaming
- GSR 56 Voice Call Control and Text Messaging via Garmin Pilot
- European Visual Reporting Points (VRPs)



GTN Series Update

SW v6.40 – Visual Approaches

- Provides Advisory Vertical Guidance
- Based on a Published Glide Path Angle or 3° Glideslope From Runway Threshold
- Considers Terrain & Obstacle Clearance
- Pilots can Choose the Runway and Select Vectors for the Final Approach Intercept
- Short-cut to Load a Visual Approach is Displayed Within 5 miles of the Destination Airport

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Rails


GARMIN
HOME
COM
133.20
KMSP CLR
STBY
121.80
KMSP GND
Audio Panel
Intercom
MIC
1
MON
1
IDENT
1200
STBY
NAV
111.80
STBY
115.60
Home
Map
Traffic
Terrain
Weather
Charts
Flight Plan
PROC
Nearest
Waypoint Info
Services
Utilities
System
Demo
TERM
DEMO
GPS
SUSP
Com Freq / Psh Nav
GARMIN
HOME
Com Vol
Psh Sq
Home
Demo
Map
Traffic
Terrain
Weather
COM
121.70
KEUG GND
STBY
125.22
KEUG ATIS
XPDR
ALT
1200
Default NAV
Flight Plan
PROC
Nearest
Up
Down
TERM
DEMO
GPS
Com Freq / Psh Nav

Home Button


GARMIN
HOME


GARMIN
HOME
COM 118.20 KNUW CCA+
STBY 127.90 KNUW TWR
Audio Panel
Intercom
MIC 1
MON 1
XPDR1 IDENT
1200 STBY
NAV HUH 113.00 HUH VOR
STBY 117.20 CVV VOR
Traffic
NEAR APT
SiriusXM Cloud Top Age: 21min
KNRA
KNUW
KBVS
KAWO
PORT SUSAN
TRK UP
GS 134 KT
DIS 14.3 NM
Back
MSG
Menu
CDI
OBS
In
Out
TRAFFIC TERM DEMO GPS
Com Freq / Psh Nav
Com Vol Psh Sq
Home
Demo
Map
Traffic
Terrain
Weather
Default NAV
Flight Plan
PROC
Nearest
COM 121.70 KEUG GND+
STBY 125.22 KEUG ATIS
XPDR ALT 1200 R
Up
Down

Dual Concentric Knob

GARMIN

Intuitive Operations

Data Entry


COM
136.97
STBY
133.90
Audio Panel
Intercom
MIC
MON
IDENT
1200
STBY
NAV
117.95
STBY
108.05
Com Vol
Psh Sq
Waypoint Identifier
Find
Backspace
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
Space
1 2 3 4 5 6 7 8 9 0
Back
Enter
ENR
GPS
Wpt Ident
GARMIN
HOME
Com Vol
Psh Sq
Waypoint Identifier
Find
Backspace
I J K L M
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
Back
Enter
COM
136.97
STBY
133.90
XPDR STBY
1200
ENR
GPS
Wpt Ident
GARMIN
HOME

G5 and G5 HSI for Certificated Aircraft

G5 for Certificated Aircraft

Cost Effective Glass Upgrade to Older Panels

- Sold as a Replacement Attitude Indicator, or an HSI-

  Replacement for Directional Gyro

- Valid Under VFR / IFR

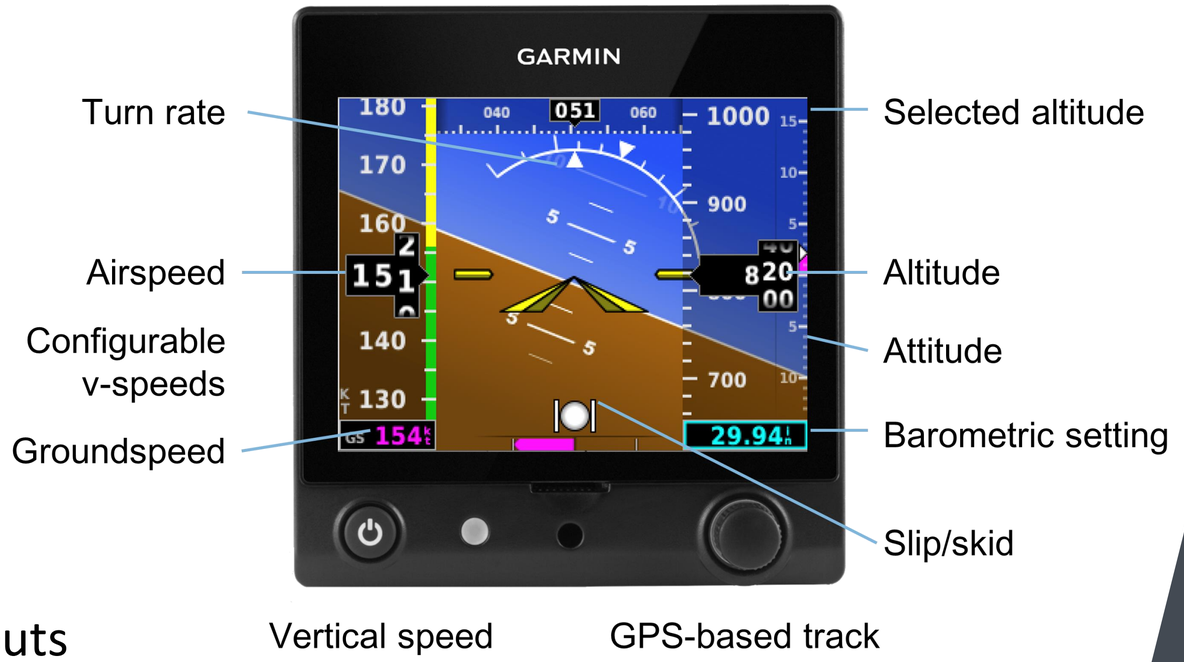
- G5 Comprehensive AML STC Covers Most Fixed-wing

  GA Aircraft

  - Most aircraft under 6,000 lbs.
  - Garmin-held STC
  - Hundreds of aircraft models
  - Optional GPS Antenna
    (For Aircraft Without a Compatible Navigator)

G5 Attitude Indicator

- 3 1/8-inch Flight Instrument Replacement
- 3.5-inch Bright, Sunlight Readable LCD Display
- Includes 4 Hour Back-up Battery
- Only Needs Power, Ground and Pitot/Static Inputs
- Suitable as Standalone Primary Source of:
  - Aircraft Attitude Information
  - Turn Coordination Information
- Suitable as Secondary Source of:
  - Altitude
  - Airspeed
- List Price - $2349



New Units for G5 STC

- GMU 11
  - New low cost magnetometer from EAB market
  - Provides magnetic heading data to G5 Attitude indicator and/or G5 HSI.
- GAD 29
  - Existing product from EAB market
  - Provides interface to ARINC 429
  - Allows G5 to interface to Garmin navigators

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G5 Horizontal Situation Indicator

- 3 1/8-inch Flight Instrument Replacement
- 3.5-inch Bright, Sunlight Readable LCD Display
- Includes 4 Hour Back-up Battery
- Suitable as Standalone Primary Source of:
  - GPS Heading (GMU 11)
  - HSI VHF Nav (GAD 29)
  - GPS Nav (GMU 11 & GAD 29)
- Dual G5 configurations provide redundancy for the AI (HSI/DG Manually Reverted)
- Valid Under VFR / IFR
- List Price - $2975

G5 DG/HSI for Certificated Aircraft

Installation Considerations

- Existing G5 AML STC Will be Updated to Include DG/HSI Replacement
- STC Permission Letter Issued for Each Aircraft
- Existing HSI or CDI is Not Required to Remain in the Aircraft
- Single GMU 11 Magnetometer can Support Dual G5s
  - Adds Magnetic Heading to G5 Attitude Indicator
- STC Will Not Cover Removal of Vacuum System
- **GAD 29 (+) GTN or GNS WAAS series provides Vertical Guidance (ILS/LPV) to both G5's.**

G5 for Certificated Aircraft Update

Third-party Autopilot Compatibility

- Provides Heading and Course Error from G5 to Third-party Autopilot
- Utilizes New GAD 29B Adapter
- With Compatible Navigation Source, Enables Following Modes:
  - Heading
  - GPSS
  - Navigation
  - Instrument Approach

GARMIN

G5 for Certificated Aircraft Update

Third-party Autopilot Compatibility

- Third-party Autopilot Support Expected to Include:
  - Century II/III
  - Century IV (AC), IV (DC)
  - Century 21/31/41
  - Century 2000
  - Cessna 400B
  - Cessna 300 IFCS/400 IFCS
  - Honeywell (Bendix King) KAP 100/150/200
  - Honeywell (Bendix King) KFC 150/200
  - Honeywell (Bendix King) KAP 140
  - Honeywell (Bendix King) KFC 225
  - S-TEC 20/30/40/50/55/60-1/60-2/65
  - S-TEC 60 PSS
  - S-TEC 55X

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G5 for Certificated Aircraft Update

New Flush Mount & Availability

- New Flush Mount Kit Also to be Made Available

- G5 for Certificated Aircraft with GAD 29 Kit Will be Updated to Include GAD 29B
  - Same Price! - $2,975
  - Deliveries Expected to Begin in September

- Expected to be Identical to Existing AML and Encompass Over 650 Aircraft

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TXi Flight Display Series

G500 TXi, G600 TXi, G700 TXi & EIS TXi

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TXi Series

Overview

- Next Generation Garmin Flight Displays
- PFD, MFD and EIS Capability
- 3 Display Formats
  - 10.6”
  - 7” Portrait
  - 7” Landscape
- Touchscreen with Dual Concentric Knob(s)
- Compatible with Original G500/G600 Sensors
- User Interface Harmonious with GTN Series
- To be Certified in over 600 Aircraft Models

GARMIN

TXi Series

Scalable System

- “Building Block” System Architecture
- Up to 4 Displays in One System
- “System” Can be Single PFD, MFD or EIS — or a Combination of Those Functions
- Over 25 Approved Panel Layouts
- Displays Available with Integrated AHRS and Backshell Mounted ADC
- Automatically Shifts Critical Flight Information to Another Display in the Unlikely Event of a Display Failure

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GARMIN
GARMIN
HDG ALT 4500 FT
CHRONOMETER
DAVTRON
BEECH
LANDING GEAR
BUS VOLTS
GO AROUND
28VDC
FLAPS


GARMIN
HDG ALT 4500
CHRONOMETER
SELECT
CONTROL
PUSH OPEN T
PUSH HI RPM P
PUSH RICH M
GEAR DN & LOCKED
LANDING GEAR
PARK BRAKE PULL ON
FLAPS
4500 FT


GARMIN
CHRONOMETER
M800
DAVTRON
BEECH
HDG ALT 4500
PROP AMPS
DE-ICING PRESSURE PSI
GO AROUND
FLAPS
GEAR DN & LOCKED
LANDING GEAR
PARK BRAKE PULL ON
BUS VOLTS
28VDC
WARNING

TXi Series

Configurability – 10.6” Display

Installer Configurable To:

- PFD/MFD
  - PFD on Left or Right
  - Pilot Selectable Full Screen PFD
- PFD/MFD/EIS
  - EIS on Left or Right
  - PFD on Left or Right
  - Pilot Selectable Full Screen PFD with EIS Strip

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TXi Series

Configurability – 7” Portrait Display

Installer Configurable To:

- Dedicated PFD
- Dedicated MFD
- Dedicated EIS Display
  - Single Engine Piston
  - Twin Engine Piston

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TXi Series

Configurability – 7” Landscape Display

Dedicated Engine Information System Display

- Single Engine Piston
- Twin Engine Piston

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How the Systems Compare

G500 TXi

- Designed for Part 23 Class 1 & 2 Aircraft (Aircraft Weighing Below 6,000lbs/2,700kg)
- SVT™ (Synthetic Vision) Optionally Available

G600 TXi

- Designed for Part 23 Class 3 Aircraft (Aircraft Weighing Below 12,500lbs/5,700kg)
- SVT™ (Synthetic Vision) Standard

G700 TXi

- Designed for Part 23 Class 4 and Part 25 Aircraft
  (Aircraft Weighing 12,500lbs/5,700kg and Above)

EIS TXi

- Designed as a Standalone EIS Solution or as an Integrated System
  with G500TXi and G600 TXi
- Currently Compatible With Most Lycoming or Continental 4 or 6 Cylinder Engines

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GARMIN
HDG
AP
YD
ALT
262°
KSPB
KPDX
ROARK
CDI
Menu
Full
Push Sync
GARMIN

Features

TXi Series

PFD Features

- New Touchscreen User Interface
  - Functions Also Available Via Dual Concentric Knob
- Simply Tap to Access:
  - Heading Bug
  - Airspeed Bug
  - Altitude Bug
  - Vertical Speed Bug
  - Barometric Setting
  - And More
- HSI Map
- SVT™ - Synthetic Vison Technology
- Optionally Display Winds, Clock/Timer, and More

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TXi Series

PFD Features – HSI Map

- Single-finger Zoom
- Overlays Include:
  - ADS-B Traffic
  - Terrain
  - NEXRAD Weather
    - FIS-B
    - SiriusXM
    - Connext (GSR 56)
  - Flight Plan
  - SafeTaxi® Diagrams
  - And More

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TXi Series

Integrated Standby Capability

- G500 TXi System with Two 7” Portrait Displays Can Meet Standby Instrument Requirements
- Both Displays Must be in Pilot’s Primary Field of View
- Requires Optional Back-up Battery

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TXi Series

Automatic Reversionary Capability

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TXi Series

MFD Features

- Dynamic Moving Map
- Traffic
  - TargetTrend
  - TerminalTraffic
- Terrain
- Active Flight Plan
  - From GTN or WAAS GNS
- Weather
  - FIS-B
  - SiriusXM
  - Connext (Iridium)
- Waypoint Info
- Sirius Music Control

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TXi Series

MFD Features – Crew Profiles

- Allows Pilots to Configure and Save Settings
  - Map Configurations
  - Audio Volume Levels
  - Backlight Settings
  - And More
- Select Profile at Start-up
- Manage Profiles via System Settings
- Export Profiles to SD Card for Use in Another Aircraft
  - Perfect for Fleets or Flight Schools
- Requires System to Have MFD Capability

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TXi Series

EIS Features

- Pilot Selectable Data Fields
- Lean Assist
  - Rich of Peak
  - Lean of Peak
  - Turbo Inlet Temperature
  - Exhaust Gas Temperature
- Fuel Computer
- Pilot Configurable Advisories
- Installer Configurable Exceedance Alerts

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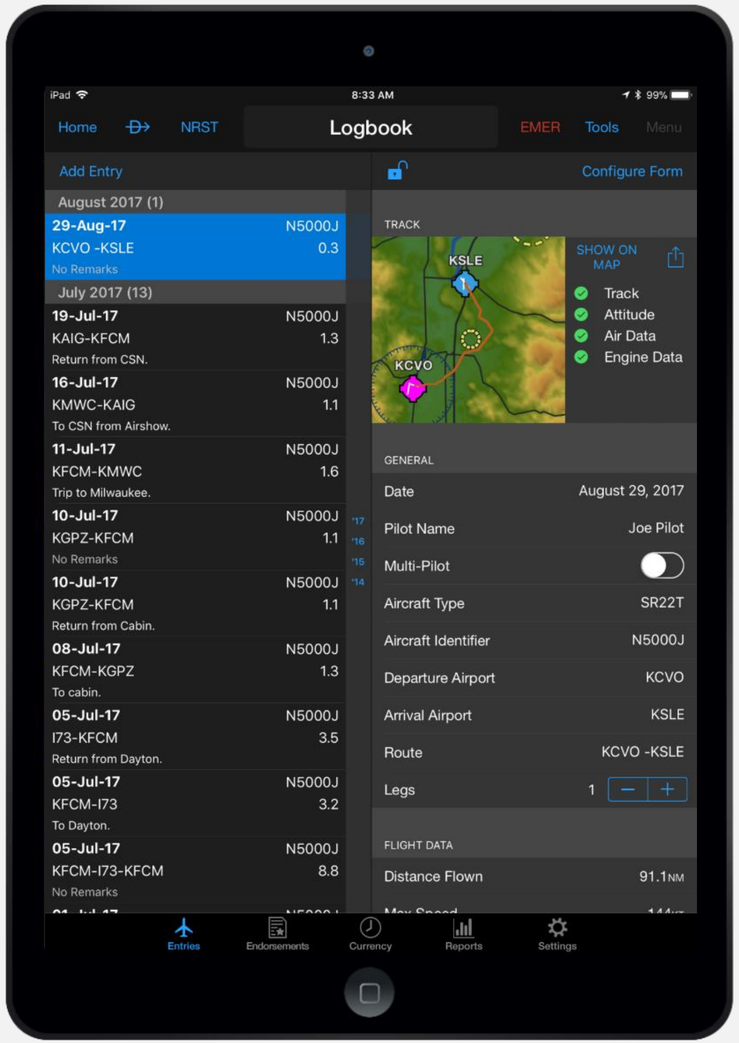
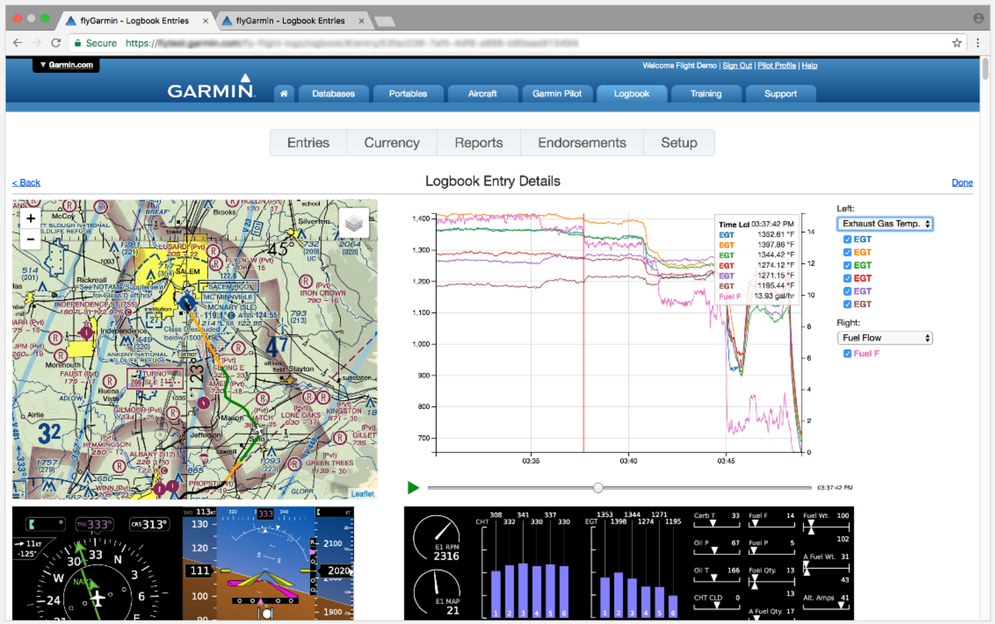
TXi Series

EIS Features – Engine Data Logging



- Engine Data Can be Logged and Exported
- GTN and Flight Stream 510 Automatically Transfer Data to Garmin Pilot, which then Uploads the Information to flyGarmin.com



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TXi Series

Additional Features - Fully Loaded Functionality

- Database Sync Updates Databases Across All GTN and TXi Displays in a System
- Database Concierge Wirelessly Updates Databases (Via GTN and Flight Stream 510)
- Integrates with Popular Autopilots, Including Garmin GFC™ 600
- View and Alternate Between Garmin FliteCharts® or Optional Jeppesen® charts.
- WireAware™ Wire Strike Avoidance Technology
- Smart Airspace™ de-emphasizes Non-pertinent Airspace
- Jeppesen VFR Manual charts (formally known as “Bottlang” charts) Available Within Europe
- European Visual Reporting Points (VRPs) Overlay on the Moving Map

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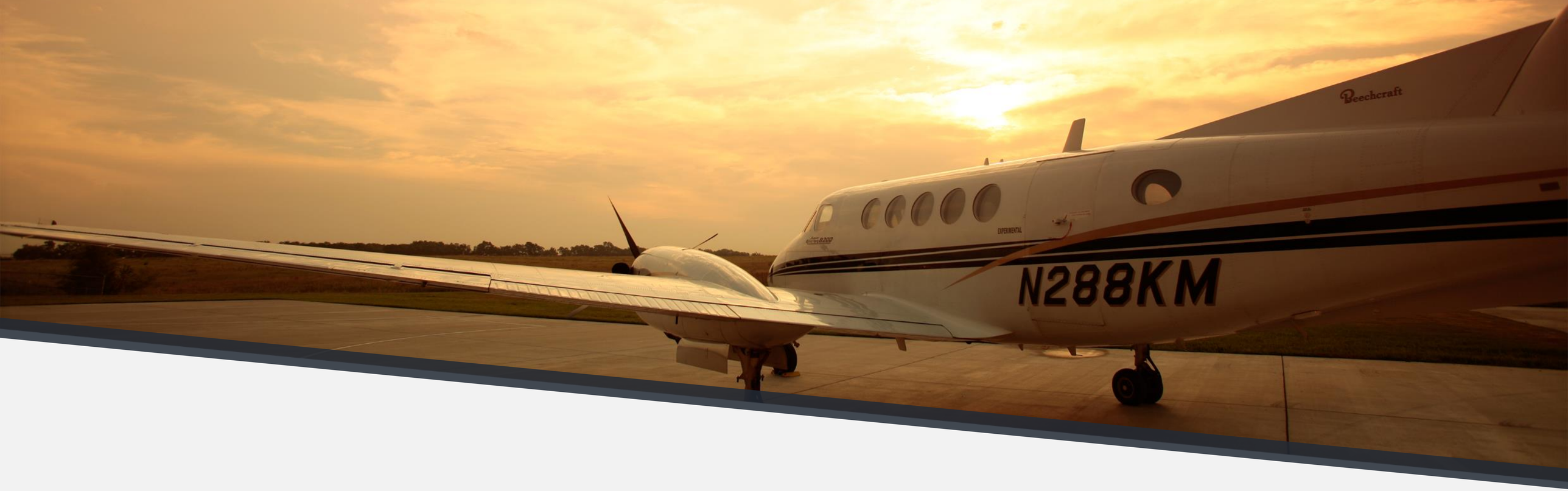

BREAK ☺

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ADS-B

- European Mandate
  - –From June 8, 2016 for new Aircraft
  - –From June 7, 2020 for retrofit
  - –For Aircraft above 5,700 kg (12,500 lbs)
  - –OR max. speed greater than 250 KTAS

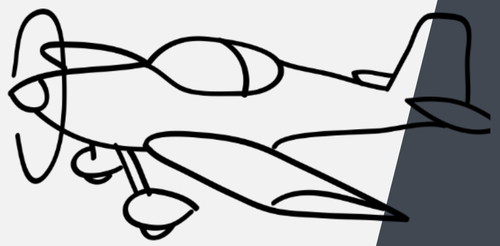
  - –For all other aircraft, **ADS-B equipage is voluntary!!!**
  - –NOTE: European ANSPs have been lobbying the EU to extend the mandate to all aircraft in certain airspace like the U.S. mandate

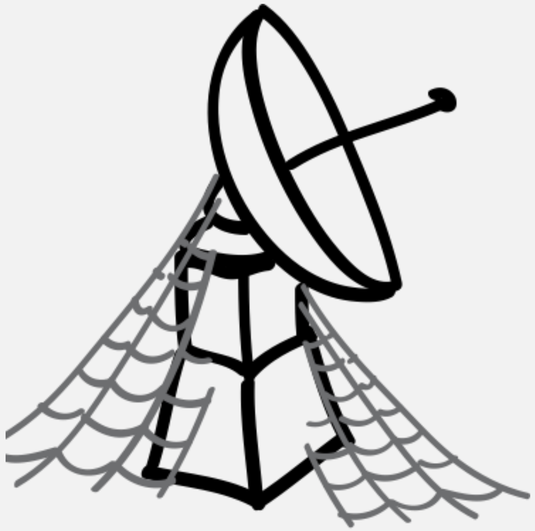
ADS-B Definitions

- ADS-B “Out” – GPS position data sent from your aircraft to ATC; “The Mandate”
- ADS-B “In” – Receiving traffic information into your aircraft; “The Benefit”
- 1090 MHz ES – Exetended Squitter! Frequency required for “Out”
- 978 UAT – Receive FIS-B & TIS-B on compatible display; **US only frequency**
- Ground Station – Replacing radar system & receives ADS-B information

What is it all about??

Decades-old radar technology can take up to 12 seconds to provide an update to ATC





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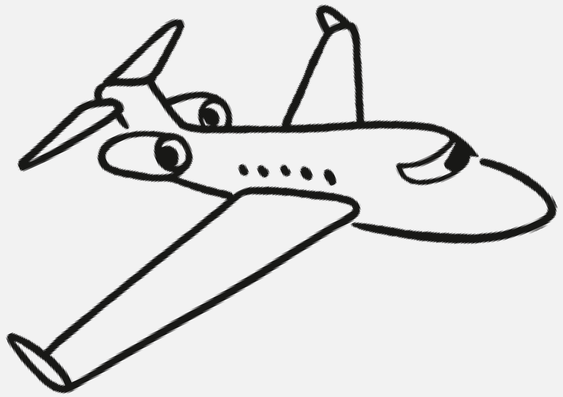
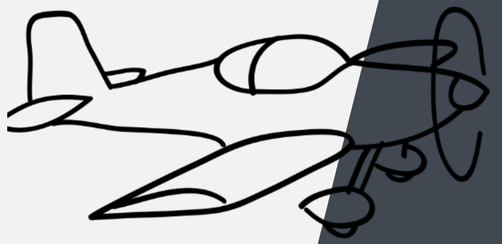
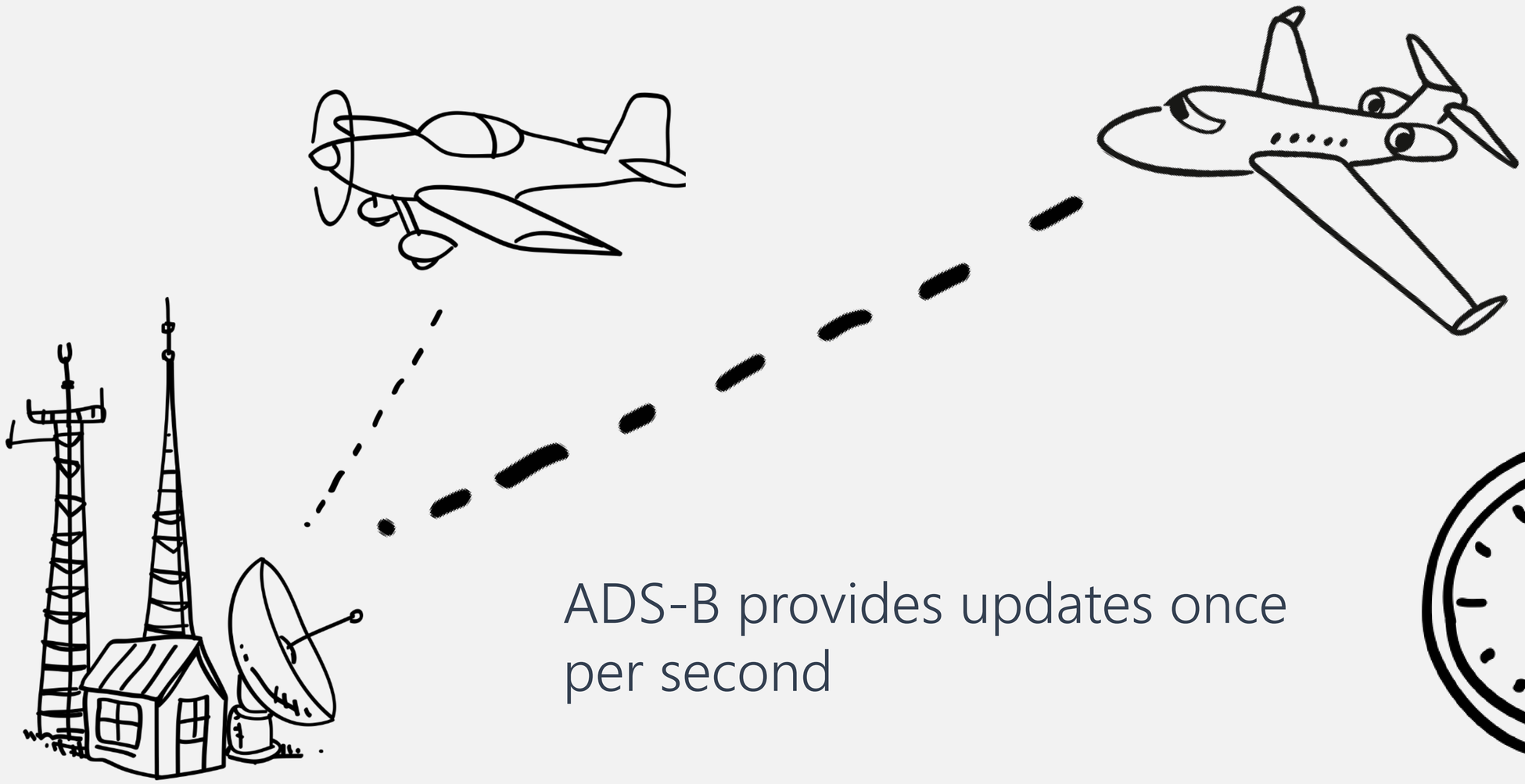
What is it all about??



As a result, wider separation is necessary.

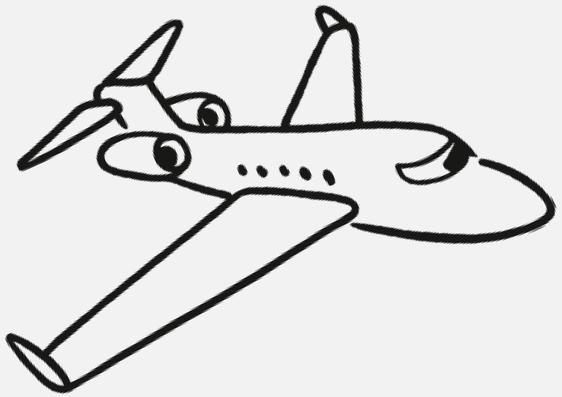


What is it all about??

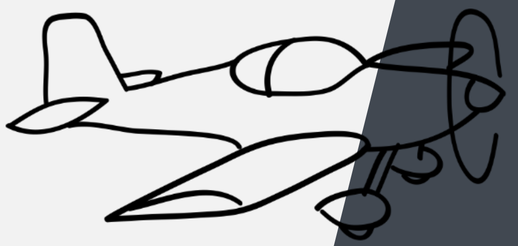


ADS-B provides updates once per second

What is it all about??



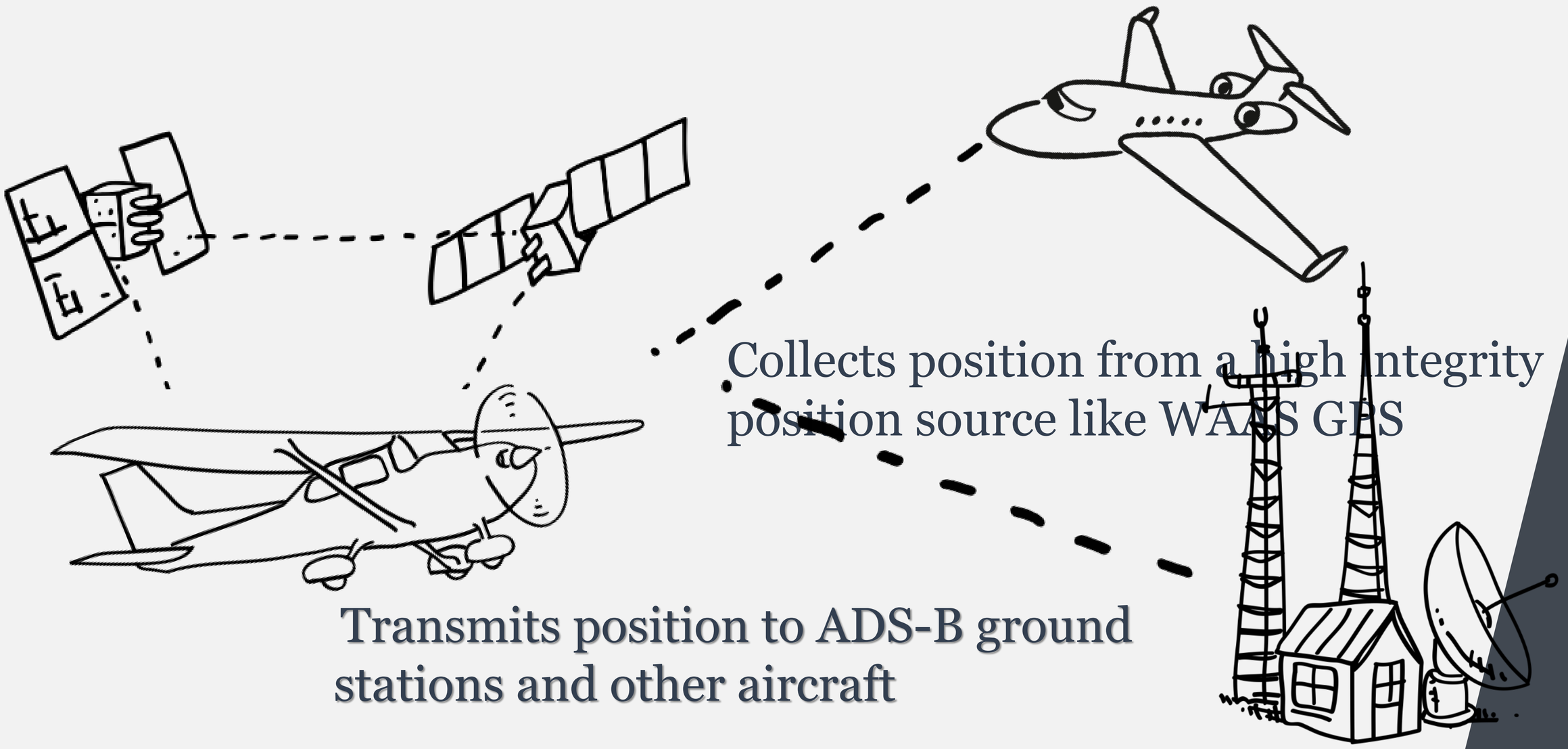
As a result, reduced separation is possible.



To handle the capacity requirements of NextGen Airspace

GARMIN

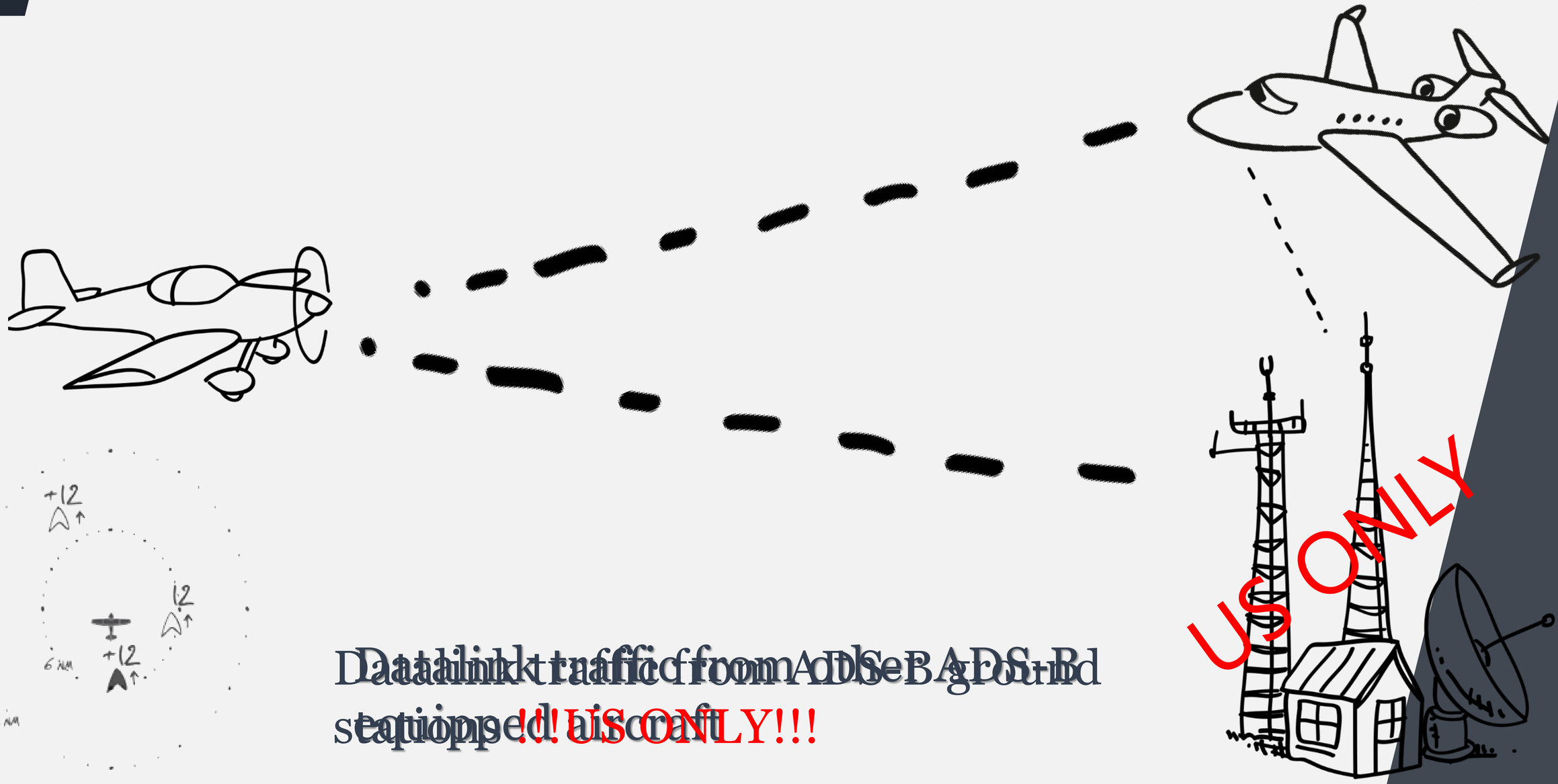
How does it work?



Collects position from a high integrity position source like WAAS GPS

Transmits position to ADS-B ground stations and other aircraft

What are the benefits?



Datalink traffic from ADS-B Ground stations

Datalink traffic from ADS-B equipped aircraft

!!! US ONLY !!!

What else do we gain from WAAS/EGNOS?

GPS – LPV Approaches in Scandinavia

- Implemented in 3 airports in Sweden
- Planned for many more

- Source: Egnos.com

Garmin ADS-B Solutions

Garmin Next Gen All-In-One ADS-B Transponders

GTX 335/345

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Garmin Next Gen All-In-One ADS-B Transponders

GTX 335/345

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GTX 335

ADS-B Compliance For Every Aircraft

- ADS-B “Out” Compliant (1090 ES)
- Industry Standard 1.65 inch Form Factor
- Remote Mount Versions Available
- Optional WAAS GPS
- NVG Compatible Model
- Economical Way to Compliance
- List Prices Starting at $2,995

GARMIN

GTX 345

All-In-One ADS-B Solution

- ADS-B “Out” Compliant (1090 ES)
- Dual Link ADS-B “In” (1090 ES & 978 UAT)
- Connext™ Capable
- Industry Standard 1.65 inch Form Factor
- Remote Mount Versions Available
- Optional WAAS GPS
- List Prices Starting at $4,995

GARMIN

Flight Stream 510

Flight Stream 510

Features

- Database Concierge – Wireless Database Transfer
- GSR 56 – Voice Call Control & Text Messaging via GP
- Two-Way Flight Plan Transfer
- GPS Position, Traffic, Weather Data – from GTX 345 or GDL 88
- AHRS Info if connected to G500/G600
  - Note – Will not transfer AHRS from GTX 345, but you can also connect GP to the 345 to receive the non-certified AHRS info

GARMIN

Flight Stream 510

Things to Note

- FS 510 is a MultiMediaCard (MMC) - <u>Not SD Card</u>
- Database Transfer Requires Garmin Pilot Subscription
  - 1 Year subscription included
- Both iOS and Android GP Support Database Concierge
- Configuration & Logbook amendment required for installation
- Only able to be installed in GTN, but Database Sync will send databases to G500/G600 and other GTNs

GARMIN

Cost-effective Autopilot Upgrades

GARMIN®

GFC 500 and GFC 600

Overview

GFC 600

- Solid State, Attitude-Based Autopilot for High Performance Single/Twin-Engine and Turbine Aircraft
- Interfaces with a Variety of Garmin or 3rd Party Flight Displays and Navigation Sources
- Compatible with a Wide Range of Aircraft Speed and Performance Characteristics

GFC 500

- Solid State, Attitude-Based Autopilot for Less Complex Single-Engine Aircraft
- Leverages G5 Electronic Flight Instrument
- Interfaces with Select Garmin Nav Radios and GPS Navigators

GARMIN

GFC 600/500

Cutting Edge Design and Reliability

- Solid State Attitude Based Design
- Robust Self Monitoring Capabilities
- Servo Design Utilizes a Brushless DC Motor and Gear Train
  - Eliminates the Need for Mechanical Slip Clutch
  - Improved Performance and Reduced Maintenance
- Superior Aircraft Control Performance
  - Faster, Crisper, Smoother Response
- Built-in GPS Roll Steering Capability
  - Smoother Navigation Tracking
  - Eliminates the Need for External Roll Steering Converters

GARMIN

GFC 600/500

Unique In-flight Benefits

Delivers Traditional Autopilot Functions, Plus:

- Level Mode (LVL)
  - Commands Autopilot to Automatically Return Your Aircraft to Straight-and-level Flight
- Garmin ESP™ (Electronic Stability and Protection)
- Underspeed Protection
- Overspeed Protection
- Airspeed Climb/Descent Modes
- Flight Director (FD)
- Support for Takeoff/Go-around (TOGA) Mode
  - Fly Coupled ‘Go-arounds’ During Missed Approach Sequencing
- And More!

GARMIN.


GFC 500

GFC 500
Overview

- Solid State, Attitude-Based Autopilot for Fixed-Wing Aircraft
- Leverages the Garmin G5 Electronic Flight Instrument
- Intended for Less Complex Single-Engine Aircraft
- Interfaces with Select Garmin Nav Radios and GPS Navigators

GARMIN

GFC 500

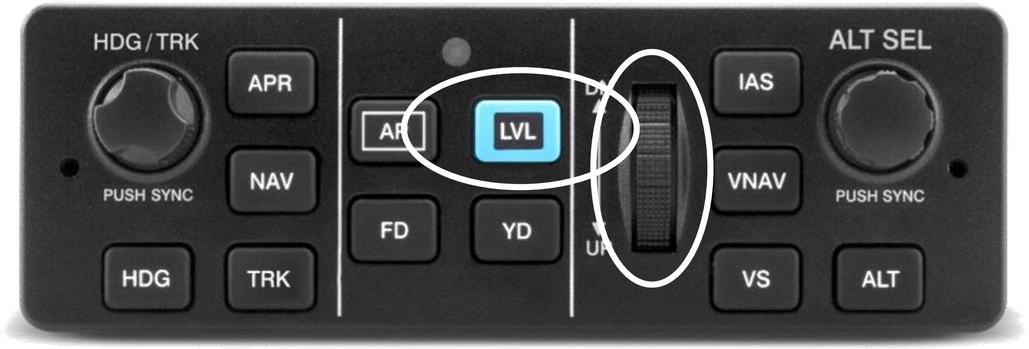
G5 Electronic Flight Display

Provides Input and Display of:

- Altitude Preselect
- Heading Bug
- Vertical Speed Bug
- Airspeed Target
- Flight Director Command Bars
- Localizer and Glideslope

GFC 500
Mode Controller

- Large Dedicated Keys and Knobs
- Level Button that Returns Aircraft to Straight-Level Flight
- Intuitive Control Wheel for Pitch, Airspeed, and Vertical Speed Adjustment
- Robust Self Monitoring Capabilities
- In Lieu of Magnetic Heading, TRK Mode Uses GPS Ground Track
- Mark-width Measurement



GFC 500
Servos

- Servo Design Utilizes a Brushless DC

  Motor and Gear Train

  - Eliminates the Need for Mechanical Slip Clutch
  - Improved Performance and Reduced Maintenance

- Addition of 3rd Servo adds Pitch-Trim
  - Automatic Trim and Manual Electric Trim

GARMIN

GFC 500
Integration

- Integrates directly with:
  - GNC 255
  - Legacy SL 30
- Optional Nav Adapter Allows Integration with Select Garmin Products Including:
  - GTN 750/650 Series
  - Legacy GNS 530/430 Series
  - Includes WAAS and Non-WAAS
- Allows for various Instrument Approaches and the use of a Remotely-Installed Go-Around Button

GFC 500

Example Configurations

GFC 500

Cessna 172 Pricing & Availability

- GFC 500 Expected to be Available for Cessna 172 in Q4 2017
  - Cessna 182 and Piper PA-28 to Follow

2-Axis System

- GFC 500: Controller & 2 Servos
  - Starting at $6,995
- Including G5 Electronic Flight Instrument
  - Starting at Less than $10,000

2-Axis System with Pitch Trim

- GFC 500: Controller & 3 Servos
  - Starting at $8,995
- Including G5 Electronic Flight Instrument
  - Starting at Less than $12,000

GARMIN

GFC 600

GFC 600
Overview

- Standalone, Solid State, Attitude-Based Autopilot for Fixed-Wing Aircraft
- Intended for High Performance Single/Twin-Engine and Turbine Aircraft
- Compatible with a Wide Range of Aircraft Speed and Performance Characteristics
- Built Upon the Acclaimed Performance of the GFC 700 Autopilot

GARMIN

GFC 600

GMC 605 Autopilot Controller

Intuitive, Built-in Control Wheel for Pitch and Vertical Speed Adjustment

Bright, Sunlight Readable Display

Level Button

Mark-width Measurement Ensures the GMC 605 Fits Into the Aircraft Panel

Back-lit Buttons

Advanced Features Include VNAV* and IAS Modes

*Growth Function When Properly Equipped

GARMIN

GFC 600

GSA 87 Servos

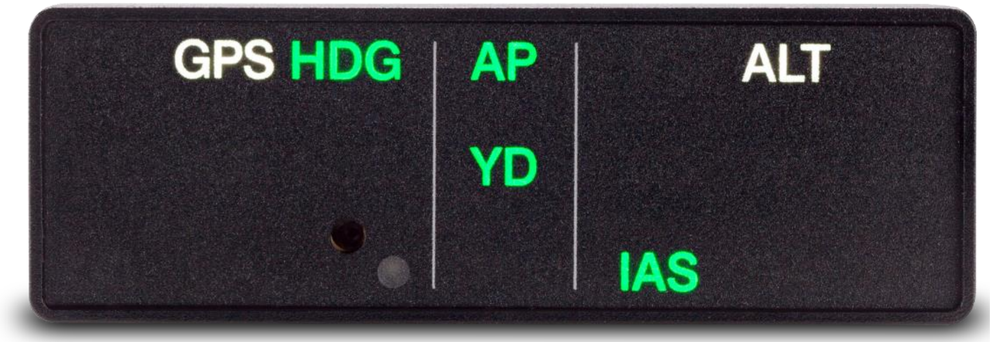
- Environmentally Hardened Servos
- Designed for Harsh Operating Conditions
- Contains a Brushless DC Motor and Gear Train
  - Eliminates the Need for Mechanical Slip Clutch
  - Improved Performance and Reduced Maintenance

GARMIN

GFC 600

GI-285 Mode Annunciator & Air Data Module

- GI-285 Mode Annunciator
  - Displays the Selected Autopilot Mode In the Pilot's Primary Field of View
  - Retains Identical Footprint of Popular Third-party Mode Annunciators
  - Multi-Color Annunciators to Indicate if Mode is Active, Armed, etc.



- Air Data Module
  - Used In the Absence of a Compatible Airspeed and Pressure Altitude Source
  - Attaches to Backplate of the GMC 605

GARMIN

GFC 600

Flight Display/Instrument Interface Compatibility

Primary Flight Displays:

- G500/G600 (includes annunciations)
- Aspen EFD 1000

Horizontal Situation Indicators:

- King KI 525A
- Century NSD360A and NSD1000
- Sandel EHSI (SN3500, SN4500)

Mechanical Gyro (DG) Interfaces:

- Sigmatek 4000C (EDO Aire 52D54 equivalent)
- Sigmatek 4000C-1 (EDO Aire 52D54 equivalent)
- Sigmatek 4000C-18 (EDO Aire 52D54 equivalent)
- Sigmatek 4000C-19 (EDO Aire 52D54 equivalent)
- Sigmatek 4000D (ARC G502A equivalent)
- Sigmatek 4000D-1 (ARC G502A equivalent)
- Sigmatek 4000H-4 (ARC G502A equivalent)
- Sigmatek 4000H-5 (ARC G502A equivalent)

GARMIN

GFC 600

Navigation Source Interface Compatibility

GPS Navigation Source (with Roll Steering)

- GTN 650/750 series
- GNS 430/530 series and 430W/530W series
- GNS 480 (CNX80)
- GNC 155XL/300XL*
- Honeywell (BendixKing) KLN 90B*
- Other ‘standard’ (TSO-C129( ), TSO-C145( ), or TSO-C146( )) course/deviation GPS NAV source that has ARINC 429 Roll Steering, providing labels 114, 116, and 121.

GPS Navigation Source (without Roll Steering)

- Honeywell (BendixKing) KLN 89B/94*
- Other ‘standard’ (TSO-C129( ), TSO-C145( ), or TSO-C146( )) course/deviation GPS NAV source.

VHF NAV Source

- SL 30
- GNS 430/530(W)
- GNS 480 (CNX80)
- GTN 650/750
- GNC 255
- Narco MK 12D
- Collins VIR-351
- Any other ‘standard’ (TSO-C40( )) Course/Deviation VHF NAV Source

*Interface to this unit can only be used as a GPS navigation source input.

GFC 600

Example Configurations

GI-285 Mode Annunciator

GMC 605 Controller

Garmin or Select 3rd Party Navigation Sources

Pitch Servo

Roll Servo

Pitch Trim Servo

Yaw Servo

Garmin G3000/G5000 Select 3rd Party Instruments

GARMIN

GFC 600

Pricing & Availability

- GFC 600 has been Certified for A36 Bonanza and B55 Baron
  - Deliveries Expected to Begin in August
- B58 Baron to Follow

A36 Bonanza

- 2-Axis Autopilot with Electric Trim
  Starting at $19,995
- 3-Axis Autopilot with Electric Trim
  Starting at $24,995

B55 Baron

- 2-Axis Autopilot with Electric Trim
  Starting at $23,995
- 3-Axis Autopilot with Electric Trim
  Starting at $28,995

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connext™
Database Concierge
Database Transfer in Progress...
Databases – 4/4
Terrain Database – 80%
Skip Transfer and Continue
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PANEL
OVATION 2
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Questions?

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