

PA46 Technical Conference

Avionics Upgrades for PA46 Aircraft

Presented by Trevor Pegrum
EMEA Aviation Sales & Marketing

Who is Garmin?

- Founded in 1989 by:
Gary Burrell and **Dr. Min Kao**
GAR + MIN = **GARMIN**▲
- IPO in December 2000
- 1,000,000 total sq ft at Olathe campus
- 2,500 employees in Kansas (over 9,025 worldwide)
- Panel Mount Aviation manufactured in Kansas and Oregon



Markets We Serve

Auto / Mobile

Outdoor

Fitness

Marine

Aviation



Product Depth

Market Breadth

Global Presence

- Salem, OR
Aviation R&D
Aviation manufacturing

- Novi, MI
Auto OEM Programs

- Chicago, IL
Retail store

- Olathe, KS (Headquarters)
Primary R&D center
Aviation manufacturing and certification
Sales, distribution, and support for the Americas

EMEA sales and distribution

- Graz, Austria
- Brussels, Belgium
- Copenhagen, Denmark
- Lohja, Finland
- Paris, France
- Munich, Germany
- Milan, Italy
- Amsterdam, Netherlands
- Dilling, Norway
- Warsaw, Poland
- Lisbon, Portugal
- Johannesburg, South Africa
- Barcelona, Spain
- Billdal, Sweden

Research & Development

- Calgary, Alberta
- Chandler, AZ
- Cluj, Romania
- Los Angeles, CA
- Minneapolis, MN
- Newport, OR
- Raleigh, NC
- Santa Clara, CA
- Tucson, AZ
- Würzburg, Germany

- Beijing, China
- Shanghai, China
- ChengDu, China
- Sales and support

- Xizhi, Zhongli, & LinKou, Taiwan
Consumer manufacturing
R&D
Sales, distribution, and support for the Pacific Rim

- Schaffhausen, Switzerland
Parent Company
European MarComm

- UK Headquarters
Sales and support
Central European distribution center

South American sales and distribution

- Sao Paulo, Brazil
- Santiago, Chile

- Sydney, Australia
Distribution



9,300+ associates

Leader in the Aviation Market

Leading provider of forward fit (OEM), retrofit, and portable aviation equipment to the general and business aviation market:

- Over 10,000 G1000 Integrated Flight Decks in service
- Over 115,000 GNS 430 & 530 products in service
- Over 700 authorized sales & service centers worldwide



Partner with industry leading aircraft manufacturers:

Cessna, Bell Helicopter, Cirrus, Daher-Socata, Diamond, Embraer, Eurocopter, Hawker Beechcraft, Honda, Mooney, Piper Robinson Helicopter, Quest, MD Helicopter, and more.



20 YEARS OF INNOVATION

Garmin Aviation Product
Support: #1 for Ten
Consecutive Years!



PA46 Cockpit?



Photo Copyright Paul Stienstra

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Magic Cockpit



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Why Retrofit?

- Old “Steam Driven” Avionics are becoming old and unreliable, difficult to repair and maintain. Some parts part’s are no longer replaceable.
- New Avionics allow easy **Management of DOC** (direct operating costs). Increase Aircraft value/resale capability.
- Analogue Avionics systems do not provide access to modern technologies such Synthetic vision, Charts, Weather display, GPS approaches, etc
- Older Avionics systems do not meet current certification standards or allow compliance with latest airworthiness requirements (8.33, Mode-S, RVSM, etc)
- Modern Avionics increase situational awareness, and reduce pilot workload, **improving mission safety**.
- Installation of a avionics system allow increased mission profile by **Reducing Aircraft Weight** and removing obsolete components.
- New Avionics come with **Warranty for parts** and labour support.

Why Garmin

- Allows a “standard approach to fleet systems” Garmin systems are easy to train on and identical across multiple platforms,
- Easy to use Avionics,
- Synthetic Vision and next generation features at reduced costs,
- Full cockpit solution, including glass, GPS/NAV/COM, Traffic, Data-link, RAD ALT, Audio, etc
- Meets all current aircraft certification standards and approvals. FAA/EASA STC's readily available.
- Full Avionics warranty for 2 years, warranty extensions available.

Options?

- Integrated Cockpit



- Glass



- GPS/NAV/COM



- Traffic/Data-link



G950 for Meridian



GARMIN.
G950
for Piper Meridian
by Cutter Aviation

System includes

- 2x or 3x display options
- EIS/CAS
- Integrated Radio's, GPS, FMS,
- Optional SVT/TAWS/CHARTS
- Options for RADAR/TAS/Data-link
- Pricing 180-220K installed depending on options.

*No Current EASA STC in Place

G500/G600



One bezel. Two screens. 3-D vision.

G500/G600 Panel Cutout

The G500/G600's display size (10"w x 6.7h") allows for easy installation.



The display unit is designed to take the space currently occupied by the instrument six-pack.

Heart of the G500/G600 System

Proven Technology:

7,000+ G1000 Aircraft

1,000,000's of Flight Time Hours



GDC 74A Air Data Computer



GRS 77 AHRS



GMU 44 Magnetometer

G500



The Garmin G500 is a lower-cost alternative to the G600, designed specifically for Part 23 Class 1 and Class 2 aircraft (most singles or twins under 6,000 lbs)





G600 Update: GAD 43e & v6.11 Software

GDU SW 6.11

Support for GAD 43e
Interfaces:

Autopilot Mode
Annunciations

Display/Control Alt Pre-Select

Display of DME Distance

Display of Analog Radar
Altimeter

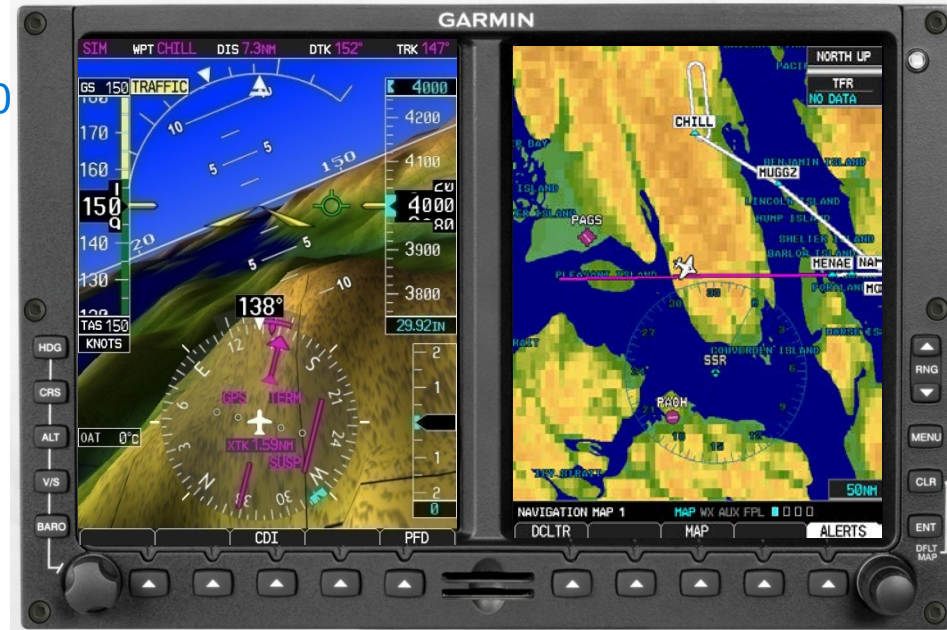
Display of Analog Nav Data

Display of Marker Beacon



G500 Overview

- Interfaces with Garmin Navs:
 - GTN 750/GTN650, GNS430W/GNS530
 - GNS480 & CNX80
- Standard With:
 - Topographic Maps & Terrain
 - Navigation Database
 - FliteCharts (requires subscription)
 - SafeTaxi
 - Roll Steering Outputs
- Options:
 - * Synthetic Vision Technology (SVT)
 - * GAD 43 autopilot adapter
 - ChartView – powered by Jeppesen
 - Altitude pre-select for S-TEC 55X autopilot
- Ability to display:
 - Datalink Weather
 - Traffic from a variety of sensors
 - GWX68/70 Radar (requires enablement option)*



Price
\$15,995

**Indicates standard on G600*

G500/G600 Comparison

HOW THE SYSTEMS COMPARE:

G 500

G 600

- Approved for Class 1 Aircraft (typically piston singles under 6,000 lbs.)
- Approved for Class 2 Aircraft (typically piston twins and turbine aircraft under 6,000 lbs.)
- Approved for Class 3 Aircraft (typically piston or turbine aircraft between 6,000 lbs. and 12,500 lbs)
- Software design assurance level
- Garmin SVT Synthetic Vision Technology
- GAD 43 replaces select A/P gyro attitude with AHRS references and provides bootstrap heading, yaw information, and baro corrections
- GWX 68 Radar interface (radar LRU sold separately)
- Internal TAWS-B terrain alerting

Yes

Yes

Yes

Yes

No

Yes

Level C

Level B

\$4,995

Standard

\$2,995

Standard

\$995

Standard

No

\$7,995

Standard System List Price:

\$15,995

\$29,995





Screen Size

- GTN 650 = 53% more screen
- GTN 750 = 98% more screen



GTN 6xx Series

GTN 625 635 650

GPS



COM



NAV



GTN 7xx Series



GTN 725

GTN 750

GPS



COM



NAV



GTN Features

Airways

Standard

Garmin SafeTaxi

Standard (US/Europe)

Obstacle Database

Standard

Terrain Alerting

TAWS-B (Optional)

10-Watt Comm

16-Watt (Optional)

Traffic

Via Compatible Traffic Source

Weather

Radar/Data-link

Remote Transponder

Via GTX 32/33

***Remote Audio Panel**

Via GMA 35

***Garmin FliteCharts**

Jeppesen ChartView (Optional)

*Indicates a feature for GTN 7XX only



GARMIN.

GTN Version 4.0

EASA
Certified



New v4.0 Features

Weather Radar GWX 70/68 & ART 2000

Advanced ADS-B GDL 88

Worldwide Connectivity GSR 56

Telligence™ & 3D Audio GMA 35

**Geo-referenced
Flitecharts** Jepp Charts too

GTN/GNS Crossfill GTN & GNS



Other v4.0 Features



Rubber Band Direct-To

Configurable Data Fields

Smart Airspace

Sort Airways Geographically

Remote Interface Options

Remote Transponder



GTX 32 - Mode C

GTX 33 - Mode S

Compatible with GTN 650 & 750

Save 1.65" of Panel Space!!

GMA 35/350: Product Overview

Auto Volume Adjustment

Select Distribution Mode

Advanced Auto Squelch

*3D Spatial Audio Processing

*Voice Command



*Indicates feature of GMA 350 only

Touchscreen Stabilization



- **Three distinct products:**

- **GTS 800 TAS** – lower cost system offering 40 watts of transmit power and up to 22nm of interrogation range.
- **GTS 825 TAS** – delivers 250 watts of transmit power and up to 40nm of interrogation range
- **GTS 855 TCAS I** - features the same 250 watt performance as the GTS 820, and also meets the FAA's TCAS I certification criteria



The GTS Series incorporates ADS-B Technology

- Our systems combine active TAS/TCAS with passive ADS-B “In” to correlate target data using Garmin’s patent pending CLEAR CAS technology
- Correlated Location Enhanced ADS-B Rceiver
Collision Avoidance System



- **Innovative incorporation of ADS-B into TAS / TCAS I**
 - Contingent upon intruder aircraft being equipped with ADS-B Out ES transponder
- **Benefits**
 - Allows more accurate and stable air-to-air target position from ADS-B
 - ADS-B traffic information delivers GPS based position of threat aircraft
 - Provides trend vector of threat aircraft *
 - Adds Flight ID and velocity of threat aircraft*
- **Technical**
 - GTS series includes 1090 MHz receiver “in”
 - Requires GTX 330/33 ES (Extended Squitter) “out”
- **End Result**
 - Allows Garmin to incorporate a seamless hybrid surveillance which provides all the benefits of passive traffic and active traffic simultaneously
 - **Verify target with TAS, position target using ADS-B**



*Future display enhancement

GTS Series Pricing

	GTS 800	GTS 825	GTS 855
• Traffic system type	TAS	TAS	TCAS I
• Transmitter power output (nominal)	40 watt	400 watt	400 watt
• Active surveillance range (typical)	22 nm	Up to 40 nm	Up to 80 nm
• Passive surveillance typical range (w/ ADS-B)	>100 nm	>100 nm	>100 nm
• Number of targets tracked	45	75	75
• Number of targets displayed (dependent on display system capability)	30	30	30
• Display range (dependent on display system capability)	2/6/12	2/6/12/24/40	2/6/12/24/40/80
• Range accuracy	+/- .05 nm	+/- .05 nm	+/- .05 nm
• Bearing accuracy	5° RMS	5° RMS	5° RMS
• Altitude accuracy	+/- 200 ft	+/- 200 ft	+/- 200 ft
• Altitude resolution	+/- 100 ft	+/- 100 ft	+/- 100 ft
• Max vertical separation	+/- 10,000 ft	+/- 10,000 ft	+/- 10,000 ft
• Audible target threat position callouts	Yes	Yes	Yes
• 1090ES ADS-B receiver (requires ADS-B "Out" capability)	Yes	Yes	Yes
• Correlated display capability	Yes	Yes	Yes
• Selective Mode-S interrogation	No	Yes	Yes
• Maximum Operating Altitude	55,000 ft.	55,000 ft.	55,000 ft.

List Price:

\$9,995

\$19,995

\$24,995

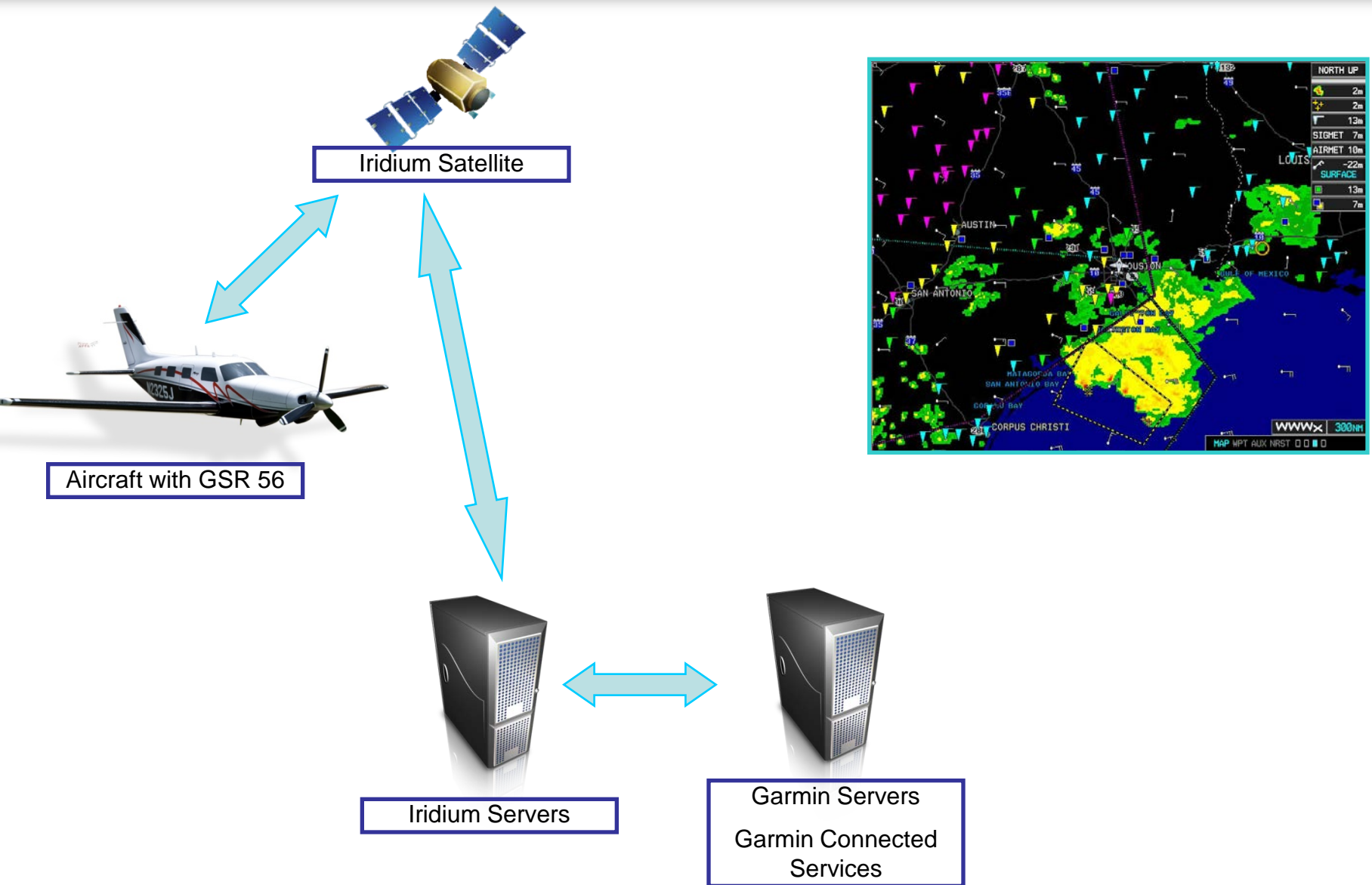


GSR 56 - Iridium Datalink System

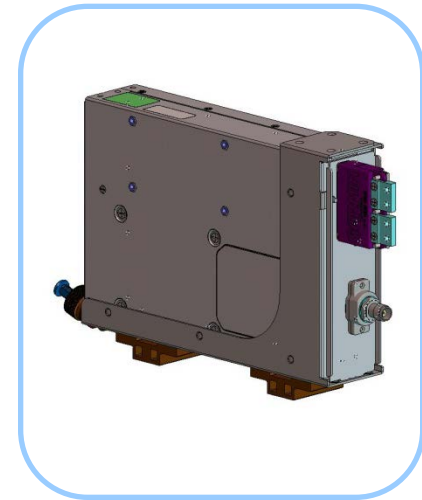
- **Satellite Phone**
 - Fully integrated with Avionics
 - Dialing interface provided via MFD/GTN
 - “Incoming Call” message prioritized with other aural messages
- **Text Messaging (SMS)**
 - Allows user to send and receive text messages to/from cell phones and email accounts
 - User interface supported through both GDU and GTN
- **Worldwide Weather**
 - Initial coverage for US, Southern Canada and Western Europe; followed by other regions of the world
- **Data Transmission**
 - GSR 56 provides an airborne low speed data link via Iridium satellite network
 - Can be used as follows:
 - **Short Burst Data** formats, while airborne
 - **Phone** communications while airborne
- **Garmin as an Iridium VAR**
 - Garmin is a Value Added Reseller (VAR) of Iridium airtime
 - Customers will sign up for Iridium voice/data plans through Garmin and will be billed for airtime by Garmin



GFDS – Iridium Data Flow Diagram



- Garmin's goal is to ensure that the product offering has **worldwide** coverage:
 - METAR
 - TAF
 - Winds Aloft
 - Temps Aloft
 - NOTAMs
 - RADAR
 - Lightning
 - SIGMET
 - AIRMET
 - TFR
 - Satellite
 - PIREP
- All of the above offerings are already available and many have substantial global coverage (METAR, TAF, Winds Aloft, SIGMETs, AIRMETs)



GSR 56

What does it cost?

- **GSR56**
 - List Price: \$9,995
- **GFDS**
 - Account Activation: \$35.00 one time fee
 - Account Activation for Voice/Text \$15.00 one time fee
- **Weather Service Subscription**
 - European Weather Subscription: \$60.00/month
 - US Weather Subscription: \$30.00/month
 - Worldwide Weather Subscription: \$70.00/month
 - Voice and Text Messaging: \$40.00/month
- **Usage Charges**
 - Minutes 1 – 50: \$1.60/minute
 - Minutes 51 – 100: \$1.55/minute
 - Minutes 101 – 250: \$1.50/minute
 - Minutes 251 – 500: \$1.40/minute
 - Minutes 501 – 1000: \$1.30/minute
 - Minutes 1001 and above: \$1.20/minute
- **Charges for Text Messaging (SMS) \$1.00/text (outgoing only)**

Pricing subject to change without notice

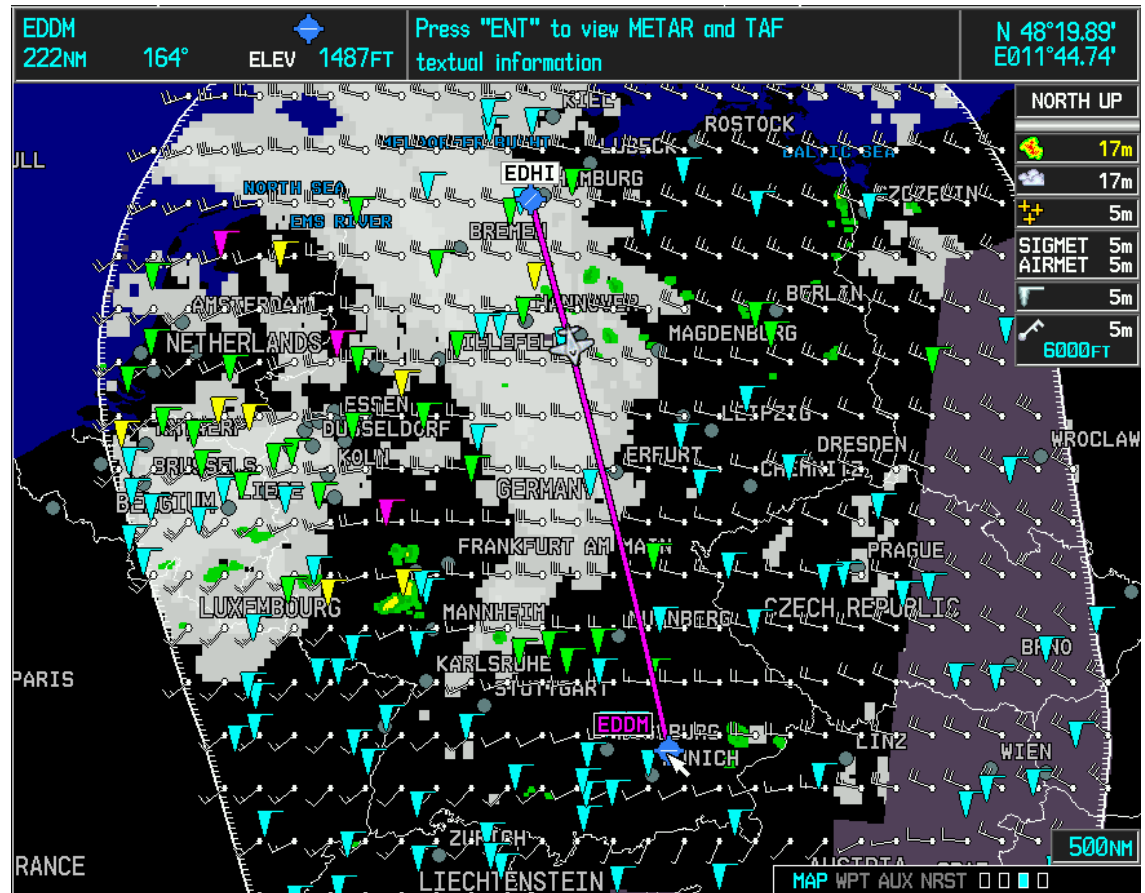
Worldwide Weather Pricing

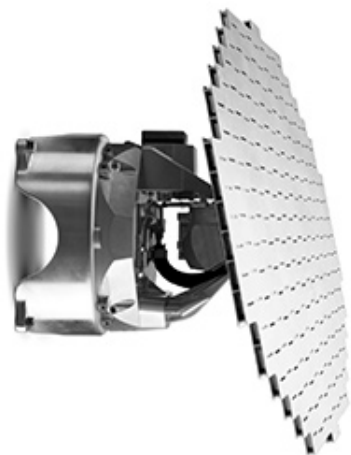
What did this request cost?

- **Request Parameters**
 - Remaining Flight Plan
 - Corridor Width: 500nm
- **Request**
 - Download time: 1 minute 55 seconds
 - Cost: \$3.20 USD

Factors that affect cost

- **Iridium signal quality**
 - Affects download speed
- **Size of requested area**
 - Larger area increases report size
- **Level of weather activity**
 - Active weather increases report size
- **Regional weather coverage**
 - Each supported weather product increases report size.





- Solid State. No Magnetron or life limited parts. Better WX penetration
- 320NM Range
- Same price as the GWX68!
- Retrofit options
- Advanced features such as Turbulence Detection, Ground Clutter Suppression, Wind Shear Detection
- Overlay on moving map display



Compatible Devices

DISPLAY	Basic GWX 70 Support	Advanced Doppler Features
GTN 750 Series	Yes	Yes
G500/G600	Yes	Future
G1000	Airframe specific	Airframe specific
GMX 200	Yes	No
GMX 20	Yes	No



PA46 - Mirage

G600/GNS/GMX



G600/GNS530/GMX



Dual G600



PA46 - Meridian

Dual G600/GTN750



Tired of Waiting Rebate

Garmin Products Purchased	Total Rebate
GMA 350, GMA35, GTX 330 or GTX33	\$250
Single GTN 650	\$500
Single GTN 750	\$750
Dual GTN 650	\$1,000
Dual GTN 750	\$1,500
GTS 800	\$1,000
GTS 825/855	\$1,500
GWX 70	\$1,000
Single G500 with SVT	\$1,000
Dual G500 with SVT	\$2,000
Single G600	\$1,500
Dual G600	\$3,000