

# 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?



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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.



# 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 6.7" h) 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

**GARMIN.**

# 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**

	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

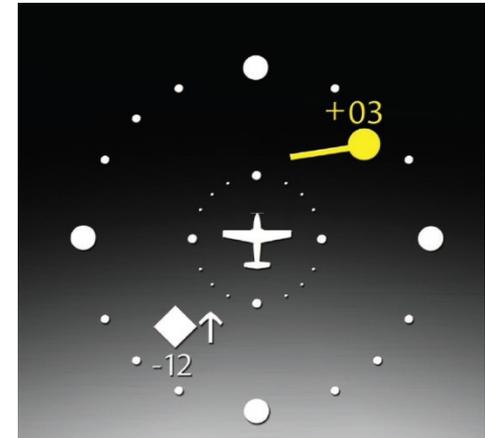


# The GTS Series incorporates ADS-B Technology

- 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 Receiver 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

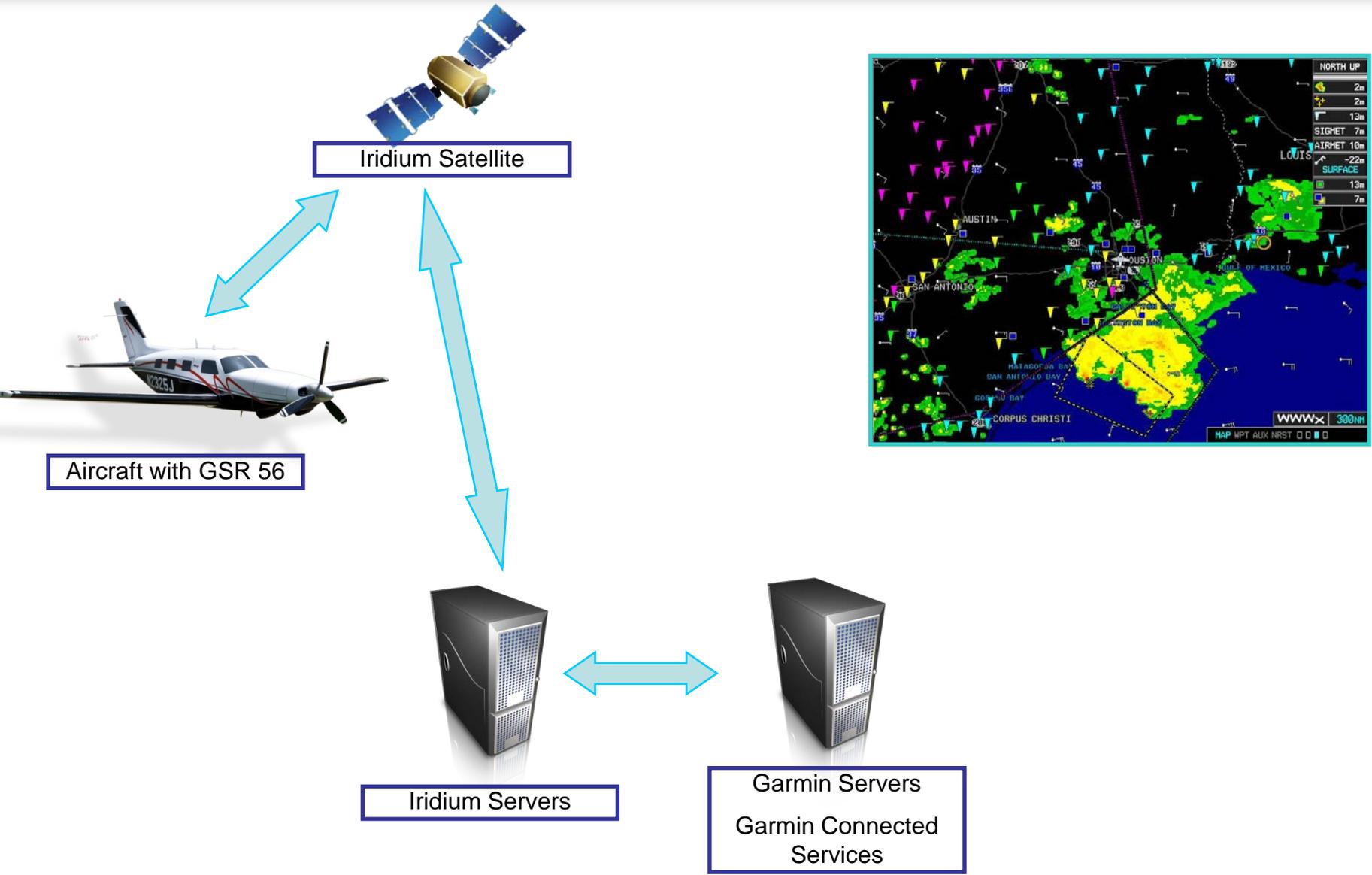


# GSR 56 - Iridium Datalink System

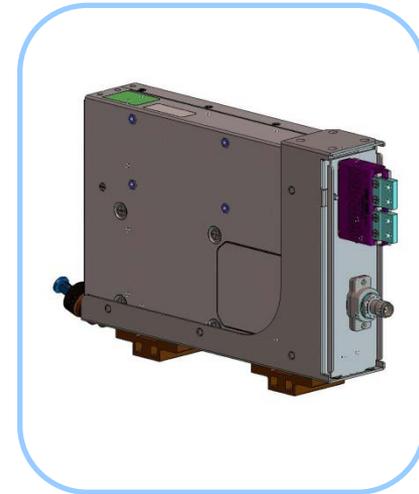
- **Satellite Phone**
  - Fully integrated with Avionics
    - Dialing interface provided via MFD/GTN
    - “Incoming Call” message prioritized with other aural messages
- **Text Messaging (SMS)**
  - Allows user to send and receive text messages to/from cell phones and email accounts
  - User interface 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***

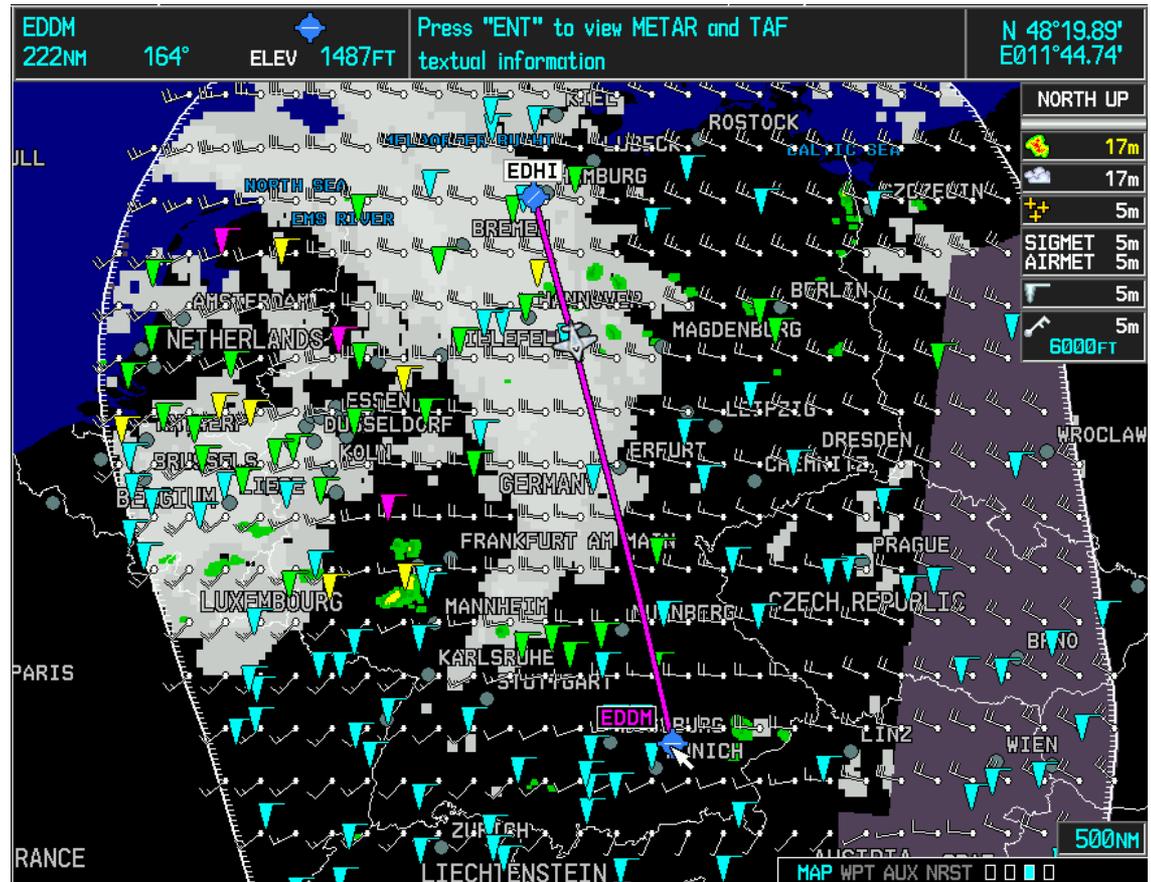
# Worldwide Weather Pricing

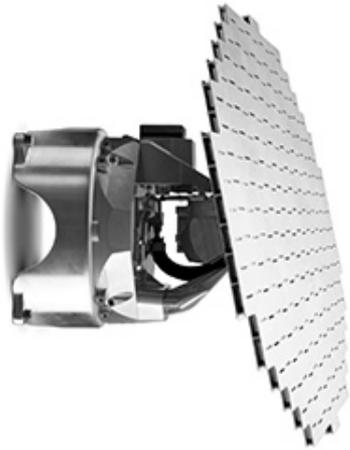
## What did this request cost?

- **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

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



PA46 - Mirage

# G600/GNS/GMX



08.13.2010  
PA46 - Mirage



# 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