Choosing a Datalink System for Your Aircraft

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AVIDYNE

Executive Summary

The availability of an accurate weather picture in flight has always been critical to the safety and utility of general aviation. With recent advances in datalink technology, a wide variety of weather products are now becoming available providing a cost effective and practical weather picture to the general aviation pilot.

Receiving weather via satellite is the preferred method of delivery. Satellites provide full continental US coverage without geographic gaps in coverage and without the altitude restrictions associated with ground-based systems. Narrowcasting of datalink weather provides the most efficient and cost-effective means of delivering weather to the cockpit. Broadcast systems must send all weather products to all subscribers and thus makes inefficient use of the available bandwidth. In addition, broadcast systems have higher overhead costs which translates to higher fixed-cost subscriptions. Request/Reply systems increase user workload and have inherent time delays. Narrowcast systems provide each user with the unique weather products based on their particular route of flight, optimizing bandwidth allocation, reducing pilot workload, and providing the best value.

In addition to actual hardware costs, installation is a big cost driver. Integrated datalink systems require fewer actual boxes to install, which translates to lower installation cost. When considering antenna placement, having the option of installing an antenna coupler can save thousands of dollars on installation costs. Having the ability to time-share a VHF Comm antenna means not having to install an additional antenna, which reduces the number of holes in the pressure vessel, and reduces drag associated with hanging another antenna on the airplane.

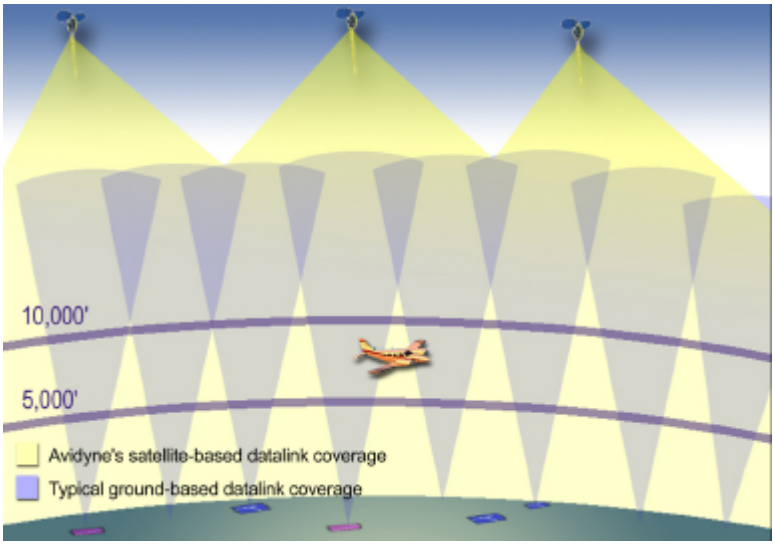
Datalink service should be on a pay-as-you-go basis so you are only paying for data when you need it. Subscription-based services bill you monthly even when you do not use the service. Most general aviation flyers don't mind paying for datalink weather when the need arises, but appreciate the ability to turn off the datalink in VFR conditions, and to not have a $50 or $80 monthly bill during the months when they are not flying. Future products such as position reporting, maintenance data downlink, flight plan uplink, and database updating via datalink will become available as well. These products take advantage of the two-way communication path possible with Avidyne's satellite network.

Considering the utility, safety and economic implications of real time weather in the cockpit, you should expect datalink as standard equipment in your avionics. With FlightMax, the complete weather picture is displayed as an overlay on the map, with your flight plan, traffic, terrain, obstacles, and TFRs making it possible to avoid the weather with complete situational awareness anywhere in the continental United States. And with Avidyne's narrowcast datalink weather system, you can have weather you want, when you want it, where you want it, and at a price you can afford.

Choosing a Datalink System

This document is intended to help you understand the technical differences between these systems and how those differences affect your ability to get the weather you want, when you want it. In selecting a datalink system for your airplane you should consider the following:

-Terrestrial vs. Satellite
-Broadcast vs Narrowcast vs Request/Reply
-Data and Display resolution
-Acquisition Cost
-Recurring Cost
-Growth capability



Weather from a higher source

The many advantages of satellite-based systems may seem obvious. First, the weather is always available – and most satellite systems have complete coverage throughout the continental United States (CONUS) today. The satellites have been launched and are operational today - there are no more ground stations to install. No waiting for complete US coverage. The second and probably most important benefit of choosing a satellite-based system is that the weather is available on the ground and at relatively low altitudes. Planning your route of flight (whether VFR or IFR) is easier when you know the current weather picture. That picture is available on the ground and at any altitude via the satellite link. Terrestrial-based datalink weather systems require line of sight between your aircraft and the ground station, which is extremely unlikely on the ground at an airport without a ground station.

Most terrestrial systems have relatively poor coverage below 5,000 feet. Terrestrial systems begin to measure their coverage and datalink availability at 5,000 feet and above. In addition, coverage over mountainous areas can be problematic. (You may remember the many-year delays in closing the mid- continent gap in the Loran system.)

The ORBCOMM (www.orbcomm.com) satellite network consists of 30 satellites in a Low Earth Orbit (LEO) constellation. There are 12 ground-based control centers, located around the world with overall service availability averaging about 99.9%. Transmissions from the satellite to the aircraft use the VHF frequencies from 137Mhz to 138Mhz and transmissions from the aircraft to the satellites use 149Mhz to 151Mhz. There are no line of sight restrictions.

Once you've chosen a terrestrial or satellite based system there are three methods for transferring weather data over that network to an aircraft.

1) Broadcast, continually transmits all available weather products sequentially.

2) Request/Reply, transmits data only when requested, and

3) Narrowcast, Avidyne's unique technology for automatically providing the needed weather products direct to the airplane.

Lets quickly review each:

Narrowcast

With Avidyne's innovative "Narrowcast" technology, the weather you want, when you want it, where you want it is automatically sent to you via the satellite network, without requiring any pilot action. When you establish a datalink account with Avidyne, we assign a unique address that identifies your aircraft on the communications network. Your preferences for the weather you want, such as NEXRAD, METARs, AIRMETs/SIGMETs, TFR/SUA and desired update rate, resolution, coverage area, and options are set through the MyAvidyne.com web portal. Upon aircraft startup, the datalink system automatically establishes a communication channel with the Avidyne Network Operation Center (NOC).

At this point, the weather you want is transmitted to the airplane via the satellite network based on your preferences and your aircraft becomes an active node on the network. This technology provides you with the lowest **Time-To-First-Weather** (TTFW) possible by sending you the relevant weather conditions even BEFORE you have entered your flight plan. Once your route of flight is entered, we automatically send you the weather updates along your route of flight as soon as they are available – no further pilot actions are required. And of course you only pay for the weather that you want.

Broadcast

Broadcast systems continuously (and sequentially) send out the available weather products to every user in the area through a costly system of interconnected ground stations that are uniquely designed for this application. Since the high cost of installation and maintenance of these ground stations must ultimately be born by the users, the long term economic viability of the system is completely dependent upon a continuous stream of monthly service fees. Simply stated, you will pay for weather data even when you are not flying.

Although broadcast systems use higher bandwidth capable frequency spectrum (two frequencies are used in the VHF band), this is required because broadcast systems suffer from an inherent inefficient utilization of this bandwidth. Broadcast transmitters must send all the data needed by every user of the system all the time even though there may be no users in the area that currently want that data. That's because the link is only a one-way pipe. The overall effect is that, as the system gets more users using more weather products, the net throughput will be continuously reduced and latency to receive the weather you want will be increased.

Request/Reply - All satellite systems are not created equal

In request/reply systems the weather data is only sent some time after the pilot makes the initial request. Lets examine the entire sequence of events that are required here. Before a request is made, the pilot must make the decision that weather data is required, then compose a request for the specific weather information and the area of coverage. This request must then be sent from the aircraft to the satellite, from the satellite to the ground, processed by the ground system and transmitted back to the airplane – a trip that can exceed 10 or 15 minutes. When the request arrives at the network operations center, the weather available at that time is transmitted to the aircraft, even though this weather may be several minutes old itself. This highlights the inherent latency limitations of a request/reply system.

Avidyne's Narrowcast system eliminates many of these latencies and the pilot workload associated with managing the datalink weather system. Because our Narrowcast system understands the weather you want, when you want it, and where you want it, there is no need for a pilot to request weather data and there is no delay waiting for a pilot request to reach the ground. Our system will send the weather you want immediately after it becomes available from the national weather service. You'll always have the most current weather data possible. There are no delays or latencies associated with requesting your weather data at the wrong time and we won't send you the same data twice.

Narrowcast technology also conserves network bandwidth. This technology provides all the benefits of a broadcast system (higher bandwidth) with the advantages of satellite request/reply systems (complete coverage). Once you power on your avionics, we begin sending weather unique to your area and your preferences no matter what part of the country you are in. Once your flight plan has been entered on your navigation system, it is sent to our network operations center via the satellite link. Since the network operations center knows your route of flight, your current position and the current NEXRAD and METAR weather – we can send the relevant weather directly to the airplane based upon the preferences that you have set. The network operations center tracks your flight and continuously sends the relevant weather without any pilot intervention or actions required. The weather products that you specify are delivered to your airplane when you need them at any altitude. When you land, the Avidyne datalink system sends a simple command telling the operations control center that the flight is complete and weather updates are no longer required. You only pay for the weather that you use.

To simplify this further, the table below illustrates most of the choices available today and displays them in the context of the previous discussion:

	Satellite	Terrestrial
Narrowcast	**Avidyne EX500** Available: NOW	N/A
Request/Reply	Echoflight – Available: Now Garmin GDL-49 – Available: Now	Aircell Available: Now w/ limited coverage
Broadcast	WSI Available: Now Merlin Available: 200X? XM Radio: Available 200X?	Bendix/King KDR510 w/ FIS Available: Now w/ limited coverage

Once you've evaluated the advantages of narrowcast, broadcast and request/reply systems the next factor to consider is the weather products themselves.

NEXRAD Weather "The way it is supposed to look"

In the United States, there are approximately 150 ground based Doppler radars each producing a local circular view at a 0.5-degree inclination to the horizon. These radars paint a picture based upon the strength of the radar return, which is a function of the amount of moisture in the air (the greater the precipitation, the stronger the radar return). NEXRAD (next generation radar) is the term applied to the mosaic created from integrating these individual Doppler pictures into a single nationwide color-coded weather picture. This national mosaic is created about once every 5 minutes and serves as the foundation for our NEXRAD weather product. The base reflectivity map, created with a resolution of 1 kilometer, is displayed in a 5-color format depending upon the intensity of the weather.

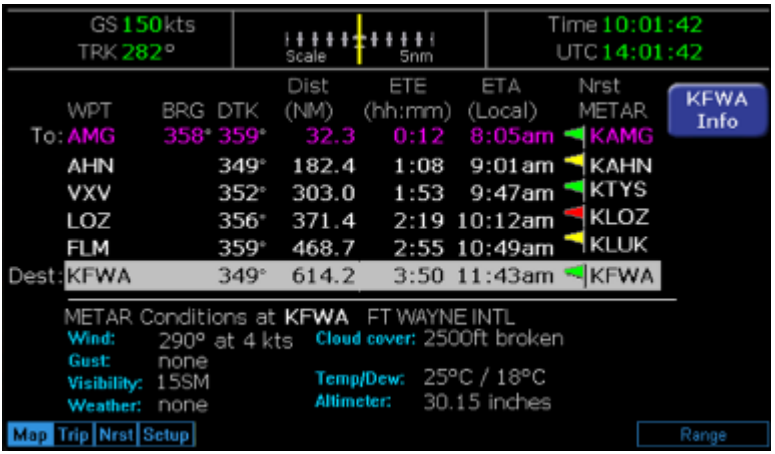
Avidyne's unique (patent pending) rendering process displays this high resolution data in a smoothed format consistent with more familiar weather displays such as The Weather Channel. Other systems render this high-resolution weather data into large "blocks" which are particularly noticeable at the lower map scales most commonly used during flight. In contrast, Avidyne's Data Link Weather System delivers this high-resolution data in an easy to interpret "smoothed" format. Simply put, when you zoom in, you see the weather…. not the pixels.

METARs (An acronymn for the French translation for Aviation Routine Weather Report) are also a standard feature of many datalink weather systems. Typically updated every hour, Avidyne's datalink weather service displays graphical METARs on the map as flags near the waypoints and/or stations that are reporting. Graphical METARs are also displayed on the trip page associated with the waypoints along your route of flight and on the Nearest Airport page, so you can see at a glance the weather conditions at your destination and for potential alternate airports. Our network operations center automatically keeps track of which METARS have changed since your last update and only resends those that have been updated – once again you only pay for the data that is relevant to your flight.

METARs come in 5 levels of severity and are color coded to indicate:

	Ceiling		Visibility		Color
VFR	> 3000	and	> 5 mi		Blue
MVFR	>= 1000	and	>= 3 mi	but less than VFR	Green
IFR	>= 500	and	>= 1mi	but less than MVFR	Yellow
Low IFR	< 500	or	< 1mi		Red
< Cat 1	< 200	or	< .5mi		Magenta

Each METAR contains a mini-weather report for that reporting point. Avidyne decodes and displays ceiling, visibility, wind speed/direction, temperature/dew point, barometric setting, and comments in plain English on the TRIP page.



This screen shot shows the EX500 Trip Page with graphical METARS for each waypoint along the flight, and the destination waypoint is selected for viewing the plain-English METAR.

More than Weather – *Avidyne adds TFRs*

Temporary Flight Restrictions (TFRs) are updated by the FAA on a regular basis to reflect any current military or national security conditions that may be in effect. Avidyne provides the most current state of the TFRs via the satellite network and displays them on your map.

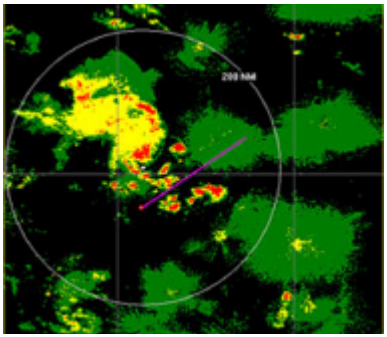
This screen shot shows the TFR over Camp David near Frederick, Md.

High Resolution –

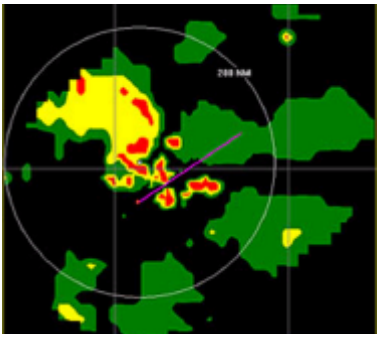
"Its not the bandwidth that matters – its how you use it"

Many datalink systems deal with bandwidth limitations by limiting the NEXRAD display to large blocks of data of up to 6nm on a side (36 sq mile blocks). Display of finer resolution weather data requires substantially more bandwidth through a limited pipeline.

Unique to our Narrowcasting approach, Avidyne uses a combination of rectilinear data compression and Variable Spatial Resolution (VSR) technology (both have patents pending) to transfer information at maximum efficiency. Consider that the storm shown in Figure A (an actual storm depicted in native NEXRAD resolution) can be rendered on the EX500 exactly as shown in Figure B using as few as 65 bytes of data. (Magenta line is flight plan). If the weather conditions along your route of flight are clear, the network operations center will send no data. Since your cost is based upon the amount of data transmitted over the satellite (measured in message units), you pay only for the weather that affects your flight. Consider that next time you send your $55 to a broadcast weather provider for service in February when you flew only 2 hours and there was no weather!!!



A: NEXRAD native resolution (raw data)



B: Cockpit rendering of same data

Best Value - Acquisition Cost (Hardware)

With the FlightMax EX500, the datalink is built in and the entire MFD system with datalink is priced at what you might expect to pay for an MFD by itself.

Avidyne is the only company offering an integrated datalink transceiver at virtually no additional cost. Alternative datalink systems require you to purchase a datalink transceiver with costs range from $3,500 to $5,500 plus installation.

The following pages show some comparisons. A complete comparison chart is available on page 20.

FlightMax EX500 vs. Bendix/King KMD850

Radar-Equipped Aircraft - Owners of radar-equipped aircraft will continue to get the tactical benefits of on-board weather radar, and datalink will provide the strategic element of weather avoidance. The FlightMax EX500 supports 19 different radars, so in most cases, you won't even need to replace your existing radar R/T, making the FlightMax EX500 the easy choice. The Bendix/King KMD850 o*nly* works with their digital series (RDS8X/RDR 2X00) radars. The FlightMax EX500 is the winner on price and functionality. *The EX500 with integrated datalink costs about 40% less than the KMD850*. It has a higher resolution display, an easier user interface and all the advantages of the narrow-cast system including full CONUS coverage and no altitude restrictions.

FlightMax EX500 **w/ RDR 2000 Radar Interface**		**B/K KMD850** **w/RDR 2000 Radar Interface**	
			
List Price	$11,995	List Price	$12,408
Datalink	Included	KDR510 Datalink	$5,546
TAS/TCAD interface	Included	TAS Traffic Card	$2,000
Total System Price	**$11,995**	**Total System Price**	**$19,954**

FlightMax EX500 advantages over KMD 850:
–EX500 has integrated datalink (one box to install versus two)
–EX500 can overlay radar AND datalink on map
–EX500 datalink has full CONUS coverage and no altitude restrictions
–EX500 has high display brightness and high resolution
–EX500 data blocks are fully configurable
–EX500 user interface for radar is much easier
–EX500 zoom rate much more responsive
–EX500 costs less, does more

FlightMax EX500 vs. Bendix/King KMD550

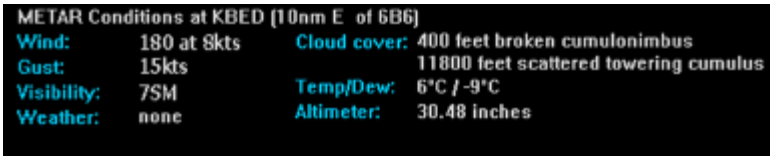
Non-Radar Aircraft - Non-radar aircraft will gain huge benefits from having datalink graphical weather on board. It costs about the same as adding a Stormscope, but adds a tremendous amount of additional value. *The EX500 with integrated datalink is about 40% less expensive compared to the KMD550*, and it has a higher resolution display, a much easier user interface, and all the advantages of the narrowcast system including full CONUS coverage and no altitude restrictions.

FlightMax EX500 (Non-Radar Version)		**B/K KMD550 (Non-Radar Version)**	
			
List Price	$8,995	List Price	$7,695
Datalink	Included	KDR510 Datalink	$5,546
System Price	**$8,995**	**System Price**	**$13,241**
TAS/TCAD interface	Included	w/ optional TAS Traffic Card	$2,000
Total System Price	**$8,995**	**Total System Price**	**$15,241**

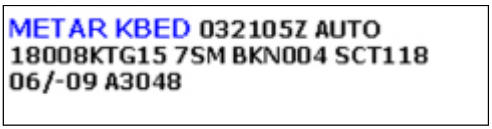
FlightMax EX500 advantages over KMD 550:
–EX500 has integrated datalink (one box to install versus two)
–EX500 datalink has full CONUS coverage and no altitude restrictions
–EX500 has high display brightness and high resolution
–EX500 data blocks are fully configurable
–EX500 zoom rate much more responsive
–EX500 costs less, does more

FlightMax EX500 vs. KMD550/850

Text METAR Comparison

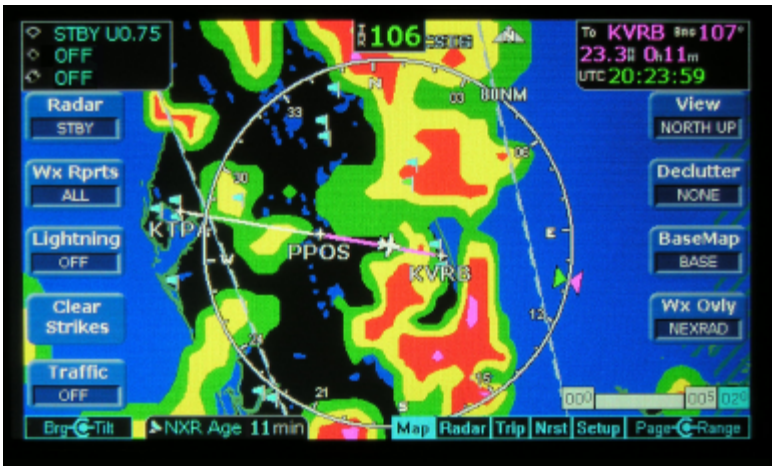


FlightMax EX500 - Provides fully-translated plain English METAR so you can get weather information at a glance. This is much easier to read and understand in a busy cockpit, as opposed to trying to translate an abbreviated-code METAR.

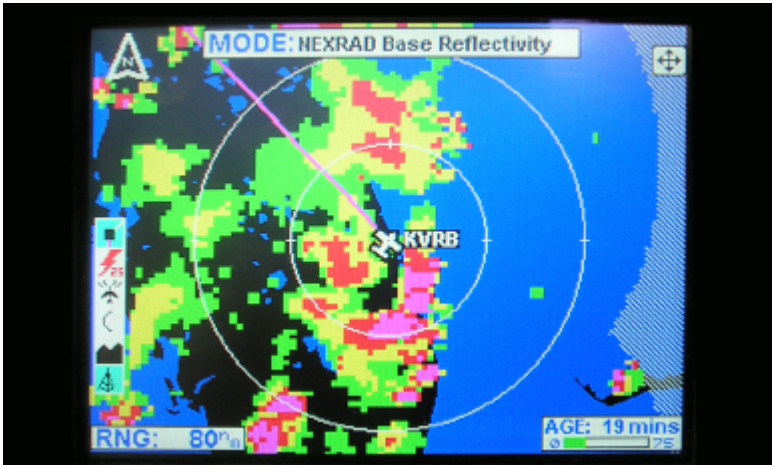


KMD 550/850 - Displays abbreviated-code METAR (with a translation table in the back of their operator's manual).

A complete comparison chart is available on page 20.



EX500 Screen shot with high resolution depiction of weather.



KMD850 screen shot with their depiction of weather.

FlightMax EX500 vs. MX20

Radar-Equipped Aircraft – As mentioned before, the FlightMax EX500 supports 19 different radars, so in most cases, you won't need to replace your existing radar R/T, making the FlightMax EX500 the easy choice. The MX20 *only* works with the RDR 2000 series radars, and costs thousands more than the EX500. The FlightMax EX500 is the hands-down winner on price and functionality here as well. The radar-capable EX500 costs about 40% less than the MX20 I/O with the WSI AV200.

FlightMax EX500 **w/ RDR 2000 Radar Interface**		**UPS/GARMIN-AT MX20 I/O** **w/RDR 2000 Radar Interface**	
			
List Price	$11,995	List Price	$14,995
Datalink	Included	WSI AV200 Datalink	$4,995
TAS/TCAD interface	Included	TAS Interface	Included
Total System Price	**$11,995**	**Total System Price**	**$19,990**

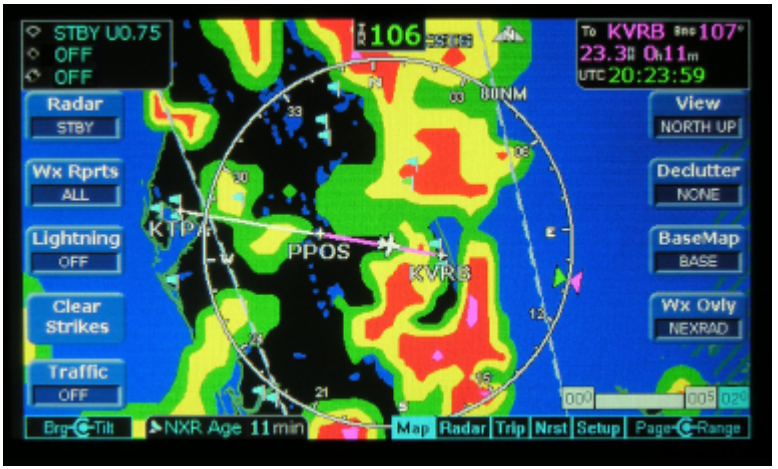
FlightMax EX500 Advantages over the MX20 I/O:
–EX500 has integrated datalink (one box to install versus two)
–EX500 can overlay radar AND datalink on map
–EX500 supports curved flight paths
–EX500 data blocks are fully configurable
–EX500 user interface for radar is much easier (dedicated Tilt & Brg Knob)
–EX500 zoom rate much more responsive
–EX500 (with datalink) weighs only about half as much
–EX500 costs less, does more

Non-Radar Aircraft - The EX500 with integrated datalink is about 30% less expensive compared to the MX20 w/AV200.

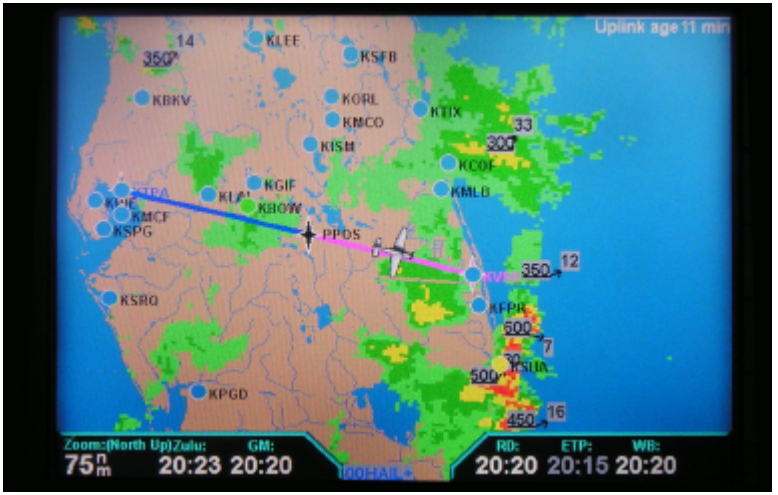
FlightMax EX500 (Non-Radar Version)		**UPS/GARMIN-AT MX20** (Non-Radar Version)	
			
List Price	$8,995	List Price	$7,295
Datalink	Included	WSI AV200 Datalink	$4,995
System Price	**$8,995**	**System Price**	**$12,290**
TAS/TCAD interface	Included	w/ optional TAS Traffic Card	$1,200
Total System Price	**$8,995**	**Total System Price**	**$13,490**

FlightMax EX500 Advantages over the MX20:
–EX500 has integrated datalink (one box to install versus two)
–EX500 supports curved flight paths
–EX500 data blocks are fully configurable
–EX500 zoom rate much more responsive
–EX500 (with datalink) weighs only about half as much
–EX500 costs less, does more

FlightMax EX500 vs. MX20



EX500 Screen shot with high resolution depiction of weather.



MX20 screen shot with their depiction of datalink weather.

FlightMax EX500 vs. Garmin GNS530

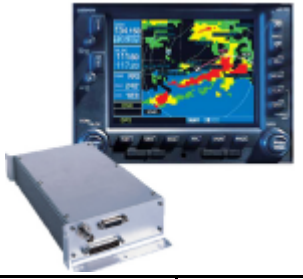
Customers trying to decide whether to get a Garmin 530 w/GDL49 or a FlightMax EX500 should consider this. You are probably looking at the 530 because you want to add a more capable GPS, and you're probably wanting to upgrade your NAV/COMM unit.

In this case, it makes more sense to choose the FlightMax EX500 with integrated datalink and couple it with a Garmin *430*. You'll get the same GPS/NAV/COMM capability as the 530, plus you'll have the absolute best moving map available today. And you will also get the advantage of Avidyne's integrated Narrowcast Datalink, rather than having to also buy a remote-mounted GDL49 datalink box with its higher-workload request-reply datalink system.

In addition, the EX500 provides full color-contoured terrain base map and a full US obstacle database, which are not available on the 430 or 530. And you get a much higher resolution display. **The EX500 has over twice as many pixels and 50% more screen area than the GNS530.**

Plus, if you have a radar indicator, the EX500 (with 19 different radar interfaces) will more than likely act as a replacement, whereas the 530 will not display radar.

FlightMax EX500 vs. Garmin GNS530

FlightMax EX500 w/GNS430		**GARMIN GNS530**	
			
List Price	$8,995	List Price	$14,995
Datalink	Included	GDL 49 Datalink	$3,450
TAS/TCAD interface	Included	TAS/TCAD interface	Included
Terrain Database	Included	Terrain Database	Not Available
Obstacle Database	Included	Obstacle Database	Not Available
GNS430 GPS/NAV/COM	$9,250		
Total System Price	**$18,245**	**Total System Price**	**$18,445**

FlightMax EX500 Advantages over the GNS 530:

–EX500 has integrated datalink
–EX500 can overlay radar and datalink Wx on map
–EX500 shows color-contoured terrain, 530 does not
–EX500 shows man-made obstacles, 530 does not
–EX500 has higher display brightness
–EX500 has higher resolution NEXRAD
(EX500 has 1 sq mi. resolution versus 530's 36 sq mi resolution)
–EX500 has higher resolution display
(The EX500 has over twice as many pixels and 50% more screen area.)
–EX500 zoom rate much more responsive
–EX500 costs less, does more

EX500 Screen shot with high resolution depiction of weather.

GNS 530 Datalink Screen shot of same weather.

Datalink Comparison Chart

	FlightMax EX500	Bendix/King KMD 550/850	Garmin GNS530	Garmin-AT MX20
Datalink Provider	Avidyne	B/K FIS-B	Echo Flight	WSI
MFD System Price w/Datalink & TAS interface	**$8,995**	$15,241	$18,500	$13,490
MFD System Price w/ RDR2000 Radar, Datalink & TAS	**$11,995**	$19,954	Not Available	$19,990
Highest NEXRAD Resolution	**1.0 nm (1.0 Sq nm)**	2.16 nm (4.6 Sq. nm)	6.0 nm (36 Sq. nm)	**1.0 nm (1.0 Sq nm)**
Narrowcast Datalink	Yes	No	No	No
All-altitude coverage	Yes	No	Yes	Yes
Full CONUS Coverage	Yes	No	Yes	Yes
Display Resolution	High	Low	Low	High
Display Brightness	High	Med	Med	High
Easy User Interface for Weather Updates	**Automatic Update**	**Automatic Update**	Request Reply	Manual Request
Graphical METARs	Yes	Yes	Yes	Yes
Plain English METARs	Yes	No	No	Yes
Full Overlay	Yes	No	No	No
TFR Updates	Yes	No	No	Yes
Dedicated Radar Range, Tilt & Bearing Knob	Yes	Yes	No	No
XYZ Heading input	Yes	Requires $2K interface card	Requires $3500 GAD 42	No
TAWS support	Yes $2K Option + Sensor	Yes $2K Option + Sensor	Yes $6.4K Upgrade Next Year	No
Support for RDR130/150/160 Radar	Yes	No	No	No
Support for Collins WXR 250/270 Radar	Yes	No	No	No
Support for Bendix RDR 1100/1200 Radar	Yes	No	No	No
Ongoing Subscription Fees	**$0 Subscription You pay only for what you use.**	$49-55/ Month $588-$660/year	$9 - $55/ Month $108 -$660/year	$50-85/Month $600 - $1000/year

Comparison data based on available website data as of August 20, 2003 and is subject to change.

Best Value - Installation Cost

Avionics installation costs vary from dealer to dealer, but many of the issues that drive cost are constant across all dealerships. When quoting an installation of a piece of gear, avionics managers typically look at the following items:

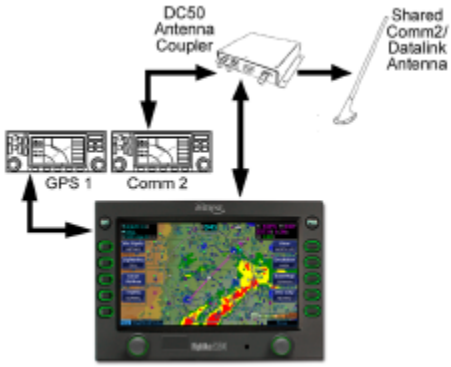
How much rearranging of the panel will be required to add this piece of gear?

How many boxes are required to make this piece of gear work? (Is this a one-box system, a two-box system? etc).

Do I need to install another antenna on the aircraft? Do I need to punch another hole in the skin to add the antenna? (This is particularly expensive on pressurized aircraft).

The FlightMax EX500 is typically the least expensive system to install because it is a one-box system with the datalink transceiver built right into the MFD. That means only one hole to cut in the panel, wires only need to go to one box, and it typically only requires one circuit breaker. In radar-equipped aircraft where the EX500 replaces the existing radar indicator, panel space rearrangement is minimal.

Another big advantage of the FlightMax EX500 system is that Avidyne offers the option of a FlightMax DC50 antenna coupler, which allows the datalink transceiver in the EX500 to time-share a single antenna. With the DC50, avionics installers replace the existing top-mounted COMM2 antenna with a new dual-purpose “COMM/DAT” antenna, which provides extended-range VHF capability for communicating over the normal VHF COMM band as well as the higher VHF satellite frequencies.



When space is at a premium on top of the airplane, or you don’t want the added drag of hanging another antenna out in the wind, or you don’t want the added expense of penetrating the pressure vessel again, the DC50 provides an attractive option that is not available with other datalink solutions.

Recurring Cost (Service)

The Big Advantage to "Pay As You Go" Service

One of the big questions surrounding datalink is the ongoing charges for the service. Competitive systems are based on subscription pricing which requires the customer to pay as much as $49, $55, or even $79 per month, even if they don't fly that often or they aren't needing datalink service on a particular flight.

For *broadcast* systems, a subscription pricing model is required because they are sending weather data all the time, whether anyone is receiving the data or not. They have an infrastructure of ground-based radio towers or broadcast satellites that must be paid for regardless of the number of "listeners." This, of course, costs lots of money, which must be passed along to the customer base to pay for this service and the overhead to support it.

The advantage of Avidyne's Narrowcast system, which uses the ORBCOMM satellite network, is that Avidyne only gets billed when we pass data through the satellite. ORBCOMM does not charge us an over-and-above fee to help pay for the infrastructure. We only pay for the satellite time we use, which means our customers only have to pay for the data they need. This provides Avidyne with a huge price advantage over competitive systems.

Avidyne uses a unit of measure called a "message unit" to track the amount of data sent between the aircraft and the satellite. Simply put, a message unit is a quantum of data dependent upon both the length of the message and the rate that your datalink system is used. The ORBCOMM system uses a "packetized" protocol optimized for short duration messages. As such, optimum performance, and therefore lowest cost, can only be obtained by extensively compressing the messages, parsing the data into short duration segments and using unique message codes to reassemble them on the airplane. To equate this to more familiar terms, consider the image previously referenced in Figure A. This storm system contains several weather cells (some of them are severe). Based upon the current pricing structure, this storm would cost approximately 18 cents to render in your cockpit. On a typical 300nm flight with average winter weather conditions, you might expect to use 30 to 40 message units per hour. If you fly a 150-160 knot airplane you could expect to pay about $5.00 - $10.00 for winter weather data on that 2-hour trip.

All of the subscription-based services (typically anywhere from $49 $79/month ($600 - $1000 per year) will be billed to the customer whether they are flying or not. *With FlightMax, you only pay for the weather you use, no monthly subscription costs.*

We're just getting started

Once you've established a two-way link to the airplane, numerous opportunities become available to provide additional situational data and safety products.

Products such as cloud tops, layered NEXRAD (precipitation at specified altitudes), and lightning data will soon be available for use in general aviation. Current Icing Potential (CIP) data now available on the Aviation Digital Data Service website (http://adds.aviationweather.noaa.gov) will likely be approved for general aviation decision making later this year. As these products become available, we will update our web portal to allow user selection and display integration.

Future products such as position reporting, maintenance data downlink, flight plan uplink, and database updating via datalink will become available as well. These products take advantage of the two-way communication path possible with Avidyne's satellite network.

Can I afford datalink on my airplane?

The question is can you afford not to have datalink on your airplane. Compare the costs and features of the competing systems. Avidyne's integrated approach will save you money in both avionics cost and installation. You don't have to buy an additional transceiver or another box. In fact, we think it is so practical and affordable that we have integrated the datalink transceiver into every EX500 we make. Considering the utility, safety and economic implications of real time weather in the cockpit, you should **expect** datalink as standard equipment in your avionics.

With FlightMax, the complete weather picture is displayed as an overlay on the map, with your flight plan, traffic, terrain, obstacles, and TFRs making it possible to avoid the weather with complete situational awareness anywhere in the continental United States. Our high-performance internally pipelined processing and integrated graphics architecture allow simultaneous real-time display of all the situational data available. With Avidyne's Narrowcasting datalink weather system, you can have weather you want, when you want it, where you want it, and at a price you can afford.

Notes

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