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owners

The Aviation Consumer®

Aspen Evolution

Drop in (almost) glass for
steam-gauge wannabes...
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BUGGED SPEED

AIRSPED TAPE

CUSTOMIZED
VSPEEDS

S ALOFT

CALCS
SPEED/OAT/

E AIRSPEED

D HEADING

NEXT LEG

SOURCE/
ME/TIME/



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Datalink Weather: WSI Beats XM By a Hair

Both vendors provide the critical stuff well and reliably, but WSI leads on lightning, storm identification and icing products.

by Scott C. Dennstaedt

GPS is designed to survive a crash and broadcast take-it-to-the-bank position data to get you found. Our view is that 406 ELTs are an order of magnitude better than 121.5 ELTs, although long-term reliability is still an unknown. They also cost between \$2000 and \$5000 installed. And although the NTSB has recommended that the FAA require owners to have them, the FAA has so far declined.

For a fraction of this cost, a PLB will get you found...if it and you survive the crash and the gadget can be manually activated. So the cost/value relates to how much you're willing to spend for an in-airplane beacon that will watch your back automatically versus one that requires manual operation. We think the PLB is a reasonable second choice—but it won't provide the same level of worst-case protection that a 406 ELT will. If budget isn't a factor, buy both and know you've done all you can on the SAR front.

In our view, the GME Accusat MT401G is the best choice. Its price is competitive, it's the lightest of the bunch, is roughly the same size as other PLBs and it floats. It's also the only PLB we looked at with a built-in strobe. The MT401G also has the longest shelf life and warranty—seven years for both—of any PLB we examined, although we might service it more frequently than that. Other choices, in order, are the Kannad, ACR and McMurdo. All have basically the same features, are easy to activate and are priced within \$109 of each other.

Meanwhile, at almost \$900, the only thing the MicroPLB has going for it that we can see is its small size. If you wanted a PLB to do double-duty for hiking or mountain biking, size and weight would be important. In that case, the MicroPLB might deserve another look.

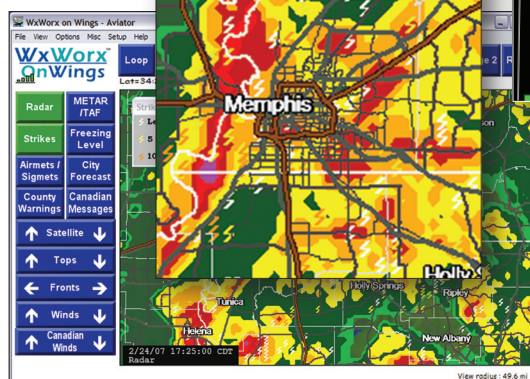
Until someone markets an inexpensive GPS-equipped 406 ELT, a PLB with GPS may be best way to be found quickly after a remote crash. After January of next year—especially if you fly off the beaten path where there may not be any airliners overhead listening to 121.5—one of these PLBs may be the only way to get rescued at all.

Jeb Burnside is Aviation Consumer's associate editor and editor of Aviation Safety magazine.

Datalink weather from WSI (Weather Services International) or through XM-based WxWorx, are far more alike than different. Even the pricing is identical for the basic and second-tier service, at \$29.99 and \$49.99 a month respectively. But close examination reveals a few key differences.

Remember that vendors, such as Avidyne or NavAero, decide how to display the data from either service in any manner they choose, and even what data to display. WSI (WSI InFlight) and WxWorx (WxWorx on Wings) both provide their own software that displays all of their broadcast products, so that's what we'll use for our head-to-head comparison.

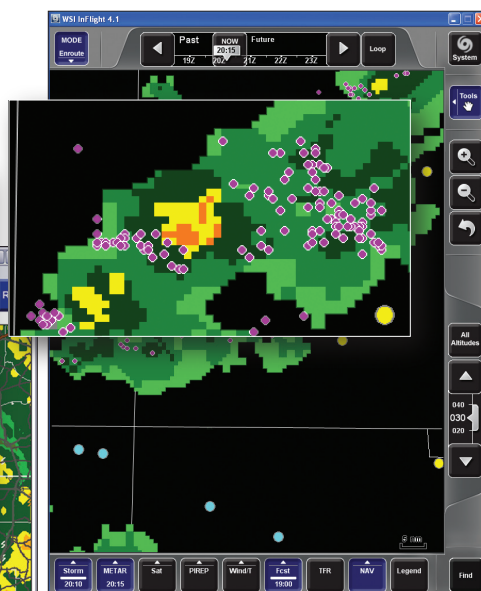
Even if your equipment can only display XM or WSI, it's still good to know the differences. WxWorx (below left) only shows ground-strike lightning and only on a 4-km grid. WSI (below right) shows additional cloud-to-cloud strikes and at a finer resolution. This is true no matter which system you use to view the data.

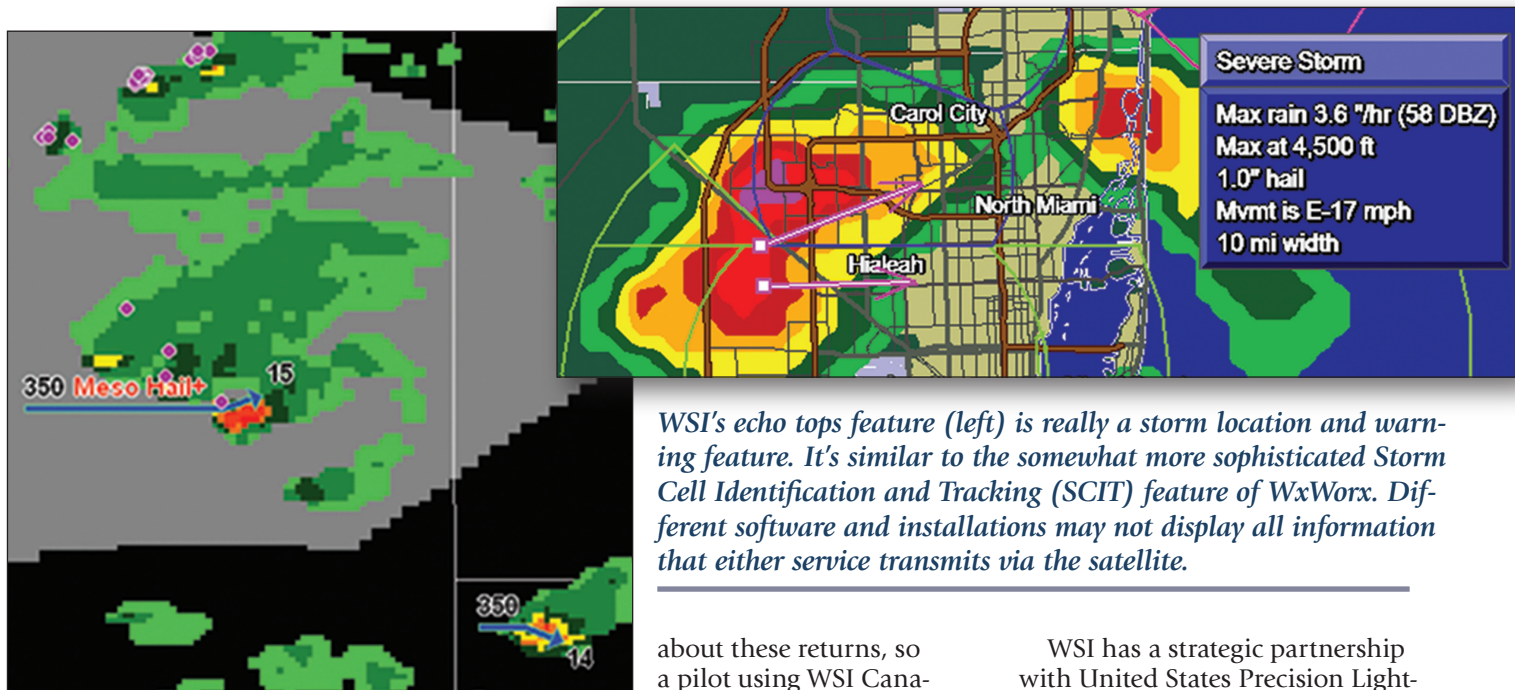


CHECKLIST	
	You can't go wrong adding any datalink weather to the cockpit.
	Even after ADS-B, private vendors will likely supply value-added products.
	Choice of vendor is often determined by hardware.

NO WINNER ON NEXRAD

Ground-based radar is the cash cow of both services. Its high glance-value is the reason why pilots





WSI's echo tops feature (left) is really a storm location and warning feature. It's similar to the somewhat more sophisticated Storm Cell Identification and Tracking (SCIT) feature of WxWorx. Different software and installations may not display all information that either service transmits via the satellite.

justify the fixed \$30 or \$50 monthly subscription. There is no clear-cut winner since both vendors broadcast a nearly identical ground-based radar product that'll tell you where you are likely to spill your coffee.

The image you see in the cockpit is not the same as the image found on the NWS web site. That's because both WSI and WxWorx do a fair amount of data massaging before the image reaches your satellite receiver. Sometimes this quality-control step improves the image, and sometimes it eliminates real features.

For example, WxWorx uses a gross filter to eliminate any returns that are under 10 dBZ, which are usually not of significance to the pilot. However, this eliminates the presentation of gust fronts and outflow boundaries from thunderstorms, which often show up as low dBZ returns. WxWorx also adds a step that eliminates ground returns in Canadian weather that look like storms but aren't. WSI doesn't do anything

about these returns, so a pilot using WSI Canadian radar may see nasty returns that aren't storms at all.

Both radar mosaic images incorporate the high-resolution, short-range (124 nm) base reflectivity. WSI extends the coverage by utilizing the high-altitude, long-range base reflectivity. For those that fly beyond the U.S. border, this might be a slight advantage. We don't see this as a huge benefit, because only the most intense convective and tropical systems will appear.

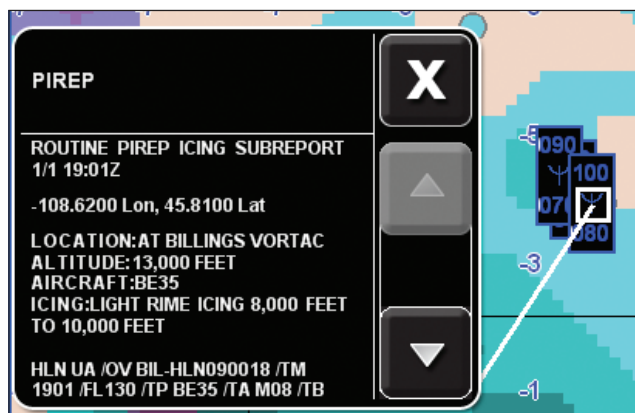
Other functionally equal products are winds aloft, en route advisories such as AIRMETs, SIGMETs and convective SIGMETs, infrared satellite mosaic, precipitation type and TFRs. The infrared satellite mosaic shows cloud heights at 5000-foot intervals using the cloud top temperature—colder tops are higher. Precipitation type (snow, rain and freezing precipitation) is a product that is uniquely derived by WSI and WxWorx, but because neither company will disclose their secret sauce for this product, it's hard to objectively compare.

WSI has a strategic partnership with United States Precision Lightning Network (USPLN) for lightning data. The technology from USPLN allows for the detection of inter-cloud and cloud-to-cloud lightning strikes in addition to cloud-to-ground strikes. WxWorx uses the National Lightning Detection Network (NLDN) provided by Vaisala that can only detect cloud-to-ground strikes. This is more important in the Midwest, where there are 10 times more inter-cloud and cloud-to-cloud strikes as there are cloud-to-ground strikes, and less important in Florida and along the Gulf Coast, where the ratio is nearly one to one.

WSI lightning data extends to greater distances, covering areas throughout North America and hundreds of miles offshore. They've even seen lightning in the Amazon.

The resolution of the data is much higher with WSI. WxWorx lightning resolution is downgraded to a 4 km grid to keep the subscription cost down. This means that there could be 50 lightning strikes within a 4 km by 4 km grid box, and only one lightning bolt symbol will appear for that grid point. WSI shows you each and every stroke, and is reported with a precision of roughly .6 nm.

The next big ticket items are METARs and TAFs. Both provide a similar capability to see the full METAR and TAF. The primary difference between these two services is geography. WSI



LIGHTNING GOES TO WSI

Datalink lightning is the next best thing to a spherics device such as a Stormscope. Here WSI leads in three ways.

PIREPs and the Current Icing Product (CIP) are only available to users of WSI's latest software for electronic flight bags (EFBs). The colors in the background are the potential for ice, as the PIREP attests.

SERVICE	WSI	XM
\$29.99/MO (WSI BASIC XM AVIATOR LITE)	WSI NOWRAD, PRECIP TYPE DYNAMIC RADAR LIGHTNING METARS/TAFS TFRS	HIGH-RES NEXRAD PRECIP TYPE DYNAMIC RADAR GROUND LIGHTNING METARS/TAFS TFRS
\$49.99/MO (WSI STANDARD XM AVIATOR)	RADAR SUMMARY WINDS ALOFT TEMPS ALOFT SATELLITE CLOUD TOPS AIRMETS/SIGMETS SURFACE ANALYSIS CANADIAN RADAR STORM ECHO TOPS	RADAR ECHO TOPS WINDS ALOFT FREEZING LEVEL SATELLITE CLOUD TOPS AIRMETS/SIGMETS SURFACE ANALYSIS CANADIAN RADAR SEVERE WX TRACKS COUNTY WARNINGS CITY FORECASTS SEVERE WX TRACKS SURFACE FORECASTS
\$70.75/MO (WSI PREMIUM)	PIREPS ICING POTENTIAL	N/A
Items marked in red indicate differing or unique services. XM expects a premium product by Oshkosh and will soon add PIREPs to its Aviator service. WSI premium only available on portable EFBs.		

covers much of the North American continent including parts of Greenland, Alaska, Hawaii, Caribbean and northern South America. WxWorx only broadcasts the METARs and TAFs for the CONUS and Canada.

Both WSI and WxWorx broadcast the latest surface analysis chart, updated every three hours. This includes surface fronts, troughs and centers of high and low pressure. Additionally, WSI also provides a surface isobaric analysis (lines of constant pressure) at 4mb intervals.

WxWorx also includes a forecast for surface fronts, troughs and centers of high and low pressure out to 48 hours. While WSI doesn't provide a similar forecast product, it's hard to imagine how a forecast beyond 12 hours is all that important to have in the cockpit.

VALUE-ADDED FEATURES

There are some products that are mutually exclusive. Let's take a look at these and discuss their relative value.

CONTACTS

WSI
978-983-6325
www.wsi.com

WxWorx/XM Weather
321-751-9202
www.wxworx.com

WxWorx broadcasts a freezing level product depicting the MSL height of the lowest freezing level. WSI doesn't directly offer such a product, but does broadcast temperatures aloft on a grid from 3000 feet MSL through FL510. One freezing level is easy to interpret, but seeing multiple freezing levels can help you spot possible freezing rain in the winter.

Now let's jump back to the radar products. WxWorx broadcasts the echo tops product that are generated by the WSR-88D Doppler radars. This product provides the echo-top heights based on the highest elevation angles at which reflectivities greater than or equal to 18 dBZ are detected. This product is useful in identifying the most significant storms by locating the highest tops. It's important to note that this product does not identify the height of the cloud tops. Echo tops are referenced to MSL at 5000-foot intervals. We find it hard to imagine how helpful this will be to pilots flying below 18,000 feet.

Storm Cell Identification and Tracking (SCITs) markers, patented by WxWorx, identifies the location of potentially dangerous storms. SCITs markers are typically represented by lines or arrows originating from the storm cell centroid. A SCIT indicates the direction and speed of a storm cell exhibiting severe characteristics such as shear, large hail or heavy rain rate. They have the highest

refresh frequency broadcast at once every 1.25 minutes.

While most SCITs look reasonable, some exhibit strange behavior, especially during the initial stages of development or when the cells are moving slowly. It's common to see two SCIT markers right next to each other showing movement opposite directions. That's probably not accurate. Relying on this information for the direction of a specific cell isn't wise, especially if you see a lot of discrepancy. Due to their automated nature, SCITs tend to come and go. One may pop up and three updates later, it's gone. Two updates later, it's back again.

WSI offers a close cousin to the SCIT marker which is part of their radar summary product they call "echo top." This is not the same echo tops product offered by WxWorx. The NWS WSR-88D Doppler radars produce a table containing vital storm characteristics such as storm tops, existence of hail and mesocyclones (storm rotation). From this table, WSI is able to display the location of significant storm cells.

Finally, WSI currently broadcasts PIREPs and the Current Icing Product (CIP) severity for subscribers of their premium service. They have other products for their premium service in development, including a graphic turbulence product. WxWorx has several new products in the works and will be announcing a new package at Oshkosh. PIREPS will be added to the Aviator package.

Satellite datalink products will continue to grow in quality and quantity as long as the satellite bandwidth doesn't remain a huge issue as it is now. With that we expect the lead in this race will fluctuate between vendors. ADS-B also promises to deliver some of these same weather products without the monthly fee. Even at \$50 per month, however, both products provide an exceptional value that has contributed to aviation safety almost as much as GPS. The days of getting your en route weather via flight watch, flight service or HIWAS aren't dead yet, but they are surely gasping.

Scott Dennstaedt is a former NWS meteorologist specializing in weather and TAA training for pilots.