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— LATEST BRIEFING —

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## What Good Looks Like

*by Charlie Precourt, CJP Safety Committee Chairman*

I'm really excited about what your CJP Safety Committee has put together for the 2017 Convention - an array of events around our theme of safety and training. We'll have a Safety Standdown to review accidents and incidents in our fleet, and a panel discussion with the best Citation flight instructors in our community reviewing the common pilot errors they see during Citation training. We also have several speakers with compelling personal lessons to share about flying the Citations. I'm certain you'll find these venues to be powerful teaching tools and a real opportunity to advance your own flying knowledge and skills. These events may seem to be more of "What good *doesn't* look like," as we dive into all kinds of things that went wrong, but in my experience, that's the fastest way to get to "Good"... knowing what went wrong, and how it happened, is a powerful tool for your safety.

For instance, I attended Textron Aviation's own internal pilot safety standdown as a guest speaker last year, and got to listen to Peter Basile go through several accidents and incidents, much like he will do for us at the convention. One that I found riveting was a night instrument approach into Elk City Oklahoma where the CJ pilot descended to minimums way too early, and struck a



telephone pole with his wing, only 20 feet or so above the ground, broke the pole in half, and managed to fly away from it...not knowing until later what really happened! There are some powerful lessons in all of Peter's review that you'll not soon forget.

At the CJP Convention next week, Peter will present an in-depth accident analysis as part of the CJP Safety Standdown, This session occurs on Thursday, October 5 from 1:00 to 3:00 MST and will be webcast through Textron Aviation GoToWebinar for any and all Citation pilots to watch. If you are unable to attend the CJP Convention, [you can register for this session here.](#) There is much more safety and operations content at the convention and [you can still register to attend at the Arizona Biltmore.](#)

Very early in my career I benefited from the kinds of things you'll hear during the standdown flight instructor panel. When I was going through Air Force flight school, we were assigned to classes of about 18 students with a half-dozen instructors, all in a single briefing room. I became really great at eavesdropping as each instructor briefed or debriefed a flight with one of my classmates while I was between my own flights on the schedule. There's no better way to learn than from the mistakes of others. I was pretty good at going out and making my own mistakes, too, but then the others learned from me as well. Neil Singer will be one of the Master CFI's on stage with the panel. For a preview of the lessons we might hear from Neil, I encourage you to check out his *AOPA Pilot* magazine articles from the August and September *Turbine Pilot* sections...where he discusses single pilot flying techniques and how to be ready if/when the "magic" behind your automation system decides to quit.

Neil stresses the value of redundancy that comes from proper use of the autopilot. He noted, "Our single-pilot best practices should be focused on backing up the pilot." The autopilot enables us the mental bandwidth to catch the errors we inevitably make. When I was flying Space Shuttles, I was often asked if we hand flew the Orbiter, or was it all just automated. The answer is we could and did hand fly the Shuttle through all phases of flight except for the first forty seconds after liftoff. Those first few seconds had such high dynamic pressures on the control surfaces that a wrong stick input could overstress the vehicle. Much like Tamarack winglets have active load relief, the Shuttle also had load relief in its autopilot programming for the liftoff phase. On the other hand, we always hand flew where the autopilot was deficient, like in the final moments before docking contact, or the final approach to touchdown, where go around wasn't an option (fortunately our Citation autopilots don't have these deficiencies!). Otherwise we were always on autopilot, enabling us the mental bandwidth to think ahead and manage the trajectory, or potential malfunctions. Mastering the autopilot and your automation is part of "What Good Looks Like."

Another aspect of "What Good Looks Like" comes with being able to stay well ahead of the aircraft. Even in emergencies, the hand motions and actions of an expert pilot or crew are slow and deliberate. My wife once commented after a flight we took with a friend in his Cessna 340, that he was always making jittery hand movements and seemed to never sit still, to the point it made her very nervous. There's something to be said for that. Our old Air Force saying was, if you are ever startled by a situation, "wind your watch" (pause and think first). In the Shuttle when we trained to emergency scenarios, we used to say, "it may look bad now, but we can sure make it worse" if we act in haste.

"What Good Looks Like" also has to do with how well you're prepared to handle things that are outside your routine. We'll be introducing the CJP Gold Standard Safety Award at the Convention, as I wrote about in the last edition of CJP Right Seat. Our members who pursue and complete a number of prerequisites will earn the award and recognition at our next Convention. These prerequisites are geared to exposing us to flying that is outside our routine, to strengthen our ability to respond correctly to unusual events in flight. Among the menu of options for the prerequisites are upset recovery training, simulator-based scenario training (beyond the 61.58 requirements) and completion of additional ratings (glider or seaplane for example). The full menu of options will add variety and enjoyment to our flying, build confidence, and make us better all-around aviators.

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A number of us on the CJP Safety Committee recently completed a 10-day trip in three Citations to Greenland and Iceland. In many ways, this was flying well outside our routine. Planning for long flights overwater, foreign airspace where the flight levels are as low as 7,000 feet instead of the US standard 18,000

0 feet, altimeter settings in hectopascals instead of inches of mercury, out of radar contact in controlled airspace, requirements for position reports... lots of good exercise at things we had little prior experience with. By taking on challenges like this (and the other CJP Gold Standard activities), you learn the importance of slowing down and being more deliberate and avoiding hasty actions when confronted with the unusual. You become like the fine pianist who covers mistakes so well we can't hear them, that's "What Good Looks Like."

Finally, "What Good Looks Like" is our willingness to pursue continuous learning. One of our biggest risks, complacency, comes from thinking we've learned it all. So, you'll also find our CJP Convention is geared to providing lots of continuous learning, with breakout sessions to cover operations and maintenance issues for every make and model in our fleet.

Also in the interest of continuous learning, Rob Finrock provides us the two articles that follow: one on the myths behind Nexrad, and a second comparing various flight planning tools. Some of you might recall my CJP convention presentation last year, entitled "No Folklore," where I focused on debunking aviation myths. Rob's article on Nexrad debunked a couple more for me. As for the flight planning tools, not surprisingly, each tool has something unique to offer. Integrating the best attributes of each can give us a better planning picture than we get from any single tool. Lots to consider.

We saw that in spades when we flew to Greenland and Iceland. One of the best tools for that was SkyVector, something I'd used very little, but will start integrating into my future planning.

Looking forward to seeing you all at the Convention and sharing our love of flying!

Fly Safe  
*Charlie*



# Understanding Nexrad: A Significant Weather Avoidance Resource for Pilots

By Rob Finfrock

One of the most significant flight safety advances in the modern era is inflight access to Nexrad (next-generation radar) weather data, an important tool for pilots seeking to plan the safest and most efficient route around severe weather. However, it's critical that pilots understand how Nexrad works, and how it should be used to complement other weather equipment available to pilots, including onboard radar systems.

Nexrad provides an incredibly detailed view of area weather, including storm system boundaries and intensities. That data comes from a ground-based network of 159 Doppler radar stations throughout the United States measuring several parameters, including cloud development and movement, precipitation type and intensity, and lightning activity.

This information is then disseminated through subscription-based satellite weather service providers, and increasingly through flight information services-broadcast (FIS-B) data available through Automatic Dependent Surveillance-Broadcast (ADS-B) "In" systems.

Numerous flight planning applications for portable tablet computers and smartphones may also stream Nexrad weather information.



While this increased level of information presents obvious safety benefits, it also increases the potential that pilots might incorrectly interpret the information seen on their weather displays, or misuse that information to make improper in-flight decisions.

The greatest potential 'gotcha' for pilots is that Nexrad information is not real-time; it's near real-time. The composite radar image a pilot sees is comprised of signals from several different Nexrad stations, with each image taken from antenna sweeps made at different times and frequencies. It may take several minutes for the radar service provider to gather this data and form the mosaic image for transmission up to the cockpit.

That latency attracted the attention of aviation regulators, culminating in a July 2012 industry hearing before the National Transportation Safety Board (NTSB) on the use of Nexrad technology in aviation. Following that hearing, the NTSB issued a Safety Alert to Pilots noting that, in some cases, Nexrad latency delays could exceed 15 to 20 minutes.

Dr. David Strahle is one of the original developers of Nexrad, and an outspoken advocate for improved weather information for pilots who's spoken at several CJP events, most recently this summer's regional event on Mackinac Island. He testified at the 2012 hearing, and noted the NTSB's subsequent determination wasn't entirely accurate.

"They overstated the delay," he explained. "The NTSB misunderstood by stating the actual age of all images could exceed the age indication in the cockpit by 15 to 20 minutes. The reference to a 20-minute delay by the XM [satellite weather] representative was for Nexrad's operating in Clear Air Mode when there isn't any convective weather in the area... not

Precipitation or Storm Mode. In Storm Mode (automatically selected by the Nexrad site once convective weather is identified) you should only see a few minutes of delay.

"That created a new problem," Strahle continued, "as rather than pilots believing the data represented live conditions, those warnings from the NTSB drove people to the extreme in the other direction."

### Images in Storm Mode Just a Few Minutes Old

In fact, Strahle emphasizes that nearly every Nexrad image a pilot sees in Storm Mode should be no more than 4 to 6 total minutes old. "That number represents the time it took to create and send the image," he said. "On average, it takes around two minutes to capture the data from each radar site, 35 seconds to review and compile, and five seconds to create the composite. That is then transmitted every five minutes to pilots. The number seen on the pilot's screen is the time from final creation of the image, including transmission time, to the pilot and should typically be reported as 2-4 minutes."

Pilots must also be aware that Nexrad service providers determine what information is shared. Some providers may not transmit display lightning strike data, or cloud top altitudes. Slight variances to how data is displayed, including the shades of colors used to denote significant information, are also common between providers.

Another important distinction is whether the image pilots receive is a base image - which only accounts for a single elevation or "slice" of airspace - or a "composite" mosaic that also includes vertical storm intensity and development.

"For years, numerous Nexrad receivers were sold that only received base images," Strahle explained. "One of the providers of that data was WSI Weather, and when SiriusXM purchased WSI a few years ago it initially offered only base imagery."

Strahle lauded the work done by Dave Wasby, VP of Aviation and Maritime Weather services at SiriusXM, to change that. "He listened to the issues, and recognized the importance of composite imagery," Strahle continued. "Mr. Wasby got it changed, and today's images on Sirius XM weather are composite; in fact, there should really be very few if any services, including ADS-B, still relaying only base images. However, it's important pilots confirm which images their provider utilizes."

### Onboard Radar or Nexrad? Use Both!

Another outgrowth of discussions about latency has been the persistent belief by some pilots that onboard weather radar is preferable to Nexrad, particularly when near active storms. While Strahle acknowledges some circumstances in which radar may display a given weather situation better than Nexrad, "I have hundreds of examples the other way around.

"Nexrad is highly accurate in presenting a complete picture of surrounding weather," he continued. "Even accounting for latency, a storm line should never be off by more than 4-5 miles, and the majority a mile or two - *and you shouldn't be that close in the first place!* We've been telling pilots for years not to fly within 20 miles of severe storm cells, so a few miles of misplacement shouldn't be a significant concern."

To completely mitigate the issue, Strahle encourages pilots to mentally position storms five miles ahead of their direction of travel. "That way, displacement is of no issue," he said. "There's also a nagging belief that Nexrad may not capture intense pop-up



storm activity; the strongest individual storm development aviation has ever seen, from no activity to severe intensity, took 40 minutes, and with today's systems you'll have seen eight Nexrad images in that time showing the progression.

"However, things can change very rapidly when storms share energy when they are too close to each other," he added. "This is the exact reason for the recommended minimal distances for flying between cells."

Strahle also bristles at talk that Nexrad is a "strategic" planning tool, whereas onboard radar offers a "tactical" advantage once airborne. "There isn't a situation where you should use one system over the other; both should be used at all times," he emphasized. "They complement each other."

"That said, when talking about storm development, the most important parameters to consider are a storm's true size, and its true intensity," he concluded. "The only systems that will give you that information are the multimillion dollar ground stations feeding Nexrad images to you in the cockpit."

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## It Helps to Keep an Open Mind with Flight Planning Tools

*By Rob Finfrock*

Citation pilots benefit from a variety of excellent flight planning tools on the market, ranging from desktop resources to app-based programs displaying active flight paths, Nexrad weather and airport data, all just a tap away on your tablet's touchscreen. CJP Director (and resident tech guru) Marc Dulude utilizes a variety of flight planning resources, and he encourages other CJP members to not play favorites.

"Each offers unique capabilities, and it pays to explore what they all have to offer," he said. "Sticking to a single flight planner is a lot like hitting the "Direct" button on your GPS; it's an adequate solution that will usually get you where you want to go, but you won't gain a lot of understanding about how it got you there."

Earlier this year, popular general aviation pilot app ForeFlight launched a dedicated service specifically for turbine operators, and with an eye towards corporate flight departments. [ForeFlight Performance](#) provides a suite of aircraft performance profiles and the ability to generate global routing information.

One unique feature that may be news to many CJP members is ForeFlight Performance's procedure advisor, which will display entry and exit points for all STARs and SIDs overlaid on IFR charts. "You don't have to guess; you can actually see them depicted," Dulude said. This information may also be synced between a tablet and smartphone, although like earlier ForeFlight applications, it's limited to iOS devices.

For Android or iOS users, [Garmin Pilot](#) offers nearly all the same features available from competitors, including comprehensive worldwide weather data and real-time lightning data, METARs and TAFs, and infrared and visible satellite imagery for the U.S., Western Europe, Australia and Canada. An exclusive NavTrack feature allows pilots to preview how changing weather conditions may alter planned routing.

One of the most popular available flight planning resources among CJP Members is



[www.FltPlan.com](http://www.FltPlan.com), available through an online resource as well as through the FltPlan Go app on [Google Play](#) and the [App Store](#).

In addition to offering a full slate of weather forecasting tools, TFR notifications and up-to-date charts, FltPlan Go also offers interesting tools including a cloud height estimator. "Snap a picture of an upcoming cloud deck on your phone, enter a bit of basic information like altitude, and it will tell you the height of those clouds," explained Dulude.

FltPlan.com also utilizes planning algorithms to offer suggested routing. "That's a very practical tool," he added. "You'll often wind up getting what you filed."

### Not Just About Geography

Of the above, Dulude most often uses ForeFlight Performance and FltPlan.com - but not for everything, he was quick to add. "Planning a flight isn't just about geography," he noted. "Fuel consumption and performance parameters are also critical steps."

That's where [CESNAV](#), Textron Aviation's in-house flight planning app intended specifically for Citations, comes in. "If I'm carrying four people over a long distance, I'll use CESNAV to compute that data," Dulude continued. "If I use FltPlan.com and it tells me to expect an average 22-knot headwind while en route, I'll also enter those parameters into CESNAV to compare the two results. They're usually very close, which gives me a greater level of understanding what I'm likely to encounter."

It also helps to compare results with other flight planning tools, such as [Jeppesen's FliteStar](#). The Windows-based application was among the first dedicated online flight planning tools, and it remains an easy-to-use and powerful alternative.



"FliteStar gives you a lot of control over your vertical route of flight as well as the horizontal path," Dulude said. "That's extremely beneficial when you're flying VFR and plotting around airspace and clouds, but not so much when your aim is to climb as high as you can, as fast as you can. There are lots of pilots who love having that level of information, but it may bog others down with information most jet pilots really don't need."

Despite individual preferences, Dulude reiterated that pilots should be open to utilizing a variety of tools when planning their next Citation flight. "I like to look at all sides, and to not get fixated on just one tool," he concluded. "People can and should be looking at each of them. They have largely overlapping capabilities, each also offers their advantages."

The companies representing all the flight planning tools described here will be exhibiting at the 2017 CJP Convention, coming Oct. 4-7 in Phoenix.

Citation Jet Pilots is the world's premier Cessna Citation aircraft owner-pilot organization. If you are a Citation owner-pilot who wants to operate your aircraft more safely, professionally, and economically, this is the place to be.