popa

Pilatus Owners & Pilots Association

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In This Issue...

"POPA...
The Voice of the
Pilatus Community!"

Disclaimer

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THE PILOT IN COMMAND (P.I.C.) IS RESPONSIBLE FOR THE SAFE AND PROPER OPERATION OF HIS OR HER AIRCRAFT. IT IS THE RESPONSIBILITY OF THE P.I.C. TO OPERATE THAT AIRCRAFT IN COMPLIANCE WITH THAT AIRCRAFT'S PILOTS OPERATING HANDBOOK AND OTHER OFFICIAL MANUALS AND DIRECTIVES.

Cover Photo by Jean Claude Fouchard.

From The President ...

How did it get to be September already? As I look back on this year's flying season, I do so with mixed emotion. On the sad side, I think of the four tragic PC-12 accidents in which we lost the lives of POPA family members, their family members, pilots and friends. On the positive side, I think of the wonderful flying opportunities my PC-12 has afforded me.

Having now been in Northern California from Massachusetts for two years, I am busy exploring the West. This year I flew regularly from KPAO to Baja Mexico and to Rifle, Colorado to enjoy a mixture of sun, snow and completely different cultural experiences. Most recently, I celebrated an Austrian skiing colleague's wife's

On the Apsen ILS

birthday with a 3-week trip from Northern California to Aspen, Colorado followed by a quick trip to Billings, Montana to take in the biggest American Indian pow-wow in the Western States on the Crow Reservation. What a contrast! Flying one of the most technically advanced airplanes in the world to an event that sported well over 100 tee-pees, traditional Indian dancing, drums, arts, crafts and food. The costumes and participants were incredible! Then it was on to Ketchikan, Alaska to explore one of the first Gold Rush mining towns, while observing the local rivers fill up (literally bank to bank) with one of nature's miracles–spawning salmon!

With the weather deteriorating, we forewent our visit to Sitka, and headed south to McMinville, Oregon to explore some of America's best Pinot Noir wine country, unseasonable 90 degree weather, and the Evergreen Air and Space Museum which now houses Howard Hughes' Spruce Goose…indoors! It was a bit of a whirlwind trip, and I must say it's good to be back home to regroup as school and football season are upon us.

Back to my mixed feelings. What occurs to me is we fly an incredible machine that has enormous capability and one of the best safety records in the industry. Yet we still lose pilots, family and friends. Although the NTSB findings are not in, nothing has come to light about the PC-12 failing as a cause of any of these tragic losses. What does come to my mind is all of these accidents happened in near mountainous terrain and/or in various weather and light conditions – Santa Fe, New Mexico at night, Steamboat Springs, Colorado during the day in Winter conditions, afternoon weather in Butte, Montana, and a bit of a high attitude mystery in Virginia. Great planes, great pilots, and for whatever reasons, horrible outcomes.

Reflecting on my recent flying in the West, I think of the similarities. Crossing vast areas of wilderness at high altitudes. Descending over bumpy terrain through afternoon build-ups to encounter nasty 90 degree crosswinds and 90 degree weather in Rifle, Colorado. Snow showers in Montana. Fog, drizzle, and wind in Alaska. Sun and afternoon thermals coming into Hillsboro, Oregon. A short field with water and mountain induced crosswinds at Palo Alto, CA. All had mountains near by. Some of the airports and their procedures were entirely unfamiliar to me. Some weren't. The good news is that all of my outcomes were positive.

Now some might say, "Well, I don't fly in the West or in Alaska." Then I think back on similar experiences in New Hampshire, Chapel Hill, North Carolina, northern Virginia, Grand Bahama, Little Cayman Island, etc.. Mountains, weather, unfamiliar airports, the fun, the adventure, the challenge–all doable! I am haunted by the knowledge some of us, indeed too many of us, recently haven't made it and have paid the ultimate price.

As Fall and Winter approach, the question I ask myself is am I prepared for my upcoming hunting trip to Canada? To Thanksgiving in Mexico? To the ski season in Colorado? To visiting my son in Ohio and my mother in North Carolina?

To Leadville overflying Crested Butte

While the simulator is the best place to learn and review important emergency procedures, there is nothing that can replace real time instruction in my own plane with a trusted instructor on board. Whether it's the mountains, foreign countries, or the congested airspace around big cities, critical real-time decision making with all that technology in our hands as PC- 12 pilots, requires practice and constant learning even with thousands of hours of flight time.

So, I am off to the jointly sponsored POPA/SimCom Mountain Flying course for the second time at the end of this month. Whether or not you join me at the course, I hope, as the long and sunny days of Summer gradually change, you ask yourselves: "Am I fit to fly?" "Am I on top of my game?" And then you go do something about it! We don't need any more losses.

I look forward to seeing you all in Tulsa, OK at our next convention where safety and pilot skills will again be at the top of our agenda.

Safe flying!

Bob MacLean

Welcome New POPA Board Member...Brian Cleary

Brian flies S/N #733, N326V. After flying a TBM700 for a while, Brian purchased his PC-12/47 in September 2006 to gain greater range and more cabin comfort for colleagues and clients. The aircraft is used almost exclusively for business and flies about 300 hours/year mostly up and down the Atlantic seaboard from Maine to Miami. The versatility of the Pilatus is perfectly suited for Brian's missions with 40% of the trips in the 300-500nm distance, 40% in the 500-1,500nm trips and 20% greater than 1,500nm.

Brian owns several businesses that keep him regularly on the move. But when he has a chance to cool his heels, he can generally be found at his home on Longboat Key, Florida or at one of his business locations in Connecticut or Maine. Brian has been a member of POPA since 2006, and is delighted to serve the membership on the Board of Directors.

And

New POPA Board Advisor...Phil Winters

Phil has been involved with Pilatus since 1997, serving as a Regional Sales Manager for Western Aircraft for several years, and was named VP of Aircraft Sales in 2004. Phil has taken over from Mike Fitzgerald as the second representative of the Service Center Community to sit on the POPA Board as an Advisor. A graduate of LaTourneau University in Longview Texas with a BS in Aviation Technology, he has held posts as a flight instructor, A&P Mechanic, Corporate Pilot and Trade Analyst/Demo Pilot for Ratheon Aircraft Company prior to moving to Boise, ID to join Western Aircraft. He and his wife JJ and daughter Sloane reside in Boise, Idaho and enjoy flying, golfing, fly fishing, skiing and traveling.

ASK LANCE TOLAND...

I am considering leasing my Pilatus to a commercial operator. What do I need to be concerned about insurance wise?

There are a number of considerations to take into account once you have elected to let your aircraft out to a commercial operator. Diligence researching the potential operator is a start; this is easily accomplished by looking to services such as Argus and Wyvern, who both specialize in keeping tabs on part 135 operators and their track records with regard to crews, maintenance and overall safety performance. Insurance is a bit more challenging issue. One needs to weigh leaving the relative safety of ordinary liability and assume strict liability measures through the operator. There is very little if any way to shield yourself from this change except insuring your aircraft for the highest legal liability limits you can attain in the marketplace at a reasonable cost through your insurance Broker or the operators fleet insurance program.

I typically like to see the owner control the insurance as the policy holder. This means keeping your current insurance policy intact with endorsements from the underwriters amending the **use** from Pleasure and Business to include part 135 operations and also recognizing the 135 operator as an additional insured. A better **use** change would be **"any operation of the named insured"**, but this is so broad that may insurers hold tight reins on agreeing to such wording. These arrangements can test the limits of both the insurers and the operator's patients if your broker is not responsive to initial certificate needs, as well for various that change continually throughout the year.

Many owners elect to place coverage through the fleet policy of the part 135 operator. This seems like a simple move but requires the same attention one would expect in maintaining an individual policy. Never rely on just a certificate of insurance from the operator, demand a copy of the policy and have your aviation insurance broker review it for you, and inform you of who, what, and how much you are insured for. Additional reviews by an aviation attorney are also suggested for good measure. Between the two, they can advise you of your rights and privileges under the insuring agreement.

One coverage caveat to be acutely aware of. There have been a number of new operators pop up in recent years eager to sign themselves up as a manger/135 operator. In number of case I have reviewed, I found many individuals relying on **"as approved"** wording for pilot approval as a means to fly their Pilatus with higher limits through a fleet insurance arrangement. Many of these owners had experienced difficulty obtaining needed liability with their limit pilot experience and looked to a manager for insurance solution. In most cases had there been a loss, the underwriters would have had reasonable grounds to deny coverage based on material differences in underwriting information at the time of binding. In the minds of the underwriters 135 operators are expected to have full time professional pilots operating the aircraft, not low time private pilots building time.

Without some correspondence from the underwriters recognizing you as an owner pilot, do not rely on this type of arrangement for cover. You might find yourself in a very serious situation in the event of catastrophic loss.

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Lance Toland Associates

A Few Things You Should Know... About Your Satellite-Delivered Weather

by Scott C. Dennstaedt

From a safety standpoint, satellite-delivered weather is perhaps one of the greatest innovations to hit general aviation since the GPS was first introduced. Similar to what GPS did for navigation, delivering the weather on a moving map display has greatly improved the pilot's situational awareness with respect to adverse weather. As compared to onboard weather radar, satellite-delivered weather is a fairly inexpensive technology. It may seem easy to use, however, it is quite complex with lots of open manholes. While you may want to believe your display is an accurate picture of the current weather, don't always count on it. While this discussion may also likely apply to satellite-delivered weather from WSI, the discussion to follow is specifically directed toward XM-based satellite weather users. Here are a few important points you'll want to consider prior to your next flight.

1. Not a substitute – While your satellite-delivered weather greatly improves your situational awareness with respect to adverse weather it is not a panacea for good, detailed preflight weather planning and analysis. Some pilots are cutting their analysis time in favor of the satellite-delivered weather. It is very easy to say, "I'm running late, I'll just get the weather while I am en-route." This kind of habit will eventually result in a bad experience.

If you've done a thorough preflight analysis and developed a reasonable plan, satellite-delivered weather should primarily be used to monitor the weather that unfolds during your flight. There should be very few surprises if you've done your homework before departing.

2. Not real time - There's an inherent latency in all of the data that is broadcast. Many pilots that purchase one of these receivers are mostly interested in the high glance value provided by the ground-based radar image. While it is broadcast every five minutes, they may not realize that the radar mosaic they see on their display could be as old as eight minutes from what they are seeing on the other glass panel in the cockpit called the windscreen.

When the weather is changing rapidly, inherent delays are magnified. A rapidly developing cell can appear to be a light sprinkle on one update transitioning to a monster thunderstorm with intense rainfall, lightning and hail in as little as two updates later. More importantly, if this cell were moving along at 45 knots, it will have moved nearly 4 miles between updates.

It is not uncommon for a METAR to show clear and calm conditions even though a severe thunderstorm is bearing down on the airport producing strong straight line winds, lowered ceiling and visibility and heavy rainfall.

3. Missing updates – No technology is perfect. All the products broadcast are latent already so missing an update, whatever the reason, can make things interesting when the weather is challenging. Missing updates are normally related to antenna placement, interruption in power, direction of flight, turning or other hardware-related issues. In some cases, I've heard pilots report they tend to miss updates more often when they are actually threading through a line of convection or an area of precipitation; not the time you want to miss an update or two.

You may also feel that you have missed an update when, in fact, you haven't. METARs, for example, are refreshed every 12 minutes, but that doesn't mean you'll get an update to a particular METAR unless a special observation (SPECI) has been issued for that airport. SPECIs are primarily issued when a certain weather threshold is crossed (for the better or the worse). For example, if the ceiling was reported as scattered 600 feet and changed to broken at 600 feet, you've crossed over the VFR to IFR threshold for the airport – that'll trigger a SPECI that will be delivered on the next broadcast.

Between 47 minutes and 53 minutes past each hour, the ASOS performs its routine hourly observation. Most surface observations are issued a minute or two after this period. If there hasn't been any significant change to the weather that triggered a SPECI, you won't get an update to that METAR until the next scheduled broadcast after 53 minutes past the hour. So it may appear that the METAR is stale when, in fact, it is the latest available. That's not true for all METAR locations. Airports with an AWOS-3 will send out a METAR report more often, but not as often as if you were listening to the AWOS-3 "one minute" weather.

The best strategy is to have a backup plan if you tend to use the satellite-delivered weather aggressively. If necessary, call flight watch on 122.0 MHz or one of the high altitude flight watch frequencies listed on the inside-back cover of the airport/facilities directory (A/FD).

4. Missing data – In order to provide the most clean radar image, the source ground-based radar data from the NWS is filtered to remove non-precipitation echoes before it is broadcast. Most of the time, the process works flawlessly. However, filters such as this will tend to remove important features such as gust fronts and thunderstorm outflow boundaries. Outflow boundaries and gust fronts are mesoscale cold fronts that represent the "exhaust" of deep, moist convection. As the cold pool of air moves away from the convection, the NWS WSR-88D NEXRAD Doppler radar can "see" the density discontinuity of the boundary. This typically generates a line of a low reflectivity returns less than 15 dBZ which get promptly filtered from the broadcast.

The NWS WSR-88D NEXRAD Doppler radar produces a fair amount of clutter (especially at night) even when the air is clear. As a result, a manual gross filter is applied to remove any returns that are clearly non-precipitation returns. These

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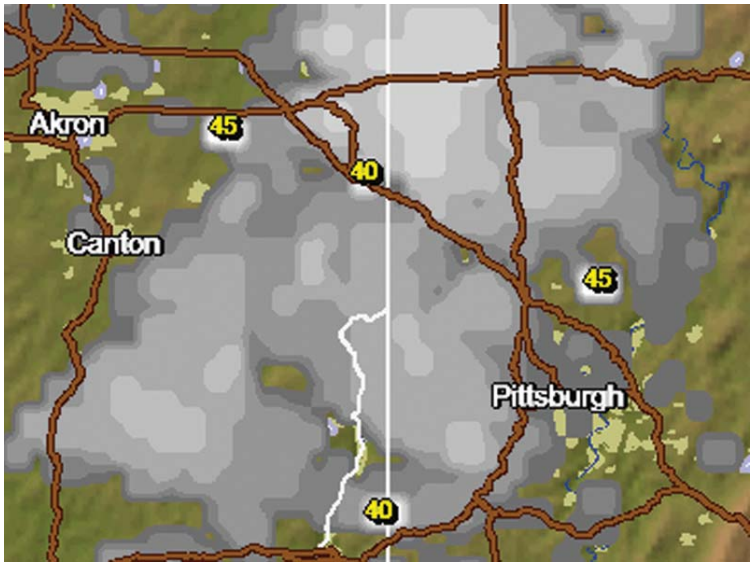
A Few Things You Should Know...(Continued from Page 6)

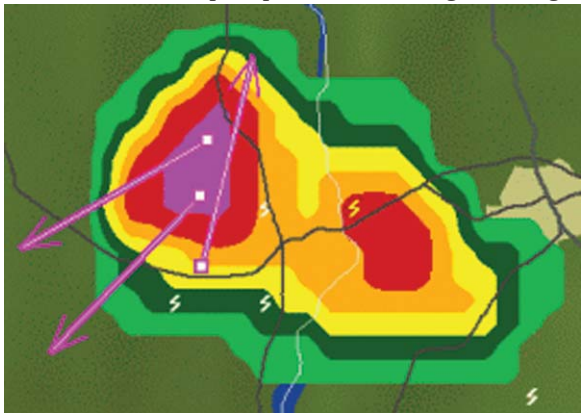
filters are normally applied in regions where precipitation is highly unlikely. At the onset of precipitation, if these filters are not promptly discontinued, they can remove real precipitation echoes, including those from severe thunderstorms.

5. False data - From time to time you will utilize a particular product that may not be telling you the complete truth. Echo tops, for example, will often display tops that are consistent with moist, deep convection (40,000 feet), when in fact, the actual cloud tops are much lower (25,000 feet). Normally this happens very sporadically, but will pop up in a region of light to moderate precipitation giving the pilot the wrong impression.



In this non-convective rainfall event, the echo tops product show several tops at above 40,000 feet giving the pilot the impression that this precipitation was falling from deep, moist convection (thunderstorms). In reality, the average tops were at most 20,000 feet.

The satellite-delivered radar display is typically fairly clean. A significant amount of processing occurs before it is broadcast to remove non-precipitation returns called ground-clutter or anomalous propagation (AP). The process isn't perfect; there are times where non-precipitation returns get through the filters and are broadcast to your receiver. This includes reflectivity that is consistent with deep, moist convection. This is why it is important to always compare what you see with other products such as satellite, echo tops and METARs.



This was a very isolated and slow moving cell that quickly developed. Often with developing pulse-type thunderstorms or pulse-type thunderstorms with little or no movement, the Storm Cell Identification Tracking (SCIT) markers can show a very chaotic direction of movement including two adjacent markers pointing in nearly opposite direction.

Storm cell identification and tracking (SCIT) markers indentify cells that exhibit severe characteristics such as heavy rain rate, hail and shear. These are automatically generated every 1 minute and 15 seconds using a proprietary algorithm and do not represent official NWS guidance. They show the location, speed and direction of the "severe" storm cell. SCITs at times may offer poor guidance especially when they are shown within developing deep, moist convection or pulse-type convection this is moving slowly. Often two SCITs right next to each other can point in opposite directions.

6. Lack of resolution - There's no question that satellite weather providers are bandwidth challenged. The echo tops ground-based radar product, for example, is delivered in 5,000-foot increments because that's the native resolution of the product. Winds aloft, on the other hand, is broadcast at 3000-foot intervals even though, the product is available at a much higher vertical resolution. Limited bandwidth restricts the amount that can be broadcast.

The ground-based radar data that is derived from the NWS WSR-88D NEXRAD Doppler radar is also broadcast as a reduced resolution product. The native resolution of the 124 nm (short range) radar reflectivity product is about 1 km by 1 km with 16 intensity levels. This is reduced to 2 km x 2 km and seven intensity levels before it is broadcast.

Due to the very high cost of high resolution lightning data, XM-based ground-based lightning is also reduced to a 4 km gridded product. In other words, not every lightning strike is shown. If there are 50 strikes within a specific grid point only one lightning symbol is displayed.

7. Training not included - When you purchase a satellite weather receiver and a monthly subscription, there's no owner's manual that comes with the unit. Well, you may get a manual that includes a short description on button-ology, but that's about it. Before you turn on your receiver for the first time, you'll quickly thumb through the documentation to learn how to find the METAR for an airport and maybe how to enter in a flight plan or how to loop the radar image.
Beyond the basic button pushing, there's no documentation discussing the limitations of the products and how they should be interpreted in the context of your flight. Moreover, you won't find a chapter in the Aeronautical Information Manual (AIM) or the Pilot's Handbook of Aeronautical Knowledge that even mentions satellite weather much less a discussion on how to safely use the product.

Much of the training I do online with my customers and build for my website includes concrete examples that go way beyond the rudimentary button-pushing. I don't think anyone would attempt to use onboard weather radar to penetrate a broken

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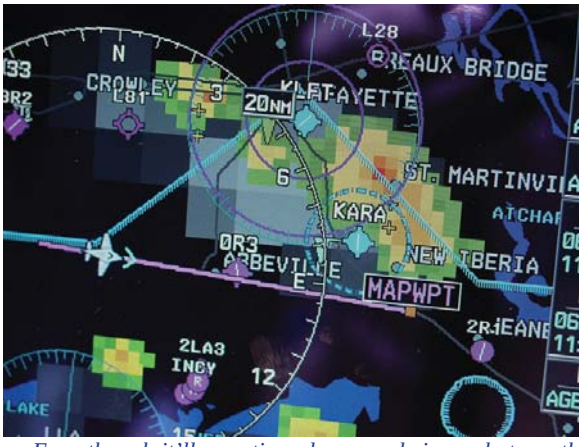
line of convection without spending some quality time in the classroom and with a knowledgeable flight instructor. Given that so many pilots use and depend on satellite weather it only makes sense that you should also take the time to learn how to effectively utilize the data.

8. Idiosyncrasies - As with any technology satellite-delivered weather also has some inherent idiosyncrasies; nothing should be taken at face value.

Data initialization - Satellite weather products get broadcast on a specific schedule regardless if the data was updated or not. If a particular product only gets updated hourly and you happen to turn your unit on one minute after that update, you don't want to wait for another hour to see it. Consequently, the data is broadcast more frequently to build your initial picture as quickly as practical given the bandwidth available on the satellite datalink.

Product age - On some of the products there's no easy way to determine the exact age of the product. When the product is broadcast and your satellite receiver processes the data to display, the date-time stamp may not represent the valid time of the product; it may simply be the time the product was broadcast or schedule to be broadcast. By the way, if your display indicates an "age" of the product, you may simply be looking at the age since it was received or broadcast.

This is often the case with ground-based radar and lightning data. The radar data is derived by examining the last 14 elevation scans of the radar. From these elevation scans a composite product is built using a complete volume scan's worth of data ranging from one to six minutes old. After processing time and time to uplink and broadcast the product, the average age of the radar data is nearly four minutes old when it is finally rendered on your display. Then you get to stare at this image for an additional five minutes before it is refreshed.



Even though it'll sometimes be very obvious what weather to avoid by simply looking outside, the satellite-delivered radar mosaic will give us the guidance on how to best work our way around the weather. This cell was moving slowly to the north and on the G1000 multifunction display we created a map waypoint (MAPWPT) to the south which allowed us to quickly modify our GPS flight plan and tell ATC we needed a 20-degree deviation to the right.

Forecast versus observed - Products such as the freezing level and winds aloft are actually forecasts from the Rapid Update Cycle (RUC) model. They are not observed data as many pilots assume. The RUC model is run hourly so new data is available on an hourly basis even though it may be refreshed multiple times during the hour.

Composited radar image – The radar image you see is built from weaving together all of the elevation scans for each of the WSR-88D NEXRAD Doppler radars across the country. This is a volume product called a composite image. In a composite image you may lose storm scale features such as hook echoes. You may also tend to see returns from ice crystals in the anvil giving the impression the physical storm is a bit larger than the main core of the precipitation.

Data synchronization – Various data broadcast gets updated at different intervals. For example, the infrared satellite image and echo tops may look completely different since echo tops get updated every 7.5 minutes and the satellite image only gets updated every 15 minutes. Rapidly building deep, moist convection may clearly show on the radar or echo tops, but may show as clear air (no clouds) in the infrared satellite image.

9. There are no standards – Even though the XM satellite broadcast is a constant, keep in mind that there are multiple vendors that receive and display the broadcast. Given a particular subscription level (e.g., Aviator), you may discover that not all of the potential products being received are actually displayed on your portable or panel-mounted equipment. There are no display standards; a particular vendor may choose to display the ground-based radar display as four levels versus seven, effectively reducing the resolution of the product.

Technology such as this, if used within its limitations, can be a real boon for pilots flying technically advanced aircraft. When monitoring satellite-delivered weather before you depart or while en-route, my best advice is to always retain a certain amount of suspicion when interpreting the data. The picture you see is only a recent glimpse of the past and may not be representative of the actual weather that is occurring.

Scott C. Dennstaedt is a former NWS meteorologist and active CFI based in Fort Mill, South Carolina. To learn more about aviation weather, visit his new website at http://avwxworkshops.com or contact him via e-mail at scott@avwxworkshops.com.

"Papers?! I don't need no stinking (approach/enroute charts) papers". Or do I?

By John Morris

The navigation/information equipment available for general aviation just keeps getting more useful and powerful. The only limitations to use of this equipment are cost and physical location in the cockpit. So one of the solutions is a Multi-Function Display (MFD) and/or an Electronic Flight Bag (EFB). The PC-12 has always had an MFD installed as standard equipment.

As the PC-12 has evolved so have the available MFDs. Part of the evolution of the MFD is the availability to include electronic chart information. With this [electronic chart] inclusion the idea was/is to no longer have on-board those annoying paper approach plates and enroute charts. Why paperless? They take up valuable space, cost too much, access, and oh yes-those fun revisions!

So are we allowed to not have those stinking papers on-board?

The answer is YES, there is nothing in the FAR's that require us, as Part 91, non- Subpart F--Large and Turbine-Powered Multiengine Airplanes and Fractional Ownership Program Aircraft, to carry any approach or enroute charts while operating an aircraft-apparently. And this is not including the advent of MFD's.

I say apparently because, as other folks have written about this subject, it may be how the FAA, or we interpret the regulations. Example: Sec. 91.103, Preflight action appears to imply possible inclusion of paper, but not specifically.

With my (and yours too, I hope) natural paranoia towards the FAA and due to proper initial VFR/IFR training, we still want to have the approach and en-route charts available. So how do we eliminate the paper but still operate according to our own interpreted regulations. Answer: the MFD and the Electronic Flight Bag (EFB).

What's the difference between a MFD and an EFB? Generally it is that the EFB is portable and the MFD is permanently mounted into the cockpit instrument paneling. However EFB's can be semi-permanent mounted as well. The following information is excerpted from Advisory Circular [AC 91-78]

Subject: Use of Class 1 or Class 2 Electronic Flight Bag (EFB), Issued 7/20/07- (Abbreviated) provides aircraft owners, operators, and pilots operating aircraft under Title 14 of the Code of Federal Regulations (14 CFR) part 91, with information for removal of paper aeronautical charts and other documentation from the cockpit through the use of either portable or installed cockpit displays (electronic flight bags (EFB)).

4. DEFINITIONS. The following definitions are specific to this AC and may differ with those definitions contained in other published references.

a. Electronic Flight Bag (EFB). An electronic display system intended primarily for cockpit or cabin use. EFB devices can display a variety of aviation data (e.g., checklists, navigation charts, pilot's operating handbook (POH)) or perform basic calculations (e.g., performance data, fuel calculations). The scope of the EFB system functionality may also include various other hosted databases and applications. Physical EFB displays may be portable (Class 1), attached to a mounting device (Class 2), or built into the aircraft (Class 3).

b. Electronic Chart Display (ECD). A display device that presents a comprehensive depiction of interactive information and/or precomposed information that is the functional equivalent of a paper aeronautical chart. An ECD may be a device installed in the instrument panel of an aircraft or a portable device. (ICAO, Annex 4, Chapter 20.) An ECD is not a multi-function display (MFD) that is permanently installed into an aircraft that is designed under a technical standard order (TSO). However an MFD may incorporate databases that depict checklists, navigation charts, POH, etc.

6. REMOVAL OF PAPER FROM THE COCKPIT FOR OPERATIONS UNDER PART 91.

a. EFBs/ECDs can be used during all phases of flight operations in lieu of paper reference material when the information displayed meets the following criteria:

(1) The components or systems onboard the aircraft, which display precomposed or interactive information, are the functional equivalent of the paper reference material.

(2) The interactive or precomposed information being used for navigation or performance planning is current, up-to-date, and valid.

NOTE: Supporting reference material such as legends, glossaries, abbreviations, and other information is available to the pilot but is not required in the cockpit during operation.

b. The in-flight use of an EFB/ECD in lieu of paper reference material is the decision of the aircraft operator and the pilot in command. Any Type A or Type B EFB application, as defined in AC 120-76A may be substituted for the paper equivalent. It requires no formal operational approval as long as the guidelines of this AC are followed.

c. It is suggested that a secondary or back up source of aeronautical information necessary for the flight be available to the pilot in the aircraft. The secondary or backup information may be either traditional paper-based material or displayed electronically.

It is clear from the abbreviated AC above that we can go paperless with an MFD (with the appropriate data available) on-board, right?

Before I answer that question I want to give another opinion about the whole idea surrounding this concept, as it at least applies to the PC-12. I feel that unless the electronic data, with that data being approach plates, is within my primary instrument scanning view, then I still have to have the paper, either attached to the yoke or on my

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Papers...(Continued from Page 10)

kneeboard. Over the years I have seen numerous MFD/EFB installations and carry-ons in the PC-12. In almost all cases, with the exception of a yoke mounted EFB or the STC'd mount near the DV window, the data available is outside of what is considered, by Part 23 [23.1321], as in the primary field of view. That view includes the Basic "T" instruments and primary powerplant instruments. This view is meant to limit head movement during critical phases of flight in both the horizontal and vertical axis. Generally, all of the MFD/EFB installations fall outside of that requirement.

Now, to answer the question regarding the Advisory Circular. It sounds good about using what is already available except that the AC also advises to have back up either by paper or an EFB, since we may already have an approved MFD that can have the electronic data available. Why a backup? Answer: redundancy. What if the unit (Display) fails? No info available but not required by Part 91. Are our MFD's dual electrically powered? No, not required by Part 91. Part 135 and Part 121 operators are required to have better redundancy, including in most cases a second pilot, to allow for the greater possibility of a paperless cockpit. I have read of a large fractional jet operator successfully going paperless, using the guidelines from the Advisory Circular. I have to believe that a large part of that success has to do with dual pilots and the location of EFB's.

As a backup an EFB is definitely less of a load, paper wise, if you want to have the entire US approach and enroute database available. The manufacturer of the MFD/EFB is required by TSO to maintain the databases to currency but it is up to the pilot to load the current database into the units. *Note: Pilatus Master Minimum Equipment List (MMEL) requires current Aeronautical Charts if navigation databases are out of currency. With the Internet we cannot use the excuse of availability for why our information is not current. An EFB, if a carry-on, is not that small or light. Compared to paper, it needs internal battery power or powered via the aircraft (carry-on cords or hard wired) and probably an antenna for GPS/Weather. Are you mounting it or is it on your knee?

Conclusion: Yes we can be paperless in the PC-12 according to Part 91. But why should we treat ourselves as anything less than Part 135 or 121 with regards to this issue. Isn't the safety of yourself and your passengers as important as a paying passenger? In most cases the PC-12 is flown as a single pilot operation. That immediately negates, to me, using the installed MFD as the source of information for conducting an IFR approach due to its location in the cockpit. Even the 'NG Multi-Mode Display (Flight Management Window) falls outside of the guidelines for primary field of view. The only way to safely go paperless is to have an approved data storage MFD and a removable EFB mounted to the yoke (position that will not interfere with your flight instrument visibility), or mounted near the DV Window, or securely on your knee.

**It should be noted that I did not mention enroute charts very much. Personally, I definitely like having them loaded into the units since at times it is quite convenient to access an intersection or airway when ATC changes a route assignment. However, I would recommend to continue to carry the paper High / Low Altitude enroute charts since you can see the "big" picture, the renewal dates are longer, and normally to see the airways and intersections on an MFD/EFB you have to scale down to a small cross-section due to display characters.

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Back To Basics - Do You Remember When...? You Should. By Jeff Rhodes

I release from the towplane at 3,000 feet above the ground. Powerless in the Grob sailplane, I nail the airspeed at best glide and begin to search for rising air.

After an hour of soaring in the summertime thermals, I find myself in the airport pattern and getting low. 800 feet AGL, midfield left down wind – time to land. Abeam the touchdown spot, the spoilers are deployed halfway. Airspeed 60 – left base. Airspeed 60 – turn final. The touchdown spot appears stationary in my view through the windshield – not sliding up or down. That means I'll hit it. In the flare, inches above the ground the spoilers come out to kill the ground effect as my touchdown spot slides under the nose. The single wheel touches the grass and I keep the wings level and stow the spoilers to extend the roll enough to get me to a parking spot clear of the runway. The sailplane rolls to a stop exactly where I want it and I open the canopy and climb out. An hour long exercise in energy management.

The following accident happened at my hometown airport recently. Compare the energy management techniques below with the ones described above. A stark contrast. A Private pilot was attempting to land the FBO's rental Cessna 172 SP at the airport on a VFR day. On rollout, the Cessna ran off the left side of the runway and struck a runway sign and its concrete base, damaging the right main landing gear. The pilot applied power and performed a go around from the grass adjacent to the runway. Noticing that the landing gear was significantly damaged, the pilot entered the traffic pattern and performed a number of fly-bys while he discussed the situation via Unicom with people on the ground. The pilot then landed the damaged aircraft in the grass next to the runway. The right wing and horizontal stabilizer stuck the ground and the veered to the right and came to a stop.

The pilot, the sole occupant of the aircraft, was uninjured. The right main landing gear strut was bent up and touching the right side of the fuselage. The right horizontal stabilizer was bent upwards at mid-span. Presumably there was also damage to the right wing where it contacted the ground during the final landing.

The NTSB report of this accident (ATL07CA047) indicates that the Cessna 172 first touched down more than 1,000 feet beyond the (displaced) approach threshold. Marks on the runway indicate heavy braking 2,000 feet past the threshold. The airplane left the runway 500 feet later and then hit a runway sign 100 feet beyond where it left the paved surface. There was still enough energy left during the collision to severely damage the landing gear and then to get the airplane flying again fairly quickly after the go-around was initiated.

The operating handbook for most Cessna 172 models lists the ground roll distance around 560 feet. During this landing, this Cessna seems to have consumed about three times that much pavement and 100 feet of grass, with the brakes locked and tires screeching for almost half of it. After that ground roll the airplane must have still been traveling 25-30 knots, allowing a quick go around on broken landing gear. What must this pilot's approach and touchdown speeds have been? Certainly they were far higher than the 63-68 knots recommended in the operating handbook.

In the aviation insurance business we see many losses associated with poor energy management techniques. Stall / spins, runway overruns, bounced landings, and loss of control accidents lead to millions of dollars of hull insurance payouts every year. As new high performance personal and corporate airplanes become more and more automated and advanced, better equipped, and better performing, it is more important than ever to train and be proficient in the basics of putting an airplane in the proper point in space at the right time and at the right speed.

I speak to aviation underwriters frequently about underwriting trends for low-time pilots transitioning to turbine aircraft as well as veteran pilots going through recurrent training or moving to another model. These days, simulator training rules, as it allows pilots to experience situations too risky to recreate in an actual airplane. The sims also allow pilots to quickly and efficiently check off the maneuvers in which they are required to demonstrate proficiency. Initial and (at least) annual recurrent training for turbine aircraft isn't going anywhere and I believe that it has contributed to a marked increase in the safety of corporate aircraft over the last two decades.

But, like the Cessna driver described above, all too often we see aircraft lost and people hurt or killed because of approaches flown way too fast or way too slow. Accidents during near-to-ground maneuvering (often in VFR conditions) seem to be the result of rusty or poor pilot technique and lack of basic airplane handling skills. Maybe part of our personal recurrent training plan should include some regular seat of the pants basic training.

My suggestion would be to find a school and go get that glider add-on. Or, take an aerobatics, a mountain flying, seaplane, or a tailwheel transition course. These kinds of activities help "250 knot straight and level" pilots brush up on – or maybe experience for the first time – techniques like energy management and feel of the airplane in all corners of a performance envelope. We get to remind ourselves about stall buffet, the effects of torque, P-factor, low speed turning tenancies, and spins. These things have all been engineered

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out of the airplanes we fly on a regular basis. We only see them when something goes wrong and too often, we have forgotten the proper way to deal with them when it counts.

In addition to this basic handling refresher, why not occasionally go rent a minimally-equipped IFR trainer. You remember the type - with two VHF navcom radios, a transponder, and the basic six flight instruments. These trainers have no autopilot, no ice protection, no GPS, and no glass cockpit display. Perhaps there would be an ADF. Go do an IFR cross country and practice some partial panel IFR flight including holding and perhaps a good ole NDB approach. I know – we have no use for NDB approaches anymore. But nothing teaches airplane control, instrument scans, and mental situational awareness better than the hand flown partial panel NDB approach. This is certainly no-frills training, but modern avionics and systems have eroded modern pilots' aptitude for IFR aircraft control. When you get back to the "big" airplane, the procedures and techniques that the "hard way" has reinforced will keep your muscle memory and mental awareness where it really needs to be all the time.

When we see licensed pilots losing control of Cessnas, or corporate turboprops, or light jets, in good weather and with no mechanical problems, we know that they have not been effectively taught the basics of aircraft control and energy management. As capable and modern as our airplanes are, we must remember to continually tune up the decidedly low tech piece of "equipment" sitting in the front left seat.

I'd like to know what you think and what some of you are doing to keep the basics at the front of the brain and at the tips of the fingers while flying your regular airplanes.

Drop me a line at jrhodes@chappellsmith.com.

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Jeff Rhodes is an aviation insurance specialist who has a rich personal and professional background in aviation. He has experience in professional aircraft management and flight school management. He is an instrument rated private airplane pilot and active glider pilot. Jeff earned a bachelor's degree in management from Georgia Tech. He has been approved by the Georgia Insurance Department as an instructor of aviation insurance continuing education courses. Jeff is divisional vice president of CS&A Insurance's Atlanta Division and is president of CS&A's Junior Board of Directors.

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Hey Watch This!
*Or...*ATM's 4 Pretty Good Rules To Live By.

By David Garvey

I started my aviation career with an opportunity provided by the U.S. Department of Defense. That experience has shaped nearly every fiber of my being. Even now, 30 years later that collection of experiences still dominate my thinking and perspective...or has warped my thinking and perspective as my siblings would have you believe. I managed to survive it all, along the way with many close calls, some self induced. Now retired, at least from my obligation to the department of the Navy, I continue to forge ahead in the General Aviation arena.

I had the ignorance (or the opportunity) to volunteer for active service. In exchange for that ignorance er…opportunity, the U.S. Navy paid my tuition and my books to complete my college degree. The only condition was I had to graduate. Man I can do that! How hard can it be!

In exchange for the US Navy's benevolence and a college degree, I was granted a commission in the Marine Corps and a 4-year active duty service obligation after completion of flight school. To that end, after grinding through The Basic School (26 weeks), and Flight School (14 months), and Replacement Aircrew School (9 months), SERE School, Conventional Weapons School, countless training flights, countless weapons training flights, a 6-month Western Pacific Deployment as part of a forward deployed force, being designated a Syllabus Instructor, designated a Mission Commander, designated a Post Maintenance Flight Crew, AND designated special mission qualification, think; the big silver bullet. I had arrived. I was OPERATIONAL! I did operations and planning.

After all of that, fortunately or unfortunately, depending on how you want to look at it, I was assigned one of the dreaded schools in Naval Aviation upon return from deployment. Aviation Safety Officers School. Oh No! Oh Skipper do I have to be a Safety Nazi…no really…?! (We called Safety Officers, "Safety Nazis". Why? Safety Nazis were always telling everyone else what we couldn't do and always the guys quashing the "fun meter"). This was the school that they sent the nerds, the non-hackers, the putz' to. This was the school you sent someone to you didn't like and you hoped they failed! I wanted to go to Weapons and Tactics School, or Fighter Weapons School, or Strike University, where all you did was study the many intertwining exhausting aspects of mission planning, mission leading, aerial delivery of weapons of strike combat, weaponeering, and of course you got to set your hair on fire and fly a lot and drop or shoot lots of ordnance. The way cool stuff. But nooooo…I got to go become a Safety Nazi. That's just great.

One of the things I learned from Safety School was there is a logical flow when it came to explaining accidents or as we called them mishaps; the old chain of events. We can always recognize them when picking up the pieces. We often don't recognize them when no incident mishap or insurance claim takes place. I came to realize our job as Safety Nazis wasn't really to constantly remind everyone the rules…we were, or should be an extension of operations. The question we were always trying to keep in front of was is what we're doing make sense? Should that guy be doing that mission, with this guy? Do we really want to send our new guy to the live ordnance range leading a 3 ship when he's been here 3 months?

This process was also a good news bad news proposition. The good news is we had plenty of young volunteers more than willing to fly at a high rate of speed in a complex tactical jet with bombs strapped to them. The bad news is there are many opportunities during that venue to shorten one's career path rather quickly and decisively. Also causing the loss of a valuable piece of government equipment, and a lot of paper work in the process, from a wide variety of reasons. I am not unusual in that I've buried no less than a dozen contemporaries during my peace time tenure of 14 years operating tactical jets. It's an inherently risky business.

DoD has come up with a standardization process it employs for all its organizations that are charged with operating complex pieces of machinery, including jets it uses for combat and transport, and the other variety of mission requirements. Key words here are TRAINING and STANDARDIZATION. It is no bid deal to land an F-18 on a pitching carrier deck at night after 6.5 hours combat sortie and it is done all the time. However, for those individuals executing that process, it isn't their second look at the back of the ship.

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On to my point. General Aviation is still killing at least 550 people per year. [1]GA has minimum 2-3 reportable incidents per day in the U.S. These are insurance claims ultimately drive up insurance rates for all of us, regardless of whether or not we have an insurance claim for our hull. Each of these mishaps is often the culmination of not matching the skill set with the task at hand.

We want YOU to know as much about YOUR aircraft and the environment YOU are operating in so that YOU can make the trade off decisions competently to alleviate the risk of equipment damage to YOUR airplane, yourself or those that might be flying with YOU. The big down side of incompetently operating a complex piece of machinery in a complex environment, is an insurance claim or worse. Naturally, if someone wants to do foolish things and impose Darwinian Theory of natural selection on themselves- fine. It is something entirely different to impose that on those who happen to be riding with you. You've got to take an entirely different attitude and perspective when you have passengers in your aircraft. You have to be able to match the skill set with the task at hand.

In many respects military aviation is not much different than GA flying. It does have fairly new and expensive equipment. The standardizations and specific training that are perceived as appropriate are driven by make and model specifics and underwriting. The operators of both operate 60 to 300 hours per year and in a wide range of proficiencies and currencies. Most individuals are operating only 1 or 2 make model of aircraft. Many military operators also carry significant additional job tasks and distractions concurrently with aviation related responsibilities. We call it compartmentalization. The difference is the supervisory overview and constraint the military organizations have over those they trust to operate their equipment. The training is very specific and logical in it's progress. In the event of a mishap, the first documents the investigation board looks to secure is the training jacket of those involved. What were these guys' qualifications and what were they assigned to do on the day in question. Were there matching skill sets with the task at hand; was there proper supervision?

Unfortunately aviation is an experience driven endeavor. If we can encapsulate and capture those experiences, we can pass them on to those that follow to enable their self preservation. Most of us know someone that has been killed or killed themselves in a GA mishap. What is it about the individuals involved in these accidents that we can identify, quantify and incorporate into our training syllabus to start making a dent in the fatality rate in the U.S., and to help you, the operator, supervise your operation better to enable you to match your skill set to your task at hand?

This leads us to ATM's four pretty good rules to live by.

(1) ***Know the environment you are operating in.*** Applicable FARs, runway of intended use, forecast weather, alternates, traffic density, NOTAMS, TFRs, density altitude, etc.

(2) ***Know your aircraft's limitations***. Performance capability, weight and balance, normal procedures, abnormal procedures, etc.

(3) ***Know your limitations***. Did I get a good night's rest, how long has my day been, am I feeling well, am I capable of performing to the task at hand?

(4) ***What are the trade offs?*** Do I really need to go today under the given circumstances? Can we go tomorrow, when the weather is better? How many accident reports were the trade offs question not considered or not considered significantly enough to change the decision process. Classic example---The day the music died; the Buddy Holly crash. Had they waited till daylight? What would have been the change in the outcome of that fateful flight?

Dave Garvey

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Dave Garvey is the owner of Aviation Training Management LLC, ATM does initial and recurrent training in 50 different make and model of aircraft, insurance approved. Paul Sanchez an instructor with ATM contributed to this article.

1 Bureau of Transportation Statistics U.S. General Aviation Safety Data thru 2007

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Fighting Fatigue: A Wakeup Call For Pilots

If you doubt that pilot fatigue threatens safety, consider these facts. An international group of scientists said fatigue is "the largest identifiable and preventable cause of accidents in transport operations, surpassing that of alcohol- or drug-related incidents in all modes of transportation," according to a report by the National Transportation Safety Board.

In fact, fatigue accounts for some 15 to 20 percent of all accidents. It's easy to see why. Being physically or emotionally weary reduces vigilance and concentration, makes you easily distracted, reduces your awareness of deviations, impairs comprehension, slows your movements and reaction times, and renders you unable to make good snap judgments.

With recent accidents focusing on crew fatigue as a contributing factor, the Federal Aviation Administration (FAA) is taking action. In August, FAA administrator Randy Babbitt vowed that his agency would tackle the issue of pilot fatigue in response to the Continental accident in February near Buffalo, NY that killed all 49 people onboard. The young co-pilot didn't feel well but felt compelled to fly anyway.

While airlines may be grabbing all the headlines at the moment, in a single-pilot aircraft like the Pilatus PC-12, fatigue management matters even more. It's time to wake up to this serious safety issue.

"General aviation pilots are typically not exposed to the same occupational stresses as commercial pilots (i.e., long duty days, circadian disruptions from night flying or time zone changes, or scheduling changes). Nevertheless, they will still develop fatigue from a variety of other causes," wrote Dr. G.J. Salazar in the FAA publication titled Fatigue in Aviation.

"Given the single-pilot operation and relatively higher workload, they would be just as much at risk (possibly even more) to be involved in an accident than a commercial crew. Any fatigued person will exhibit the same problems: sleepiness, difficulty concentrating, apathy, feeling of isolation, annoyance, increased reaction time to stimulus, slowing of higher-level mental functioning, decreased vigilance, memory problems, task fixation, and increased errors while performing tasks."

Fatigue is not a matter of will power, strength or intelligence, but rather basic human physiology.

Salazar contends, "A tired individual truly does not realize the extent of actual impairment. No degree of experience, motivation, medication, coffee, or will power can overcome fatigue … individuals, as well as organizations, often ignore the problem until an accident occurs."

Is life getting in the way of safety?

Feeling fatigued is often a consequence of our everyday habits. Do you have a tendency to push yourself beyond your limitations to meet family, business and community obligations? On your day off do you squeeze in several rounds of golf, work long hours on your laptop or tend to household chores until late at night?

Take control of your schedule and manage your time wisely. Consider your personal limitations and make adjustments accordingly. Switch to decaf coffee after lunch, turn down the late evening dinner invitation from your clients or golf buddies, and click off the TV before your eyes go bloodshot.

As pilot of your aircraft, it is your responsibility to be an uncompromising critic of your flying performance and a staunch advocate for your passengers. On the eve of every flight, conduct a thorough and candid evaluation of your mental, emotional and physical well-being. Be flexible and err on the side of caution.

If, regrettably, you stayed up until 2 a.m. the last night of your Bahamas vacation impairing your piloting skills, consider staying an extra day or changing your flight schedule to a later time to accommodate a few hours of late morning sleep.

There may be unsavory ramifications and a good amount of grumbling but at least you and your passengers will have a greater chance of reaching your destination safely. Most people would gladly swap a few hours of inconvenience and embarrassment for a safe landing at home.

Even beyond your lifestyle habits, there are other considerations, including how temperature, noise, light, vibration and the monotony of flying long distances can accelerate the onset of feeling tired. During flight planning, remember that cumulative fatigue comes on slowly and is compounded by these issues as well as health problems and sleep deprivation.

You'll also want to keep in mind that fatigue is taking its toll on air traffic controllers, too, which means you need to be especially vigilant both on the ground and in the air, leaving nothing to chance.

Are you sleeping soundly?

If you're feeling fatigued, how much and when you sleep is an obvious first place to look. Do you get seven to nine hours of uninterrupted sleep every night? Do you need to sleep during the day because of your work schedule?

If you're not sleeping well or as long as you should, it can take up to three days to recover from the deficit. Although

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it may be difficult, try to keep to a fairly regular schedule by going to sleep at the same time every night and waking at the same time each morning.

Don't underestimate the importance of restful, restorative sleep. Sleep is an active state in the body and is essential to maintaining proper memory functioning, cognition and a strong immune system. Using sleeping pills interrupts your body's natural functioning and healing processes.

When flight planning, don't ignore your body's biological clock or circadian rhythm. This natural cycle is responsible for your energy level throughout the day, including that drowsiness you feel after lunch.

Early morning flight times increase fatigue posing an increased safety risk, according to John A. Caldwell, J. Lynn Caldwell, authors of Fatigue in Aviation: A Guide to Staying Awake at the Stick.

"Having to be at the flight line at 5:00 a.m. can mean getting out of bed at 3:00 in the morning … It is difficult for most people to get to sleep two hours earlier than usual in preparation for such an early report time due to circadian factors … This means that sleep restriction will unavoidably result … To top it all off, the requirement to roll out of bed at the ungodly hour of 3:00 in the morning will mean fighting a higher-than-normal level of post-sleep grogginess (sleep inertia)! So, early report times are a problem … [for] alertness …"

Jet lag from crossing times zones compounds the problem, according to researchers. Lack of sleep coupled with jet lag or other scheduling issues that work against your body's biological clock can have the same effect as being intoxicated. You are at risk of falling asleep at the controls, committing errors due to inattention and failing to respond appropriately to the complex situations that arise during flight—all of which can lead to a serious or deadly accident.

As you know, an accident is not only devastating to you and your passengers, but it directly affects the hundreds of family and friends, employers and employees, coworkers and colleagues, who care about and depend on each and every person onboard your PC-12.

Could your fatigue be health-related?

If your fatigue is not a result of sleep deprivation, it may be a health issue. Do you have cold or flu symptoms? How about seasonal allergies? Are you under a lot of emotional stress at work or home? Do you drink alcohol, interfering with your sleep patterns?

Is there an underlying health-related issue such as heart or lung disease, malnutrition or obesity? Do you have sleep apnea? Medications, carbon monoxide poisoning, restless leg syndrome and chronic pain can also contribute to fatigue.

When do you feel tired? How long does it last? Does it remain constant or occur in cycles? Is there an obvious reason? Is your fatigue a new issue or something that's been ongoing?

If you spend a great deal of time in the cockpit, at home and in the office, you probably get very little sun, which could lead to a vitamin D deficiency. Some doctors report that 85 percent of their patients are deficient in vitamin D, which can interfere with sleeping, increase muscle pain, create a feeling of chronic fatigue or lethargy, and produce symptoms of depression.

Ask your doctor for a simple blood test to determine if you are deficient in vitamin D or iron; anemia is another cause of fatigue. A blood test will also examine your electrolytes—potassium, magnesium, calcium and sodium—which could alert your doctor to an underlying health issue that needs explored.

Lastly, healthy eating habits and frequent exercise are the best fatigue fighters. Your body needs good fuel to work efficiently so choose wisely what goes in your mouth. Although it may seem counterintuitive, exercise boosts your energy levels. According to research, hormones and neurotransmitters such as dopamine, norepinephrine and serotonin work better than artificial stimulants.

If you have insomnia, shun caffeine and other stimulants. They just lead to a crash later when the chemical boost wears off. When traveling, make it a priority to choose hotels that offer a comfortable environment, especially when it comes to bedding and noise. Pack an eye mask and ear plugs, and use them.

If you find that you're flying while tired, talk to your doctor about possible health issues, read more about human physiology and fatigue, attend a fatigue management seminar, and actively manage your schedule to accommodate adequate sleep every day, but especially a few days before you fly.

What to do if you're flying with fatigue

- Take frequent rest breaks, moving as much as possible between and after flights.
- At every stop, re-evaluate your mental alertness and physical ability to fly safely. Resist pressure from clients, colleagues, friends and family members to continue onto

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your destination. If necessary, end the flight, get a good night's sleep and resume your task the next day. As pilot-in-command, you are the ultimate authority.

- Eat several small meals or snacks consisting of high-energy foods that combine protein and carbohydrates such as chili, yogurt with fruit and nuts, a hard-boiled egg, protein shake, whole grain bread or crackers with cheese, chicken salad or peanut butter. Never skip breakfast.
- Avoid sugar or caffeine. Both cause "crashes" and interfere with sleep patterns.
- Drink lots of water. Dehydration can cause fatigue.

Christine Knauer, a freelance aviation writer, has more than 13 years experience writing for and about aircraft and avionics manufacturers, flight service centers, aviation technology and industry-related issues. A contributing editor for Avionics News, her articles also have appeared in Twin & Turbine Magazine, AutoPilot Magazine, American Bonanza Society Magazine, International Federation of Airline Pilots Association New Technology Journal and other industry publications.

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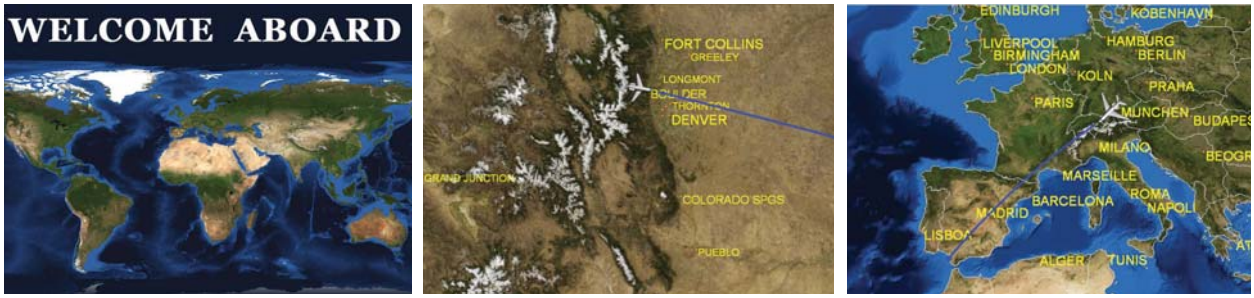

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Fuel Nozzles: The Unseen Force

By Ron Cox

Hidden under the cowl and wrapped around the gas generator case sits fourteen fuel nozzles. Unseen and mostly unforgotten until something drastically changes on the Inter Turbine Temperature (ITT) Gauge or the engine fails to start in a normal fashion. Then it's a mad scramble to remember temperature and starter limits. (See Figure 1)

Fig. 1 Fuel Nozzel Harness

Individual fuel nozzles are either of the simplex or duplex construction. Simplex nozzles are a single orifice for both the primary and secondary nozzles that feed fuel into the gas generator. Typically, these nozzles are set up in a variety of arrangements depending on the airframe manufacturer. For example, all fourteen nozzles can be configured as primary nozzles, as in the TBM 700 series aircraft, or they can be configured as in the PT-6 67B/P as ten primary, three secondary, and a flow divider. (Figure 2) During maintenance of the fuel nozzles it is recommended by the Pratt & Whitney Maintenance Manual to handle the fuel nozzles with gloved hands. It also recommends on removal that each of the primary and secondary nozzles be marked specifically on the gas generator where they are removed. Most shops conduct a pre-flow check before sending the nozzles out to specialty shops for cleaning and repair. Dropping or mishandling of any of the components definitely will inflate the cost of the repairs required by the specialty shop.

Fig. 2 Simplex Nozzle

Duplex nozzles have two ports in the tip of each nozzle, primary and secondary, and fuel is contained in each nozzle. (Figure 3)

During startup, metered fuel from the Fuel Control Unit (FCU) is delivered under pressure at the rate of 141 PSI at 15% of Ng, accelerating to 230 PSI 20% Ng, 391 PSI at 25% Ng, and by the time engine is running at full Ng of 94%, fuel is travelling in the manifold tubes at approx. 600 PSI. Manifold tubes running from each of the fourteen manifolds carry the metered fuel under considerable pressure in primary and secondary fuel lines. Per the Pratt & Whitney maintenance manual, it is best when having the fuel nozzles overhauled at the 200 or 400 hour limits to have the manifold tubes checked for alignment and continuity at the same time. Leaking fuel under relative high pressure could present a potential fire hazard under the cowl. (Figure 3)

The fuel divider is mounted on the fuel inlet manifold adapter at the six o'clock position on the gas generator case and depending on configuration, incorporates a dump or purge valve. The flow divider schedules the metered fuel from the FCU to the fuel manifolds as a function of primary manifold pressure. During engine start metered fuel is delivered initially by primary manifolds with the secondary fuel cutting in above a preset value. All manifolds are operative above ground idle.

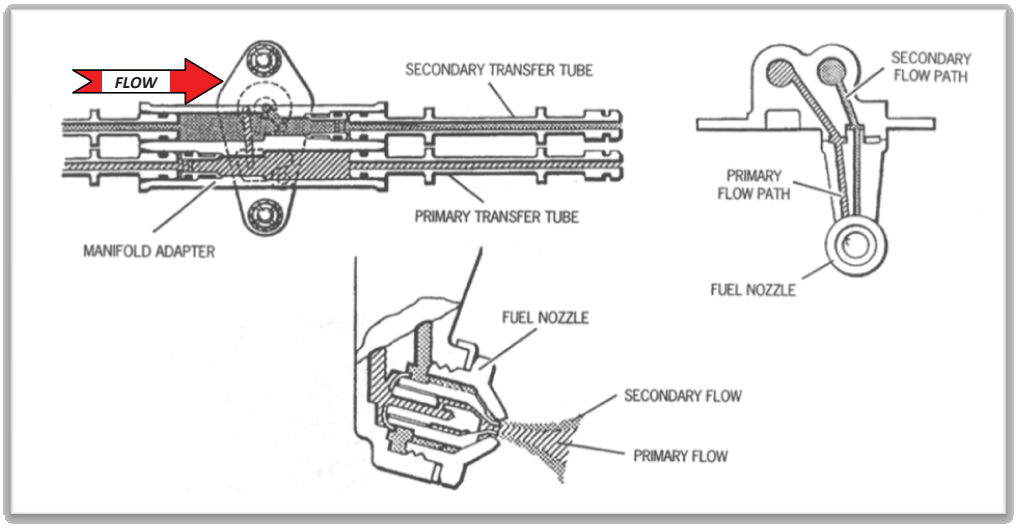
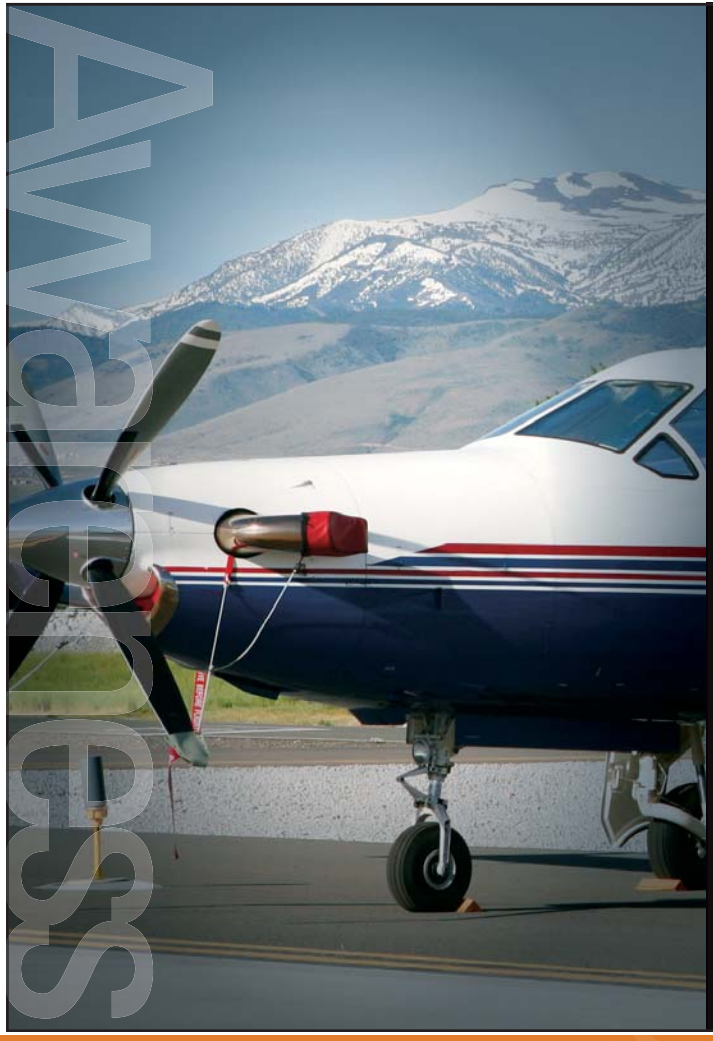


Figure 3 Duplex Nozzles & Fuel Manifold Lines

During a recent refresher course, the question of how and when the secondary fuel delivers primary and secondary fuel during a normal start, consumed a better part of a half hour discussion. After considerable research it was found that there are two methods to deliver primary and secondary fuel. In

(Continued on Page 30)



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Fuel Nozzles...(Continued From Page 28)

very sophisticated turbojet engines primary and secondary fuel is delivered via computers on Ng settings. In the PT-6 67B configuration, this delivery system is via fuel pressure. Looking at Figure 3, you can see the fuel adapter that has both primary and secondary fuel running through the adapter. Primary fuel is constant to the nozzle and secondary fuel being scheduled at preset fuel pressure through a lever in the manifold adapter. What we see during a normal start process in the 67B engine is a rise in ITT upon the introduction of fuel by the condition lever and an additional rise of the ITT when the Ng reaches approx. 30 to 32% Ng and the secondary fuel begins to flow. What in essence is really happening is the metered fuel from the FCU is actually kicking in at a pressure of around 400 PSI through the secondary nozzles and a corresponding rise in ITT is being registered.

The flow divider and purge valve (Figure 4) provides two functions during the start sequence and normal operation of the engine. During the start sequence metered fuel is delivered from the FCU to the primary valve in the flow divider and primary manifold tube to the other ten primary fuel nozzles, as the fuel pressure continues to rise, the secondary fuel

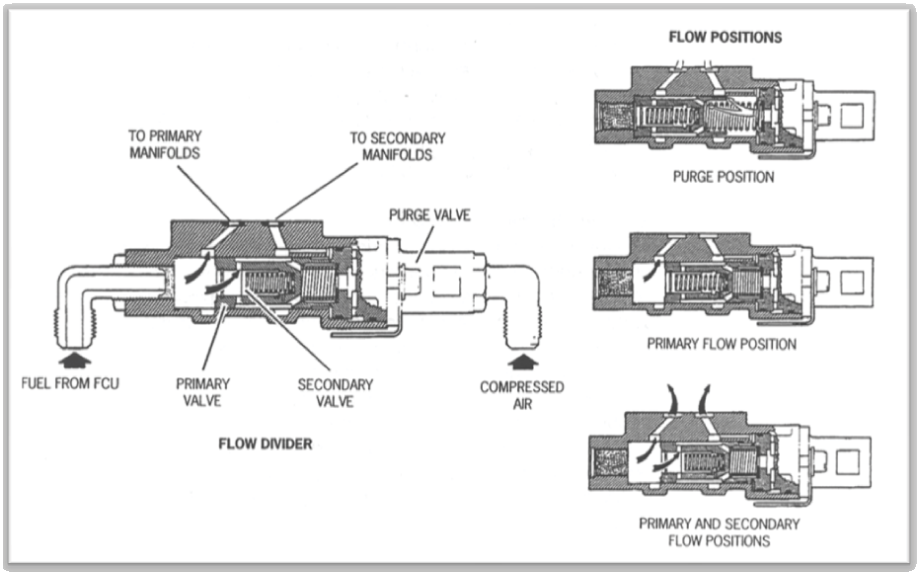

Figure 4. Flow Divider and Purge Valve

valve in the flow divider opens and starts the fuel through the secondary manifold tube to the three secondary fuel nozzles.

During shutdown, the opposite end of the flow divider (Figure 4) is commanded to open by stored P3 air from the accumulator on the starboard side of the engine. A soft seat check valve is located inside the purge valve. See (Figure 4) in the purge position. This soft valve prevents fuel from entering the air purge accumulator which is charged with P3 air. At engine shutdown, the purge valve opens and lets compressed air flush the residual fuel from the manifolds into the combustion chamber where it is burned off. We see this activity as a slight rise in the ITT and on cold days a puff of white smoke emitting from the exhaust stacks.

During normal maintenance when the engine is bore scoped for tell tale signs of abnormal spray patterns or when the fuel manifolds and nozzles are sent out for normal cleaning, specific spray patterns from the nozzles are noted. The following are considered abnormal:

1. "Spitting" is a condition which exists when large drops of anatomized fuel occur intermittently and usually on the outside of a spray cone. Caused by carbon deposits at the nozzle face.

2. "Drooling" is a condition which occurs when large drops of anatomized fuel form on nozzle face. Caused by carbon deposits at nozzle face or partial obstruction of fuel nozzle distributor.

3. "Void" area of fuel spray showing discontinuity in fuel flow, such as air gaps. Caused by obstruction on internal fuel passage.

4. "Skewness"describes a spray condition that is not centered. Caused by damage to nozzle orifice.

You may now have a little more understanding how fuel is getting from the FCU to the fuel nozzle manifolds and harnesses. There is nothing high tech about these components as they consist of nothing more then springs and valves. Normally, they give little trouble but when they do go askew they can create some expensive maintenance and operational problems for us.

Fly Safe!

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Ilulissat, Greenland: A Must Stop... On The Way To or From Europe!

By Thierry Pouille

Crossing the Atlantic is still the most challenging journey because of the unpredictable weather, the rugged terrain we fly over and because of the cold water of the north Atlantic. One of the rules at Air Journey is that we will not launch any crossing if we do not have our destination open, plus two viable alternates. In my early days I was familiar with three airports in Greenland: Narsarsuaq (BGBW); Nuuk (BGGH); and Kangerlussuaq (BGSF). All details can be found at: http://www.slv.dk/Dokumenter/dsweb/View/Collection-393

Narsasuaq (BGBW) is located on the south end of Greenland. It offers the shortest northern Atlantic crossing with only 675 miles from both Goose Bay, Canada and Reykjavik, Iceland. You have a long runway (6,000'), but only an NDB-DME approach with a DH at 1,800' (changing shortly to a GPS approach). The airport offers only advisory and relay flight plan, but you are on your own for the approach and departure.

Nuuk (BGGH) Capital of Greenland is 250 miles north of Narsarsuaq and could be used as an alternate. Runway is only 3,000' and is subject to fog. Also offering a GPS approach with a DH of 680'.

Kangerlussuaq (BGSF) - also known as Sondre Stromfjordor (Danish) and Sondie for the people familiar with the destination. Sondie is the only one offering the LOC/DME approach with a DH of 450'. A GPS approach is forthcoming.

Over the years the activity at the airport of Kangerlussuaq from the red painted Air Greenland aircraft seemed to be increasing. Beside their fleet of 6 Dash 7 (4-engine turbo prop, short field capable), Air Greenland also operates a Boeing 757 and an Airbus. These aircraft bring a steady stream of tourists every summer. Why? Where do these people go?

Still a question needs to be answered: "Why Greenland is called Greenland". There is ice everywhere. Greenland is by area the world's largest island. It is also the least densely populated country in the world.

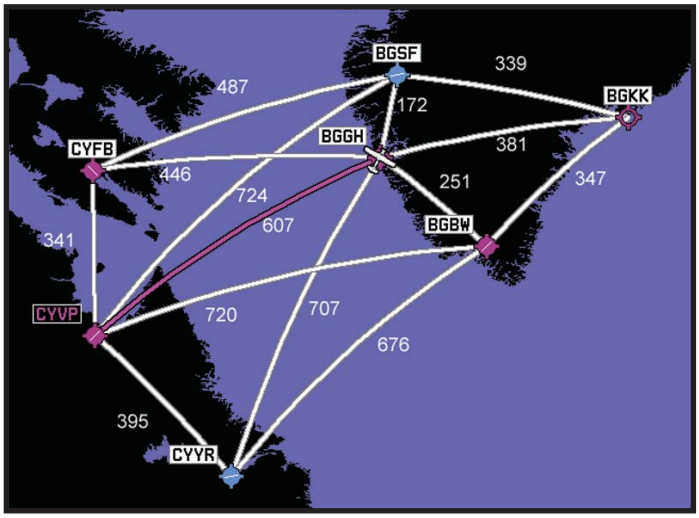
An interesting issue is the geography and climate. The coastline of Greenland is 24,430 miles long - about the same length as the earth's circumference. The highest point in Greenland is Mkoliohn at 12,119'. The weight of the massive Greenland ice cap has depressed the central land area to form a basin lying more than 1,000' below sea level. Now amazing research also confirms that higher snow falls between 1994 and 2005 caused the interior of the ice cap to thicken by an average of 6 cm per year (2.5"). The population is 57,500 people - 88% Inuit and 12% of European descent. (Where is Global Warming?) In June 2009, we visited Ilulissat, 140 nm north of Kangerlussuaq, North of the Polar Circle, daylight of 24 hours and located on Disko Bay. This what this article is all about.

Documentation

The map show the different distance between Canada and Greenland, the shortest one, been from Iqaluit (Frobisher Bay) to Kangerlussuaq with only 485 nm of which 200 are over water. While Greenland retains ties with Denmark, it has not been using the Euro as a currency. It also does not obey the same rules for private aircraft as Europe which means that the excess liability provided by American insurance companies is sufficient and the $15M required for the PC-12 in the rest of Europe, is not required.

(Continued on Page 34)

*Ilulissat, Greenland: A Must Stop...**(Continued From Page 32)*



Airports in Greenland while open 24 hours/day, 365 days/year are not free of charge all the time, they operate from 8 am to 5pm local time during the week and are closed on week-end. If you want to arrive there outside of the regular open hours, be ready to spend $1,200 per airplane to open the airport.

Sondre Stromfjordor has a local based weather station run by a team of four people who extremely knowledgeable on the weather pattern of this part of the world, they are a delight to talk with over the phone or even to visit with while up there. There is a need to call customs at your airport of arrival ahead of time but you will only be requested to present your passport.

You should purchase from Jeppesen their Transatlantic Trip Kit which will provide you with all the approach plates from the different airports in Greenland, east coast, west coast and Canada. I would also highly encourage you to visit the IAP of Greenland on the internet which provides up-to-date information on the different airports, fuel availability and restrictions.

It is also very important to be familiar with NOTAMS related to runway conditions, presence of icebergs at end of the runway in Narsarsuaq as well as the exact location of the electric wires crossing the fjord 40 miles west of Narsarsuaq airport. You should program your flight to Greenland in clear weather to enjoy the scenery and not try to go in as minimum closing in since the alternate airports are far away from one another.

Ilulissat is in western Greenland located approximately 120 miles north of the Arctic Circle. It has a population of over 5,000 people (4,000 sled dogs) and is the third largest settlement in Greenland after Nuuk and Sisimiut. If we go for direct translation, Ilulissat is the Greenlandic word for icebergs. Tourism is a principal industry because of the picturesque Ilulissat ice fjord. The runway there is only 2,800'. It seems like you are landing on an aircraft carrier and the approach at both ends is pretty rugged.

The most interesting feature of Ilulissat is the ice fjord which runs west 25 miles from the Greenland ice sheet to Disko Bay. At the eastern end the glacier name is Jakobshavn Isbrae and is the most productive glacier in the northern hemisphere. It flows at a rate of 70-120' per day. That took 20 billion tons of iceberg passing out of the fjord every year. Some of the icebergs were so large (3,300' in height) that they are two tall to float down the fjord and lie stuck on the bottom, sometimes for years until the force of the glacier ushes them up the fjord.

Preparing Your Flight

There is a couple of rather important information you need to be aware of or you will be in for big surprise. I did get the surprise! First, it is highly recommended to carry a handheld GPS (Garmin 696 fits the bill) Their database coverage come in 2 version, the Americas and the rest of the world and guess where the coverage stops?: in the middle of the crossing of Canada and Greenland. Make sure you download the World Database on a SD card and make sure it is readily available during the flight to upload onto the GPS.

Next, do make sure that the WAAS capability of your GPS onboard equipment (Garmin) has been disabled. First, you don't need them because none of the approaches are WAAS approved but second, since the triangulation of the WAAS satellite is not guaranteed more than 60% of the time, you will end up with a message on your GPS showing dead reckoning, no more map, no more altitude, no more navigation equipment reference. We are back in the early days of aviation. That happened to us on a Garmin 1000 equipped airplane entering the soup and stayed like that for nearly 10 minutes. It was rather unusual and an uncomfortable situation since we had to wait until landing to figure out what happened.

During the flight you will be under radar contact under Iaqluit in northern Canada, Nunavut territory and then you will pass on to Greenland radio. Throughout the flight you will be using VHF only communication. No need for HF and you will have excellent coverage. You will need to polish your position reporting skills. You will have to use the accurate verbiage regarding your position and estimate.

(Continued on Page 35)

(Continued from Page 34)

We operate our journey in early summer to take advantage of the sun shining 24 hours a day. Because we are north of the polar circle, no night flying, no need for lights and a beautiful setup. Because of that position far north and the sun shining 24 hours a day, you will see the sun and the blue skies most of the time. Our surprise was on landing at with an outside temperature of 60 °F. This is not due to global warming.

Ilulissat has a small ramp, but adequate to park at least 10 aircraft. It is an airport of entry and has jet fuel and avgas. Prices are very similar to what we would pay in the US. The terminal is modern. You have access to the control tower for your outbound flight and a computer to check weather. The ride to town is short on paved roads by bus, minibus or taxi.

The only attraction of Ilulissat is, of course, the ice fjord. You can over fly it with a helicopter ride. You can sail through it on cruise lasting anywhere from two to six hours, or you can trek on the shore with very well designed paths with markers. Because the sun never sets down, it is certainly a most beautiful place to visit.

Returning Home

Very simple! Go to the airport, contact the control tower, file an ICAO flight plan with your estimate for the boundary to Canada, show an alternate airport and check the weather. Don't forget to call CANPASS to let them know that you are coming and give them details.

Study the destination and route carefully. Plan a flight plan with the published waypoints and your position reporting waypoints. Become familiar with the reporting position format. Check the weather and understand the pattern of front movement. Make sure you have the adequate survival equipment in the plane. Flying a single engine, you do need a survival suit per person, a life vest per person and you also need survival equipment composed of a knife, boiler, propane heater, etc. as well as a raft. Make sure you are familiar with the usage of the equipment. Do study the approach plate ahead of time. Do know your alternate. While flying monitor 123.45 which is the airline Unicom that can help you relay information or secure weather details if you can't reach Center.

This journey was so exciting for us. The beauty of the trip can be enjoyed with some of the photoe included in this article. It makes me want to go back there next June. I will include a game of golf on the 18-hole course in Kangerlaussauq.

Tail Winds and Blue Skies Always!

Thierry Pouille
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SIMCOM TRAINING CENTERS

Q &A

By Ted Otto
tspotted@yahoo.com

SUMMER Q&A!

Question #1

What is the procedure for a flap reset?

ANSWER

Place the flap position selector as close to the actual flap position. Pull the flap warning CB 1&2 for 30 seconds. Reset the CBs. Push the flap reset button, and the flaps CAWS should appear. Complete a functional check of the flaps.

Question #2

Can the landing gear be pumped up?

ANSWER

The landing gear cannot be pumped up as the direction of pressure goes only to the down side.

Question #3

On the PC-12/47, what is required if the landing is made with the A/C weight over 9921 lbs?

ANSWER

There is a procedure in the maintenance manual for Hard Landing and Overweight Landing. It must be conducted prior to the next flight by qualified maintenance personnel.

Question #4

What are the minimum oxygen supply limits for the PC-12?

ANSWER

A minimum oxygen supply of 10 minutes for each occupant is required for flight above FL250.

FALL 2009 QUESTIONS

Question #1

How can you tell if the compressor bleed air valve is stuck in the open position?

Question #2

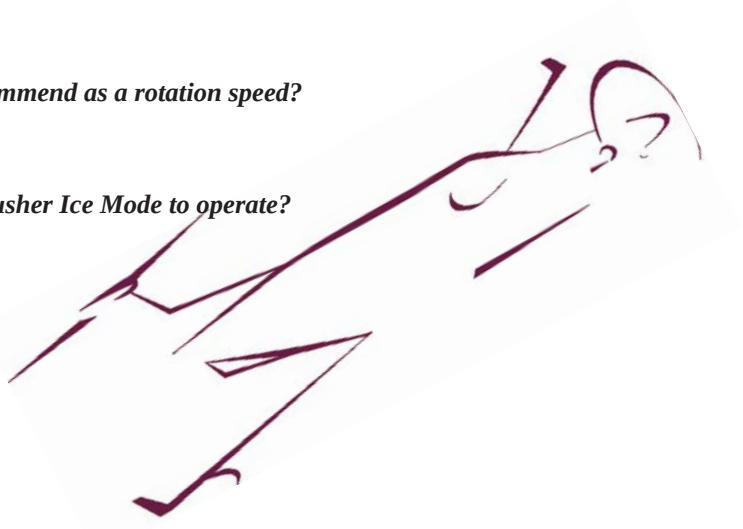
In gusty conditions, what does the POH recommend as a rotation speed?

Question #3

If prop-deice has failed, can we expect the Pusher Ice Mode to operate?

Question #4

How do we keep the de-ice boots deflated?



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Service Center Spotlight...Kansas City Aviation Center!

Kansas City Aviation Center (KCAC) has spent the past 45 years focused on providing our customers with a full-range of services to meet their aviation needs. With aircraft sales, maintenance, avionics, charter,

parts, flight training and a first class FBO, KCAC has set the standard for aviation service. Based at Johnson County Executive Airport in Olathe, KS (KOJC), KCAC is located near many of Kansas City's key business, shopping and entertainment areas and is centrally located for fueling and maintenance for cross country travelers. In 2007, KCAC opened Midwest Aviation Center (MWAC), at the Spirit of St. Louis Airport (KSUS), Like KCAC, MWAC offers a full array

of aviation services and offers the same high level of service to its customers. As Pilatus Sales and Service Centers, KCAC and MWAC can offer customers two convenient locations to choose from with the same great service and reliability that our customers have come to experience over the years.

Technology Advances

With all of the advances in avionics for general aviation aircraft, KCAC has lead the way in providing cost- effective solutions for the Pilatus PC-12. "KCAC continues to be the leader in avionics applications suitable for the PC-12," stated Angelo Fiataruolo, KCAC's General Manager. "Our commitment to Pilatus and the PC-12 owners is evident through our continued pursuit of opportunities to provide improved avionics capabilities for the PC-12." KCAC currently has four STCs for avionics upgrades for the PC-12, with several more in process.

KCAC was the first to develop a glass panel cockpit retrofit for the PC12. Utilizing the Universal EFI-890R with Synthetic Vision, KCAC has retrofitted numerous aircraft with both three-screen and two-screen installations. In addition to synthetic vision, the displays also offer advanced technology and display features such as aeronautical charts, satellite weather, TAWS, video and a host of other emerging applications. These features modernize the cockpit to improve situational awareness and add to the overall safety of each flight. Several options for the Universal installation are available which include WAAS, GH3100 by L3 Communications and a Universal FMS. In addition, PC-12 owners can also choose additional upgrades including Garmin 430/530 installations, cabin entertainment and communication systems.

According to Aircraft Bluebook, PC-12s with the Universal EFI-890R display installations are retaining their resale value to include the installation costs. Most Universal equipped PC-12s have actually increased in value. "With the current Universal trade-in program, now is the optimal time to upgrade your PC-12's avionics," states William Benton, KCAC's Program Certification Manager, referring to the Universal trade-in credit towards its highly rated EFI-890R Primary Flight and Navigation Display units. Until the end of the year, customers can trade-in their existing EFIS / instrument systems for a suite of EFI-890R glass displays and receive up to $100,000 off the purchase price. Trade-in credit for the Universal FMS is also available. According to Benton, "With bonus depreciation and the Universal program, PC-12 owners can economically turn their cockpits into a state-of-the-art flight deck."

Maintenance

KCAC's maintenance team works closely with their customers to ensure timely, professional service that meets an owner's budget and schedule, while maintaining each aircraft to the manufacturer's and customer's standards. Our close proximity to both Garmin and Honeywell afford us an advantage for acquiring parts as well as getting answers in a timely manner on avionics issues. In some cases, we can have a representative from one of these suppliers on-site within hours to troubleshoot issues with their equipment. This saves the owner both time and money with this expertise located just miles from KCAC.

KCAC is a proud supporter of the Pilatus Owners and Pilots Association and applauds the organization's goals of supporting the Pilatus owners with education as well as interfacing with Pilatus. We look forward to our continued involvement with the organization and POPA's continued growth.

A&P Mechanic Bob Cowart works on a customer's PC-12.

Press Releases...

Phoenix Police Department Selects Pilatus PC-12 Spectre

Pilatus is pleased to announce that the Phoenix Police Department has selected the PC-12 Spectre for use by the Department's Air Support Unit over the City of Phoenix, Arizona.

Commander Dave Harvey, Commander of the Phoenix Police Department Tactical Support Bureau, said, "After careful consideration, the PC-12 Spectre was selected in part because it is an economical, single-engine, pressurized aircraft with sufficient cabin space to help accomplish a multi-mission role. It is a proven surveillance platform that will also assist us in crime suppression, transport of Department Detectives for investigative purposes, and assist with out-of-state extraditions."

Leonard Luke, Vice President of Homeland Security and Government Business at Pilatus added, "It is a real honor for Pilatus to contribute to the protection and service to the City of Phoenix. The PC-12 Spectre is a force multiplier and will be a powerful tool for the Phoenix Police Department's high demand operations. The aircraft's proven durability is backed by the best product support in the industry, which means it will be consistently ready to dispatch on a wide variety of missions."

The PC-12 Spectre is scheduled to be delivered to the Phoenix Police Department in September and their goal is to have the aircraft operational in 2010. The aircraft will join their fleet of eight helicopters and replace several smaller fixed-wing aircraft that had been operated for decades. The Phoenix Police Air Support Unit provides service to 1.57 million Phoenix residents encompassing an area of more than 500 square miles.

The PC-12 Spectre provides a true multi-mission surveillance aircraft available to meet today's operational realities and tightening budgets. Featuring a retractable surveillance platform, Primus Apex avionics suite, and a pressurized reconfigurable cabin, the PC-12 Spectre has set a new standard for multi-mission aircraft capability. Strong performance, fuel efficiency, and a rugged airframe suitable for military missions make it the ideal special mission platform for today's government and law enforcement agencies.

PILATUS

Southwest Airlines Names Western Aircraft No. 1 In Fueling

Southwest Airlines recognized Western Aircraft in Boise, Idaho as the Number One fuel provider in enabling on time departure flights from January through June. Out of 66 operations throughout the country, Western Aircraft led the way with zero delays from fueling.

"On time performance is very important to us and our customers, and Western Aircraft has done their part to make sure that our flights at BOI leave when they're supposed to," says Tom Mann, Southwest Airlines Fuel Operations.

Ken Hawk, Vice President of FBO, praises the Line Service team for their excellent work, "Whether we are serving commercial airlines or corporate operators, it's critical for us to facilitate on-time operations. We are proud to be number one out of 66 operations throughout the country for the past six months."

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AlphaFlying

Alpha Flying, Inc. Announces Advanced PC-12 Training Course

PORTSMOUTH — September 1, 2009 — Alpha Flying, Inc. is pleased to announce that they are now offering an Advanced PC-12 Training Course for owner/operators.

Company History
Alpha Flying, Inc. (AFI) flies the largest fleet of PC-12s in the world and has over 105,000 flight hours and 14 years of experience with the aircraft. They operate PC-12/45, PC-12/47, and PC-12/47E aircraft and their affiliate, Atlas Aircraft Center, Inc., maintains them. They have been performing all initial, upgrade, and recurrent training for their own pilots for the last 10 years, which has resulted in finely honed training materials that they are now sharing with PC-12 owner/operators.

Course Information
The course has been carefully designed to cater to owner/operators with experience in the aircraft. It is an opportunity for tailored one-on-one training geared towards the specific pilot and aircraft.

The ground training course will cover PC-12 systems and avionics, CRM, checklists, weight and balance, PC-12 flight profiles, operational tips and procedures, and summer and winter operations. The flight training portion will include a minimum of 6 hours of training during which all normal VFR and IFR maneuvers, abnormal procedures, and selected emergencies will be practiced. AFI's goal is to ensure every pilot attending the course is trained to proficiency.

Interested Pilots
The course will take place at AFI's facility in Portsmouth, NH (KPSM) starting October 2009. The course schedule will be tailored to each individual. Any pilot wanting to attend Alpha Flying's Advanced PC-12 Training Course should contact the Alpha Flying Training Department at pilottraining@alphaflying.com.

For more information, contact:
Lara Jaugust, Director of Training
603-501-7612
ljaugust@alphaflying.com

2010 POPA CONVENTION
Tulsa, OKlahoma

The 14th Annual POPA Convention will be held in Tulsa at the Renaissance Hotel and Convention Center.

Aircraft will fly into R.L. Jones Airport (KRVS). Host FBO will be Christiansen Aviation.

Save The Dates!

June 3rd - 5th, 2010

News, Announcements, Notes...

POPA is looking for Magazine Cover Photos!

* * * * *

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Dues are now due!
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Thank you for your continued support of POPA!

News, Announcements, Notes (Cont.)...

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#287	*Francisco de la Rosa*
N287PC	*San Luis Potosi, MX*
#390	*Dale Thuillez*
N12DZ	*Loudonville, NY*
#575	*Jack Long*
N575PC	*Austin, TX*
#751	*Thilo Butzbach*
D-FIMM	*Illertissen, Germany*
#1098	*Mike Raney*
N948MW	*Las Vegas, NV*
#1110	*Dave Krysko*
C-GKRY	*Kelowna, BC Canada*
#1124	*Ivo Lukacovic*
N72747L	*Czech Republic*
#1144	*John Pritchard*
PT-VXJ	*London, UK*

PILATUS 2009 CALENDAR

September 16-20th	*Reno Air Races*
	Reno, NV
October 20-22nd	*NBAA*
	Orlando, FL
October 28-31st	*MMOPA*
	Scottsdale, AZ
November 5-7th	*AOPA*
	Tampa, FL

2009 POPA Convention
Photo Courtesy of Wilson Air Center

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Non-Profit Status

The Pilatus Owners & Pilots Association has been granted exemption from income tax under Section 501(c)(7) of the United Stated Internal Revenue Code. The Internal Revenue Service (IRS) has classified POPA as a "social club" and has assigned Employer Identification Number EIN #31-1582506 to our Association. Annual dues are not deductible as a charitable contribution, but members will likely be able to deduct annual dues as a business expense. Consult your tax advisor for details.

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