

# TIPS FROM A PROFESSIONAL

***Those who fly jets for a living have an incredibly good safety record. Get some tips from a pro while taking a tour of a Citation CJ3***

by Fred Simonds

As the jet pros. They make it look so easy.

For most of us, bizjet jocks are the next level up in the mighty ziggurat of aviation.

So, what can we learn from them that will add polish and safety to our own goings and comings?

The best way to answer that is to ask one who flies them regularly. I spoke with Sam Trask, a longtime friend, fellow CFII and the first officer of a 2007 Cessna Citation Jet 3. Having flown both pistons and jets, he is an ideal source for some juicy IFR tidbits.

## The CJ3

Weighing 14,070 pounds max on the ramp, the CJ3 seats six or seven passengers depending upon configuration.

The airplane is both single-pilot and dual crew certified. Also known as the Model 525B, two Williams

FJ44-3A turbofan engines offer 2780 pounds of thrust each to push the CJ3 along at 416 KTAS and boost the airplane to its service ceiling of FL450, which, Sam tells me, is routine on long trips.

By the way, its rate of climb at sea level is about 5500 fpm!

The jet is equipped with the Rockwell-Collins Pro Line 21 avionics suite, which is remarkably similar to but more capable than the Garmin G1000.

## Flow Plus Checklist

My introduction to the airplane came with the preflight.

Jet pilots do not use the traditional checklist-in-hand preflight, methodically ticking off each item as checked.

They use the more effective flow technique.

It calls for the pilot to focus solely on a particular area of the airframe or cockpit without having to divide his or

her attention between the area of interest and the checklist.

A flow is a logical pathway across the area (airframe or instrument panel) that will guide you to systems or items that must be verified or reconfigured for each phase of flight.

In this holistic fashion, the pilot sort of becomes one with the airplane, poking this and prodding that in a much more comprehensive check than with a simple checklist.

However, every checklist item is checked via the challenge and response technique following the flow to assure that nothing is missed.

One of my students recently conducted such a flow check on our newest Cessna 182. He found an unsecured fairing just aft of the nose gear which had been missed by a succession of pilots using their checklists.

## Angle of Attack

The CJ3, as with many jets, has an angle of attack gauge. A vane mounted on the fuselage (see photo) parallels the relative wind and transmits the information to a gauge which reads out the wing's angle of attack on a scale from zero to one.

The gauge allows the wing to be flown far more precisely than an airspeed indicator, especially on approach and in critical conditions, to squeeze the absolute best performance from the jet.

In a downburst, for instance, the pilot can safely pitch up to the edge of stall for maximum lift, because the gauge tells exactly where that point is.

The cockpit indicator is simple (see photo). The stick shaker (which is the stall warning) goes off just below the red arc, at about 0.8.

Full stall is 1.0, and Vref (landing reference speed at 50 feet over the threshold) occurs at 0.6 for any weight and flap setting.

## Keep It Clean

The interior is well-appointed and pin-neat. As copilot, Sam has a clos-



*Using some of the techniques and procedures followed by the crew of a Citation CJ3 can improve IFR operations in piston aircraft.*

er-than-average relationship with the portable vacuum cleaner stowed in the forward baggage hatch.

The tidy interior bespeaks professionalism and respect for the passengers, something we should pay attention to in our personal airplanes and rental fleets.

Turning left into the cockpit, the front office is neither roomy nor claustrophobic. I think there is more room in a 182, but hey, this cockpit goes lots faster.

## It's Like My G1000

Three things jump out – first, a distinct absence of paper such as hefty Jepp chart books (paper backups are there, but stowed). The second thing is that the cockpit looks remarkably simple. But the third thing truly blows me away – the panel could be a G1000.

Glass pilots would immediately recognize two Primary Flight Displays and the shared Multifunction Display.

In larger aircraft the Flight Management System is a separate display and keyboard on the center pedestal. The G1000 is called an Integrated Flight Deck in part because its FMS functions are built into the box itself.

There are many functional parallels between the Pro Line FMS and the G1000 so I was interested to see how a pro makes use of a glass panel.

Terminal charts and airport diagrams can be viewed on the MFD.

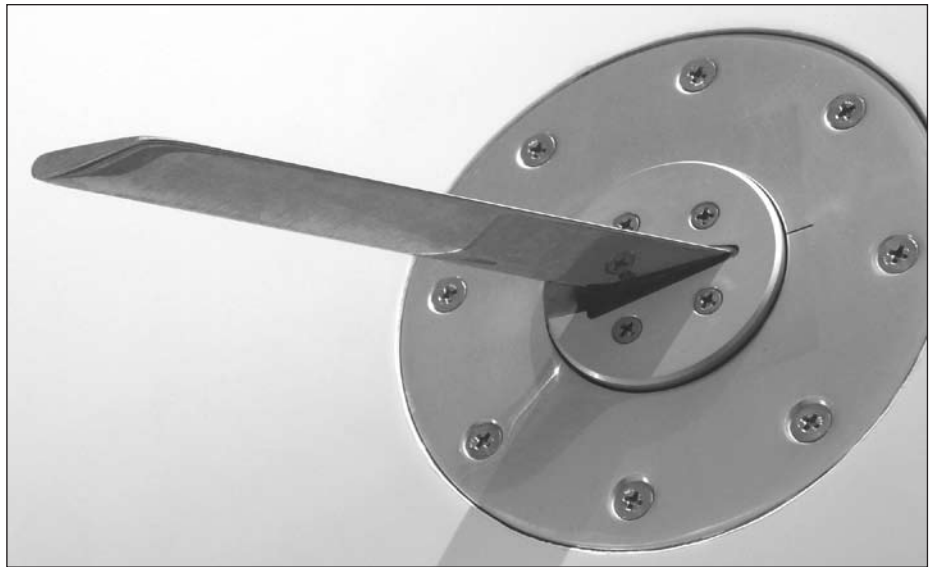
Since the MFD cannot show en route charts, Sam points out that they are aboard in paper form.

## Paper Backup

Sam and captain Jared do not rely solely on the MFD, they have an iPad backup including JeppView plates and aircraft manuals with paper manuals as secondary backup.

I have had a number of discussions with pilots about the value of carrying a paper backup, I was glad to see the pros do it.

One of the best features of the FMS is the ability to plot a prospective path



without executing it and view it as an overlay atop NEXRAD weather.

This helps the crew choose the smoothest, safest route. The Pro Line offers animated NEXRAD and even lets the pilots zoom in on an area of interest.

With the animation, a crew planning ahead can see a weather problem coming and make specific avoidance requests to ATC, something we can do in our glass cockpit aircraft.

The crew is trained to closely monitor what the jet is doing all the time. If a system is not performing as desired, it is shut down immediately. That works for us, too.

## Buttonology

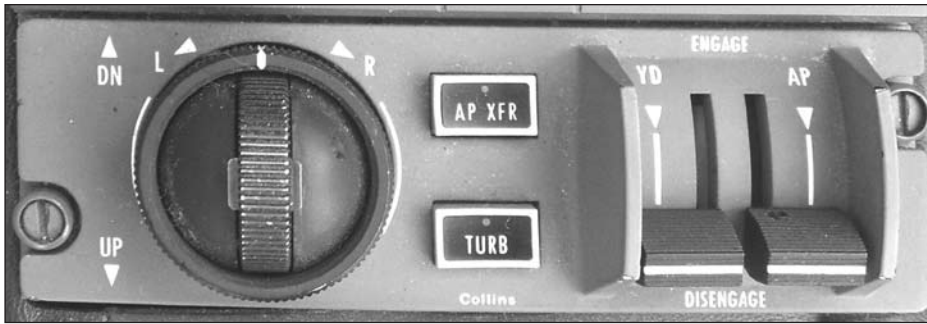
That leads to a discussion of “fat-fingering”, pressing a button you don’t want to press, and the potential consequences if the problem is not undone. I learned about a Citation II accident that was traced to unintention-



*The angle of attack vane jutting out of the side of the fuselage automatically aligns itself with the airflow (top). It transmits its position to the gauge on the panel that reads out the aircraft’s angle of attack in a graduated readout from 0 to 1.0 with 1.0 being stall.*

ally turning on the autopilot instead of just the yaw damper immediately after takeoff. The toggle switches are right next to each other. (See photo next page).

The ensuing confusion while fighting the autopilot close to the ground caused a crash. Care in buttonology taken by the jet pros has equal application to us.



Autopilot control head on a Cessna Citation II; the yaw damper and autopilot engage switches are side-by-side.

## Flight Planning: Be a lemming

When plotting a route, Sam suggests you follow the crowd.

Consult [fltplan.com](http://fltplan.com) and elsewhere online to see what pilots going your way are getting.

Look in the AFD for preferred routes.

Filing direct sounds nice, but Sam isn't crazy about it. In crowded areas like the northeast or west coast, you'll unlikely get direct routing and there is no assured obstacle clearance, communications, radar or VOR coverage if you fly off-airways.

It's also good to be a lemming when it comes to alternates. If your primary

destination folds, where will you go? Nothing says you must go to your filed alternate. Is it currently the best choice?

Sam pays attention to where other flights are bailing when things start to go bad. Pros are flexible because they recognize that a lot of variables can and do change.

Don't be afraid to query ATC. Sam emphasizes that ATC is an integral part of your crew even if not physically aboard.

## Speak Well

Sam noted that, even in a Citation, how well you talk often determines

what you get. If you sound like a pro, you'll be treated that way – and vice versa. It's a good reminder for us.

## Oxygen

At FL450, the CJ3's cabin altitude is 8,000 feet, but mild hypoxia can occur.

Above FL410, one pilot must wear oxygen all the time, usually the pilot flying. The pilot not flying works the radios without a mask.

Sam's experience is that a shot or two of oxygen at altitude and before beginning descent for landing clears out the cobwebs and improves night vision dramatically.

Even when flying as low as 8000 feet, especially at night, Sam recommends that if you are fortunate enough to be oxygen-equipped, occasional use of it is worthwhile.

Jet pros demonstrate precision, strict adherence to procedures, and planning ahead all the time. Their safety record demonstrates the result. There's no reason we can't do the same.

*Fred Simonds is a Gold Seal CFII and factory-certified G1000 instructor. See his web page at [www.fredonflying.com](http://www.fredonflying.com).*

## GO WITH THE FLOW

The widespread use of checklists in aviation was a major milestone when it came to increasing the level of safety.

As airplanes became more complex it was illogical to expect a pilot to reliably be able to recall everything that must be done during a flight from the point of first walking up to the machine.

The crash of the prototype Boeing B-17 due to an overlooked control lock was a major impetus in the development and use of checklists.

The use of checklists has recently spread to the medical profession resulting in a spectacular decrease in patient mortality in hospitals.

However, checklists are not perfect, and items do get skipped, even when clearly written on the checklist, often because a pilot was distracted in the midst of what

was seemingly carefully going through the checklist.

Human factors research has led to the increasingly popular flow technique of checklist use. It is fairly simple and is proving remarkably effective in assuring that essential actions are taken at the start of each phase of flight.

Where the pilot would ordinarily pull out the checklist for, say, the pretakeoff check, flow calls for the pilot to first look at the areas of the cockpit that have gauges or switches that need to be examined or repositioned in an organized, logical, consistent fashion, often left to right and top to bottom, and take the needed actions.

Pointing at or touching each instrument or switch aids the process.

Then, when everything is done, the

checklist is run using the standard challenge and response technique to check that everything has, in fact, been done.

The checklist again becomes what it was designed to be, an organized method of assuring that all needed actions have been taken and all indications are where they should be.

Flow means that the pilot has to get to know the airplane to come up with the scan that is appropriate for each phase of flight.

It also means the pilot must truly look at each and every instrument, gauge and switch while conducting it, rather than just going through the motions.

To be effective, checklist should be a checklist, not a dolist; the flow procedure allows that to happen.

— Rick Durden