Automation Is Wonderful — When Used With Attentiveness

Dear Volunteers,

If you've flown a modern general aviation aircraft in the past decade, you've witnessed an incredible transformation.

What once required constant attention can now be managed with remarkable precision. Today's avionics can fly instrument approaches to minimums, manage climbs and descents, navigate complex arrivals, avoid terrain, provide traffic alerts, monitor weather, and even recover an aircraft from an unusual attitude or emergency with the push of a button.

These advances have unquestionably made flying safer. But they have also introduced a new challenge. Automation is an outstanding servant — but it has the capacity to make a poor pilot.

The Silent Shift

Many of us learned to fly by trimming the airplane, maintaining heading with rudder pressure, and constantly scanning the six-pack. Every climb, descent, and turn required deliberate control inputs. Today, it's easy to engage the autopilot shortly after takeoff and disconnect it on short final. On longer cross-country flights, the airplane may fly itself for hours while we monitor systems and communicate with ATC.

That's not necessarily a bad thing. In fact, reducing workload allows us to devote more attention to weather, traffic, fuel management, and strategic decision-making. The danger arises when we stop managing the automation — and instead allow the automation to manage us.

"Why Is It Doing That?" or "Where Is It Going Now?"

Some of the most common questions heard in technologically advanced aircraft aren't about weather or navigation. They are: *"Why is it doing that?"or "Where is it going now?"* The autopilot wasn't wrong. The airplane simply followed the instructions it was given. Many incidents involving advanced avionics aren't caused by equipment failures. They're caused by pilots misunderstanding what mode the automation is in — or what mode they *thought* it was in.

- A selected altitude instead of a vertical speed.
- Heading mode instead of NAV mode.
- GPS sequencing suspended.
- The flight director commanding something unexpected.

Automation does exactly what it's told to do — not necessarily what the pilot intended.

Monitor — Don't Assume

One of the most important lessons airline pilots learn is simple: Never assume. Every change to the flight guidance system deserves verification.

- After selecting a new altitude…Confirm it.

- After engaging the autopilot…Verify the correct lateral and vertical modes.
- After loading an approach…Confirm the airplane is flying the procedure you intended.

Good automation management means constantly asking: *"Is the airplane doing what I expect?"* If the answer is no, intervene immediately.

Almost all airline Flight Operations Divisions have very deliberate and structured Standard Operating Procedures (SOPs) regarding automation management.
Specifically, regarding autothrottle/thrust, lateral, and vertical mode management and awareness. We can say with certainty that behind the creation of every SOP there is usually an accident/incident, as well as exhaustive research. It will serve us well to adopt such proven SOPs in our GA flying. Garmin and other companies have suggested procedures as well. For example, Cirrus Aircraft training programs refer to modes as the "scoreboard." A term I personally dislike, but likely since it is different from what I am most familiar with. We refer to thrust, lateral, and vertical mode annunciations as FMAs (Flight Mode Annunciations). Most airlines require the verbal announcement of any FMA changes.

Think of it this way. The FMS, or the Autopilot panel, where we selected the lateral/vertical modes is *rumor.* The verified FMAs are *facts*. Don't rely on rumors. Verbalize, Verify, and Monitor the facts!

Here is excerpt from the United Airlines Flight Operations Manual (FOM 3.20.2, 26 January 2024):

Verbalize, Verify, and Monitor (VVM)

VVM is an effective Threat and Error Management strategy to counter threats and errors encounteredduring flight operations. Crewmembers who **verbalize** plans and ideas, **verify** them with others, and **monitor** for the expected result are better threat and error managers, enhancing safe operations.

So, for us in GA, we can *verbalize* our automation status and FMAs, *verify* that we are in the correct mode and configuration, and *monitor* the result. In other words…VVM it! Even when we are solo pilots.

Allow me to describe an example where I could have used better VVM while I was flying my single engine GA airplane, in reference to automation.

Those of you familiar with the Garmin navigation systems are likely very familiar with the three quick words of "Direct, Enter, Enter." Proceed direct to a fix by pushing the direct button, enter once to initiate the direct command and enter again to activate. I entered the wrong fix to go direct to and then expeditiously and with no pause in between the two "enter" commands, I started proceeding towards the wrong fix. At least, I appropriately *monitored* the incorrect result and corrected the error. However, after my post flight self-debrief, I realized that I need to significantly pause between the two "enter" commands and *verify* before activating with a second "enter." Therefore, my now new five words are "Direct, Enter, Verify, Enter, Monitor."

Incidentally, in multi-crew operations, any execution of a navigation action on the FMS requires a verbal concurrence from the other pilot. In single pilot resource management operations, it is even more incumbent on us to VVM more deliberately and thoroughly.

The Erosion of Hand-Flying Skills

Automation can quietly diminish manual flying proficiency. If every climb, cruise, and descent is flown by the autopilot, opportunities to maintain stick-and-rudder skills become less frequent. Those skills matter. Automation can disconnect. Electrical systems can fail. AHRS sensors can become unreliable. Unexpected icing or turbulence may require immediate manual control. The first time you hand-fly an airplane in six months should not be during an emergency. Whenever conditions permit, consider hand-flying portions of routine flights.

- Practice precision.
- Maintain altitude within 100 feet.
- Hold headings accurately.
- Fly stabilized approaches without automation.

Like any other skill, proficiency fades unless exercised.

Automation Can Increase Workload

Ironically, automation is often introduced to reduce workload. Yet when something unexpected occurs, workload can increase dramatically. An altitude amendment. A runway change. A revised clearance. A missed approach.

Suddenly, the pilot is reprogramming avionics, communicating with ATC, monitoring weather, and ensuring the airplane remains where it should be. That's when "button pushing" can become "head down." And every second spent looking inside the cockpit is a second not spent looking outside. Sometimes the safest response is surprisingly simple. Disconnect the autopilot. Level the wings. You know, like the Blue Level button on most new autopilots! Fly the airplane. Then sort everything else out.

Know When Less Is More

There is no rule requiring the autopilot to remain engaged. Professional pilots disconnect automation whenever it becomes more complicated than simply flying the airplane. The same principle applies in general aviation.

If you're spending more time trying to convince the avionics to do what you want than it would take to simply fly the airplane manually, the solution may be obvious. Fly the airplane.

The Passenger Doesn't Care

Your passengers won't remember whether the airplane tracked the RNAV centerline within five feet. They won't remember whether VNAV captured the descent perfectly. They will remember that you appeared calm, confident, and in control. Good automation supports that professionalism. It never replaces it.

Automation Is a Tool

Technology has dramatically improved safety in general aviation. Synthetic vision, terrain awareness, traffic systems, envelope protection, and sophisticated autopilots have prevented countless accidents. We should embrace these tools. We should also remember that every one of them depends on one final layer of protection: A knowledgeable, proficient pilot.The best aviators don't simply know how to turn automation on. They know when to turn it off.

Automation is one of the greatest advancements in aviation safety. Used wisely, it reduces workload, enhances situational awareness, and helps us make better decisions. But the moment we stop actively monitoring it — or allow our own flying skills to fade — we surrender the very safety margin it was designed to provide. Technology should always make us better pilots. It should never replace being one.

Thank you for your time and as always, I welcome your input and feedback.

In Safety,

Alexi Stavropoulos
AFW Safety Officer
alexiosS@angelflightwest.org
707-953-8947