Bad Ideas

Aviation's two most dangerous words: **"watch this"**

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IVAN BETANCOURT

The gear-up landing of Gulfstream G159 YV-08CP, Aug. 27, 1993.

There is no shortage of bad ideas out there, but the ones that concern me are old sayings that have a history of being wrong yet are still embraced by some pilots. Let's look at a few.

A common denominator seems to be that certain pilots absolutely believe that their procedures are safe, until they end up breaking something. At that point, they blame the airplane, their training or something else. I've had my share of bad ideas over the years. But once I recognize the error, I am the first to admit I screwed up, and then try to spread the word so nobody else falls for the same bad idea.

"Train like you fight, fight like you train" is a sound idea for a military flying unit where the job is to kill people and break things. But when you do that, the training losses usually exceed wartime losses. That has been true in the U.S. Air Force and Navy since the dawn of military aviation. But when you aren't fighting a war, it is a bad idea to play so close to the edge of safety in airplanes when you have high-quality simulators available.

My generation of Air Force pilots has been especially guilty of staying on the edge in training others. We had simulators, but they were not very good. We didn't have as much access to them as necessary, and we got bored doing the same thing over and over. Then one day, somebody had the bright idea of pulling circuit breakers while flying airplanes.

When the 89th Military Airlift Wing flew the Lockheed JetStar (C-140), just about all of the training was conducted "in house" and instructors became creative about how to place their students under stress. The idea was to make the training as difficult as possible so that the mission itself became easy. Fair enough; the JetStar was practically bulletproof.

Bad Idea: CB Shenanigans

In the late 1980s when those aircraft were replaced with the Gulfstream GIII (C-20), the same cadre of instructors looked at ways to play the same training games. It didn't matter that they had access to very good simulators. So, we ended up cutting engines during takeoff, and failing all sorts of systems from before engine start all the way to landing. The most realistic way to fail many of the systems was by pulling the associated circuit breaker.

My last job at Andrews Air Force Base was as the wing's chief of safety, while also serving as a qualified C-20 pilot. We were having a rash of failures with the C-20's Electronic Flight Instrument System (EFIS). It seemed curious that the civilian version of the airplane didn't have these problems. And I knew that our instructor force delighted in pulling the EFIS circuit breakers to force the student to select alternate instruments or to fly the airplane using standby instruments.

Suspecting a connection, I managed to convince the wing to place a one-month ban on pulling EFIS circuit breakers. To the delight of the maintenance squadrons, our EFIS problems went away. After the ban was lifted, the circuit breaker pulling resumed, and so did the EFIS problems. The aircraft that later replaced the C-20 cannot tolerate these kinds of circuit breaker shenanigans, so the practice was finally dropped. (Or so I am told.)

If you are tempted to say a few avionics problems are a good price to pay for high-quality training, consider a Gulfstream of a much earlier vintage. In 1993, a GI landed gear up at Simón Bolívar International Airport, Maiquetiá, Venezuela (SVMI). From one of the local pilots: "The PIC was conducting a command upgrade check ride. They were configured for a flaps 0 landing on Runway 09 when ATC instructed them to join right downwind and land on Runway 26, a parallel runway. The examiner was known to pull CBs and disable warning systems as part of his check ride routine. Well, he disabled the gear horn warning [no idea why he would do such a thing], but when combined with fatigue, distraction, incredible foolishness and over-confidence the outcome was predictable."

Since those days, most manufacturers have become rather explicit about pulling and resetting circuit breakers.

To paraphrase a few manufacturers: The circuit breaker is not a switch. Don't pull them unless the checklist tells you to; don't reset them without fully considering why they had popped in the first place.

Bad Idea: Never Go Around Once the Gear Is Down


NTSB

The result of a test pilot's decision to land the airplane rather than go around.

Around 1984, my Boeing 707 (EC-135J) squadron in Hawaii had a rash of flap problems that only became apparent after the gear was extended. This is actually a common trait of many airplanes: You can't get that last notch of flaps until the gear is extended.

We had a pilot run into this after being cleared to land on Honolulu International Airport's (PHNL) longest runway but to remain short of an intersecting runway. The pilot told tower he needed all of the runway and tower said he could either comply or go around. The pilot elected to land. He managed to stop prior to the intersecting runway, but all eight main gear tires exploded from the braking effort. The airplane was damaged and the runway was closed.

That pilot didn't want to go around and resequence himself into a busy pattern. He didn't want to declare an emergency because the airplane was perfectly landable if given the full runway. He somehow felt he was selecting the only option available to him. This feeling that landing is the only option isn't uncommon. On Feb. 14, 2011, a highly qualified Gulfstream production test pilot made a similar decision at Outagamie County Regional Airport, Wisconsin (KATW), heavily damaging a brand-new Gulfstream G550.

The hydraulic system on the G550 that provides pressure for the flaps, ground spoilers and wheel brakes failed on short final. The copilot asked, "Should we go around to check it out?" To this, the pilot flying said, "No . . . we're gonna land 'cause it's leakin'."

Experienced Gulfstream pilots know the airplane doesn't "sit" on landing with the ground spoilers inoperative and endeavor to fly the airplane onto the runway. This pilot didn't touch down until 2,048 ft. down the runway, leaving 4,453 ft. to stop. It then took 8 sec. to lower the nosegear. The pilot deployed the right thrust reverser, but the left was inoperative because of the left hydraulic system failure. The pilots failed to extend the speed brakes. With only 3,000 ft. remaining, they discovered their wheel brakes were inoperative. At this point the emergency brakes could have stopped the airplane. The pilot instead attempted to abort the landing and take off. Gulfstream tests show this would not have worked. Fortunately, the copilot pulled the throttles back, very likely saving their lives.

Why would a production test pilot make a series of mistakes that a novice pilot would have avoided? Sometimes confidence overpowers caution. Why would a highly experienced combat pilot make a procedural error a moderately experienced Gulfstream pilot would have gotten right? Sometimes non-applicable experience works against you. Why would a pilot trained in the precepts of crew resource management ignore an input from another crewmember that could have prevented the accident in the first place? Sometimes being taught CRM doesn't mean you've fully embraced it.

The former Marine Corps pilot was a decorated combat veteran who had been taught that it is wiser to land an airplane when something goes wrong after the gear is down, than it is to go around. He blamed his training but acknowledges today that he would have made a different decision given what he has learned since.

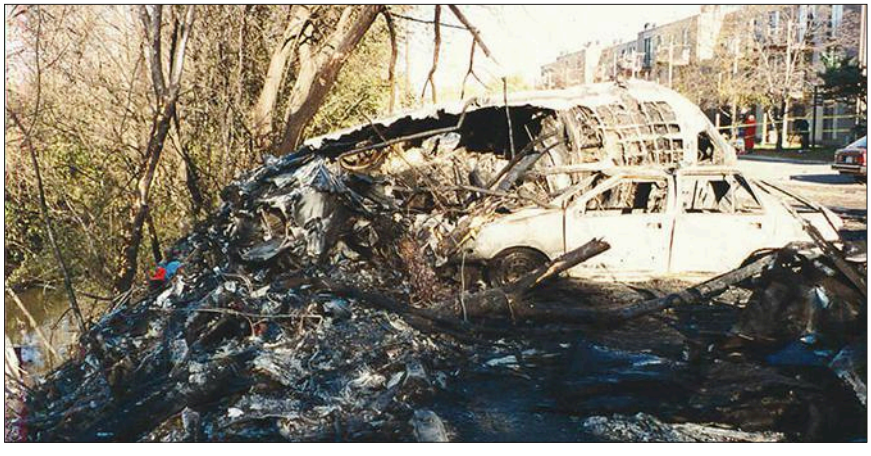
I have never been taught it is better to land than go around if I had a problem after the gear was down. I think this is probably true if you are on fire or if something bad happens and you've no doubt about the airplane's ability to stop. But if you insist on this idea, I urge you to consider a few exceptions:

- If any system needed to stop the airplane (spoilers, flaps, reversers, brakes, tires, etc.) is impacted.
- If anything happens that invalidates your planned landing performance calculations, such as a smaller flap setting, inoperative spoilers, inoperative reversers, anti-skid system failures, etc.
- If anything happens environmentally that impacts the runway, such as contamination or obstructions.

In other words, there are so many exceptions to this idea of not going around, so as to make it a bad idea.

Bad Idea: Any Airplane Can Be Flown Like Any Other

I think we tell ourselves all airplanes fly alike as a way of saying we don't need to work at relearning when we move from one type to the next. It is even institutionalized by one of the Flight Safety Foundation's Golden Rules: "Automated Aircraft Can Be Flown Like Any Other Aircraft."


NTSB

View of N23AC fuselage.

The crash of a Gulfstream GIV (N23AC) on Oct. 30, 1986, was due to the pilot's inability to maintain directional control in a crosswind during takeoff.

The aircraft started to diverge from the centerline less than 1,000 ft. into the takeoff roll. The GIV departed the paved surface, landing gear and other components separated from it, then the airplane slid on its belly, became airborne momentarily, and crashed into a parking lot. Everyone on board was killed.

The NTSB and the world at large placed emphasis on the position of a switch in the cockpit that links the nosewheel steering to the rudder. Older Gulfstreams (the GIII and previous) didn't have a connection between the rudder pedals and the nosewheel steering; the switch was designed to make them comfortable with old techniques in a new airplane.

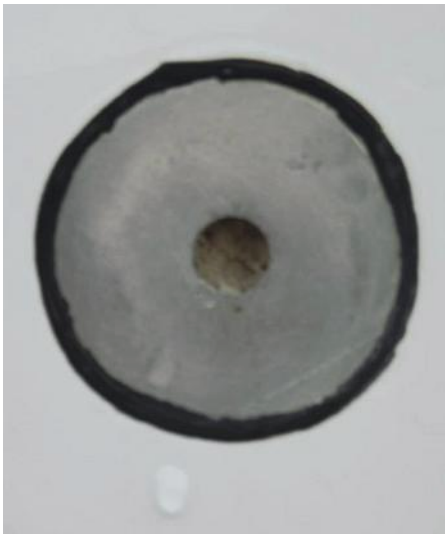
In the GIV and those models that followed, I've yet to see a credible reason to ever disconnect the pedals from the nosewheel steering. But I don't think this had anything at all to do with the crash.

So, why did the pilot lose control of the aircraft? The answer was buried in the NTSB report: "The PIC tended to unload the nosewheel on the GIV during takeoff to make it easier on the airplane on rough runways." This is a poor technique in a multiengine jet. Such aircraft have a large vertical fin and rudder to compensate for the adverse yaw from an engine failure. With or without an engine failure, that fin acts as a weather vane and tends to turn the aircraft into the wind. The primary responsibility of every pilot is to maintain aircraft control and in a crosswind a tricycle gear airplane — certainly a GIV — needs to have the nosewheel on the runway at least until reaching its minimum control speed on the ground (VMCG).

The winds were 60 deg. off runway heading at 20 kt. gusting to 35 kt. at the time of the accident. The aircraft was controllable on the ground so long as the nosewheel stayed there until rotation speed, as is the standard operating procedure on that airplane. This pilot caused the crash by using procedures from his light aircraft experience, which were unsafe in this larger, multiengine jet.

Every change of aircraft should involve an inventory of procedures and techniques to see what works and what doesn't. Your best source of information may be someone who had made the transition before you and has enough experience to have been "bitten" once or twice. But don't rely on just one source. For example, if your favorite Gulfstream pilots tell you the airplane is landed "wing low" in a crosswind, find another source.

Bad Idea: The Mechanic Already Did the Preflight



NTSB

Close-up of the outflow valve static port.

I hear this all the time, and sometimes I hear it during recurrent. It is so obviously wrong, I continue to be surprised when it's said. Take, for example, the need to check pitot tubes and static ports.

On April 10, 2015, a Gulfstream GIV (N450KK) departed Simón Bolívar International Airport, Venezuela (SVMI) bound for Fort Lauderdale Executive Airport, Florida (KFXE). Just prior to beginning their descent, the crew noted an over-pressurization warning that indicated a differential pressure in excess of 9.8 psi. At this point the aircraft's cabin pressure relief valve (CPRV) should have opened but did not. The crew heard a loud "bam!" in the cabin and initiated an emergency descent 2 min. and 15 sec. after the initial warning. The pilots leveled off at 20,000 ft. when the over-pressurization message extinguished. Two minutes later it re-illuminated. The crew continued the descent, manually opened the pressurization valve, and continued to KFXE unpressurized.

The reason for the over-pressurization was never determined, but the failure of the CPRV was traced to a static port blocked by dirt from a mud dauber. The loud "bam!" was internal structural damage that did not cause the airplane to depressurize. According to Gulfstream, a blocked CPRV static port would render the CPRV inoperative due to its inability to measure the cabin-to-atmosphere pressure differential. However, the cabin pressure could still be controlled independently by manual operation of the outflow valve or by shutting off bleed air for pressurization. No other mechanical anomalies were found with the pressurization system.

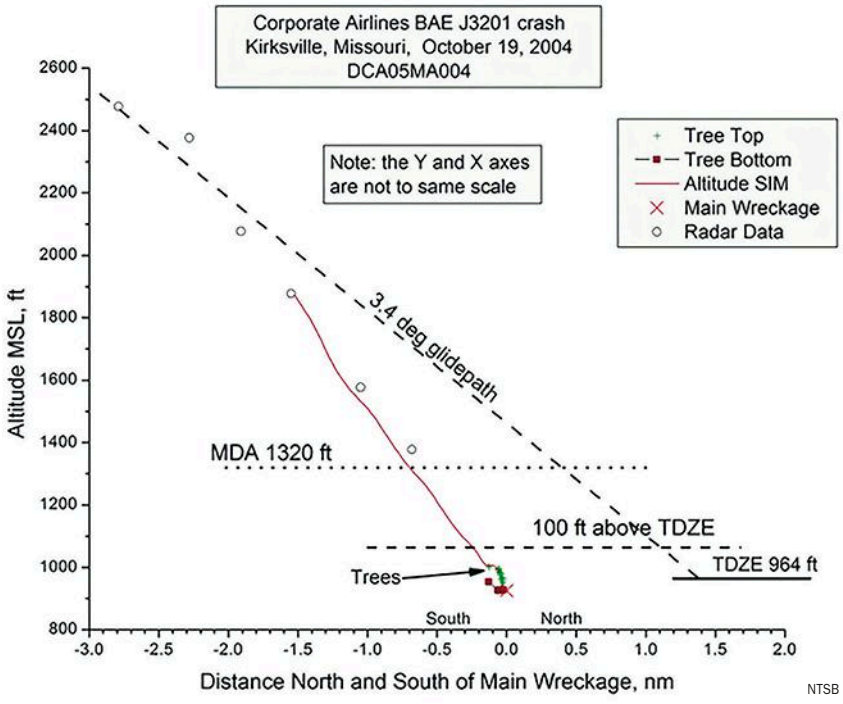
Inspecting the CPRV static port is a part of the GIV Airplane Flight Manual exterior preflight inspection and is easily accomplished without any special stands or tools. A photo of the static port clearly shows it was blocked. It is all too easy to assume everything was OK before, so it is going to be OK again. It is especially tempting to think that when the weather is very cold or very hot. But the price of missing things can be very high.

Bad Idea: If the Approach Doesn't Exist, Build One

We quite often see accidents caused by pilots who want only to fly visual approaches, even in questionable weather. But there are also cases in which pilots

PAKISTAN SAFETY INVESTIGATION BOARD

Air Blue Flight 202



Corporate Airlines Flight 5966 descent profile.

cannot seem to fly without some kind of electronic course guidance, even if it means building that guidance despite regulatory restrictions. Can you build your own approach? Yes. Should you? There are so many ways to get it wrong that the answer has to be "No."

The captain of Air Blue Flight 202, an Airbus A321, was worried about having to circle at Chaklala International Airport, Islamabad, Pakistan (OPRN) on July 28, 2010. The weather was just good enough for the left pattern. For some unknown reason, he preferred the right pattern and had the first officer build that into the FMS. Tower denied their request for a right pattern several times, due to low clouds on that side of the airport. The captain commanded the right turn for the pattern by selecting heading mode. He then heard a competing airline had just landed, flying the left pattern. The accident report said that "put the captain under further pressure to ensure a landing at Islamabad under any circumstances."

The report speculates that the captain decided to fly a right pattern at this point by saying he was "going for NAV" but neglected to select the mode. The aircraft remained in heading mode even as the crew noted passage of the waypoints they had built. The crew looked in vain for the airport (perhaps looking to the right when it was to the left) until about several miles north of the airport, at which time NAV was selected. The radar controller instructed them to turn left. The captain said he was turning left, but he was moving the heading bug while the autopilot was still in NAV mode. They hit the terrain a few seconds later and all 152 persons on board were killed.

There was much more going on in the cockpit, not the least of which was a breakdown in CRM. I think the Pakistani report suffers in translation, so the facts are not explicitly laid out. The ad hoc approach they had built in the FMS didn't cause the crash, but selecting the approach after the pilots became lost delayed their recognition of a need to go missed approach before they impacted the terrain.

There are times when flying what the nav world calls a PBD (place/bearing/distance) waypoint helps situational awareness and should be encouraged. But you should never fly such a waypoint as a means of getting down to instrument minimums or navigating through terrain. The practice is prohibited by several FAA Advisory Circulars and orders. Besides, it is dangerous.

Bad Idea: Callouts Are for Newbies

I have been in social settings where the topic du jour was how some pilots took themselves too seriously (perhaps it was an intended jab at me) or, on the other side of the debate, there was far too much chatter in the cockpit and wouldn't it be best if nothing was said at all? I like a quiet cockpit, but I also like standard callouts.

The crew of Corporate Airlines Flight 5966, a British Aerospace 3201 Jetstream 32EP, descended below their minimum descent altitude (MDA) while on approach to St. Louis Lambert International Airport, Missouri (KSTL) and struck the terrain well short of the runway. Both pilots and 13 of 15 passengers were killed.

The aircraft was technology-poor, but the pilots had what they needed to compute a visual descent point and the techniques to do so were well known at the time. The crew's joking banter prior to the instrument approach may appear harmless, but it sets the wrong tone for the serious work ahead of them. Finally, the first officer missed several opportunities to call for a go around when he lost sight of the runway while below the MDA.

One of the ironies of this mishap is that 28 min. before their deaths, both pilots were talking about hating pilots who "take themselves too serious." In the end, they didn't take what they were doing seriously enough:

1909:30 (HOT-1): "Gotta have fun."

1909:31 (HOT-2): "That's truth man. Gotta have the fun."

1909:35 (HOT-1): "Too many of these # take themselves way too serious in this job. I hate it, I've flown with them and it sucks. A month of # agony."

1909:47 (HOT-1): "All you wanna do is strangle the # when you get on the ground."

1909:50 (HOT-2): "Oh # . . . [sound of laughter]."

1909:52 (HOT-1): "Oh *, yeah, oh well, he was one but I didn't, I didn't have to fly with him that much 'cause. . . ."

1909:56 (HOT-2): "I know."

1909:57 (HOT-1): "It was kinda a fluke. But, uh, some of the guys that aren't here anymore you wanted to just # kick 'em in the #. Lighten the # up #."

The pilots failed to make several mandatory callouts, any one of which could have changed the outcome.

Bad Idea: Getting More Performance From the Airplane Than the Guys Who Designed It

When I was in the ratings chase, flying my trusty T-37, I often stretched the range string to its maximum. A training sortie was usually 1.3 hr., but we could get 2.0 out of the airplane. I've done 16-hr. flights in the Boeing 707 and 20 hr. in the Boeing 747. But those included

multiple air refuelings. I've done a 10.0 in the G450 and 14.5 in the GV. But in all of those cases, you could rebuild the flight using the AFM performance charts. If you are doing better than your charts, you are probably doing something wrong.

On April 4, 1979, Trans World Airlines (TWA) Flight 841 was flying from New York-JFK International Airport (KJFK) to Minneapolis-St. Paul International Airport (KMSP) when a leading-edge slat asymmetry caused the airplane to roll uncommanded while at cruise altitude. The NTSB determined the asymmetry was caused by the crew's manipulation of the flap/slat controls, but there was some dispute as to why. The Safety Board was very careful in its choice of words, but the talk among Boeing 727 and TWA pilots at the time was this:

▶ The trailing edge flaps on the Boeing 727 extend aft a great deal before they extend down. If it were not for the automatic deployment of the leading edge slats, the first notch of flaps would turn the wing into one that produces more lift (greater span with very little change in camber).

▶ There was a belief among some Boeing 727 pilots that you could increase the airplane's speed by pulling the circuit breakers on the leading edge slats and extending the trailing edge flaps to their first notch.

▶ The mishap pilots did just this while the flight engineer was aft using the lavatory. When the engineer returned to the cockpit, he noticed the popped circuit breakers and reset them, causing the leading edge slats to extend.

▶ This caused a buzzing sensation, prompting the captain to retract the flaps. When he did this, the No. 7 leading edge slat failed to retract, causing the subsequent roll.

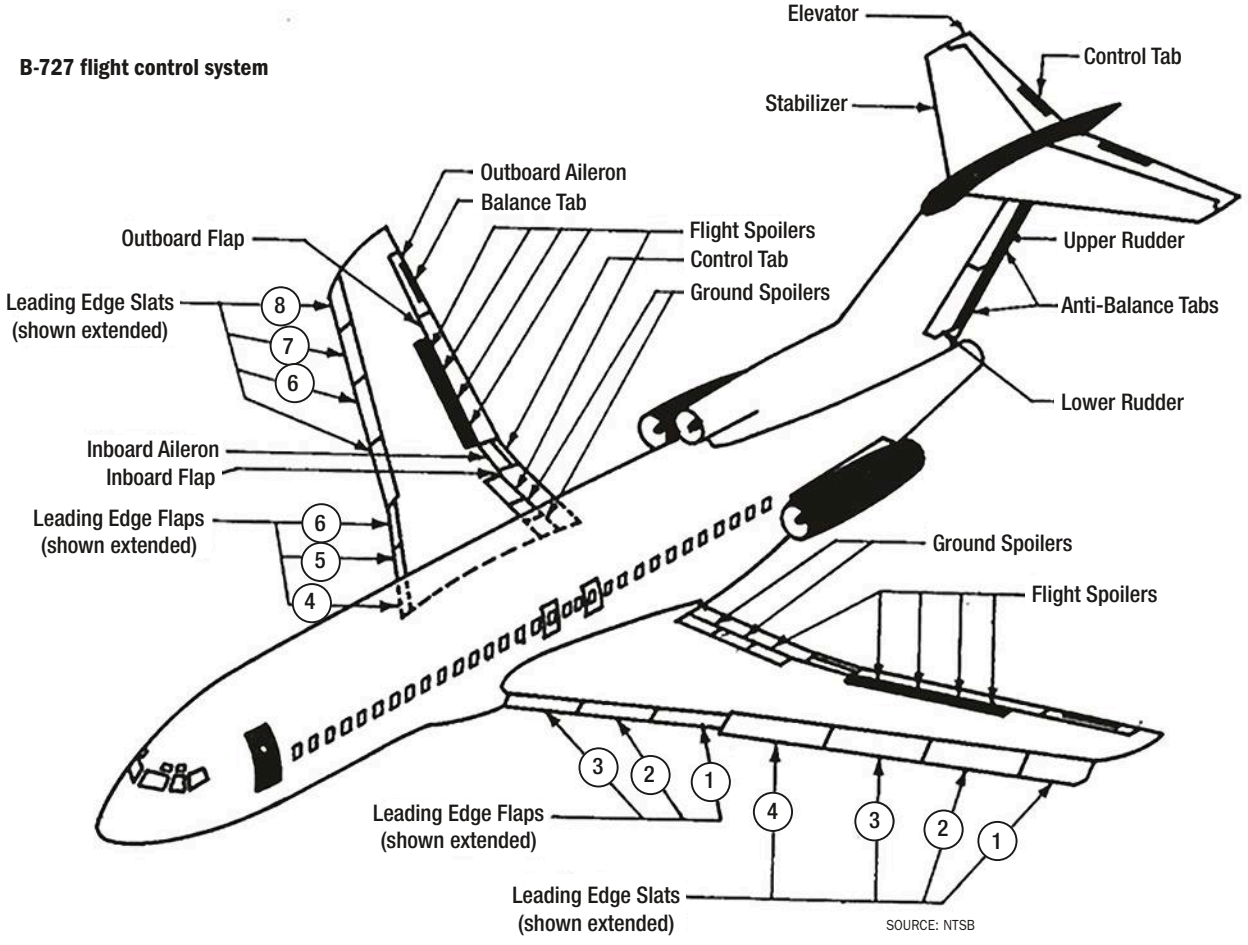
A manufacturer has hundreds and even thousands of hours in the certification process to explore an airplane's envelope. It is in the company's financial interest to get the most performance out of the airplane as is safely possible. This is accomplished with highly experienced pilots backed up by teams of engineers. If you think you've come up with a better way to fly the airplane, you are probably wrong.

Are 'Bad Ideas' in the Eye of the Beholder?

I once heard of a pilot who swore you could increase an airplane's en route speed by over-pressurizing it in a tailwind, thereby increasing its cross-section and thus the "push" it got from the wind, or under-pressurizing it in a headwind to decrease the aircraft's cross-section and thus its resistance to the wind. I am positive that person finished his or her flying career believing that.

I think one of the finest attributes in a professional pilot is humility: the knowledge that you cannot know it all, can always learn, and have to be aware of the fact you may someday find yourself in uncharted territory. The best way to avoid such unwelcome pioneering is to stick to known procedures, which produce known outcomes. **BCA**

B-727 flight control system



SOURCE: NTSB