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Orchestrating The Human Symphony In Flight Operations

Those who would mount the podium with the baton of managerial authority must understand, very clearly, that they are communicators as well as conductors.

by
John J. Nance
Author and Pilot

“Captain, this is not a stabilized approach. We’d better go around.”

How do you answer that if you are sitting in the left seat? Whether the copilot is junior or senior, whether he calls you captain or “Hey Bill,” or whether you are flying a King Air or a 747, the pressures and the temptations are identical. The pressure to perform perfectly and never admit to a mistake, and the temptation to snap his head off for daring to question your abilities, and to question your right to command, are the same. The potential for making a fatal mistake — responding incorrectly to his statement — is always there in aviation operations.

We are riding the first stage of a new revolution in our management of aviation safety, but let me explain, lest you think I’m attempting to reinvent the wheel.

Strapping on an airplane and going out to fly has long since evolved from a totally macho, daredevil pursuit to a professional occupation of demanding precision and technical knowledge. Exactly when that transition was mostly complete is anyone’s guess, but the fact that precision and professionalism is required these days to fly a business jet, a C-5, a Concorde — and even a Mode 3 transpondering Cessna 150 in the Los Angeles basin — is a matter of critical certainty. We must have trained people who know their equipment and know their procedures, know their environment and their manuals, know

their weight and balance and FARs, and above all, know that getting from point A to point B safely is — with apologies for the pun — no accident.

But somewhere between the late 1970s, through the horrendous deregulatory wars which have laid waste to segments of commercial aviation, and into the present age of overcrowded air traffic control facilities, limited airports, aging aircraft worries, TCAS requirements, and ever spiraling costs, we have come to understand suddenly a great truth that was actually with us all along, like a long-ignored century plant whose moment to blossom has finally come. That truth? Simply this: Aviation is a human business, and thus must be managed with human frailties in mind at all times.

Yes, we knew that was true, but we never really understood what to do about it, and therein lies the final piece of the puzzle (the missing sheet music, to round out my metaphor) which enables a collection of complicated, disparate instruments — the humans and their machine — to perform in concert.

Along the way, what we have found are some new and amazingly effective tools which would be relatively useless without the basic acceptance of the proposition that we are engaged in a human, not mechanical business.

CRM — cockpit resource management training, for example, and its evolving derivatives — is nothing more

than a way of training people to share their knowledge and skills and training in a synergistic way, so that a multi-place cockpit becomes more than the sum total of several pilots working in concert, with maximum efficiency and safety, rather than a solo captain and a standby copilot. At the same time, advanced understanding of human factors in accident investigation has enabled us to rise far above the ancient and myopic method of looking at mechanically-caused crashes as a puzzle to be solved, and a pilot-caused accident as a book to be closed. LOFT — Line Oriented Flight Training, and its derivatives — are taking our use of flight simulators into a new range of effectiveness as a sophisticated training and proficiency tool with greater benefits than we had imagined. And there are many more examples based on maximizing human performance and reliability.

Harmony Vs. Cacaphony

But when you line all these new methodologies up, they all beg for the very same thing that a well-written symphony and a collection of well-practiced musicians must have to play together with maximum effectiveness: a conductor — a manager — whether a single chief pilot in a two-pilot operation, or a thundering herd of people in a major corporate flight department or airline. No matter how well the players know their part, no matter how well tuned the instruments, without enlightened, communicating management, it will be cacophony and chaos — and in our business, that can translate into an aviation accident looking for a place to happen.

If you accept the proposition that the human machine in the aircraft cockpit is a vital part of the safety equation because it's failure can cause a disaster, then it is a very short leap to the conclusion that we need to know as much as possible about what causes that human machine to fail. If we know, then we can take steps to minimize those failures, and minimize their effects. Certainly the subjective and imprecise human nature of many of what an engineer might call human "failure modes" can be totally exasperating, but if we are to prevent them from causing accidents, we must understand them.

People get tired, for instance, and tired people make more mistakes, and more mistakes means a greater chance of accident.

People get angry and upset at times, and angry, upset people also make more mistakes.

People also get distracted, they get task-saturated, they get overwhelmed with noise, they get forgetful, and they sometimes can get just plain stubborn.

But, if one of those people is a pilot with a manager or a management that simply refuses to allow such activity as fatigue, anger, forgetfulness, distraction, and so on, he or she is in a heap of trouble, because these things are going to happen despite the most stringent of company rules and the most diligent of professional intent.

It would be great if we could just issue a company memo directing that employees will not become fatigued on the job, even if that crew duty day stretched to 15 hours and, oh, sorry, we do need the bird in Pittsburgh at 5 a.m. tomorrow morning, and there's no one else to fly it.

There are a lot of aviation folks in managerial positions in the world who have been tempted — really tempted — to put a placard on the front panel of their aircraft that says simply: **crashing this aircraft if prohibited**. Bingo. End of human factor problems.

Of course, we all know that will not work, but what kind of a system do we have to uncover such problems before they end up discussed in an accident report? What kind of procedure, or mechanism, or early warning system do you have to catch such problems as pilot, or mechanic, or flight attendant fatigue, or anger, or other human problems?

Ah, but you do have such an early warning system, provided you have two or more employees. In fact, just as there is no one who can more accurately report on the fighting at a particular position on a battle front than the guy in that particular trench, no one can do a better job of giving you an early warning than your people themselves. The question is not whether they can recognize potential problems in themselves and their coworkers, but whether the manager is listening. All the broadcast wattage in the world with High Definition TV, for instance, is useless if none of us have a High Definition TV receiver. If the boss is not listening, will not listen, can not listen, is not trained to listen, or refuses because no one listens to him, you will not get the message, and you won't have the warning.

Speak Right Up

Let us talk about practicality. I do not mean suggestion boxes. I mean real time feedback, whether a phrase in a conversation from your falcon crew in Phoenix, "Boy, we're sure beat. Any chance of parking for another 24 hours?" or a worried comment from a new copilot to a macho captain who thinks he can handle anything. "Captain, that tire sure looks bad to me."

You see, this is a generic lesson, whether we're in a cockpit resource management class trying to teach an iron pants captain how to listen to advice that could save

his life, or whether we are talking to the senior vice president and trying to explain why, despite the closing of the deal tomorrow in New York at 7 a.m., it just is not safe to take off in WOXOF conditions on a VFR runway.

In the Air Florida crash, three times the copilot tried to get the captain's attention, tried to indicate that the engine instruments and normality were not matching: "That doesn't seem right, does it?" "Ah, that's not right." "Naw, I don't think that's right." The captain, the copilot, and all but five of their passengers paid with their lives because the man was not listening.

Again it is generic, whether it is someone like John Dean trying to warn Richard Nixon of a cancer on the presidency, a space program engineer trying to warn the big flight managers that the shuttle is not ready to fly despite the political urgency of the schedule, or a gaggle of nautical employees up in Valdez, Alaska, who had been passing rumors for months about the drinking habits of certain maritime employees, rumors that no one in management or in government apparently wanted to hear.

Back in the cockpit, an all-time classic was the Texas International crash in Mena, Arkansas, in 1973. The captain was descending lower and lower through mountains, trying to stay VFR in worsening IFR conditions, and the copilot, after giving hint after hint that he would like to do something other than play blindman's bluff with a bionic buzzard (it was a Convair 580), took out the map as they hedge-hopped at 2,000 feet, located the minimum en route altitude, and said, "Minimum en route altitude here is forty-four hund..." The rest of that sentence died with the copilot and his captain and their passengers as they slammed into a 3,000-foot mountain-side.

Watch for the Warning Signs

This sort of communication breakdown is certainly the type of thing we must train all our air crews to guard against, and to listen for, but it is equally true for the chief pilots and the flight managers, the vice presidents with authority over the flight department, and anyone else to whom early warning messages — which are sometimes whispers — are directed, even if they are nothing more than a gathering thunderstorm of rumors.

Now, let us take another aspect. Let us say you and your people, and your captains, are good listeners, but no one is talking. No one is reporting. Why not?

We know these days that it isn't enough to just tell a copilot, "If you see anything you don't like, tell me."

That invitation is stillborn unless backed up by a receptive attitude. If the first time a copilot says, "Captain, are you sure that was a clearance to eight thousand?" and the captain bites his head off, he is going to get the message: do not correct this man unless you're about to die. If that captain is also his flight manager or chief pilot or corporate leader — what I call a boss to the second power — he is twice as likely to bite his tongue while you "bust" an altitude, turn the wrong way in holding, or land on someone's taxiway.

A Down-to-Earth Concern

This, folks, is also true for those on the ground. Again, it is generic. If your people do not feel they can come to you with worries or problems of a relatively mundane nature, they are not going to come to you with a serious problem that might reflect on the department, and on you. The organization's receptivity has to be reinforced, and rewarded, constantly, or even the best listeners will hear nothing.

What we are talking about here is vertical communication, and that sounds suspiciously like management seminar stuff. But, you see, that is part of the revolution, the radical idea that real pilots in nuts and bolts airplanes really need such fuzzy thinking as human values of communication.

Let us go back to the orchestra again. What does the conductor do? Yes, he sets the pace, the rhythm, but with equal importance, he sets the mood. Watch John Williams of the Boston Pops sometime. That is not acting, that is enthusiastic communication, watching and listening and giving back the pace and the direction within the context of the mood.

I used to wonder why a conductor was important. But replace him with a metronome and you do not have an orchestra, you have a rather bad rehearsal. Well, from the lowest managerial or supervisory tier in the pecking order — the guy with one employee to manage — all the way up to the chairman himself, when we are dealing with flight departments and aviation operations, it is the setting of the organizational tone, the establishing of an atmosphere and a corporate attitude, which is indeed the glue that binds a safety system together.

In the airline business we are emerging from a terrible period in which too many senior managers did not have the sheet music, and could not play the instrument. They treated delicately balanced airlines as if they were — to quote Dick Ferris formerly of United — a "truck assembly factory". Messages of concern and worry over maintenance and training problems and expenditures flowed

upward in such organizations and splattered ineffectively against the iron-clad attitude that such communi-ques did not matter. Setting the tone of the organization, letting the people know that one of their most serious duties is to communicate any concerns and worries and discoveries they have regarding safety is a prime ingredient. All the memos in all the sleazy bulletin boards in all the branch offices in the world won't substitute for a positively established, positively reinforced atmosphere of safety-first concern, backed up without deviation by the managers at all levels.

What do I mean, "backed up?" Let me give you an example from the developing world of Cockpit Resource Management (CRM). Several friends of mine involved with CRM set up an excellent course at Alaska Airlines near me in Seattle. (There is, by the way, an excellent article on that course in the January 1989 issue of *Professional Pilot* magazine.) The course is designed, naturally, to maximize communications, and as all good CRM courses, one of the major goals is to get subordinate pilots to be respectful but assertive and effective in communicating safety information to their captains, and in getting the captains to be receptive. "One of the first things we did," one of them told me, "after we wrote the course, was to sit the vice president of operations and both the chief pilot and his assistant down and read them the riot act on one point: If you discipline one single, solitary flight engineer or copilot for speaking out to a captain who doesn't want to listen, if you do it even once, you might as well scrap the program. The word will get around to 600 pilots within days, and the goals of the program will be rendered impossible. The entire subordinate pilot force will get the message that following the guidelines of CRM could get them fired, and recalcitrant captains will get the idea that they still have the authority to fly solo if they damn well please."

Making Actions Match Words

I submit to you that this caveat to Alaska's leaders applies not only to each operation that embraces CRM, but as well to the entire concept of tone-setting in a flight operation. No matter what your carefully-crafted memos say, it is your actions, the daily bureaucratic rewards and punishments, that speak to your people. Discipline, discourage, or merely glower at one of your people for doing something conservative and safe which inconvenienced the schedule or cost additional funds, and you have telegraphed your message with great clarity: If you want to get ahead in this organization, do not do that again.

For example, deicing services cost money, and deciding when to ask for them is often a judgment call. No flight

manager wants to get an unexpected three hundred dollar bill from Doofus Aviation in West Orange, New Hampshire, because one of his pilots thought he saw an ice particle one cold and frosty morning. But if you let that pilot know you were not pleased — if in **any** way you telegraph your displeasure without a careful two-way discussion of what decisional parameters you do want him to use — some seriously frosty morning somewhere else that same pilot may decide to please the boss, bypass the deicing bill, and fail to clear the trees on the departure end.

Who Tipped the First Domino?

And you know, from an accident investigation point of view, it may be impossible to track such an accident back to its source. Even the manager who pulled the bill from the envelope and fired off the memo or a verbal broadside may not make the connection to what went wrong, and how he started the accident causal sequence.

But what I am asking you to do, right here, right now, is to make that connection ahead of time. Realize that your sharp, intelligent, observant flight crews watch and listen to management much more than they let on. Whether you want the Tigers to win, or an end to flight delays for changed tires, they **will** get the message, and more ominously, they **will** act on it to try to please the boss.

I call it the Thomas Becket syndrome. Many of you may recall the story of St. Thomas Becket, the Archbishop of Canterbury during the reign of King Henry II of England. The King, angry at this friend the Archbishop, vented his linguistic anger in the presence of several of his knights. "Who will rid me of this damned priest?" roared the King, never dreaming that his knights would take what was essentially a private complaint as a public command. Four days later, though, the knights murdered Becket in his church at Canterbury, and Henry was profoundly shocked and saddened. That had **not** been his desire.

That murder took place in 1170, but here, 820 years later, the Thomas Becket syndrome is still a major problem in business and in government. Within the last few years, for instance, the White House attitude of "Who will rid me of these damned Sandanistas?" seems to have unleashed Colonel North and company. The Lorenzian attitude of "Who will rid me of these damned unions?" has led to the downfall of Eastern, and probably the entire Texas Air patchwork quilt of failing companies.

And how about your organization? You do not need to

ricochet through the office yelling “Who will rid me of these damned bills?” to have a profound effect on your people. A single memo can do it. A single phone call. A single rebuke of a pilot for being overly cautious, or a maintenance man for being overly careful.

Say Only What You Mean

My point is, you are being watched as a manager at all times for cues and hints of what the king wants. Be very careful not to send the wrong messages, lest your knights ride out to act on them. Having issued that warning, though, let me give you the panacea: A flight department with a clear and certain intolerance of risk taking which also has wide open channels of communication for its people.

If your folks know, and I mean know, that no one in the chain of command will tolerate pressing limits, sneaking in below minimums, overloading aircraft, flying while fatigued, disregarding maintenance problems, or any other deadly practice, they will also know that doing those things will not enhance their professional standing, even if they are blind to the safety risks. If your people also have the ability to bring anything to you and your superiors at any time, **and** the ability to shut down an operation at any time for safety reasons without fear of chastisement, then the Becket syndrome cannot operate. Someone will swing into your office instead, and ask: “You didn’t really mean for us to do such-and-such, did you?”

What do your people think you want? What do they think you will tolerate, and will not? Do you reward them with a wink and a pat on the back for sneaking in when they really should not have chanced it? Downeast Airlines in Rockland, Maine did, and 18 people died in their Twin Otter.

Do you encourage the goal-oriented captain in your organization who would lose both generators yet try to fly a 45-minute flight through thunderstorms on battery power with a 30-minute battery at night? A young pilot at Air Illinois did, and died, along with his passengers and crew, and the reason was the atmosphere, the attitude, among his flight department managers. Yes, that was a small airline, but the point is absolutely as valid for any corporate flight department. This fellow had limped in many times with the airplane on his back, trying to get it back to the home base where company maintenance could repair things at the lowest cost. He, too, you see, was a stockholder. The chief pilot knew this. The chief pilot was also a stockholder, and the chief pilot used to go buy him a round of beers when he succeeded in limping home. It was like some

sort of wartime relationship between wing commander and young bomber commander, rather than anything related to the careful nature we expect of airline — or flight department — operations. Well, our barroom hero was getting a positive reward and positive reinforcement for increasingly dangerous actions. And never in a three-year period did anyone sit him down and say, “Son, you do that again and you’re fired!” Yet the truth is, that pilot — and his passengers — would probably be alive today if someone had.

“Never in our flight department would such a thing occur!” Wonderful, I am glad to hear it. And I am aware that the average flight department is led by people who already know these things, and who are very careful not to send the wrong signals themselves.

But how about more senior management? Do **they** understand the same nuances, how setting an atmosphere of approval for creative noncompliance with rules regulations, procedures, or common sense can end in disaster?

Even such a simple a thing as forcing flight managers and chief pilots into rigid cost-effective justification of every expenditure, forcing you to cost-justify expenditures item-by-item to someone not knowledgeable of aviation — someone uninformed about the delicate nature of a well-balanced flight operation — can send the wrong message to everyone below and compromise a flight department’s ability to attain and hold the highest levels of operational safety. Pretty soon you just get tired of fighting the battle, and start scaling down your requests, and scaling down your safety margins.

Justify through Education

Can you justify to the bean counters the cost of sending your people to a CRM course? Can you justify all the simulator time you really think your people need? Do you have a constant battle just getting normal maintenance items funded? These things can impact and diminish the margins of safety without anyone in the organization realizing what has happened, and if they are happening to you, I would suggest that you’ve got a problem which you may have to go to the top to solve. Now, I have been in corporate life. Like the reader, I realize flight managers can not saunter in to the board of directors and ask for a blank check with no questions asked. But your senior leaders do need to understand the effects of pressure they place on you, and if they do not have the aeronautically-oriented technical expertise to understand what you understand, then the burden is on you, the manager with the information, to **teach** them. Just as we teach copilots to be respectfully assertive, to

make sure their message of caution gets through, we need to teach each other that the same process is vital in flight management.

There is a flight department out in the Pacific Northwest, and a big one which shall go unnamed, in which the chief pilot sympathizes constantly with his overworked pilots. These aircrews are putting in six and seven days per week, 10- to 15-hour flight days, sometimes for three and four months in a row. Fatigue, burnout, anger, and defection to other companies are rampant. Yet every time this manager goes to his superiors with a litany of how he desperately needs more personnel to solve the problem, he is rebuffed. "Are you crazy? I can't get authorization for five more people. I'd never be able to justify the cost." Now, given the nature of this company, I guarantee you that if one of their excessively-fatigued pilots augers in somewhere, senior management is going to be shocked to the depth of their being to discover what happened, and did not happen. Senior management would be shocked today, if this fellow would — or could — take his problems to the top.

Persistence is the Key

There, again, is the communications problem. This flight manager is an early warning system, but the message is not getting through, and people may lose their lives before it does. If in any way this company sounds familiar to your situation, act on it. Go to the CEO. Go to the chairman. Go to the board. Go to whomever you need to approach to get the problem solved, because pressure on a flight safety system simply cannot be perpetuated without running risks that are probably not acceptable.

Of course, in a well-oiled organization, the ability for the senior flight managers to communicate with the top brass and everyone in ideal situations in human endeavors are few and far between. Yet we also know that to achieve the highest levels of safety, we have to pursue the ideal.

It is rather like an assignment in which you are supposed to try to reach a wall by jumping no more than 50 percent of the remaining distance in each jump. Now, you can jump as many times as you like, but no one jump can cover more than 50 percent of the distance. Obviously you will never reach the wall. But is it equally obvious that with only a handful of jumps, the remaining distance will be negligible. And so it is with our attempts to reach ideals in corporate or human endeavors, and specifically in the pursuit of perfect flight safety.

The key is to never stop jumping — never stop trying.

Information sharing, by the way, is a two-way process. It also requires being fully open and liberal with the flow of valid and realistic information down from the strategic leaders to the troops. After all, middle management is mainly a communications switch, translating policy to action, and providing feedback. You may be the head honcho of the flight department, but in the hierarchy of the corporation, you may also fill the role of middle management.

Communication Goes Both Ways

If you get the idea that what I am espousing here is orchestration of communication, you've got it. Without it, all the excellent training and qualified people, corporate support and fancy equipment in the world cannot be marshalled into a smoothly flowing, symphonic performance. And that brings me to the final point. When you look hard at what CRM teaches, you find that those lessons are fully applicable outside the cockpit, and in fact to any human organization.

To know what is going on, to derive the benefit of a subordinate's intellect and experience and observation, you have to listen, and he has to be willing to communicate. All of you must share information back and forth on a real time basis, and all of you must understand this bedrock basic: all of us fail from time to time despite training, professionalism, maturity, discipline, balance, and stringent company controls.

Even the CEO and the chairman make mistakes. If we are not willing to listen when someone points out those mistakes — someone who's action in pointing them out is for the greater good of everyone involved — then we destroy part of the information and feedback loops. In the cockpit, that means flying solo in a multi-pilot craft. In the office, that is the rough equivalent of simply ordering and never checking to see the results of those orders. At the corporate level, it means doing what we did at Braniff International: dividing the company into non-communicating fiefdoms, all of which eventually began to spend more time fighting each other than the common economic enemies in the marketplace. In corporate life, that can lead to bankruptcy. In a flight department, that can lead to an accident.

We have new tools for flight safety. New hardware. New software. New "liveware", as one researcher has described the human element. These are all pieces in the orchestra of flight operations. The sheet music before them is a combination of the regulations, procedures, training, company standards and rules, and the mission

is to go from point A to point B safely and efficiently each and every time. Those who would mount the podium with the baton of managerial authority must understand, very clearly, that you are a communicator as well as a conductor. To make it work — to orchestrate this dynamic collection of people and machinery and ideas and rules into the smoothly functioning, safe operation it must be — the true key is to keep the two-way communication flowing unimpeded, and setting the atmosphere, the tone, within which the rhythm and the pacing can operate.

And only when you never forget the human nature of human being can those goals be achieved♦

[From an address given to the Flight Safety Foundation's 34th Corporate Aviation Safety Seminar in Dearborn, Mich., April 19-21, 1989 — Ed.]

About the Author

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Nance flew for Braniff for seven years until its bankruptcy in 1982. A former U.S. Air Force pilot, he is a veteran of 34 combat missions in Vietnam. He is currently a Lt. Colonel in the U.S. Air Force Active Reserve involved in flight safety education, and maintains currency as a C-141B aircraft commander. He has accumulated more than 10,000 hours of flight time during the past 23 years. Nance is a frequent guest on the Today Show, MacNeil-Lehrer Report, CBS Evening News, Good Morning America, Face the Nation, 20/20, NOVA and many others.

Nance's editorials appear nationwide in newspapers syndicated by the Los Angeles Times and U.S.A. Today. He is the acclaimed author of Splash of Colors on the Braniff bankruptcy, Blind Trust on effects of deregulation on airline safety, and On Shaky Ground, the pivotal account of the previously unknown threat of catastrophic earthquakes to the entire nation. He also serves as an analyst for the major television networks on aviation and seismic safety.

Aspartame — Not For The Dieting Pilot?

If you replace sugar with substitute sweeteners, you may be replacing one problem with a worse one that could manifest itself in the air.

Aspartame is a synthetic compound of two amino acids (aspartate and phenylalanine) bonded by methanol. So what? Aspartame is a widely used food and drink sweetener, particularly used in place of sugar. And evidence (reference material supplied by Texas Aspartame Consumer Safety Network) suggests that for some people aspartame produces reactions which pilots would rather not have.

The issue appears to have been heating up throughout the past decade in the United States. A number of pilots have informed the U.S. Federal Aviation Administration (FAA) of various symptoms which they attributed to use of aspartame. Some of these symptoms were bad enough to result in loss of license.

A pilot report this year to the FAA followed a night flight before which the pilot had drunk two cups of hot chocolate that were artificially sweetened. He stated, "during the final night leg of the flight, I found myself unable to see the instruments clearly because of blurred vision.

I remember the controller asking me my airspeed.

"I was confused and unable to read or interpret the instrument, so I gave him my DME digital readout which was in large, bold numbers. I maintained altitude by keeping the big white needle straight up and down on the altimeter. I felt apprehensive, insecure and "way behind the airplane." I knew that if I had a real in-flight emergency I would be unable to handle it, since I was already in an overload condition."

Some of the symptoms reported include severe continuing headaches, nausea, vertigo, blurred vision, memory loss, gastrointestinal disorders, seizures, hearing loss, rashes and numbness. Some of these reactions have been severe enough to result in suicidal depression and loss of limb control.

Neither the company which manufactures aspartame, nor the United States Food and Drug Administration (FDA) nor the FAA have acknowledged the reported symptoms as being caused by aspartame. Both the manu-

facturer and the FDA have indicated that other causes could result in the reported symptoms. The FAA has not yet made a definitive ruling on its position.

Although these symptoms are not officially ascribed to aspartame, a growing number of people, including some doctors, believe that aspartame does cause these reactions in some people. Cases have been reported in which a person has gone onto an artificial sweetener for the first time, suffered adverse symptoms and recovered after stopping the use of the artificial sweetener.

If you regularly use an artificial sweetener containing aspartame and have had no adverse reaction you probably have nothing to worry about. But if you are an occasional user of these products or about to use them for the first time, monitor your reaction and do not fly until you are sure you suffer no ill effects. ♦

(Adapted from the Australian Civil Aviation Authority's Aviation Safety Digest in the interest of sharing aviation safety information with the worldwide aviation community.)

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“Flight Safety—An Endless Task”

For more information contact Bob Vandell, FSF

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HUMAN FACTORS AND AVIATION MEDICINE

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