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FAA Aviation News

Volume 32 Number 2

FEATURES

DEPARTMENTS

On the Cover:
Want to learn how to fly this cockpit? See page 2 for further details.

On the Back Cover:
Photo courtesy of Embry-Riddle.

The Myth of the Superpilot

by Dean Chamberlain, *Associate Editor*

1992 marked the end of an era that many of us never thought would happen. Superman died. His demise was marked by a special commemorative issue and national TV commentaries. Many believe he will make a super comeback, as few can envision a world without the super hero. Time will tell. But in a way, Superman may have outlived his usefulness by a generation or more. Today, in our politically correct world, Superman would have to be a Superperson. And frankly, it is hard to imagine a Superperson saving the world from evil as did the man of steel time after time. Or maybe the world has changed so much since the arrival of that baby from another planet, that not even Superman could survive the disillusionment of our times after seeing such acts as carjackings, violence in the streets, and shootouts between teenage gangs on the nightly TV news. In Superman's glory days, it was easy to tell good from evil. Good guys wore white hats and bad guys wore black. Today, sometimes it is hard to tell the good guys (persons) from the bad guys (persons). Compounding the problem is the fact we must now face an uncertain future without our super hero.

So who is going to protect us from evil?

Or maybe the question should be rephrased to ask, "Do we need super heroes at all?" Maybe we no longer need them. Which leads in a super stretch of the imagination to the question of should the myth of the superpilot be laid to rest with Superman? Do we still need the image of general aviation (GA) pilots being able to leap off tall hangers in a single bound? So what if someone needs a running start to leap off small T-hangers, does that make that pilot any less of a pilot? And what if maintenance technicians do not have X-ray vision, does that make them any less capable? And for that matter just how big, strong, and fast do men and women have to be to be good, safe, general aviation airmen? Although some young GA pilots aspire to be weapon platform managers in multi-million dollar flying weapons systems, not every middle-aged GA pilot aspires to fly the dawn patrol over the Western Front at sunrise. Many are happy just to fly the spouse and kids to the next airport for lunch; i.e., something else that does not require the skill of a super hero to perform well; something that can be done by a normal, everyday-type of person; someone that thinks aviation can be done just for fun. After all, not every boat is a cargo ship, nor is every vehicle on the highway a truck, nor every golf course a farm (although a few golf courses would make great GA airports). The fact is many different kinds of ordinary people enjoy general aviation. Pilots do not have to be super people to fly; pilots are just super people.

Dean Chamberlain

But like Superman, some doom and gloom forecasters would have us to believe that general aviation is dying or dead. Or is aviation, like Superman, just waiting for the right moment to take off and fly again? Only time will tell, but as we wait for the next chapter in the saga of Superman and general aviation, what are you doing for aviation while you wait? Because while you are waiting out the traditional bust or boom cycle of aviation, what you fail to do might be more important than what you do.

1992 not only saw the demise of Superman, it also saw a change in national politics. The Congress has

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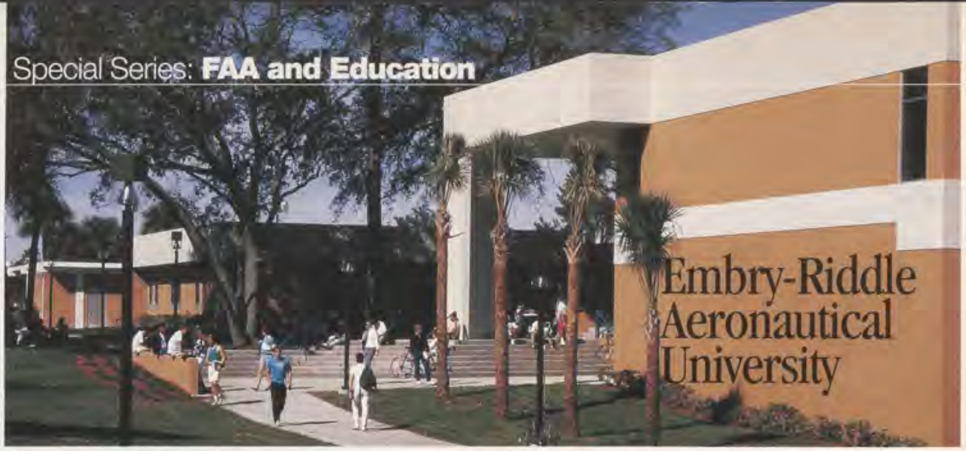

Embry-Riddle

Embry-Riddle Aeronautical University

by Dean Chamberlain, *Associate Editor*

We discussed in the previous issue the FAA's involvement in aviation education and research. Now it is time to start our series on representative Airway Science Program (AWS) schools by discussing one of the world's most famous universities dedicated to aviation and aerospace—Embry-Riddle Aeronautical University (ERAU) of Daytona Beach, Florida, and Prescott, Arizona. Known throughout the aviation world, it is also one of the largest universities dedicated solely to aviation. In describing the university's and its students' focus on aviation, the phrase "Aviation is spoken here" may be a gross understatement. As one young ERAU student said when asked why she went to Embry-Riddle, "I wanted to learn to fly, and Embry-Riddle has a great reputation." Being able to study all phases of aviation at one of Florida's premier beach resorts has to be an added bonus. For students who prefer a western setting instead of the beach, there is ERAU's Prescott campus in Arizona. For students, especially military students, who cannot attend either campus, ERAU offers bachelors and masters degree programs at over 90 continuing education centers around the world.

For those not familiar with ERAU, it is a private, not-for-profit, co-educational university that traces its heritage to the early days of aviation. During the barnstorming days of the 1920's, two aviation pioneers, T. Higbee Embry and J. Paul Riddle, founded an aviation school in 1926 at Lunken Airport in Cincinnati, Ohio. That school would later grow into ERAU. According to ERAU, the men started the school based upon the philosophy, "To teach every phase of flying, from the ground up to the sky."

Since then, ERAU has developed into a major aeronautical university that offers more than 20 aviation-related undergraduate and graduate level degrees. Although many of the degree programs at ERAU—such as its aerospace engineering; electrical engineering; engineering physics; aeronautical science (professional pilot, which also includes the FAA-sponsored Airway Science (AWS) curriculum); aerospace studies; aviation maintenance technology; avionics engineering; and computer science programs—may sound similar to other university programs, there is one significant difference between ERAU's programs and many of the others around the nation. Everything at ERAU has an aviation connection. While the flight portion of the AWS program at ERAU and other participating schools provides students the opportunity to earn their FAA-Commercial Pilot Certificate with Instrument and Single- and Multi-engine Ratings and the maintenance portion provides students the opportunity to earn their Airframe and Powerplant (A&P) certificates, ERAU's commitment to aviation is seen throughout its campuses.

From the aircraft suspended from the ceiling of the Daytona campus' cafeteria to ERAU's classrooms and research labs to its flight lines, aviation seems to be the only subject at ERAU. Although ERAU students study a broad range of college subjects, the one attitude they all seem to have in common is that they all seem to live and breath aviation and aerospace. Their attitude about aviation is also shared by the professors and instructors at ERAU. One professor, Dr. Gerry Gibb, the Director of the Airway Science Simulation Lab, said although it may sound like the party line, aviation is everything at Embry-Riddle. According to Dr. Gibb what makes ERAU unique is how the school brings the various educational disciplines together to solve a particular classroom problem. The result, Dr. Gibb said, is that the aviation program at ERAU is more diversified and far more extensive in breath than anywhere else. One benefit of ERAU's unique approach to teaching, using computers, practical experience, mixed disciplines, and state-of-the-art teaching techniques and equipment, he said, is that it teaches students how to work together as a team that can meet milestones, resolve problems, and find solutions to problems. Vital skills not only in aviation, but in any environment.

Although ERAU offers a large number of programs at its various sites, because of the technical requirements of some courses, such as the need for specialized facilities, labs, and equipment, not all programs are offered at all locations. ERAU's Daytona Beach campus and its College of Continuing Education (CCE), which serves the needs of students at more than 90 locations around the world, offer programs at three degree levels—associate, bachelors, and masters. The Prescott campus offers only under graduate-level programs (but no associate degree). Both campuses offer flight training using a wide range of aircraft types.

In addition to the traditional use of aircraft for flight training, computer simulation plays an important role in ERAU's flight training program. One interesting aspect of Embry-Riddle's use of simulators is how it is using both flight and air traffic control simulators to teach students in both programs how to operate in a simulated "real-life" airspace environment. Student air traffic controllers "control" student pilots "flying" aircraft simulators in real-time situations. This type of training interaction with students talking and reacting to other students adds a degree of realism to the training that some other types of simulator training may lack. This is only one example of the use of computer-based training and simulators at ERAU. Another example is ERAU's new Airline Flight Crew Techniques and Procedures course which uses classroom, computer software-based training, and full-motion aircraft simulation to train select students in advanced, high speed, "glass cockpit" procedures based upon Boeing's B747-400 aircraft's "glass cockpit." The course starts with three weeks of ground school that uses Boeing's donated computer-based B747 training software to teach students the aircraft systems, operation, and flight procedures of the B747-400 and its glass cockpit. Students who complete the ground school then go to Northwest Aerospace Training Corporation (NATCO), a Northwest Airlines affiliate, in Minnesota for additional classroom training and 32 hours of B727 and B747-400 full-motion simulator training. Throughout their training, students will train as part of a crew to learn and practice management and crew coordination skills as they prepare to take their place in tomorrow's electronic cockpits. This type of training program combines the best of traditional classroom, computer-based instruction, and state-of-the art aircraft simulation to train students in aircraft and crew resource procedures in a cost-effective manner.

As a leader in aviation education, research, and flight training, ERAU offers its students access to some of the latest state-of-the-art equipment available in such areas as aircraft simulation, computer modeling, weather forecasting, accident investigation, cockpit resource management, aircraft design, and other areas of study. With more than 4,500 students at Daytona Beach, about 1,500 students at Prescott, and more than 12,000 students enrolled in its CCE program world-wide, ERAU offers each of them one of the largest curricula dedicated to aviation in the world today. Its world-wide reputation is also recognized by the number of international students from more than 80 countries who attend ERAU to take advantage of its unique focus on aviation and learning.

Today, ERAU, in keeping with its founders' philosophy of "To teach every phase of flying, from the ground up to the sky" continues to teach that way, but now it teaches from the ground up to the sky and beyond as it does research for NASA, FAA, and major companies in the aerospace industry. Some of this research in such areas as PC-based simulation and pilot training, cockpit visual imagery simulation for approach and taxi use, and other aerospace research involving air traffic control, aircraft design, and other aerospace needs of the future. An important part of all of these studies is how the human element—the pilot, controller, or maintenance technician—fits into the overall hardware and software systems of the future. As ERAU prepares students for their future roles in space and beyond, a quote from the *Star Trek* TV series could be paraphrased to say, ERAU is preparing them to go where no one has gone before.

Embry-Riddle

ERAU's President, Steven M. Sliwa, Ph.D.

ERAU's commitment to the future is reflected in the views of its President, Dr. Steven M. Sliwa. When asked why anyone should pursue a career in aviation, he said although the short-term outlook for aviation may not look favorable now, aviation's long-term outlook is very good; especially, he said, if the United States takes a more international view and continues its leadership role in aviation and aerospace. According to Dr. Sliwa, there will be lots of growth opportunities for aviation in the new global economies being developed around the world. He said that growth will not just be in technology. "It will also be in the human infrastructure. You need to have the managers, you need to have the marketers, you need to have the pilots, the mechanics, the flight attendants. The whole airspace system has to be staffed. That is why people have the chance to be involved," he said.

He said there are two ways to get involved in an aviation/aerospace

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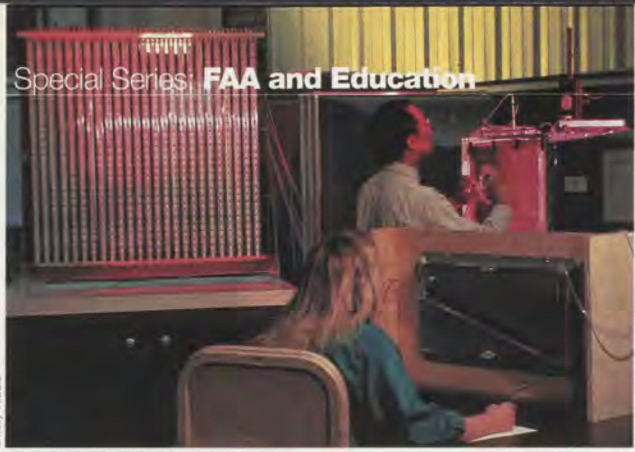

Embry-Riddle

Embry-Riddle

(Above) Aerospace engineering majors learn to design, analyze, and test aircraft systems. Here students work with measurements for wind tunnel experiments. To keep up with the rapid technological advancements of aviation and aerospace, students and faculty conduct applied research projects on campus. (Below) The curricula stress computer literacy.

career. One way is to go to Embry-Riddle. The other way is to pursue a less focused aviation science degree program and then go into the aviation/aerospace industry. But he said, "Our students are going to be incredibly competitive in the industry, be it the aviation insurance industry, engineering, computer science, legal, airport management, maintenance, or piloting. When students come here, especially to the Daytona Beach campus, where there are another 4,600 students here just like themselves who are passionate about aviation and aerospace, they learn a lot from each other's experiences both in and out of the classroom.

"The second reason I think students should come to Embry-Riddle is a general rule of thumb I have for being successful. If you start out being successful, you will end up being successful. I think it is important when you get to college where it is really tough in general that you be successful. And it is a lot easier being successful when you enjoy what you are doing," he said. That is why when students come to Embry-Riddle and get involved with our faculty the students do incredibly well, he said. "They can realize their full potential here where they are able to focus their energies and passion much more directly on their studies," he said. To prove his point, Dr. Sliwa told how well Embry-Riddle students did on two recent Florida state-wide college examinations. The State of Florida has a state-wide examination that covers a wide-range of subjects that public university students and private university students receiving financial aid must take between their sophomore and junior years. He said at the time of this interview, Embry-Riddle had scored number one in the state the previous two quarters. "I see that as a prime ingredient for why people would want to be involved in a place like Embry-Riddle," he said. As he said, Embry-Riddle teaches students how to learn. Apparently, Embry-Riddle students learn very well.

And Embry-Riddle students, instructors, and faculty not only learn and teach very well, they are willing to share their knowledge and enthusiasm with others. According to Mr. Obie S. Young, the FAA Accident Prevention Program Manager for the North Florida Flight Standards District Office in Orlando, Embry-Riddle takes an active part in the FAA's Accident Prevention Program. He said, facility members volunteer to be guest speakers at many area safety seminars, and ERAU flight instructors work closely with their students to promote safety. Speakers from ERAU are always in demand because of their aeronautical knowledge and experience, possibly because being involved on the leading edge of many research projects gives ERAU speakers an insight into aviation that others may lack. This willingness of ERAU facility members to get involved in their local aviation community's activities, the school's dedication to aviation, the quality of its students and facility, and its leading role in aviation research all combine to make ERAU a national leader in aerospace education. A role it cherishes as it prepares its students for the 21st Century. ■

For further information write to: Embry-Riddle Aeronautical University, 600 South Clyde Morris Boulevard, Daytona Beach, FL 32114-3900.

NWS

ASOS...

Coming Soon to an Airport near You!

by Harold Bogin, *National Weather Service*

Since the early days of aviation, the taking and dissemination of Surface Aviation Observations (SAO) at airports across the nation has been an essential function for the safe and efficient operation of aircraft. With the expansion of the National Airspace System in recent years, this activity has increased to the point that the National Weather Service (NWS), the Federal Aviation Administration (FAA) and the Department of Defense (DOD) collectively expend over 1,000 staff-years to take and disseminate SAO's across the United States.

With the advent of new reliable and sophisticated sensors and computer technology, it has become increasingly practical to automate many observing functions. This potential has come to fruition with the successful development and testing of the Automated Surface Observing System (ASOS) in the 1980's and its planned deployment by the NWS, FAA, and DOD at as many as 1,700 airports across the U.S. in the 1990's .

ASOS will gradually replace manual weather observations at approximately 250 NWS sites and 300 FAA flight service stations and air traffic control towers. By February 1992, 54 ASOS units were already providing test observations at airports in the central U.S. and at Atlantic City, NJ with an additional 118 units scheduled for installation across the U.S. by the end of 1992. When fully implemented, ASOS will more than double the number of full-time surface aviation weather observing locations and enable valuable human resources to devote greater attention to other vital tasks.

ASOS is designed to support aviation operations and weather forecast activities and, to the extent practical, general needs of the hydrometeorological, climatological, and meteorological research communities. ASOS provides minute-by-minute observations and performs the basic observing functions necessary to generate the SAO.

While the automated system and the human observer may differ in their methods of data collection and interpretation, both produce an observation quite similar in form and content. For the "objective" elements such as pressure, ambient temperature, dewpoint temperature, wind, and precipitation accumulation, both the automated system and the observer use a fixed location and time-averaging technique (e.g., temperature is measured at one location over a five-minute period). The quantitative differences between the observer and the automated observation of these elements are negligible. For the "subjective" elements, however, observers use a fixed time, spatial-averaging technique to describe the visual elements (sky condition, visibility, and present weather), while the automated systems use a fixed location, time-averaging technique. Although this is a fundamental change, the human and automated techniques yield remarkably similar results within the limits of their respective capabilities.

ASOS will automatically report the following weather elements in the SAO:

- Sky condition—Cloud height and amount up to 12,000 feet
- Visibility up to 10+ statute miles. (The maximum reported visibility may be changed to 10 miles.)
- Basic present weather information, i.e., type and intensity for rain, snow, freezing rain
- Fog, haze
- Pressure—Sea level pressure in Hectopascals (hPa) (Hectopascal is

ASOS sensor site

NWS

equivalent to a millibar (mb). For example: 1012 hPa = 1012 mb) and altimeter setting in inches of mercury (Hg)

- Ambient Temperature, dewpoint temperature (degrees Fahrenheit)
- Wind—Direction (tens of degrees—true), speed (knots), and character (gusts, squalls)
- Selected significant remarks including—variable cloud height, variable visibility, precipitation beginning and ending times, rapid pressure changes, pressure change tendency, wind shift, peak wind, etc.
- Precipitation accumulation (hundredths of an inch)
- In addition, ASOS will provide routine hourly and 15 minute threshold criteria precipitation totals in Standard Hydrometeorological Exchange Format.

ASOS is capable of accepting manual input (augmentation) to the automated observation. At staffed locations where NWS or FAA policy permits, thunderstorm information will be manually inserted into the SAO until this information can be obtained automatically.

ASOS' Technical Advantages

Extensive factory and field testing over a period of many years has given NWS every expectation that ASOS will perform its mission exceedingly well. The primary technical advantages of ASOS lie in its superior network resolution, objectivity, consistency, and enhanced dissemination.

Superior Network Resolution

NWS observers are skilled and dedicated professionals. However, they are only available to provide a "basic weather watch," since they must perform other high priority duties which preclude continuous weather monitoring. In contrast, ASOS provides a minute-by-minute weather watch, 24 hours a day, and automatically generates and disseminates hourly and special observations when required. This high temporal resolution will therefore substantially increase our capability to detect important small-scale changes in surface weather and hazards to aviation. With today's network, there are large surface data voids, particularly in the western U.S., between sunset and sunrise. The provision of ASOS to many smaller airports that are currently without weather observations or that maintain only part-time observing programs, will mean a significant increase in the density of the network.

Objectivity and Consistency

In contrast to human observations, which tend to vary from place-to-place and day-to-day because of subjective differences between observers, ASOS provides objective and consistent observations of the ever-changing atmosphere. For example, automated visibility and cloud readings at night are superior to estimates currently made by observers, since ASOS is not handicapped by human visual acuity differences. Moreover, ASOS observes from its vantage point near runways, in contrast to today's observing locations, which tend to be near brightly-lit terminal buildings and well-removed from the location of interest.

In addition, ASOS implementation provides the once-in-a-lifetime opportunity to install all observing sensors, insofar as possible, in accordance with siting criteria that are common to the Federal meteorological community. Adherence to these criteria ensures a consistent exposure that is not characteristic of today's network, which is the product of an *ad hoc* accrual process ongoing since the early days of aviation. ASOS implementation will also minimize errors caused by previously undocumented instrument and siting changes. Additionally, ASOS self-checking algorithms will minimize the effects of out-of-calibration and drift problems than can occur with meteorological sensors. Not to be overlooked is the fact aging observing equipment, increasingly difficult to maintain or obtain parts for, will be retired by ASOS.

Enhanced Dissemination

In addition to the automatic dissemination of hourly and special observations via the NWS and FAA communications networks, ASOS routinely and automatically provides computer-generated voice observations directly to aircraft in the vicinity of the airport, using the FAA ground-to-air radio. These messages are also available via a telephone dial-in port at the ASOS. This dissemination capability provides a level of real-time service that was not possible in the past, without an unacceptably large investment in costs to both NWS and FAA.

The Modernized Surface Observing Concept

The integration of a new technology, such as ASOS, into the operational flow of the NWS necessarily means certain procedural changes must be instituted. Although we are confident that "what ASOS does, it does very well," we know that no automated observing process can replicate the observer in every way. Hence, the modernized surface observing concept will become an important ingredient in NWS', modernized operations. In essence, this new observing concept entails the provision to users, by supplementary and complementary means, of required and enhanced observational data that ASOS cannot, or does not yet, provide. These data, in combination with ASOS, comprise the "modernized observation."

When fully implemented, the modernized observation will mean a richer and more versatile information flow to users of the surface observation, when contrasted to the single-point and subjective observation in use today.

Supplementary Component

The supplementary component consists of surface observing networks distinct from ASOS which provide specific data for forecasting and public service purposes. (Strictly speaking, this component is not new. What is different are the products in which much of these data will appear.) These networks include: severe weather spotter networks, hydrological reporting networks, synoptic and climatological observing networks, and cooperative observing networks. Supplementary observations will also be taken at more than 100 NWS-staffed offices scheduled to become Weather Forecast Offices (WFO) in the modernized NWS. Supplementary data are not disseminated as part of the ASOS observation, but are instead provided as separate data sets or products. Examples of supplementary data are: severe weather reports (tornado/funnel cloud sightings) and information on clouds, dust, and other obstructions to vision, snowfall and snow depth, hail, ice pellets and volcanic ash.

What about AWOS?

There are two types of automated observing systems in operational use in the United States: the National Weather Service developed Automated Surface Observing System (ASOS) and the commercially developed Automated Weather Observing System (AWOS). There are approximately 165 federal AWOS in operation and over 200 non-federal AWOS deployed by the states. Both systems are similar in operation and use the same basic algorithms for data processing. AWOS provides measurements of ceiling (cloud height), visibility, wind, temperature, dew point temperature, altimeter setting, and density altitude (when certain conditions are met).

Complementary Components

The complementary component to the modernized surface observation consists of data derived from non-ASOS remote sensing technologies. These technologies include:

—Satellite (including the Geostationary Orbital Environmental Satellite (GOES)

—Radar (including the Next-Generation Weather Radar, WSR-88D)

—Lightning detection system (LDS)

The data derived from these technologies will also be provided as separate data sets or products. The data in this category include thunderstorm coverage and intensity and total cloud cover information. These data are planned to be provided in near real-time.

Data Continuity

The implementation of ASOS means changes in sensor siting and sensor characteristics, as ASOS replaces the conventional observing equipment. In order to ensure data integrity and continuity, NWS is planning to provide overlapping observations to support an independent study of temperature and accumulated liquid precipitation compatibility. The purpose of the study is to determine if systematic differences exist between historical observing methods and ASOS, and, if so, to document the biases. The results of the comparative study should ensure the transition to automated observations without significant discontinuities in the historical record.

NWS-staffed locations will provide these comparative observations at up to 16 of the ASOS units to be deployed in central United States beginning in 1992. These comparative observations may be expanded to include other locations as well. This study will consist of at least one year of comparative manual observations and ASOS observations.

NEXRAD, new Doppler radar installation

The comparative observations will consist of daily liquid precipitation accumulation using the NWS' standard weighing rain gauges, daily maximum and minimum temperatures, and six hourly temperature and dewpoint temperature observations. Other elements may be observed as background data.

Summary

The successful and timely modernization of the NWS and FAA is widely accepted as a necessity. The transition to ASOS will be a critical and, at many locations, an initial step in that overall modernization and restructuring. ASOS will provide minute-by-minute, standardized and objective observations designed to meet the requirements of aviation, weather forecasting and warning services, and, to the extent practical, the nation's climatological record. The implementation of the modernized surface observing concept means that surface data from complementary technologies and supplementary networks, when combined with ASOS observations, will provide all users of the surface observation a more comprehensive and informative product. ■

For further information on ASOS, write to: Department of Commerce, National Weather Service, NOAA, 1325 East-West Highway, #12166, Silver Spring, MD 20910, Attn: W/OSD14.

"What Fools These Mortals Be"

by Bill Cuccinello, *Accident Prevention Program Counsellor, Bedford, Massachusetts*

Perhaps the title line should really be attributed to Lucius Annaeus Seneca (4BC—AD65) since he seems to be the first person on record associated with it. But more people seem to associate it with that impish Puck, who appeared in Shakespeare's *A Midsummer Night's Dream*. So for now, let us place ownership of the line to Puck, aka Robin Goodfellow.

For who knows, maybe Robin Goodfellow, the playful, mischievous fairy of old stories and legends knew something we do not. Maybe he knew, those many years ago, that the day would come when machines would fly through the skies and they would be driven by people called "pilots" who, in their every endeavors, would be out to prove their superhuman skills. And through it all, maybe Puck knew that some of those machines would fall from the skies because some of those very same pilots were not really superhuman—but mere mortals. And perhaps foolish mortals at that.

And so we wonder—why don't some of us mere mortals do *it*? After all:

Airline pilots do it.
Corporate pilots do it.
CFI's do it.
Even examiners
(and FAA inspectors) do it.

So why does the average general aviation pilot—who probably flies less than 50 hours a year—NOT do it.

What is *it*? That is right, I am talking Refresher courses with a capital R—big time safety blankets for the average pilot.

Did you ever think how stupid we pilots can sometimes be? The Professional Pilot (be it airlines, corporate, charter, etc.) flies for a living, probably puts in some 450 flight hours a year, is continually updated, attends seminars or classes, and jumps into a simulator every six months. Despite the fact they are pushing those machines around for a living and are basically getting practice everyday, they still update themselves continually with extensive, comprehensive programs.

Yet, many of the average general aviation pilots, some who barely eke out their 90-day requirements, will continually rent planes, fly in marginal weather (oftentimes scaring the H*** out of their passengers, thereby creating another anti-aviation person) and then, very complacently tell many of their coworkers of their harrowing experience and how they summoned all their "macho-ness" to get the plane to the ground in one piece.

It is a fact that the accident rate for pilots with 100 to 400 hours is one of the highest in general aviation. Recurrent/refresher courses are essential for all pilots but especially for this category. But remember the difference: Recurrency courses are not required for pilots to meet the flight experience necessary to act as PIC as specified in FAR § 61.57. Refresher training usually may be more extensive since it might include several hours of ground and flight instruction, and it may be directed at you if you have not been an active pilot for some time.

To be effective, the program should have basic objectives. If you would like to update yourself on the requirements, order a copy of AC 61-10A, *Private and Commercial Pilots Refresher Courses*. [Currently $3.75 from GPO, Superintendent of Documents, Washington, DC 20402.] The material inside will supply you with a refresher outline for the private, commercial, or instrument pilot. With this pamphlet in hand, go to your nearest instructor, and let him or her update you on some of the areas you feel you need to improve. In addition, try to fly more with other pilots. It is amazing how much more you can learn when you fly with other pilots, especially if they have a good amount of experience. Often, it is a good idea for several pilots to rent a plane together and take turns flying and navigating. It is not only a good learning experience; it is fun.

And while you are doing some refresher training, why not also refresh yourself with the POH. Try a weight and balance problem. Check on the plane's emergency procedures and systems. With your instructor (or another pilot) discuss airspace, aeromedical facts, and, above all, weather. Incidentally, while you are taking that refresher course, be certain to look over the new videotapes on weather, maneuvers, emergency procedures, etc., that most pilot schools now use as part of their curricula. If you have not looked at such tapes for a few years, you are in for a real treat. They have improved tremendously.

If you are IFR rated, by all means go over the rules and regulations. It is amazing how many instrument rated pilots actually "bust" minimums by descending below the glide slope or think the FAF is always at the outer marker.

If you enjoy the romance of night flying, by all means get a refresher with an instructor who is night current and proficient. After all, isn't it strange how altitude seems so different at night or how night distance changes the look of an airport? If nothing else, be certain you get some night emergency procedures—full or partial engine failures, landings without lights, etc. When night flying concentrate on a parallel downwind even more so than in the daylight. Keeping the runway edge lights near or under a certain point on the wing tips, you will know if you are getting wind drift or gaining or losing altitude. And be certain your instructor takes you to a few unfamiliar airports for some landings to a full stop.

I will never forget the comment by one of my students who was getting back into flying after being inactive for a few years. He originally had a commercial certificate with an instrument rating and just wanted to be checked out. After checking out day VFR, he decided he also wanted to be checked out for night VFR. Well, after some hours of night work, I suggested to him we do some stalls. He looked at me with the most quizzical look I had ever seen and said, "Stalls? In the dark? At night? In all the years I've been flying, I've never done a stall at night?" I looked at him and said, "Why? Airplanes can't stall at night? Only during the day?"

Needless to say, we not only did many stalls that night, but we also had the plane in "slow flight" for 360's, 720's, glides, turns, and everything else. When we landed, he told me he felt it was one of the most satisfying learning experiences he had ever encountered in his flying career and that it gave him the confidence he needed to fly the plane in any situation.

The moral is simple.

Piper Aircraft

The Lucius Annaeus Seneca referred to in the first paragraph was a Roman philosopher, writer, and politician. The Seneca in the photo is a twin-engine airplane built by Piper Aircraft Corporation.

Have your instructor put you through the paces. If you do not feel completely at ease flying the plane, tell the instructor. Let the instructor work with you until you feel confident handling the plane in just about any circumstance.

Remember, instructors do not get rich by instructing, but they do get great satisfaction in knowing that they have made a pilot much more proficient. The greatest feeling an instructor gets is when he or she sees the student go for that "ride" and come back with a new rating or certificate. But the instructor feels doubly proud when the examiner says to the instructor, "You did a great job with this student. This student is not only proficient, but a good, safe pilot."

So, let us listen a little closer to the impish Puck. Let us agree that we are all super and macho (or macha) and everything else we want to believe. But deep down, let us also agree that we are mere mortals, and, as such, we can make mistakes. We are not infallible. However, flying does not allow for mistakes, so instead of wasting $50 or $60 for things we really do not need, set aside a "refresher budget" for training every three months, especially if you fly less than 100 hours a year. A two-hour refresher program with a good instructor will be the best and cheapest insurance you can ever buy.

Besides that, isn't it wonderful to complete a flight, feeling completely confident that you know every second where you are, what your machine can do, and exactly what approach you are going to make when the time comes? And isn't it wonderful to anticipate how ATC is going to direct you?

It really is amazing how much a simple refresher program can help you keep current. ■

We might add that working on your "Wings"—Phases 1 through 10—is an excellent way of assuring yourself some well-used dual instruction. See your local FAA Accident Prevention Program Manager about "Wings," the Pilot Proficiency Award Program. This article was reprinted from the Communicator, the Accident Prevention Program newsletter of the Bedford, MA FSDO. Our thanks to APPM John Hemmes. **—Editor**

FULL POWER—Have You Got It?

by Mike Liversidge, *Area Manager, Prescott, AZ, AFSS*

In the mountainous west, pilots who operate aircraft with normally aspirated engines and fixed-pitch propellers are constantly measuring their aircraft's anticipated performance against the demands that will be placed upon them. Operating these aircraft requires a significant amount of careful *performance management*. This is especially true when short runways, heavy loads, high altitudes, or a combination of these or other factors that deter performance challenge these light aircraft.

Performance Management—Preflight

Flying safely under these conditions demands a painstaking approach to preflight activities. This starts with collecting appropriate background information, including but not limited to: airport elevation; runway length, orientation, gradient, and condition of surface; surface wind, temperature and other local weather factors; local terrain features; and, last but not least, computed density altitude. Next comes the task of weighing all of these data against your aircraft's performance tables. Under such circumstances, performance margins are frequently very narrow, and even a seemingly insignificant change in factors could completely erode a perceived safety margin. Also, while you are reviewing those aircraft performance tables, keep in mind that they were based on a new, or nearly new, aircraft. If you are typical of most of our breed of light plane pilot, your aircraft is probably closer to 15 years old than it is to new. For this and other reasons, remember that we are talking about *anticipated* performance.

Performance Management—Run-up

The next critical step of performance management comes with the preflight inspection and run-up, with detailed use of the checklist. If you are about to depart a high altitude airport, the pre-takeoff checklist should include your carefully following the engine manufacturer's recommended leaning procedures. [See "Thin Air Accidents" by Mr. Liversidge in the July/August 1992 issue for a discussion of leaning.] If performance margins are expected to be minimal, most mountain-wise pilots would elect to do a predeparture, full static run-up. Maximum power run-ups cannot be taken lightly, however. They require a great deal of care and alertness, with the pilot remaining aware of propeller wash and the real danger of breakaway (failure of the wheels brakes to hold the aircraft). The full throttle run-up itself would usually include adjusting the mixture control to achieve maximum static RPM. A more precise method for leaning would be with the use of an exhaust gas temperature (EGT) gauge and analyzer. In this case, the pilot would lean the hottest cylinder to peak EGT indication while remaining at full throttle. Next, enrich the mixture slowly to achieve a temperature of approximately 100 degrees Fahrenheit on the rich side of peak EGT indications. In both of these cases, the aim is to attain peak available power during takeoff and initial climbout.

Performance Management—Takeoff

Well, now comes the moment of truth. . . you start your takeoff roll, the runway is slightly uphill, and the air is thin. Still, you did your homework, including a careful preflight and run-up, and all factors indicate that you should have a reasonable margin of safety. As you move down the runway an uneasiness starts to gnaw at you; you seem to be accelerating very slowly, and the RPM seems to be taking longer than normal to develop. You scan all of the gauges for reassurance that all is well, and it seems to be. Still, it is hard to shake that feeling and you start to ask yourself questions: "Am I really developing all of the available power for these conditions?" or "Is there something wrong with my engine?" Controls feel mushy and confidence erodes... time to abort. Things might be okay, but you are just not sure, so you did the wise thing and made a safe, aborted takeoff.

These are feelings we can all relate to and are part of the anxiety of flying a light, normally aspirated aircraft under these demanding conditions. We cannot make these feelings all disappear; they are called survival instincts, and any safe pilot needs them. On the other hand, the origin of much of this anxiety is the pilot's inability to determine the efficiency of power output in this class of aircraft accurately.

In this area we can offer some relief. Some pilots have added a relatively inexpensive instrument to their aircraft, an instrument that helps to determine the efficiency of power during most phases of operation, including run-up, takeoff, climb out, or any other full throttle application. This is strictly an auxiliary instrument to supply additional "now time" data, and in no way de-emphasizes the importance of other engine instruments. While this instrument is by no means unusual or hard to find, you would be hard pressed to find one in this class of aircraft. This instrument, believe it or not, is a twin engine manifold pressure gauge.

This gauge will not tell you what is wrong, but it will tell you if the engine is right with the world this very minute.

Twin Engine Manifold Pressure Gauge

By now I am sure you are asking yourself, "what on earth would I do with a twin engine manifold pressure gauge in my single engine, fixed prop, *Skyhawk*?" Your concern for my sanity is understandable! Actually I more or less stumbled onto the value of this instrument in my own aircraft, a Cessna 150/150. It started when a friend was doing the annual inspection on my aircraft; he was aware that I sometimes conducted high altitude operations and suggested installing a manifold pressure gauge. While I questioned its value, I told him to go ahead and install one as his past suggestions always turned out to be very helpful. When I picked up my aircraft a few days later, I was somewhat surprised to see a twin engine manifold pressure gauge had been installed. My friend told me not to worry as this was just a temporary arrangement until he got the appropriate gauge in. He explained that the number two needle was connected to the engine manifold, but the number one needle was connected to nothing and reflected only static pressure. That was back in 1979, and my friendly mechanic is still trying to get his twin engine manifold pressure gauge back, but I simply will not part with it!

The real value to this instrument arrangement is the number one needle that is connected to nothing! It serves as a moving baseline of power for all phases of flight. If your engine is developing all available power, no matter how variable the conditions, the number two needle (manifold pressure) will indicate within two inches of the number one needle (static pressure). This is true for all full throttle operations, whether they be at sea level or at flight level one eight zero. If your air filter was plugged, if your mixture was too rich, if a mag was misfiring, if a cylinder has gone off line, or if the plugs were fouled, all would likely be indicated by a needle spread of more than two inches. This gauge will not tell you just what the problem is, but it will tell you quickly if a problem exists. Static minus two inches or less equates to a current state of all *available* power being on line (not to be confused with 100% of rated power). If full throttle operation exceeds two inches of needle spread, you have got a problem that requires your attention. During any takeoff roll, it only takes a few seconds for peak manifold pressure to be displayed. If needle spread exceeds two inches, you simply abort and return to the run-up area and investigate with a full static run-up. If, on the other hand, all looks good and you continue your departure, you can monitor full throttle response throughout the climb. As the static pressure needle (#1) comes down, so will the manifold pressure needle (#2). Again, as long as we are using full throttle operation, the spread should remain within that two inches. If the spread starts to increase, check your mixture; it may require some leaning.

This gauge will not tell you what is wrong, but it will tell you if the engine is right with the world this very minute. *The key point to remember is that we are looking at your engine's current state only and not its future state.* For that you must maintain a watchful eye on all of the other engine instruments.

Other advantages to this arrangement come during normal cruise when you are operating at less than full throttle. Under these circumstances a quick glance at this gauge will provide a graphic display of how much power you are holding in reserve. If the needle spread is two and a half inches, you have not got much left; but if it is four inches, you should still have some power and performance left if you need it. When your aircraft approaches its operating ceiling limitations, that two inch spread will tell you if you have got all there is to give or not.

A twin engine manifold pressure gauge is clearly no cure-all for high altitude operations in this class of aircraft. It is not a reason to bypass any manufacturer's operating recommendations. It is, however, a tool which can be of considerable value to you, the pilot. After 12 years of mountain flying with this gauge installed in my aircraft, I would not be without it. If you operate your fixed pitch, normally aspirated aircraft under similar conditions, this instrument arrangement may add a significant amount of safety to your power management. ■

Addition of a manifold pressure gauge must be accomplished by an appropriately rated mechanic who must make the required entries in the aircraft's maintenance record and weight and balance sheet, if applicable. **—Editor**

WORRIED ABOUT YOUR NEXT FLIGHT TEST?

RELAX—There Will Be No Surprises

by E. Allan Englehardt, *FAA Designated Pilot Examiner*

During the conduct of an FAA Private Pilot practical test, would it be proper for the examiner who is administering the test to expect the applicant to know the date of the Wright Brothers' first flight? Of course not! While this historic flight occurred on December 17, 1903—an important date to be sure—knowledge of this date certainly has no bearing on whether a Private Pilot can operate safely. How about requiring the applicant to describe the relationship of thrust, drag, lift, and weight on an aircraft operating in straight and level, unaccelerated flight? Again, while this type of information may be somewhat more relevant and is required knowledge for flight instructor certification, the facts are that such information is really not necessary in order for a Private Pilot to operate safely and is, therefore, not a required area of testing during the Private Pilot practical test.

Through a major overhaul of the testing system and the complete implementation of the "practical tests," as described by the FAA Practical Test Standards (PTS), we now have a true standardized practical flight test for pilot certification, one designed with a single purpose—to determine objectively if the applicant can satisfactorily perform the tasks required for the certificate or rating being sought. The present practical test—the one required for pilot certification—is no longer the individual examiner's concept of what a pilot should know or how he or she should perform; it is a concept jointly developed by the FAA and industry for a practical test that is used to determine if an applicant should be certificated.

Today's applicant should understand that the areas required for testing are not chosen by the examiner and evaluated to the examiner's standards, but, rather, they are tasks chosen jointly by the FAA and industry with standards of satisfactory performance set by this same group and observed by the pilot examiner administering the practical test. The examiner is simply a "referee" who observes and determines if the applicant has been trained to perform to the standards set forth in the PTS. Since its implementation, the days are now gone when an applicant passes or fails a test based on a subjective evaluation. The present practical test has become totally objective, with required tasks clearly stated and with clear standards of acceptable performance.

As a pilot examiner I always find it disturbing to begin a practical test, a test for which the applicant has told me he or she has prepared and one where a flight instructor has signed the student's application—stating that the applicant is prepared for the test—and then only to find the applicant unable to pass the simplest knowledge tasks required for examination during the ground phase of the test. The tasks I am referring to are the ones clearly shown in the beginning of the PTS under Area of Operation (I), Task (A), (B), (C), etc. As an example, in the Private Pilot PTS, Area of Operation (I) covers Preflight Preparation with Task (A) covering certificates and documents, Task (B) covering Obtaining Weather Information, Task (C) covering Determining Performance and Limitations, Task (D) covering Cross Country Flight Planning, Task (E) covering Airplane Systems, and, finally, Task (F) covering Aeromedical Factors.

Lack of Preparation

What is particularly discouraging to me is that many of the applicants who are unable to perform to the published standards for the practical test, fail the test not because they are poor pilots but because they are simply not prepared for the practical test they are taking. For example, I have found applicants that are completely confused about the most basic documentation and certificates required to prove an airplane and pilot properly certificated for flight. Other applicants are unable to tell me the visibility or the wind direction and velocity from a typical sequence weather report or to provide me with an accurate figure of how much fuel the airplane will burn in one hour or even where to find such information. Still others tell me that the aircraft static system is somehow connected to the vacuum driven attitude indicator. One applicant told me that the airplane has 10 gyros, and he later told me that carburetor heat is electric and that it heats the carburetor in much the same way a toaster heats a piece of bread. With answers like these I find it hard to believe that the applicant has been prepared for the test in accordance with the published PTS—after all the PTS lists all these subjects as required testing areas!

All the questions that I ask are as simple and as practical as I can make them while keeping the subject in line with the objective of the task required for testing. For example, I always ask what aeromedical concerns should be considered when the aircraft heater is in use. Surprisingly, I find applicants who are unable to tell me anything about carbon monoxide considerations.

On the other portions of the practical test, the flight portions, applicants seem to fail for any number of reasons, but in my experience the most common reason for failure at the Private Pilot level concerns crosswind landings. The applicants simply have not been trained to land in a direct crosswind of eight to 12 knots, certainly a practical and a necessary skill. If an applicant fails crosswind landings, he or she usually knows this without being told because he or she simply loses control of the airplane, and a recovery is necessary by the examiner. Sometimes an applicant has enough good sense to initiate a go-around when a safe landing is in doubt; however, it seldom makes any difference because if the pilot has not been trained for this task, the same problems will result during the next attempt.

Using the PTS to Prepare

When an applicant comes to the practical test unprepared in any of the required tasks as shown in the PTS, the examiner has no choice but to issue a "Notice of Disapproval," or "pink slip" as it is sometimes called. Such failures can sometimes occur without the applicant advancing far enough to have an opportunity to start the engine.

No examiner becomes one in order to fail pilots; in fact, in my opinion, the opposite is true: Examiners volunteer for this position because they enjoy issuing a new certificate to a qualified pilot. I believe that anyone who loves aviation receives pleasure in being part of the certification process of a new pilot. All of us, then, will understand that a failure of the practical test is bad for everyone—the examiner, the instructor, and, most of all, the applicant.

Is there a solution to this problem? Yes, there certainly is, and I believe the solution is quite simple. The applicants must simply become more involved and must take it upon themselves to be certain that they are prepared for the practical test—as that test is shown in the PTS. *In other words, applicants must read the PTS and determine if they have been completely trained and can perform to the standards set forth.* And if they feel that their training has been inadequate, they must insist that their instructors prepare them to the published standards.

I am able to pass 80% of the applicants I test, and that tells me that the greatest percentage of instructors are properly preparing their students. What I am concerned about, of course, is the 20% of applicants who fail. In many of these cases, I feel the primary problem is the flight instructor who recommends an applicant for the practical test when that pilot's training is simply incomplete.

While an applicant should understand that the test will be conducted according to the PTS, in practice the student comes to trust that the instructor knows what is to be expected on the test. A student believes that an instructor's recommendation for the test must prove that the pilot is prepared. However, the facts seem to show something different. Too many pilots are not prepared for the test, and these pilots are failing. In order to assure a satisfactory performance on the practical test, it is necessary for the applicant to take an active part in making certain that all required testing areas have been thoroughly covered.

On a recent flight test I was forced to issue a "Notice of Disapproval" before the applicant completed the very first half of the "Preflight Preparation" ground phase of the test. The applicant never had the opportunity to yell, "Clear!" In this case I telephoned the instructor to see why the problem occurred. I can report that I was told something by this particular instructor that I am afraid is all too common an attitude of flight instructors. The instructor told me that he felt the flight instructor's role was to teach the flight portion of the training, and that it is the applicant's responsibility to learn the other portions through ground school or self-study, and, after all, the student has already demonstrated understanding of this knowledge by satisfactorily passing the written test. This position, of course, is incorrect because of the fact that it is the *recommending* instructor whose name appears on the back of the application. It is the instructor's reputation that is on the line when he or she makes the written statement and signs his or her name certifying that the applicant is prepared to pass the practical test—every part of the practical test.

Using the PTS Checklist

In the back of the Private, Instrument, and Commercial PTS there is a checklist for use by the applicant, the instructor, and the examiner. This checklist shows all the required Areas of Operation and lists all the required Tasks for testing. I can assure you that all examiners use this list and administer the test according to the PTS. Please do not make the mistake of thinking that the tasks only exist in the mind of the examiner on that particular day. The truth is that the required tasks for each practical test are clearly listed in the PTS.

Please, before taking any test for a new certificate or rating, purchase the appropriate PTS and read the booklet thoroughly. Then, ask yourself, "Have I received the training necessary to perform to the standards shown?" If the answer is yes, the FAA practical test will be a pleasure and a chance to demonstrate your true ability as a pilot. The test will contain no surprises, and it is certainly possible for the examiner to be impressed enough to write a letter commending both you and your instructor on an outstanding FAA practical test. ■

Mr. Englehardt is also an Accident Prevention Counsellor in the FAA's Great Lakes Region and a first officer for United Airlines. This copyrighted article was originally published in the March 1992 issue of *AOPA Pilot* and is reprinted with permission.

Between a Rock and a Hard Place

Weather Deviations

by Ed Ari, *ASRS Analyst*

This is the fourth in a series of articles reprinted from ASRS Directline, *a quarterly publication that addresses particular areas of safety that appear in pilot reports received by NASA's Aviation Safety Reporting System and which have been identified by safety analysts as "significant."* ASRS Directline *is free from ASRS, NASA-Ames Research Center, Moffett Field, CA 94035. It is not too early to be thinking about dealing with thunderstorms, and deviation around weather is something every pilot will have to face at some point in a, hopefully, long aviation career. But the very request can raise the hackles of some controllers. Both groups need to understand the ramifications.* ***—Editor***

Each year both pilots and controllers are confronted with weather-related problems that have a significant impact on the safety of flight and on the air traffic system as a whole. Pilots want to deviate around build-ups they see and/or observe on their airborne weather radar as "red cells." In the face of weather-mandated route or altitude changes, the controller must maintain standard separation from other aircraft. Pilots frequently blame controllers for not understanding their need to deviate. Controllers, on the other hand, believe pilots have little idea of what is involved in granting such requests and the subsequent impact on other traffic.

Different Jobs, Different Viewpoints

The air traffic control system is designed to handle a large number of aircraft within a highly standardized route structure. Whenever weather becomes a factor, both the pilot's and the controller's workloads greatly increase. Since weather has little regard for the standardized route structure, the air traffic control system at that particular time and location demands non-standard remedies to reduce the negative impact on all aircraft. Controllers will, if they are able, approve deviation around the "red cells" for passenger comfort and, more importantly, for safety. Most of the time ATC can approve these deviations with minimal impact on the system; however, there are times when even slight deviations can create enormous problems for the controller. Adding to the controller's problem is the movement of the storm. It generally does not stay in one place long enough for the controller to work out some sort of routine with other sectors or positions.

The pilot has relatively few options when it comes to avoiding severe weather. The forces of nature can be extremely nasty at times. The instinct for survival tells the pilot that the weather ahead is bad stuff that he or she must absolutely, positively avoid. When ATC denies approval for deviation, both the pilot and the controller must work out and communicate solutions and alternatives. Of course, all of this is taking place while the aircraft continues to head toward the problem.

Pilot's Perspective

The number one priority for the pilot is safety. A pilot bases a request to deviate around weather on known factors that tell him or her some sort of action is necessary to remain clear of the adverse weather conditions ahead—for the well-being of the aircraft and its occupants.

Pilots may believe that controllers do not appreciate the risks that confront pilots in heavy weather. One pilot who was not allowed to deviate around a thunderstorm system reported,

> "...I believe the situation occurred because ATC procedures do not change with the changing weather. ...Controllers should be given ground instruction in the effects of thunderstorms and windshears."

Many pilots believe there should be enough flexibility in the system to handle these adverse situations. They feel that if coordination with the next controller is necessary to allow an aircraft to deviate around weather, then the controller should go ahead and do it. The pilot does not want to play "20 questions" before the deviation is finally approved. The pilot may also be reluctant to declare an emergency when the controller denies a request to deviate. One reporter claims that a "...request to squawk 7700 is an invi-

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DETACH ENVELOPE HERE ⬆ ENCLOSE FORM WITH CHECK OR MONEY ORDER (Do not send cash) tation to paperwork." [The third article in this series, "What Goes up Must Come Down," which appeared in the January/February 1993 issue, discusses the effects of declaring an emergency on the air traffic system and reiterates that a written report to the FAA is not automatically required but required only upon request.—Editor]

Controller's Perspective

Many reports received by ASRS from controllers indicate that weather deviations have been responsible for losing separation between aircraft and have frequently resulted in the controller "being charged" with an operational error. What the pilot wants to do does not always conform to ATC handbook requirements and occasionally is contrary to ATC practices. Allowing pilots to deviate from standard routes greatly diminishes the controller's ability to provide effective, positive separation between aircraft—the separation provided by the standard route suddenly does not apply. Aircraft can easily enter the adjacent controller's airspace without coordination because of the sheer volume of traffic and distractions. There is little time to coordinate new headings and routes with other ATC facilities because of frequency and interphone congestion.

A controller may also be unable to stop other traffic from entering his or her airspace right away because of coordination requirements. Traffic flow cannot be turned on and off like a faucet. One controller involved in an operational error reported that,

> "...at the time of the incident I was working 22+ aircraft with extreme weather conditions causing deviation and altitude changes ... frequency congestion was a factor..."[and] a loss of separation occurred.

The more aircraft that are deviating, the more problems the controller must contend with; the controller's ability to provide positive control to all aircraft under extreme conditions may be compromised.

The controller does not have authorization to use less-than-standard separation except in emergencies. When confronted with situations that limit their ability to provide positive control to all IFR aircraft, controllers encounter an increased risk of operational error. Operational errors are taken very seriously by the controller and the FAA. They may result in the controller being "off the boards" from two days to two weeks, and sometimes longer, while the investigation and recertification process is conducted.

Some Examples . . .

Restricted Airspace

An air carrier flight on an airway wanted to deviate to the left around a large thunderstorm, but the controller was reluctant because of a nearby restricted area.

> "...We encountered a large area of thunderstorms on our route... [and]...advised Los Angeles Center that deviations would be necessary. We requested and had approved an easterly heading which would keep us north of the weather. Center appeared to be concerned that our required deviations might eventually cause a conflict with Edwards' [AFB] restricted airspace.... While we continued to deviate to remain clear of weather, we told Center several times that we could not turn right.... Center's only concern seemed to be to keep us away from restricted airspace.... Center said we could not enter the restricted airspace. The Captain declared an emergency....We were then told by Center to 'turn hard right' because there were 'live rounds ahead'....We were in trouble, and they were no help."

Conflicting Traffic

A center controller had aircraft deviating around thunderstorms during moderate to heavy traffic conditions. Two aircraft on conflicting courses were unable to comply with ATC instructions because of build-ups along their route of flight. A loss of separation occurred between the aircraft.

> "...[The controller] told air carrier B to turn left 15 degrees, vector for traffic. Air carrier B refused to take the turn, saying it would put him right into a thunderbumper with tops at flight level 400. Radar man told air carrier A to make a left turn 15 degrees. Air carrier A said that would put him in the clouds... the radar man said, 'One of you is going to have to turn; you're head on [at] flight level 370'.... Air carrier A said he would go left... but it became obvious it wasn't enough... [Separation] was later measured to be zero vertical, 1.9 miles lateral, but on the scope it looked much less than that. I respect the pilot's wishes not to fly into the clouds, but I sometimes think they don't take us seriously enough. A cloud may be a better choice than another aircraft."

A departing air carrier discovered thunderstorm cells on radar and requested deviation around them. The controller was unable to approve the request because of heavy departure traffic in front and behind.

> "I noticed two thunderstorm cells on the radar... [and]... asked departure for deviations around the cells to the south. He told us 'unable.' We advised him that there was weather... and we needed to avoid it. He told us that there was a bunch of aircraft to our left, and he was unable to [approve a deviation] at this time.... At about 5 miles the large cells [were] painting solid red 30 degrees on either side of the centerline of the scope.... I asked the controller [again].... He said he would not and to maintain our present heading... Our heading was taking us into the center of the storm.... At 3 miles from the storm, I told departure that we needed a 30 degree right turn.... The controller seemed upset with us but granted us a turn... then told us to descend to 3000 feet and that we had traffic behind us overtaking.... I can accept the fact that he was busy with traffic and weather re-routes, but my responsibility is for the safety of my passengers and aircraft."

Reactions

The following comments indicate some typical reactions whenever requests cannot be granted by either the pilot or controllers:

> "I believe the controller and his supervisor's attitude were extremely poor and very uncooperative, not to mention dangerous." (Pilot)
>
> An operational error occurred "because [of a] vector to the west for traffic.... This was the primary factor which caused me to lose lateral separation." (Controller)
>
> "The controller just did not understand the necessity to turn to avoid the thunderstorm." (Pilot)

"Thunderstorms are extremely difficult to work with." (Controller)

"Given the same situation [again], I would do it exactly the same way, and I [am] incredulous that any controller in his right mind would send any kind of aircraft through that kind of weather. . . ." (Pilot)

Captain said, "I never heard a controller turn aircraft into a thunderstorm." Controller said, "You won't hear anything in a couple of minutes when you meet the other aircraft."

Weather Emergencies

ASRS reports indicate a reluctance on the pilot's part to declare an emergency whenever "all else" fails. In the following report, the flight crew needed to deviate around thunderstorms, but the controller could not approve the deviation since it would take the aircraft into a restricted area.

"[Our request to]. . . deviate north to avoid thunderstorms was denied. A vector. . . was assigned. . . [however] a line a thunderstorms mandated a more southerly deviation. The controller became upset over our proximity to the adjacent restricted area and attempted to vector us into the thunderstorms and make us squawk 7700. Neither request was complied with. . . . Vectoring the flight south with the knowledge that the range in the restricted area was hot might have been the root problem. I don't see this as a big deal. . . "

In another instance, a Center controller working aircraft with thunderstorm activity in the area approved a pilot's request to deviate but because of the heavy concentration of aircraft and limited flexibility in the airspace had to restrict where the aircraft could go.

"We observed a massive thunderstorm. . . . Weather radar was on and showed an extensive area of heavy precipitation and turbulence. . . . We informed the Center that we would be unable to continue. . . because of the storm. We were told we could alter our heading right of [the projected] course, but do not proceed east. . . . We informed Center that we would not be able to [comply on that heading] to avoid the storm condition. . . . We were told again to not fly east. . . 'under any circumstances.' We requested a higher altitude and were denied. . . . We then requested a right. . . to circumnavigate the storm to the west, again denied. We were told that a left turn would be permitted. We informed ATC that a left was impossible because it would place [us in] the main intensity of the thunderstorm... Our explanation was not accepted... An air carrier preceding us told ATC... that no one can get through... The PIREP was disregarded by ATC. We made a slight turn and just skirted the storm. Ice and turbulence was encountered... I told my First Officer if ATC instructs a further left turn to declare an emergency."

Reducing the Impact

Timely communication can help the pilot avoid thunderstorms while still allowing the controller to provide separation from other traffic. Last minute requests are difficult to coordinate.

Pilots

- Do not assume that the controller knows where all the thunderstorm activity is located. Tell him or her what you want and what you can do, not what you cannot do, when making your request.
- Plan ahead—give the controller as much notice as possible so that the controller can accomplish inter/intra facility coordination in a timely manner.
- The pilot is responsible for the operation of the aircraft and the safety of the passengers. Timely PIREP's can help the controller work with the pilot in accomplishing this by formulating a traffic plan in advance and relaying this information to other aircraft.

Controllers

- Controllers need to minimize last minute surprises by finding out exactly what pilots have in mind when they request clearance to deviate. Carte blanche approvals can lead to problems.
- Controllers too should plan ahead. Developing a good plan for future traffic flow and letting flight crews know in advance what is going on will go a long way toward reducing conflicts and last minute surprises.

When All Else Fails. . .

- Since the controller is not authorized to go below minimum-required separation (unless a pilot declares an emergency) and will do whatever is necessary to ensure that separation loss does not occur, the final decision on the course of action rests with the pilot.
- Pilots are reluctant to declare an emergency. However, in certain situations, there may be no other alternative available to the pilot. FAR § 91.3(b) states that: "In an in-flight emergency requiring immediate action, the pilot-in-command may deviate from any rule of this part to the extent required to meet that emergency." The *Airman's Information Manual* (AIM), paragraph 6.2, states: "An aircraft is in at least an urgency condition the moment the pilot becomes doubtful about position fuel, endurance, weather, or any other condition that could adversely affect flight safety." The AIM goes on to say, "This is the time to ask for help, not after the situation has developed into a *distress* condition."
- Once the pilot declares an emergency, the controller can provide advisories and other services until the emergency situation no longer exists and normal radar or vertical separation can be re-established.

Summing Up

Good planning by both the pilot and controller, an awareness of adverse weather conditions, effective communications, the willingness to endure a little paperwork, and mutual cooperation are the key elements to reducing the impact of being "Between a Rock and a Hard Place." ■

The Aviation Safety Reporting System is a cooperative program established by the FAA's Office of the Assistant Administrator for Aviation Safety and administered by the National Aeronautics and Space Administration.

Seaplane Right of Way

by Dean Chamberlain, *Associate Editor*

Several readers and the Seaplane Pilots Association wrote about the article "Water and Flying Do Mix Well When Pilots are Aware," which was published in the May-June 1992 issue of the magazine. They questioned an apparent contradiction between the article's "Right of Way Rules" listed on page 7, which states that the Coast Guard (USCG) considers seaplanes vessels once they land on water, and a statement made in the new FAA Advisory Circular (AC) 91-69, "Seaplane Safety for FAR Part 91 Operators," which says the Coast Guard does not consider seaplanes vessels once they land on water.

The article and AC are both correct. The Coast Guard considers a seaplane on the water a vessel. When afloat, as a vessel, seaplanes must comply with all of the appropriate Coast Guard Nautical Rules of the Road as well as the appropriate Federal Aviation Regulations (FAR). The apparent contradiction resulted because the AC failed to state clearly that the Coast Guard does not consider seaplanes afloat vessels only for the purpose of excluding seaplanes from having to meet the Coast Guard's personal flotation device (PFD) requirements for vessels. Simply stated, seaplane operators do not have to meet the same Coast Guard PFD (life preserver) requirements that other vessel operators have to meet. But seaplane operators must comply with all other applicable USCG regulations when operating on the water.

Although seaplane pilots are not required to comply with the same Coast Guard PFD requirements as other vessel operators, safety and common sense dictate that all seaplanes have some type of PFD on board for each occupant. The problem in selecting PFD's for seaplanes is that seaplanes can flip over in a crash and trap their passengers under water. Because of their bulk or buoyancy, certain types of Coast Guard-approved PFD's for vessels, if worn at the time of a seaplane accident, could possibly prevent the occupants from getting out of an overturned seaplane or any other type aircraft in water. The problems of exiting an aircraft in water is why airliners carry FAA-approved inflatable PFD's for passenger protection on overwater flights. Uninflated, inflatable PFD's allow their wearers to exit through smaller openings than other types of PFD's and to swim under water if necessary to clear the aircraft. This unique aviation need for inflatable PFD's is why the Coast Guard does not consider seaplanes vessels for PFD purposes and only for PFD purposes. The reason is current Coast Guard regulations do not allow inflatable PFD's to be used to meet minimum PFD requirements aboard vessels, hence the exclusion of seaplanes from the "vessel" PFD rule. But no matter what type of PFD you use in your aircraft, you should make sure the PFD's meet applicable FAA or USCG standards or the specific regulatory requirement for your operation.

If you plan on using inflatable PFD's aboard your aircraft, we recommend you use dual air chamber PFD's. The dual chambers provide redundancy in case one chamber is damaged. Also be aware that some inflatable PFD's on the market for boaters automatically inflate when sufficiently wet. They are designed to automatically protect someone thrown overboard who may be injured or unconscious. If this type of PFD is used in an aircraft, it may inflate before the wearer can exit a submerged aircraft. Then the wearer may have the same type of problems exiting the aircraft discussed earlier. Because of the number of types and models of PFD's on the market, both USCG and FAA approved and not approved, each pilot in command must decide based upon applicable regulations for the specific flight what is the best type of PFD for use in his or her operation. For additional information on PFD's and safety afloat, you can contact your local Coast Guard unit, local boating organization, or call the Coast Guard's Boating Safety Hotline, 1-800-368-5647. You can obtain a copy of AC 91-69 by writing to DOT Utilization and Storage Section, M443.2, Washington, DC 20590.

Another reader questioned the statement about powered and unpowered seaplane "sailing" in the article's sidebar discussion about one of the unwritten seaplane right of way rules. He said some seaplane pilots and boaters mistakenly believe that seaplanes are not simple powered vessels when on the water but are a separate category below that of conventional powered vessels. To set the record straight regarding these concerns, the Coast Guard does not consider seaplanes a separate vessel category under its nautical rules of the road. The deciding factors in determining right of way afloat involve the types of vessels involved and their particular operation at the time. Then the Coast Guard's nautical rules of the road determine right of way. Seaplane pilots must also follow appropriate FAR regarding right of way questions afloat.

One final comment on vessels (seaplanes, boats, and anything else that floats) and the nautical rules of the road is that not everyone afloat knows or follows the nautical rules of the road. Therefore, seaplane pilots afloat must always be prepared for the unexpected actions of others operating vessels near their aircraft. ■

Smoking is one of the most controversial issues of our times. It seems almost daily that another study shows the detrimental effects of smoking or passive smoke. No one will argue that it is also a difficult habit to break, that its "hold" on smokers is a physical addiction; yet the health benefits of ceasing to smoke occur almost immediately. If you are still having trouble finding a good reason to quit, consider the following article about how smoking affects your ability to deal with stressful situations—which we all have once in a while when flying. By the way, the opinions expressed by Mr. Rand are his and not necessarily those of the FAA. —***Editor***

Medical Stuff

Physiological Effects of Smoking As Related to Flight

by Rand M. Sanders

Stress is an encompassing term that includes anything and everything that places a strain on an individual's ability to perform at his or her very best. The flyer whose health is impaired is often unable to adjust to stresses or to cope with the demands of flying. In about one-half of the accidents with a "human factors" label, there were no contributing factors such as weather or maintenance—just human fallibility, especially when stresses were involved. Stress comes from many sources, most of which we can learn to control by understanding what causes the stress. Any stress imposed on a pilot by a lack of knowledge or inattention to healthy living habits are unacceptable, because they may decrease a pilot's capabilities below the level necessary for the safe operation of the aircraft.

Aside from the long-term effects to health, the smoking of tobacco—"self-imposed stress"—constitutes immediate and on-going threats to health and safety of flight. A report from the United States Public Health Service stated that cigarette smokers are 20 times more likely to die of lung cancer than non-smokers, and six to 10 times more likely to die of cancer of the larynx (voice box). The report indicated cigarette smoking may be the cause of cancer of the esophagus and bladder and is strongly suspected of causing cancer of the pancreas.

Medical studies show us that cigarette smoking causes a relative deprivation of oxygen to the heart muscle and contributes to circulatory problems by constricting arteries; thus, it affects the cardiovascular system and is significant in the development of coronary heart disease. Cigarette smoking causes irritation to the lining of the respiratory tree (lungs and bronchial tubes) which, in turn, causes edema (accumulation of fluid) and swelling, preventing air from passing in and out freely. This and other factors lead to emphysema and permanent lung damage in many individuals.

Let us look at some of the individual components of cigarette smoke and the effects they have on the human body.

Tar

This is a catch-all term for the viscous residue left from cigarette smoke after the gasses and water vapor have been eliminated. In addition to its cancer potential, it causes swelling and tends to prevent the natural cleansing action of the lungs.

Nicotine

Pure nicotine, even in extremely small doses, is one of the most toxic substances in the world. Many years ago, rose growers used it to kill many stubborn insects on rose bushes. Nicotine primarily affects the nerves and muscle tissue. If the nicotine contained in two cigarettes were extracted from the tobacco and injected into the bloodstream, it could be fatal. Fortunately, nicotine in cigarette smoke is not completely absorbed in the respiratory tree. Nicotine can, however, cause weakness and twitching of the skeletal muscles and may result in abdominal cramping, nausea, and vomiting, particularly in those not habituated to its effects. In addition to altering nerve impulses and the circulation of the blood, it also alters the heart and respiratory rates. There is also evidence that nicotine in small amounts will decrease the body's ability to adapt to stress.

Carbon Monoxide

Carbon monoxide produced in cigarette smoking probably presents the most immediate harmful effects in tobacco smoking. Carbon monoxide is a colorless, tasteless, and odorless gas produced by incomplete combustion of any carbon-containing material. It combines with hemoglobin (the compound in red blood cells that transports oxygen) 250 times more readily than oxygen. The hemoglobin involved in this combination is not available for transporting oxygen to the tissues and produces a degree of *hypemic hypoxia* (hypoxia caused by the reduced capacity of the blood to carry oxygen). A pilot who smokes will normally have 5% to 10% of his or her total hemoglobin taken up by carboxyhemoglobin (a mixture of CO and O_2 in a red blood cell). This results in hypemic hypoxia and *lowers the pilot's altitude tolerance.* Flying at a cabin altitude of 10,000 feet with 10% carboxyhemoglobin is physiologically equivalent to 15,000 feet cabin altitude. (FAR § 91.211 requires the flight crew to use supplemental oxygen for flights above 12,500 feet MSL and up to and including 14,000 feet MSL cabin pressure altitude for that part of the flight that exceeds 30 minutes and continuously above 14,000 feet.) The chronic smoker who is breathing ambient air carries this additional hazard for several hours after the last cigarette. Lack of oxygen to the brain impairs judgement, so a smoker with hypemic hypoxia may suffer a diminished ability to make decisions about a flight even though he or she is not at the altitudes that require use of supplemental oxygen. Furthermore, this carbon monoxide hazard exists also for the non-smoker who is in the same area with the smoker.

Hypoxia resulting from CO poisoning affects visual acuity, brightness discrimination, and dark adaptation in the same way and extent as similar degrees of hypoxia that results from reduced oxygen partial pressure. *As little as 5% CO in the blood will affect the visual threshold and raise the physiological altitude.* Smoking three cigarettes in succession may cause a temporary CO level in the blood of 4% with an effect on visual sensitivity equal to that of an altitude of about 8,000 feet. This effect is greater when flying at night, since our night vision is far from perfect anyway.

What cannot be explained enough about quitting smoking is that reversal of these effects occurs almost at the moment you smoke your last cigarette. You will reduce your worry about developing smoking-related cancer; your heart and respiratory rate will get back to normal; your tissues will receive oxygen from your blood more efficiently—in short, you will feel better. You will have eliminated one stressor and left yourself better fit to deal with the "everyday" stresses encountered in flying. ■

Mr. Sanders is a Technical Sergeant in the U.S. Air Force Reserves where he flies as a boom operator on KC-10A's. He is an airline transport pilot, CFI, and flies with the North Carolina Wing of the CAP. He wrote about carburetor icing in the September/October 1992 issue of *FAA Aviation News.*

Answers to Quiz:
1–T, 2–F (major repair), 3–T, 4–T, 5–F (major repair), 6–T, 7–F (major repair), 8–F (major repair), 9–T, 10–T, 11–T, 12–F (major alteration), 13–T, 14–T, 15–T, 16–F (major alteration)

Superpilot

Continued from page 1

confirmed President Clinton's appointment of Federico F. Peña as Secretary of Transportation. At some point in the political process of setting up a new administration, a new FAA Administrator will be appointed. Change was the campaign slogan of the new President, and as we said about Superman, only time will tell what changes will occur in our transportation system and the FAA as a result of President Clinton's election. But regardless of your political viewpoint, every airman has a responsibility to get involved in the aviation political process. Too many airmen sit back and do nothing, or they let one of their membership groups speak for them. In many cases, the groups may or may not speak for the majority of their members. My point is that so few airmen get involved in the process that determines how we all fly. It is a process which, once you are familiar with it, is so simple that it is an embarrassment that so few airmen participate. I am talking about the right of all airmen to comment on proposed rulemaking by the FAA, a right spelled out in Federal Aviation Regulations (FAR) Part 11 and in Advisory Circular 11-2A, *Notice of Proposed Rulemaking Distribution System*. (Available from DOT, M-443.2, Washington, DC 20590.)

Rulemaking is simple, although the results may not be. With the exception of emergency rulemaking, one of the most important rulemaking steps is the issuance of a notice of proposed rule making (NPRM). Published in the *Federal Register*, the U.S. Government's official public forum, the NPRM explains the proposed rule, the reasoning behind the proposed rule, and how the public can comment on the proposed rule. Each notice contains the name of the FAA person responsible for that particular rule. The problem is very few individuals comment on proposed rules, although most trade and membership groups do. But regardless of how airmen become aware of NPRM's, few airmen respond. In fact, more airmen respond to the FAA's implementation of a final rule than during the public comment period when it was proposed as a NPRM.

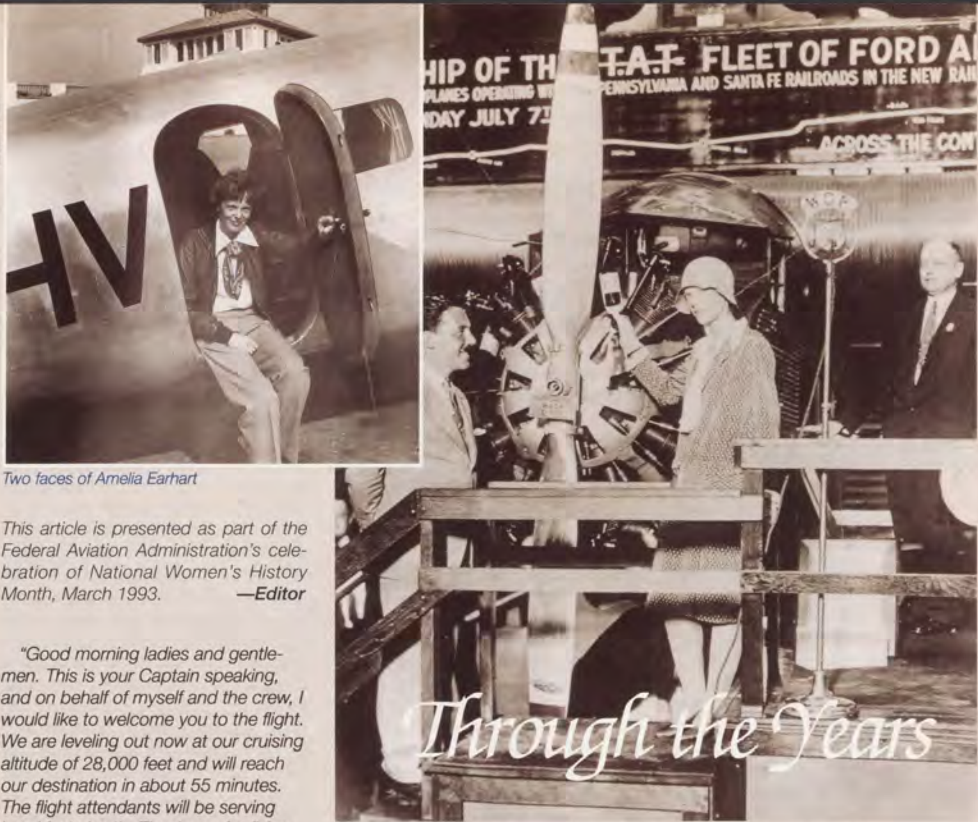
This lack of public response is regrettable because the FAA is required by law to consider all responses it receives as it goes through the rule-making process. In many cases, a proposed rule has been changed or dropped because of the comments made by interested airmen and groups. In the political reality of life in Washington, comments made by citizens can and do have impact on every law and regulation. But many times, the political facts of life in Washington are that the vocal few are heard, the so-called silent majority are not. What this means in today's aviation environment is what normally benefits one group is done at a cost to another group. One group wins. One group loses.

As you prepare for another season of flying, you need put a new item at the top of your preflight checklist—Check NPRM's. As you kick off the 1993 flying season, make yourself a promise to make your voice heard in the rule-making process in Washington throughout the new year. Remember, a bad rule can ground you just like a bad mag check. The problem is bad rules take longer to fix. We don't know if Superman will ever fly again, but a careful preflight of your aircraft, your self, and appropriate NPRM's should keep you flying for years to come.

Have a safe 1993 flying season. ■

If Mr. Chamberlain can't imagine a "person of steel" saving the world, he needs to read Wonder Woman—she flew an invisible airplane! Consult AC 11-2A for information on how to receive free copies of NPRM's. —***Editor***

Smithsonian



Two faces of Amelia Earhart

Through the Years

A Look at Attitudes toward Women in Aviation

by Kristine Kjos, *FAA Evaluation Specialist*

This article is presented as part of the Federal Aviation Administration's celebration of National Women's History Month, March 1993. ***—Editor***

"Good morning ladies and gentlemen. This is your Captain speaking, and on behalf of myself and the crew, I would like to welcome you to the flight. We are leveling out now at our cruising altitude of 28,000 feet and will reach our destination in about 55 minutes. The flight attendants will be serving breakfast shortly. Thank you for flying with us, and we hope your day is a pleasant one." After this cheerful greeting from the cockpit of the airline jet, a few of the passengers look surprised, if not down-right shocked. (And, no, it is not from the mystery breakfast being placed before them.) The voice of the captain coming over the intercom was that of a woman!

Today, it is not unusual for a woman to be an airline Captain. Although many of us have not flown with a woman at the controls, chances are we will as the number of women pilots increases in the 1990's. In 1991 there were over 1,225 female airline pilots in the United States and 1,600 worldwide. (This includes only women who fly under FAR Part 121 in aircraft in excess of 90,000 pounds gross weight.) Women currently make up close to 6% of airline pilots.

Women have participated in aviation since the first balloon rides in the late 1700's. Amelia Earhart, Anne Morrow Lindbergh, and Jacqueline Cochran are famous for their flying feats, but there were thousands more women who made spectacular contributions to aviation. So many of these women pilots or aviatrices, as they were called in the early decades of flight, are known only to small circles of aviation enthusiasts. The path for women aviators has not been an easy one, and women today are still breaking new ground for themselves and others in all aviation fields as they did when aviation was born.

EARLY AVIATION

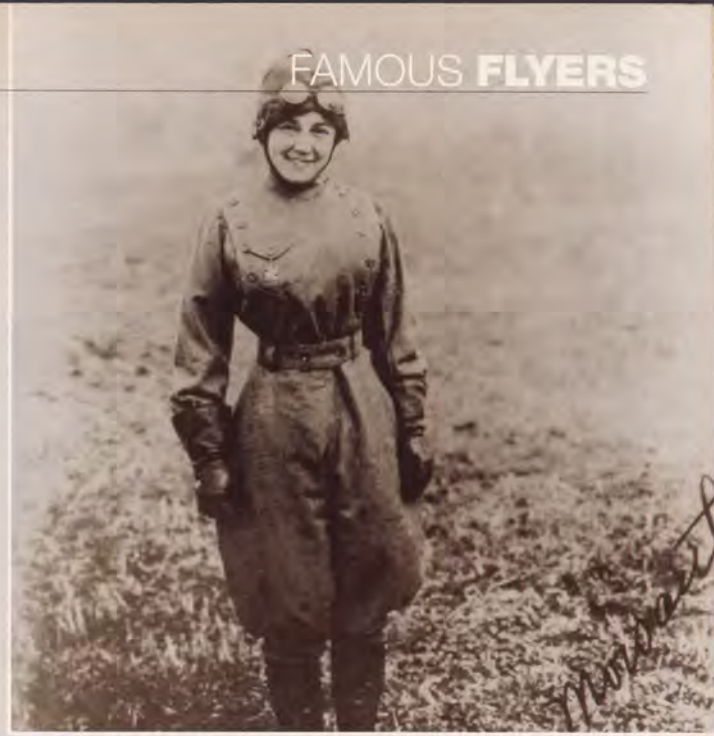
In the days after the Wright Brothers historical first powered flight, women in aviation were scarce. Flying was still new, and most Americans had not even seen an airplane. Flying was usually considered "socially inappropriate" and "physically impossible" for women in the 1910's, and early aircraft were not known for being stable. Yet, despite societal disapproval, several women became well-known aviatrices during those early years.

On September 2, 1910, Blanche Stuart Scott became the first American woman to solo in a fixed-wing, heavier-than-air aircraft. However, there is debate as to whether this flight was accidental or intentional. Glenn Curtiss, the airplane's builder and Scott's instructor, agreed to give Scott flying lessons for monetary reasons, although he believed that the sky was no place for women. Curtiss, thinking he was clever, had wedged a piece of wood beneath the throttle to prevent the plane from becoming airborne. Scott discovered the wood, removed it, and finally soared into the air, making history for women. She went on to become a stunt pilot with various exhibition groups touring the country and was famous for flying upside down under bridges and for her "Death Dive" from 4,000 feet down to 200 feet above ground.

Some credit Bessica Raiche with the title of "First Woman Aviator of America," for her first flight on October 13, 1910. Raiche and her French husband built their own airplane in which she soloed without any prior instruction. A mechanic simply told her to pull the wheel back to go up and push the wheel in to go down. Raiche flew for years, and the husband and wife team went on to form the French-American Aeroplane Company which manufactured lightweight airplanes.

Harriet Quimby was the first American woman to earn her pilot's license on August 1, 1911. "Flying seems easier than voting," said Quimby to a crowd of women after her first solo flight. Quimby soon set the first woman's record by flying at night over New York City before a crowd of 20,000 spectators. On April 2, 1912, Quimby became the first aviatrix to pilot a plane across the English Channel. On July 1, 1912, in a tragic accident at a Boston air meet, Quimby lost control of her plane, fell out of the cockpit, and plunged to her death in the shallow water of the bay. She was not wearing a seat belt, as they were very uncommon at the time.

Other famous women of the era included Matilde Moisant, Katherine and Marjorie Stinson, and Ruth Law. Moisant, the second woman in the United States to receive a pilot's license, flew in various meets around the country. She last flew on April 14, 1912, when her plane burst into flames from a fuel tank leak. Moisant's clothes were afire, but her heavy tweed flying costume saved her life.



Matilde Moisant

The Stinson sisters were both skillful pilots. The older of the two, Katherine, was the first woman to carry airmail and the first woman to loop-the-loop. She raised considerable money for World War I using her flying skills and opened a flying school in Texas with her family. Marjorie, the youngest woman pilot in the United States at the time, flew several exhibition flights and later focused on teaching at and running the Stinson Aviation School.

Ruth Law received her pilot's license on November 12, 1912. Soon she was making daily exhibition flights, carrying passengers, and looping-the-loop. In November 1916, Law set the American nonstop cross-country record, flying from Chicago to New York. She later set a new women's altitude record of 14,700 feet in September 1917.

These first few pioneers were just the beginning in a long line of women who struggled their way into aviation. Slowly, it became more socially acceptable for single women to participate in aviation, although some women continued to disguise themselves as men or as other women when taking a flight. Advances in aircraft design lessened objections to women flying airplanes for physical reasons. Daring women ventured into the cockpit wearing pants and, although this was considered improper at first, it was eventually accepted because of the nuisance and danger caused by long skirts. Although some men encouraged women to fly, there remained an unwillingness to accept women pilots. Claude Grahame-White, a famous British aviator, feared women's lack of self-confidence would

Jacqueline Cochran

cause panic and loss of control in an emergency. He felt women were "temperamentally unfit, and when calamity overtakes them, and sooner or later it will," he said he would feel "in a way responsible for their sudden decease." This perception of women as panicky was all too common. As the 1920's came in with a roar, the aviatrices tried harder than ever to prove to men and to other women that they were competent pilots.

BARNSTORMING

Women pilots in the 1920's were more daring than ever. Many turned to barnstorming early in the decade because it was the only door open to them in aviation. Social disapproval continued, but women were determined to dazzle the doubtful with their daring barnstorming loops and dives.

Ruth Law's fame grew in the 1920's when she opened "Ruth Law's Flying Circus." "My trickiest [stunt] involved climbing out of the cockpit, and inching toward the center of the biplane's wing. The pilot would then make three loops with me standing on the wing," said Law. Law also made numerous plane-to-car transfers. Laura Bromwell astounded a crowd of 10,000 when she flew 199 consecutive loops, stopping only when she ran out of fuel. Phoebe Fairgrave was famous for her double parachute jumps. After the first chute opened, she cut it loose and free-fell further through the air before releasing the second chute.

Barnstormers knew well of the dangers their stunts could incur; fatal aviation accidents were common among male and female barnstormers. Bessie Coleman, the first black aviatrix, met the same fate as Harriet Quimby when her plane flipped during a nose dive in April 1926. Wearing neither parachute nor seatbelt, Coleman was thrown from the plane and plunged to her death. Laura Bromwell died two weeks after her loop record when she lost control of her plane in a loop and crashed. Some tragedies occurred on the ground. Gladys Roy, famous for dancing the Charleston on the upper wing of a plane, accidentally walked into a plane's spinning propeller. Some of these women risked their lives to make a meager living for themselves, but most of them flew because they had caught the "flying bug."

Record setting and air racing became popular as the decade progressed. After Lindbergh's successful crossing of the Atlantic Ocean in May 1927, the race was on for a woman to cross the same waters. It was not to be accomplished by a woman at the controls until Amelia Earhart's famous Atlantic crossing in 1932, although there were several attempts made by women before her. After one of the failed Atlantic crossing attempts, Dr. Katherine B. Davis, a sociologist, said "There is no woman alive today. . . equipped for such a flight."

Other women's records were set for endurance, altitude, and speed. Viola Gentry, Bobbi Trout, Louise Thaden, Elinor Smith, and others were famous for their endurance competitions. In January 1929 Trout and Smith teamed up and remained in the air for 45 hours and 5 minutes. At the close of the decade, Louise Thaden set speed and altitude records of 156 miles per hour and 20,260 feet respectively.

In August 1929, the Women's Air Derby, later called the "Powder Puff Derby," began in Santa Monica, California. The race lasted a week and ended in Cleveland, Ohio. Out of the 18 participants, 14 made it to Cleveland, three had accidents, and one woman, Marvel Crosson, died when she bailed out too low for her parachute to open. Crosson's death created an uproar of protests to cancel the race. "Women Have Conclusively Proven That They Cannot Fly," read one headline. But the women pressed on to prove that flying was no longer exclusive to men.

A male survey at the time showed that women pilots were considered "too emotional, vain, inconstant and frivolous— hazards to themselves and to others." Despite these kinds of comments, women had firmly established a niche for themselves in aviation and had formed an unbreakable bond. In 1929, a women's aviation group called the Ninety-Nines was formed to promote women pilots and to serve as an information exchange network. The Ninety-Nines participated in air races, promoted aviation and related research, and supported other aviation causes. They were and continue to be instrumental in the aerial marking campaign. The campaign involves painting thousands of airport names on building roofs around the country and indicating the direction and number of miles to these airports. This effort by the Ninety-Nines has assisted numerous lost pilots over the decades.

Also in 1929, federal regulations were established prohibiting low flying and hindering many barnstorming stunts. Some women retired from their flying careers, and some went on to set bigger and better records. A famous quote by Amelia Earhart best described what many of these women were feeling at the time: "Now and then, women should do for themselves what men have already done—and occasionally what men have not done—thereby establishing themselves as persons, and perhaps encouraging other women toward greater independence of thought and action."

PROFILE: Mary Feik—mechanic, engineer, pilot

Mary Feik calls herself an aviation "anomaly." After overhauling her first engine when she was 13, Mary turned to airplane engines at age 18 and taught aviation mechanics at the U.S. Army Air Force Seymour Johnson Air Base at Goldsboro, N.C. during WWII. Mary became an expert on several WWII fighter planes before advancing to Wright Field in Dayton, Ohio where she is credited with becoming the first woman engineer in research and development for the Air Technical Service Command. One of Mary's primary assignments was to design and build the "Captiveair," an apparatus used to train fighter pilots. "We mounted a real P-51C *Mustang* off the line on pylons, (*see photo above*), moved all the cockpit instruments back to an instructor's cubicle, leaving the pilot with remote indicators the instructor could operate to simulate operational situations and emergencies," described Mary. The "simulator" was a success and Mary helped other bases build "Captiveair's." To her great relief, Mary was finally allowed to fly the planes she worked on (after many secret early morning and middle of the night test flights) and flew more than 5,000 hours during WWII and the Korean War as a B-29 flight engineer, engineering observer, and pilot in fighter, attack, bomber, cargo, and training aircraft.

The Smithsonian Air and Space Museum was lucky to recruit Mary in 1976, where she worked for many years as a docent, or guide, and antique and classic aircraft restoration specialist. Today, Mary continues to lend her restoration expertise to many and has now been restoring airplanes for 50 years. She gives lectures to the community about aviation history, women in aviation, and aircraft restoration, and is active in many aviation organizations, including the Civil Air Patrol (CAP), Experimental Aircraft Association (EAA), and the Potomac (MD) chapter Ninety-Nines, of which she is a charter member. Mary owns, flies, and maintains a 1962 PA-24 180 Piper *Comanche* and a 1952 PA-20 135 Piper *Pacer*, both in original condition, of course! When asked how she feels about aviation, Mary responds that "Flying is only half of it. No airplane flies safely if the maintenance is not good. There are a lot of women [mechanics] out there who are technically capable, but nobody ever hears about them." Needless to say, she feels that pilots should understand engines and can never know enough about the planes they fly. Mary sees herself as a "resource" for people seeking advice and enjoys sharing her knowledge about aviation. And if you need to find her, chances are she is out at the airfield working on one of her beautiful planes with a smile on her face.

THE GLORIOUS THIRTIES

Records of all kinds continued to be set by men and women in "The Golden Years" of aviation. Flying was becoming a more reliable means of transportation and women were used to demonstrate its safety and ease to the public. They were seen in advertisements with anything to do with aviation. Women raced, toured, made promotional flights to demonstrate the safety of flight, sold airplanes, and instructed. Membership in the Ninety-Nines continued to grow. In 1932, there were 472 licensed women pilots in the United States, and by the end of the thirties, the number of women pilots was nearing 1,000.

There were some people who continued to doubt women's flying abilities, but others began to acknowledge their skills. A chief pilot for a flying service explained that women "are easier to teach, and learn quicker than men. Women usually think about flying for a long time before they start taking instruction. They leave the instruction to you. When you tell them their mistakes, they pay more attention, and often correct them faster."

Some of America's most famous women flew in the 1930's. Everybody knows of Amelia Earhart's famous ocean crossings and mysterious disappearance over the Pacific during an attempt to circle the world at the equator. Her bravery and strong beliefs in women's competence have fascinated people for decades. Earhart was a woman ahead of her time. In 1936, Louise Thaden and Blanche Noyes won the Bendix air race, a race previously limited to men. Laura Ingalls finished a surprising second.

Higher, faster, farther! As soon as one woman set a record, it was broken by another. Ruth Nichols, Amelia Earhart, Bobbi Trout, Frances Marsalis, and Elinor Smith are just a few women who set records in the 1930's.

In 1938, Jacqueline Cochran won the Bendix. Cochran was an amazing woman who climbed to an altitude of 30,052 feet with no heat, oxygen supply, or pressurization. She got frostbite, ruptured a sinus blood vessel, and became very disoriented from lack of oxygen but was not one to let "little things" like these deter her efforts. Cochran was also famous for her unbelievable speed records. During and after WWII, Cochran would earn her title "The greatest woman pilot in aviation history."

Women who flew in the 1930's have fond memories of the "Golden Age." Louise Thaden described aviation in the 1930's: "It was the first time women began to be accepted on their own merits as pilots. It was a time of growth and exploration, when all 'firsts' were really firsts. It was a time when camaraderie existed because words were not always necessary between fellow pilots, a time of instant friends and a spirit of cooperation, and a sense of something shared." The "camaraderie" Thaden describes became stronger than ever when women pilots were allowed to fly for the Army during WWII.

PROFILE: Velta Benn—pilot,CFI

The name Velta Benn is well-known in the Washington, D.C. aviation community. Velta has been a flight instructor since 1945 and is an FAA designated examiner. During WWII, she answered the call for women pilots to join the war effort and became a Women's Airforce Service Pilot or WASP. She was in the third to last class to graduate and flew for three months at Merced Army Airbase in California (now Castle Air Force Base), before the WASP's were disbanded. During this short time, Velta flew combat returnees back for their "R and R" and also flew with these men for their four hour "R and R" currency requirements. When asked if she was disappointed about the WASP's being disbanded, Velta replied that she felt and still feels very grateful for the flying opportunity. It was a positive experience for her and an enormous boost to her flying career.

Velta's aviation record is pretty impressive. She has taught several Congressmen how to fly, as well as a Canadian General, and was even approached by former First Lady Mrs. Nixon who was interested in flying lessons (unfortunately, White House security did not permit the lessons). Velta says that she has been the chief flight instructor during most of her jobs and has "always been well-accepted." In the late 1960's and early 1970's, Velta was a partner in a company that wrote scripts for Navy training films. "I wrote training scripts about carrier landings, gunnery patterns, and high angle of attack and spin characteristics of high performance jets," described Velta. Ironically, creating the films brought Velta back into military cockpits, as the Navy let her fly the jets described in the films.

Today, Velta's love for aviation is as strong as ever. She enjoys giving check rides as an FAA pilot examiner and has no intentions of stopping anytime soon. Chances are she is in the air even as you read this!

THE WASP's

When the United States entered World War II, major air races were suspended and flying was not permitted near the coastal areas. Everyone began to focus on the war effort. By 1942, women were not uncommon in commercial aviation and began filling in for the men who went off to battle the Axis powers. There were women pilots, mechanics, engineers, assembly line workers, flight instructors, flight attendants, and air traffic controllers. The men working in these fields were reluctant to hire women at first, but with the war progression and shortage of men, women were soon welcomed and encouraged to do their part in supporting the war effort.

Jacqueline Cochran saw the war as a golden opportunity for women to serve their country as ferry pilots. She suggested her idea to the Army and was rejected at first. Determined to form a group of women ferry pilots, Cochran organized and established an elite group of women ferry pilots who served in Great Britain. As the war continued, another influential pilot named Nancy Love proposed using a small number of well-qualified women pilots to ferry aircraft domestically under the Air Transport Command. Love's proposal was accepted and the Woman's Auxiliary Ferry Service (WAFS) was created on September 10, 1942, with Love as squadron commander.

Cochran was angry about the situation. She came back to the United States from Great Britain and convinced the Army to form a second group of women ferry pilots of whom Cochran was in charge. Love's WAFS had more flying experience and were an elite group. Cochran's group, called the Woman's Flying Training Detachment (WFTD) had fewer hours so she organized a huge operation to provide further training. The two groups were eventually combined into one called the Women's Airforce Service Pilots (WASP's), headed by Cochran.

Doubts about women being too weak to handle heavy equipment were dispelled as the WASP's flew every kind of military airplane all over the U.S. They flew 77 different types of planes, from the P-51 *Mustang* fighter to the B-29 *Superfortress*, for a total of 12,650 deliveries and 60 million miles travelled during their two years as WASP's. There were 1,074 WASP's, 76 of whom lost their lives in accidents. Surprising to some, the WASP's safety record was better than the men's record for the same types of missions. At first, the WASP's were responsible for ferrying planes to coastal ports for shipment to the war arenas. Eventually, the women served as test pilots for problem aircraft, towed targets to train ground-to-air gunners (real ammunition was fired at the targets and sometimes hit the planes), trained male cadets, flew simulated strafing and smoke-laying missions, and performed radar jamming and searchlight tracking missions.

The WASP program run by Cochran was very militaristic to guarantee top performance by the women. Despite long hours, marching and exercising, rustic quarters, and the sometimes dangerous and unsafe aircraft, most WASP's enjoyed their jobs. Comraderie was high as was pride. The situations that the WASP's found themselves in were sometimes amusing, sometimes dangerous, sometimes infuriating. Women were at first grounded during their menstrual cycles. (This rule was later revoked.) Some had to have physicals every month, unlike the men. This was also quickly revoked. Even sabotage was a scary possibility. One WASP was killed in a crash because somebody deliberately put sugar in the gas tank of the plane she was ferrying. But the danger and hassle endured by WASP's was worth it for most when they saw the looks of shock on ground crew's faces, as they climbed out of the fighter planes.

On December 20, 1944, the WASP program was deactivated. Loss of men in the war theaters was lower than predicted, and some male pilots began to return home. Many WASP's were disappointed at the loss of their jobs. They were of course happy that war losses were minimal, but they had worked so hard and come so far. They struggled to find other jobs in aviation, but jobs were scarce for men, let alone for women. At the last WASP graduation ceremony in Sweetwater, Texas, Cochran and the WASP's felt a great deal of pride and accomplishment when General Arnold (who doubted the WASP program at first) stated the following: "Frankly, I didn't know in 1941 whether a slip of a young girl could fight the controls of a B-17. You, and more than nine hundred of your sisters, have shown that you can fly wingtip to wingtip with your brothers. The entire operation has been a success. It is on the record that women can fly as well as men. . ."

But the WASP's were not properly recognized for their valiant efforts or fully incorporated into the Army. After years of protesting and negotiations with the Department of Defense, the WASP's were finally made veterans and thus eligible for appropriate benefits, on November 23, 1977, almost 40 years later. ■

End of Part 1

Editor's Note: Part 2 of this article will appear in the April 1993 issue of *FAA Aviation News* and will cover the period from after WWII to the present. Ms. Kjos was a U.S. Department of Transportation Management Intern when she prepared this article as part of a developmental assignment on the Aviation News Staff. She is a student pilot who now works in FAA's Office of Contracting and Quality Assurance.

Author's Note: Special thanks to the Potomac (MD) Chapter of the Ninety-Nines for the help and encouragement given me on this article and towards getting my pilot's license, especially Patricia Garner, Evie Washington, Nancy Waylett, Mary Feik, and Linda Denett. Thanks also to Velta Benn, Jean Ross Howard, Pat Napier Adams, and JoEllen Casilio for their time and input. For others who have caught the "flying bug" as I have and who would like more information about women in aviation, I suggest visiting or contacting the Smithsonian Air and Space Museum in Washington, D.C.

The word has been out on airspace reclassification just long enough for the questions to start coming in. The way we would like to handle them is in a regular "Airspace Corner" column, similar to our "Instrument Corner." For future editions of "Airspace Corner" we would welcome questions, comments, or subjects that the readers feel need clarification. **—Editor**

Question: *Since special VFR (SVFR) operations can only be authorized and conducted in a control zone, are we still going to be able to get an SVFR clearance in the new airspace?*

Answer: Yes. FAR Section 91.157a(1) has been amended, effective September 16, 1993 to allow SVFR operations to be conducted (with an ATC clearance) within the lateral boundaries of Class B, Class C, Class D, and Class E airspace surface areas up to, but not including 10,000 feet MSL.

Question: *In reading the new FAR's for SVFR, it appears that "through flights" are no longer authorized (§ 91.157). Also, VFR flight is now prohibited within the lateral boundaries of Class B, Class C, Class D, and Class E airspace surface areas anytime the ceiling is less than 1,000 feet (§ 91.155c). Am I reading these sections correctly?*

Answer: You are correct. However, in both cases, the rules were inadvertently changed. The FAA fully intended to continue to allow SVFR flights through Class B, Class C, Class D, and Class E surface areas. The revised rule prohibiting VFR flights within Class B, Class C, Class D, and Class E surface areas when the ceiling is less than 1,000 feet inadvertently dropped the phrase, "beneath the ceiling." One item our "eagle-eyed" reader missed was the title of Section 3, Appendix D to Part 91, Locations at which Special VFR operations are prohibited, did not include the phrase "fixed-wing." We did not intend to prohibit SVFR operations for helicopters. The FAA intends to initiate rulemaking action to correct these three administrative oversights prior to September 16, 1993.

Question: *What is a "surface area?"*

Answer: The term "surface area" has been selected as a generic replacement for "control zones" and/or "airport traffic areas" when there is application within more than one class of airspace. In a forthcoming change to the Pilot/Controller Glossary, we plan to define surface area as, "The use of the term surface area applies to the airspace within the lateral boundary of Classes B, C, D, and E airspace areas that begin at the surface and extends upward."

• Outer Marker Approach

According to FAR § 91.175(k) a compass locator or precision radar may be substituted for the outer marker or middle marker. DME, VOR, or NDB fixes that are authorized in the standard instrument approach or surveillance radar may be substituted for the outer marker. According to the inoperative components or visual aids table, if the middle marker is out and a compass locator or precision radar is not available for substitution, then we simply increase decision height by 50 feet for Cat. A, B, and C aircraft.

My question is, if the outer marker is out and there is no substitute available, can we still fly the approach? Since there is no inoperative components or visual aids table for outer marker failure, are there any adjustments necessary?

Kevin L. Davis
Honolulu, HI

The answer to your question is no. You can not fly an ILS approach if the outer marker is out and no other authorized means of defining the outer marker fix is available. Since the approach is not authorized without an outer marker, no adjustment is applicable.

• SVFR Operations

This is a request to either reprint or do a new article on the various conditions that permit special VFR operations (SVFR). I believe that there was an article done in the late 1970's or early 1980's that explained various unusual situations that allow SVFR.

One of these would be a VFR tower reporting -X9 OVC 4F. The control zone is IFR, but a pilot requests transition at 2,500 feet. If the pilot states that he is above the clouds and has five miles visibility the controller may authorize his transition without a SVFR clearance. Do you concur?

Second, a pilot is transitioning a control zone at 2,000 feet and cannot comply with VFR requirements below the clouds. Even though the zone is VFR, I believe that the pilot may request and be granted SVFR clearance through the control zone. This allows the pilot to deviate from the FAR's and stay "clear of clouds." What is your opinion?

I believe that both pilots and controllers are generally unfamiliar with these situations and neither the Airman's Information Manual *or the controller handbook specifically address them.*

Leslie John Gaton
Isla Verde, PR

Yes, there was a control zone article published in the January/February 1985 issue of the then *FAA General Aviation News.* We currently are not planning on doing a special VFR article before the new airspace change scheduled for September 1993. We intend to focus our efforts on informing everyone about the new designations rather then writing about airspace that will change. We will be discussing how the current airspace procedures will be merged into the new system. For example, next year, control zones will become either Class B, C, D, or E airspace depending upon the establishment criteria for such airspace.

To answer your two questions, in the first example, if the pilot is able to maintain VFR at 2,500 feet and is outside the airport traffic area (ATA), the pilot does not have to talk to the controller at all to transition through the control zone assuming that the control zone is not within a TCA or ARSA. If the pilot plans on flying through an ATA, TCA, or ARSA the pilot must meet other requirements before entering such areas.

In your second example, a SVFR clearance does not allow a pilot to deviate from the FAR. A SVFR clearance simply lets the pilot meet another FAR standard that provides an adequate level of safety. Although we do not completely understand your question, if you mean can the pilot request a SVFR clearance under FAR § 91.157 to stay at 2,000 feet while maintaining less than the minimum VFR cloud separation in the control zone? The answer is yes. However, this operation would be subject to approval from the ATC facility responsible for the control zone. Remember, when the weather at the primary airport in the control zone is VFR, even with a SVFR clearance, the pilot, and pilots on IFR clearances, must be very alert for other VFR traffic in the zone. Control zones are designated to provide controlled airspace for terminal instrument operations at a primary airport and extend upward from the surface of the earth to a designated altitude or to the adjacent or overlaying controlled airspace when weather conditions are less than that required for visual flight rules (VFR) at the primary airport for which the control zone was established. When conditions are VFR at the primary airport, pilots can transition under VFR through a control zone without talking to a controller as long as the pilot is not going to penetrate an airport traffic area, TCA, or ARSA, which requires communication with ATC. Control zones are designated by rulemaking and are always in effect regardless of the weather. The only time a VFR pilot must be concerned with a control zone is when the weather is less than basic VFR.

Please note: FAR § 91.157(e) limits the use of Special VFR by pilots of fixed-wing aircraft to daylight hours except where the pilot is instrument rated and currently qualified and the aircraft is equipped for IFR flight.

FAA AVIATION NEWS welcomes comments from its readers. We may edit letters for style and/or length. We will select one representative letter from those on the same topic for publications, and because of our bimonthly publishing schedule, responses may not appear for several issues. We will send personal replies only upon request. We will not print anonymous letters, but we will withhold names upon request. Address: Editor, FAA AVIATION NEWS, AFS-810, Washington, DC 20591.

• Emergency Frequencies

Simon Whitney's article, "Preflight Passenger Preparation" in the March/April issue provides an excellent outline for indoctrinating first flight passengers. However, the article does have one minor inaccuracy: Commercial airlines do not routinely monitor emergency frequency 121.5 MHz within the contiguous U.S. Airline aircraft do monitor this frequency when operating in oceanic airspace.

In addition, it is my understanding many FAA air traffic control facilities no longer monitor the emergency frequencies. It might be helpful to summarize in a future article what agencies and facilities still monitor the emergency frequency.

Glenn Morse
Director, Air Transport Association

According to FAA's Air Traffic Service, Flight Service Stations and the Civil Air Patrol continually monitor emergency frequencies.

• Contacting ATC

I am a private pilot with an instrument rating and a small plane. I was told in flight training that whenever I was receiving flight following or any other air traffic control (ATC) services, I didn't have to worry about contacting the towers of the airport traffic areas I was going through. ATC would coordinate the transition. This is precisely what the Airman's Information Manual (AIM) paragraph 3-61(b) says.

During a recent visit to an approach control facility, the controllers were surprised that some pilots relied on them to contact the towers. They said that nothing in their training contained a statement similar to AIM paragraph 3-61(b).

It seems that the AIM and pilot procedure should be amended so that whenever a pilot is approaching an airport traffic area he or she should either call the tower for approval to enter or ask ATC to do so and receive explicit verification that they have indeed secured permission for the pilot to enter. It is obviously very dangerous to be close to an airport without the tower knowing you're there.

John Paul Zima
Shaker Heights, OH

• Missed Approaches

I have two questions about missed approaches. When flying a side-step maneuver on an ILS, such as the Oakland, CA, ILS RWY 27R procedure, if you have to make a missed approach at the side-step altitude, do you execute the missed approach procedure at that point on the glide slope, or do you continue to fly at the side-step altitude until expiration of the time from the final approach fix to the missed approach point like you would do for a non-precision approach?

If you are flying an ILS approach to a circling procedure, do you fly the glide slope down to the circling minimum descent altitude (MDA), or do you just ignore the glide slope and fly the localizer? If we use the glide slope, do we execute a missed approach at the MDA on the glide slope like we would do at the decision height on a full ILS approach, or do we continue to fly at the circling MDA until our time runs out? I am referring to the Livermore, CA, ILS RWY 25R circling procedure.

Thomas Klump
Oakland, CA

First, you must follow the procedures listed in FAR § 91.175 as to when you must execute a missed approach procedure. Then regarding your questions, the best answer is it is your choice. Just remember that although the glide slope provides good vertical guidance on a precision approach, when you are flying a non-precision approach, the use of elapsed time from the FAF to the MAP should normally put you closer to the runway. Both of the examples you mentioned show the MAP to be the end of the runway. If you go missed approach on the glide slope, you probably would not be as near the runway. Either way, you must comply with FAR § 91.175 as to whether you can land safely or must execute a missed approach.

An important safety point that must be made regarding any missed approach procedure that has an initial turn as part of the procedure is that no turns should be made until you are at either the DH on a precision approach or MAP on a non-precision approach. The reason is that missed approach procedures are designed only to protect you starting from the DH or MAP and not before. If a missed approach procedure involving a turn is executed before either of these points the only safe procedure is to climb and continue flying to the respective missed approach point before executing the missed approach instructions.

The AIM does not have to be amended. We checked with the facility Mr. Zima's mentioned in his letter. The appropriate manager contacted Mr. Zima, and the facility will provide the services outlined in the AIM. In a second letter to the magazine, Mr. Zima discussed the facility's telephone call and asked the magazine to ". . . disregard my first letter." But Mr. Zima's first letter provides us an opportunity to review some of the pilot and ATC responsibilities involved when pilots operate in certain airspace.

As Mr. Zima noted, AIM Paragraph 3-61(b) states, "FAR § 91.127 requires that unless a pilot is landing at or taking off from an airport in the airport traffic area (ATA) or authorized otherwise by ATC, the pilot must avoid the area. Generally, it is the pilot's responsibility to obtain the necessary authorization. Pilots operating under IFR or *receiving radar services from an ATC facility* (emphasis added) are not expected to obtain their own authorizations through each area. Rather, the ATC facility providing the service will coordinate with the appropriate control towers for the approval to transit each area." The requirement for air traffic controllers to coordinate with appropriate airport traffic control towers is contained in FAA Order 7110.65, *Air Traffic Control* paragraph 2–16b.

One important item for all VFR pilots to remember is that, in certain cases and areas, ATC services to VFR pilots are provided on a workload-permitting basis. Therefore, it is possible that ATC radar services could be terminated rather abruptly. If that happens, the VFR pilot would be told that radar services are terminated and to squawk 1200. From that moment on, the VFR pilot would be responsible for requesting his or her own authorization when planning to enter an ATA. This is why VFR pilots need to be aware of their position at all times and be prepared to resume their own navigation.

For detailed information on available ATC services, including emergency services, pilots should review the current edition of the AIM, which is the FAA's official guide to basic flight information and ATC procedures. The AIM also provides a glossary of pilot/controller terms to help improve the communication between pilots and ATC personnel.

Pilots can order the AIM from the Superintendent of Documents, U.S. Government Printing Office (GPO), Washington, DC 20402. GPO's Washington, DC telephone number is (202) 783-3238.

Looking to Aviation's Future

At the 1992 Experimental Aircraft Association's Fly In and Convention at Oshkosh, EAA launched the Young Eagle Program in an effort to introduce more young people to the world of aviation. EAA has gone a step further by introducing a new magazine, *Sport Aviation for Kids,* to its publication lineup. Aimed at the 17 and under audience, this bimonthly magazine fills a void previously ignored by featuring aviation personality profiles, history, games, and trivia. The magazine is available only to members of the Sport Aviation Club (annual membership fee $15). It will not be sold on the newsstand; however, participants of the Young Eagle Program will receive two complimentary issues.

MTBE Approved for Autogas STC

In the January/February "AvNews/Briefs," we reported about oxygenated fuels and the autogas STC. In the article we mentioned that FAA had not approved the additive methyl-tertiary-butyl-ether (MTBE) for aircraft fuel systems using autogas. As that story was going to press, FAA did approve MTBE's use.

As a blending agent, MTBE increases the antiknock index of autogas, and oil companies now add it to fuels to meet Environmental Protection Agency standards. Research conducted at FAA's Technical Center in Atlantic City, NJ with autogas blended with MTBE has not shown any safety related problems, nor have material compatibility and performance data supplied by the Experimental Aircraft Association and Petersen Aviation, the main holders of autogas STC's, shown any safety related problems. FAA service difficulty reports do not reveal any material compatibility or safety issues. Accordingly, the FAA has determined that *autogas blended with MTBE can be used safely in aircraft that are approved for the use of autogas by STC.*

The existing prohibition on the use of alcohol additives remains in effect. It is the operator's responsibility to assure that autogas conforms to appropriate specifications. The policy guidance in Advisory Circular 23.1521-1A which prohibits the use of MTBE additives will be revised to reflect MTBE's approval.

Do You Know the Way to Sun 'n Fun

If you plan to attend the annual Sun 'n Fun Fly-In, reading a copy of the *Notices to Airmen* (NOTAM's) is strongly advised as part of your preflight planning. As an increase in traffic is expected, special procedures are in effect at Lakeland Airport from April 17 through 24.

To facilitate the flow of traffic, airplanes will arrive using the Lake Parker arrival procedures. Ultralights shall enter and exit from the south-southwest, and helicopters shall enter and exit from the southeast. For more details on IFR and VFR arrival and departure procedures, see NOTAM's.

Exclusion from the Mode C Veil rule for both Tampa and Orlando are defined in the Class II NOTAM's. Aircraft without electrical systems, balloons, and gliders are excluded (FAR § 91.215) from Mode C transponder requirement.

Limited grassfield operations can be accommodated. For "Special Grassfield Authorization and Procedures," contact: Sun 'n Fun (EAA) Fly-In, Inc., P.O. Box 6750, Lakeland, FL 33807, telephone (813) 644-2431. For those planning to fly an aircraft without a radio to Sun 'n Fun, a postcard should be sent to: Air Traffic Control Tower, Tampa International Airport, Tampa, FL 33607. Be aware that this postcard will indicate to ATC that you have read and understood all the procedures presented in NOTAM's for Lakeland Airport.

The Lakeland Linden Regional Airport Control Tower will be open and the control zone in effect from 6:30 a.m. to 9:30 p.m. However, these special procedures will be in effect ONLY from 7 a.m. to 7 p.m. on April 17 through 24.

Missing Something?

Several subscribers let us know that their copies of the January/February 1993 issue were missing pages. If this was the case for your copy, rest assured it is not bureaucratic cost-cutting but a binding error. Let us know *(see the inside front cover),* and we will try to replace your copy. But, our supply is *limited.*

News on the Move

The magazines with perhaps the best circulation are those that you find in the seat pocket in front of your airline seat. Unless an intrepid traveller takes the copy, you usually find the issue, well-thumbed by numerous readers, there for your entertainment. *FAA Aviation News,* thanks to Delta Air Lines, is taking a step in that direction. No, we won't be showing up in the seat back pocket of Delta planes, but one issue at least might be in a far more important place: the flight cases of Delta Air Lines' pilots. Mr. Bill Watts, Manager of Delta's MD-88 fleet, took the offer of a complimentary copy of the magazine, tendered in the November/December 1992 editorial, very seriously. He asked for 9,500 complimentary copies—one for every Delta pilot. Just after the first of this year, Delta mailed the copies with a cover letter encouraging pilots to subscribe. Flight Standards Director Thomas Accardi sent a letter of appreciation to Delta Air Lines, citing their interest in aviation safety and their generosity.

Being a pilot who sweats it out when she can't kick her own rudders, I might relax a little if I knew my captain and first/second officers had read the latest FAA safety news before takeoff. And just so that there are no hard feelings—we'll be happy to supply copies to any other airlines who want to follow Delta's example.

Is that southern hospitality or what?

—The Editor

New World Record Set

On October 3, 1992, 200 skydivers exited from six airplanes at approximately 18,000 feet over the skies of Myrtle Beach, SC, and successfully shattered the 150-way freefall formation record. It was their 24th attempt at complete a 200-way freefall formation. The jumpers used three DeHavilland DHC-4 *Caribous,* a DC-3, and two DeHavilland DHC-6 *Twin Otters.*

TEST YOUR PILOTING IQ: Preventive Maintenance Quiz

by Louise Oertly, *Associate Editor*

For those of you who have let your aircraft take a long winter's nap, the arrival of spring means preparing your aircraft for flight. Part of this preparation includes checking for bird, rodent, and insect nests in expected—and unexpected—places and conducting preventive maintenance. According to the Federal Aviation Regulations (FAR), the holder of a pilot certificate issued under FAR Part 61 may perform preventive maintenance on any aircraft owned or operated by that pilot which is not used under FAR Parts 121, 125, 127, 129, or 135.

The following quiz is to test your knowledge of what is considered preventive maintenance (provided it does not involve complex assembly operations). The answers are on page 19, but the complete list of preventive maintenance work can be found in FAR Part 43, Appendix A.

Answer the questions **True** or **False.**

___1. Replacing and servicing batteries.

___2. Repairs to deep dents, cuts, scars, or nicks on, and straighting of an aluminum propeller blade.

___3. Replenishing hydraulic fluid in the hydraulic reservoir.

___4. Replacing or cleaning spark plugs and setting of spark plug gap clearance.

___5. Calibration of radio equipment.

___6. Removal, installation, and repair of landing gear tires.

___7. Replacement of fabric on fabric-covered parts such as wings, fuselages, stabilizers, and control surfaces.

___8. Special repairs to structural engine parts by welding, plating, metalizing, or other methods.

___ 9. Replacing defective safety wiring or cotter keys.

___10. Trouble shooting and repairing broken circuits in landing light wiring circuits.

___11. Replacing bulbs, reflectors, and lenses of position and landing lights.

___12. Installation of structural parts other than the type of parts approved for the installation.

___13. Replacing wheels and skis where no weight and balance computation is involved.

___14. Servicing landing gear shock struts by adding oil, air, or both.

___15. Replacing safety belts.

___16. Installation of an accessory which is not approved for the engine.

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