

# FAA WORLD

SEPTEMBER 1976



## CONVERSION FACTORS

inches to centimeters  
feet to centimeters  
yards to meters  
miles to kilometers  
square inches to square centimeters

X2.5  
X30  
X0.9  
X1.6  
X6.5

millimeters to inches  
centimeters to inches  
meters to feet  
meters to yards  
kilometers to miles  
square centimeters to square inches

X0.04  
X0.4  
X3.3  
X1.1  
X0.6  
X0.16



# metrics

are on the way

square feet to square meters  
square yards to square meters  
square miles to square kilometers  
acres to hectares  
ounces to grams  
pounds to kilograms  
fluid ounces to milliliters  
gallons to liters  
cubic feet to cubic meters  
cubic yards to cubic meters  
Fahrenheit to Celsius

X0.09  
X0.8  
X2.6  
X0.4  
X28  
X0.45  
X30  
X3.8  
X0.03  
X0.76  
32 X5/9

square meters to square yards  
square kilometers to square miles  
hectares to acres  
grams to ounces  
kilograms to pounds  
milliliters to fluid ounces  
liters to gallons  
cubic meters to cubic feet  
cubic meters to cubic yards  
Celsius to Fahrenheit

X1.2  
X0.4  
X2.5  
X0.035  
X2.2  
X0.03  
X0.26  
X35  
X1.3  
X9/5 + 32



# EDITORIAL

## Make Efficiency And Responsiveness Our Hallmarks

*Administrator McLucas looks over the weather maps that are electronically displayed via closed-circuit TV in the briefing room of the Washington FSS. He is accompanied by facility chief Dick Johnson.*



As public servants and taxpayers, we have a vested interest in the efficiency of the Federal government. Lately, we have heard growing criticism of "big government," and there's been a new interest in cutting marginal programs and in making government more responsive to the needs of its citizens.

At times, such ideas work at cross-purposes. We in FAA, however, already have been working both side of that street, and successfully, too. The Aviation Review Conference is now eight years old, and during that period, the idea of consulting regularly with industry and the public has been expanded to include "Listening Sessions" and other specialized meetings. In 1974, we held our first Biennial Airworthiness Review Conference, and a year later, our first Biennial Operations Review Conference. We not only have listened at these meetings but responded with numerous changes in our rules and regulations, policies and programs. Among them was the criterion for establishment of control towers at low-activity airports. Based on strong sentiment against the installation of these towers because of the expense to aircraft operators to equip their planes for communications and to the government to build and staff them, FAA will build only one-third of those originally planned over the next 10 years.

I think it's apparent that economic and environmental pressures will continue to intensify, requiring us to manage our resources even more efficiently. We need to build and expand on what we already have and analyze critically the cost-effectiveness of new and upgraded programs. Imagination and creativity will continue to be in demand, but ideas that look good on the drawing board will have to fly before the FAA buys.

It all means a different philosophy of planning and programming than most of us have been used to, and it's a good thing, too. We're here to serve and manage our common pocketbook. The dollar we save very well may be one less tax dollar we'll have to pay.

*John L. McLucas*

**JOHN L. McLUCAS**  
Administrator

# FAA WORLD



SEPTEMBER 1976

VOLUME 6, NUMBER 9

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### The cover:

The metrics are coming; the metrics are coming! The United States is committed to converting to the decimal system of measurement, and Americans might just as well get immersed in the metric way of doing things. The story on page 4 explains the rationale behind the metric system and how to use it.

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# metrics

## are on the way



**D**id you ever think about the problem of multiplying feet and inches—say, two feet, eight inches by 10? First, you've got to convert to inches, multiply and then divide the product by 12. Why, just thinking about it is exhausting.

But even now, if we're dealing with two dollars, eight cents (\$2.08) instead, multiplied by 10, all we have to do is move the decimal point, and it comes out simply as \$20.80. This is because dollars and cents make sense and feet and inches, not to mention yards and miles, just don't.

The critical difference between these two problems is that our monetary system—like our mathematics in general—is based on the decimal system: on

the number 10 and its multiples and divisions.

However, the so-called customary system of measurement is based on a hodge-podge of apparently arbitrary measurements.

For a starter, take the foot: We must divide by 12 to get an inch, or multiply by 5,280 to get a mile or multiply by three to get a yard, which, in turn, we multiply by 1,760 to get a mile or divide by 36 to get an inch. And when we finish with all this, we can consider the gallon which we multiply by anywhere from 31 to 42 to make a barrel or divide by four to make a quart, which is then divided by two to make a pint, and this is divided by 16 to make a fluid ounce.

To straighten out this mess and get in step with the rest of the world, the

United States is going to the trouble and expense of changing to metrics. In a decade or so, we're going to convert principally because of the system's simplicity.

So let's take a look at the logic of metrics for a moment. We start with the meter and divide by 100 to get a centimeter or multiply by 1,000 to get

a kilometer, and that's that. For volume measurements, begin with a liter and divide by 1,000 to get a milliliter. For weights, the gram is the basic unit; one thousand grams is a kilogram and one thousandth of a gram is a milligram.

Of course, changing to a new system, regardless of how simple it is, will

## CUSTOMARY AND METRIC EQUIVALENTS

### LINEAR

1 centimeter = 0.3937 inch  
1 inch = 2.54 centimeters  
1 foot = 0.3048 meter  
1 meter = 39.37 inches  
1 yard = 0.9144 meter  
1 kilometer = 0.621 mile  
1 mile = 1.609 kilometers  
1 nautical mile = 1.852 kilometers

### AREA

1 acre = 0.405 hectare  
1 hectare = 2.471 acres  
1 square centimeter = 0.155 inch centimeters  
1 square foot = 0.092 square meter  
1 square meter = 1.196 square yards = 10.764 square feet  
1 square yard = 0.836 square meter  
1 square kilometer = 0.386 square mile  
1 square mile = 2.5888 square kilometers

### VOLUME

1 cubic centimeter = 0.061 cubic inch  
1 cubic inch = 16.387 centimeters  
1 cubic foot = 0.028 cubic meter  
1 cubic meter = 1.308 cubic yards  
1 cubic yard = 0.765 cubic meter  
1 milliliter = 0.03 ounce  
1 ounce = 29.565 milliliters  
1 pint = 0.473 liter  
1 liter (liquid) = 1.057 quarts  
1 quart (liquid) = 0.946 liter  
1 gallon = 3.785 liters

### WEIGHT

1 gram = 0.035 ounce  
1 ounce = 28.350 grams  
1 kilogram = 2.205 pounds  
1 pound = 453.592 grams

liter. Again, one kilogram is a little over two pounds (one kilogram equals 2.2 pounds).

As we go metric and think metric, our standard sizes will change to metric. The one quart bottle will become the one-liter bottle. We'll pick up two liters of milk and half a liter of cream at the grocery.

There'll be other changes, too, which are easy to remember. Freezing will be at zero degrees, which makes good sense. The boiling point of water, instead of an odd 212 degrees Fahrenheit, will become an easy-to-recall 100 degrees Celsius (formerly called Centigrade).

For good reason, the swing to metrics is being pioneered by big manufacturers, especially those competing in foreign markets. General Motors, IBM, International Harvester and Caterpillar Tractor are already shifting to metrics. Ford is also a leader. In fact, the engines powering both Pintos and Mustangs are designed entirely in metric measurements.

The reasons these industrial mammoths are anxious to change is primarily economic, for its use will ultimately reduce design costs. Many of these firms are already using metrics in their overseas operations, and a switch at home would make all parts interchangeable. Another important consideration is that worldwide consumers are more and more often insisting on hardware built to metric specifications. Supporters of the metric system estimate that the switch could mean an increase of \$500 million a year in foreign sales.

Now, let's take a look at some of the problems involved, aside from those we might run into at the grocery store or gas station. The cost of conversion is estimated variously at between \$5-10 billion. This sounds like a lot to pay for new scales, yardsticks (oops) metric sticks and measuring tapes. But, of course, much more is involved than that. Manufacturers, specifically, will have to replace or convert machines to metric specifications, and machines making machines to metric specifications will have to be purchased or modified.

Just the cost of replacing dials and

take some getting used to. At first we'll have to mentally translate metrics into our old, clumsy, but familiar, system. Let's see, a 100-kilometer trip on the freeway — that's 62 miles — at 98 kilometers an hour—that's 60 miles an hour. Now, gas consumption is 20 miles to the gallon; that's 32 kilometers to four liters.

In the beginning, we can get familiar with various similarities between the two systems. For example, a meter is just about the same as a yard (one meter equals 1.1 yards). Therefore a foot is about one third of a meter. A liter is about the same as a quart (one liter equals 1.06 quarts). And, it follows that the pint is about one half a



gauges will be considerable. Take the three standard aircraft instruments: the altimeter, air-speed indicator and vertical-speed indicator. The altimeter for an air-carrier aircraft goes for \$4,000 to \$5,000 each. When you total up the cost of replacing just these three instruments aboard the country's entire aircraft fleet, you come up with a nice round \$164 million.

This is one reason why the country is not switching to metrics overnight. Some of the costs of conversion can be minimized by new planes being equipped with instruments having both metric and customary scale cards. But in some cases this is easier said than done. The altimeter poses a bit of a problem. Since it has more than one pointer on the face, simply changing the values of the scale could get pretty confusing.

Maybe, like the hundred-yard football field, the altimeter, scaled as it is in feet, will be with us for some time.

Indicated air speed, on the other hand, could quite easily be produced with dual markings. This is already happening in the auto industry. New cars are coming off the production line with speedometers that are scaled in both miles and kilometers per hour. New York State law will require that all autos built after Sept. 1, 1980, and registered in the state have speedometers showing both miles and kilometers per hour.

Increasing the use of the metric system in the U.S. is stated as a national policy in the Metric Conversion Act of 1975. This act, signed by the President last December 23, sets up the U.S. Metric Board, which will coordinate national policy and help set up public education programs.

At FAA it's official, too, but still in the study stage. Flight Standards, one of the services most intimately involved, is "playing a waiting game." Coordinator Charles Maple explained, "Metric measurements are legal in this country, and we will accept metric designs. But as far as overall policy is concerned, we will follow the lead of industry. As a service organization, that's the appropriate thing to do."

The Air Traffic Service is consider-

ing the safety implications of the conversion. Their primary concern is that a pilot in a clutch situation would not have time to convert from one system to the other. As they see it, conversion would involve a mammoth re-education program for airmen and controllers. Also, all the rule books, including handbooks, Federal Aviation Regulations and charts would have to be re-written.

The Airports Service, on the other hand, is going ahead with the change. The engineering division is putting metric units and customary units in all standards for airport design and construction. Runway lengths and widths are expressed in meters as well as feet, while the thickness of the pavement is being written in centimeters as well as inches. By the same token, the bearing strength of runways and taxiways is being written in kilograms and pounds.

So, how much is two feet, eight inches? Metrically, it's 81.28 centimeters. Multiply this by 10 and it comes out eight meters, 12.8 centimeters, or 8.128 meters, which is a nice, easy way of doing things.

—By Theodore Maher



## THE MENTAL MINUTE

By Henry T. Hettger, Office of Personnel and Training

IF

A and B working together can do a job in 4 days and  
B and C working together can do a job in 6 days and  
A and C working together can do a job in 8 days,

THEN

How long would it take to do the job if A, B and C work together?

Answer on page 14

# FEDERAL NOTEBOOK

## THE LAST PAY PICTURE

As this column goes to press, the last before implementation of some sort of pay increase, the picture remains clouded. The President's advisers have recommended a weighted increase averaging 5.16 percent. Lower grades would get a lower percentage and higher, higher. Most unions that comprise the Federal Employees Pay Council have countered with an across-the-board 6.7 percent with a phase-in of weighting. One Union is seeking the amount of the increase denied last year plus this year's full comparability, less the 2 percent from expanding the wage survey--or, a total of 8.2 percent. ■ Some pundits see the handwriting on the wall for within-grade increases, regardless of the election's outcome. The automatic 3 percent increases are seen by many critics as incentives not to be exceptional, since 97 percent of all employees get them, and as superfluous because of the Pay Comparability Act.

## THE KICK IN THE PENSION

With claims that Federal retirees have received a larger percentage in raises than active workers and more than the increase in the cost-of-living, the 1 percent kicker on annuities seems moribund, despite a House defeat of a bill to repeal the kicker. The bill was brought to the floor for a quick decision under a rule that required a two-thirds vote. However, the vote was 238 to 143, a clear-enough majority for when the bill returns under normal procedures. Rep. David Henderson (NC), chairman of the House Post Office and Civil Service Committee, says the kicker has boosted annuities 72 percent

since 1969, while the cost of living has risen only 56 percent. He would like to see the kicker replaced by quicker cost-of-living adjustments and quicker checks.

## NEW FRIEND IN COURT

If Congressional majorities remain as they are, with the retirement of David Henderson, the new chairman of the House Post Office and Civil Service Committee is expected to be Rep. Morris Udall (Ariz). Sen. Gale McGee (Wyo) is expected to be re-elected and retain his chairmanship of the Senate Civil Service Committee.

## WATCHDOGGING

Blue Cross-Blue Shield is reported to be planning to examine future claims more closely. Thomas Tinsley, director of the Civil Service Commission's Bureau of Retirement and Insurance, suggests careful examination of contracts for their exclusions, questioning doctors and hospitals on the "medical necessity" of procedures or services they order, making sure that lab tests and X-rays are done on an outpatient basis when possible and being cautious about ordering special-duty nurses. ■ In case you think the introduction of the bill to revise the Hatch Act--which failed to become law--indicates a relaxed attitude on the subject, CSC has stated that vigorous enforcement of the law will continue.

## BACK PAY BACKED

The General Accounting Office has decided that employees who are detailed to higher-grade jobs for more than 120 days or who are improperly denied promotions are entitled to back pay. It doesn't apply to improper job classification.



Medical illustrator Betty Gatliff shows the placement of rubber blocks to determine the proper tissue thickness on a skull in a facial restoration.



The clay face on the left bore enough of a resemblance to the woman on the right to prompt a positive identification by her brother. The eyeglasses were a guess that proved correct; the gray wig was just what was available for a woman of her age, since there was no way of knowing the hair configuration.

## FACES OF DEATH AID POLICE

The photograph of a woman's face in the newspaper appeared with a request for information about her. It brought quick identification from a man who wanted to know where the newspaper had gotten a picture of his missing sister.

The answer was that the picture was that of a clay re-creation over the skull of a murdered woman. The man produced a photograph of his sister that showed a remarkable resemblance to the clay face.

This novel reconstruction of facial features was the work of Betty Gatliff, a medical illustrator in the Civil Aero-medical Institute at the Aeronautical Center. Although her basic job is illustrating medical reports, she has never found her 15 years at CAMI dull.

Collaborating with Dr. Clyde C. Snow, CAMI anthropologist, Gatliff has perfected a technique for restoring facial features, based on measurements of tissue thickness at various points over the skull. The technique has been used by a Dr. Wilton Marion Krogman and documented in his book, "The

Human Skeleton in Forensic Medicine."

Gatliff glues blocks of rubber that have been cut to precise measurements to selected points on the skull. Clay strips are then applied to connect the points represented by the rubber blocks and equal to the thickness of the blocks. The spaces are filled in, the surface built up with more clay and the eyes positioned.

A holder of a degree in art with a minor in science, Gatliff next puts her artistic talent to work in the finishing of the surface, shaping the nose, eyelids and lips. In the case of the murdered woman, Gatliff formed the lips to show the distinctive teeth that were still attached to the skull.

While law-enforcement agencies have called on her many times to assist in identifying bodies where no other means of identification were possible, there have been no requests for this technique to be used for aircraft accident victims. Her reconstruction of 20 faces has led to positive identification in all but two cases. Gatliff says, "We

have the capability of helping to identify airplane crash victims, and we hope we'll be called upon to do so in the near future."

Another of her projects has been sculpture in cloth instead of clay. The job was to come up with the right shape for a dummy simulating the body of a six-month-old child.

For many years, research projects had been hampered by the lack of an adequate model to test the reactions of an infant in stress situations. Insufficient, or even inaccurate, data on the protection of small children resulted in inadequate safety devices.

Because of the need for a truly anthropomorphic infant dummy, CAMI's Protection and Survival Laboratory, headed by Richard Chandler, conducted extensive research on the sizes and shapes of babies to work out such factors as the body weight distribution, strength of neck, movement of limbs, etc. Engineering drawings were made and a body developed of leather, lead weights and foam padding.

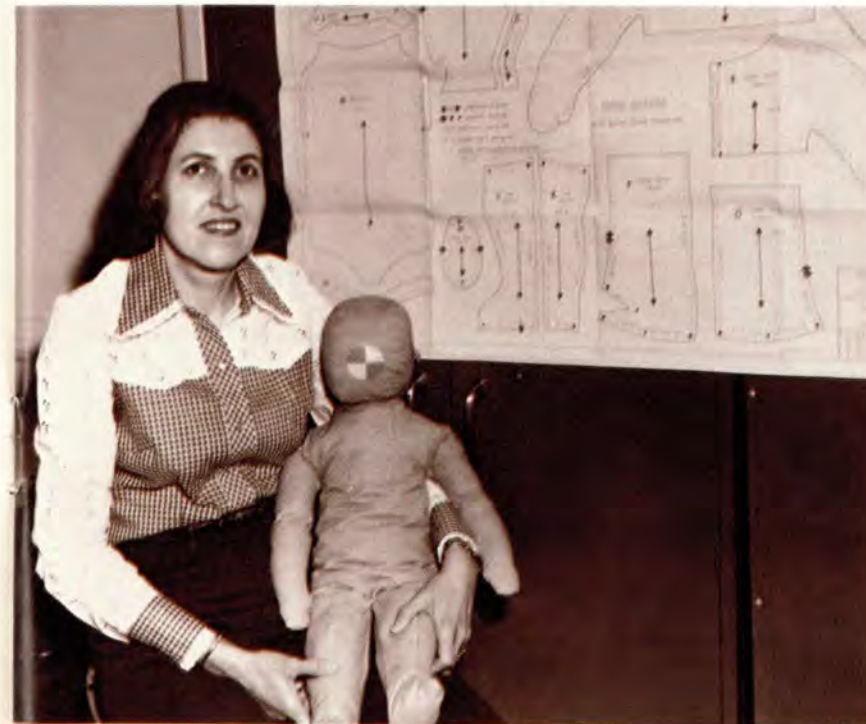
Gatliff then had to design a cover that would give it the distinctive baby shape. "My mother and I sewed up lots of babies before we came up with just the right one," she recalls.

The "right one" is called Mark II, which has been in constant demand for research projects in private industry, as well as government programs. Currently, two major airlines use the dummy in their training programs. The National Highway Traffic Safety Administration uses Mark II for crash-survival testing, and it has been used extensively in CAMI's testing of child-restraint systems.

The patent rights to Mark II are protected by CAMI, the plans having been published in the *Federal Register*. Engineering drawings are available from the Government Printing Office for \$5.00. Using these drawings, several companies are manufacturing and selling Mark II dummies.

One of the not-quite-right baby dummies occupies a place in Gatliff's office, dressed in terrycloth pajamas. "I just can't seem to get rid of it," she says, "so, he just stays here with me."

—By Bobbie J. Mardis



Betty Gatliff holds Mark II, her dummy baby, in front of the full-scale pattern that gives the dummy its baby shape.



# FACES and PLACES



**A FIRST**—New England Public Affairs officer Mike Ciccarelli holds the bell that is the symbol of the Publicity Club of Boston after being elected president of the group, the first time a Federal employee has led the 28-year-old club. Surrounding him are other newly elected officers of the Publicity Club.



**ONE IF BY LAND**—Perched atop their specially made 12-foot tower, Stockton, Calif., tower controllers Joe Abrams (center) and Dick Svinth (right) directed over 400 landings during the weekend of the Calaveras County Fair and Frog Jump Jubilee in Angeles Camp, Calif.  
Photo by B. Storey, CAP



**MAN IN THE MOON**—Astronaut Neil Armstrong, the first man to walk on the moon, spoke at the dedication of the new Johnson County Airport tower near Kansas City. Central Region Director C. R. "Tex" Melugin (right) also spoke at the ceremony.



**HISTORIC FOR HANDICAPPED**—Double amputee Arthur Zervas became the world's first paraplegic to earn an FAA pilot instructor rating. On the completion of his checkflight, Zervas was interviewed and filmed by a newsmen, as FAA safety inspector Donald Muzeroll from Burlington, Mass., disembarked.

**TRAINING PLUM**—Aeronautical Center Director Thomas J. Creswell (left) presents radar instructor Calvin Fox with a notice of his selection for a one-year course in Education for Public Management at Washington State University. He is one of only four in the agency chosen for this program. A 150 Program graduate six years ago, Fox has continued his education with Directed Study Courses.



**PVD DOCTOR**—John Aschenbach adjusts a new cathode-ray-tube tester that he and Phil Gustafson developed at NAFEC for testing plan view displays for ARTCCs. It checks the tube and the circuitry and can be modified for terminals.



**TOP FACILITY**—Raymond G. Belanger, Director of the Air Traffic Service, presents the National Air Traffic Facility Award for 1975 to Lyle H. Wicken (right), chief of the Minot, N.D., FSS, for the station's high degree of operational efficiency.



# 40 Years and 7,000 Planes Later...

**I** did everything a poor farm boy could do—cleaned the planes, mowed the grass, carried cans of fuel. Just one look at an airplane, and I knew that was the end of farming for me. . . .”

His story unfolds like those of so many other boys growing up in the golden age of aviation. An unbroken love affair with flying . . . an adventuresome, record-breaking flight to show the public a young industry’s “mastery” of the air . . . and a 36-year career of dedicated service to CAA and FAA.

Ken Kress was just entering his teens in Lock Haven, Pa., when Charles Lindbergh flew into the pages of history. In two ways, at least, the young aviator and the young lad were very much alike. Both grew up as “country boys” on farms. Both were

struck with the beauty and adventure of flying at an early age. If Kress had been a young man and not a young boy in the spring of 1927, he admits that he might well have joined the daring pioneers who gathered at Roosevelt Field on Long Island to make separate attempts at the New York-to-Paris flight.

Instead, almost exactly 11 years later, he set off on a non-stop flight from Newark, N.J. to Miami and back to publicize the virtues of the Piper Cub. Like Lindbergh, he succeeded on his first attempt.

Today, Kress is chief of the Baltimore General Aviation District Office. With the responsibility for overseeing the safety standards of 35 flight schools, 33 air taxis, 11,000 pilots, 2,500 aircraft, 37 repair stations and 950 flight instructors, Kress keeps his finger on the vibrant pulse of everyday flying by ordinary people—the kind of flying he did so much to promote when he worked for the Piper Aircraft Corp. in the late 1930s.

“Things have changed a lot since the Thirties, of course,” Kress observed. “But there’s still the same feeling of mutual interest and concern for safety—a personal touch, really—that runs through aviation people.

“One of our big jobs in the early days was encouraging pilots to be ‘legal.’ Until the end of 1941, pilots didn’t need Federal licenses if they didn’t fly across state boundaries. Afterwards, we had to bring them all into the fold.

“Safety . . . of course, that’s the most important thing. Today, FAA has the Accident Prevention Program—a good one, too. But we’ve always been doing that sort of thing. That’s the whole point of the job.

“Aviation has really mushroomed. Product reliability has gone up tremendously. With so many planes in the air, that’s been a great plus for safety.”

Kress had a lot to do with getting those planes into the air. At a time when no one knew for sure if inexpen-

sive small planes could carve out a respectable chunk of the market, Kress single-handedly flight tested an entire fleet of them. That was from 1936 to 1940 when he worked for Taylor Aircraft Company in Bradford, Pa., and then for the firm that took it over, Piper Aircraft Corp. in Lock Haven.

Kress had learned to fly in his hometown, soloing at age 16. Still in his teens, he became a pilot for Bald Eagle Aviation in Williamsport, Pa., before joining Taylor.

In his first two years with Piper, Kress test-flew over 1,200 Piper Cubs, sometimes as many as six a day, strapping on a parachute and taking each one up to 3,000 feet and putting it through a series of stalls, spins, rolls, loops, dives and pull-outs. He never had to use the parachute.

By the time he left Piper, Kress had Airline Transport Pilot and Airframe and Powerplant ratings. He also had flight tested, by his own estimate, some 7,000 Cubs. That’s a one-man record for a number of airplanes flown, which undoubtedly still stands.

In April of this year, Kress was reunited with—it’s difficult to believe—the first Piper Cub he ever tested and the first one, in fact, to roll off the new company’s production line in 1937. Parked near that first plane was the 100,000th Piper Cub. The occasion was “Heritage of ’76,” a ceremony held by Piper in Lock Haven, with Kress among the specially invited guests. The first Cub was “discovered” in Pittsburgh where a businessman had restored it.

Jockeying those Cubs back in the late ’30s was good work. But finally, Kress says, “I had enough of flight testing. There was no future in it. So in December 1940 he signed on with a bigger company that also offered steady work as well as a challenging career: the U.S. Government, Department of Commerce, Civil Aeronautics Administration.

He began his career as a flight operations inspector at the Des Moines GADO, moving in 1942 to the Kansas City GADO as acting chief, where he worked closely with TWA in setting up the airline’s transcontinental cargo

operations, which supported the war effort. In December 1942, he went east and set up the Allentown, Pa., district office. In 1958, he took on the job as Baltimore GADO chief.

So just how did he fly a Piper Cub—designed originally for 200 miles—over a 2,420-mile non-stop route in 1938? Extra fuel tanks helped, but that wasn’t the entire solution. Inflight refueling was the only way to do it—but not the kind of refueling common today, with two airborne planes and a fuel line stretched between them. Instead, the “tanker” stayed on the ground while the Cub flew overhead. The tanker was an automobile with a man strapped to the front holding a five-gallon can of gasoline. The airplane slowed to 50 mph, matching the car’s speed as it drove down an airport runway. Kress’ co-pilot, Glenn Englert, dropped the end of a rope to the car 20 feet below, and the man clutching the can attached it to a hook on the rope. Up came the can, and sometimes sandwiches and coffee as well, and the fuel was poured into a special fuel line leading from the cockpit to the plane’s gas tank.

Kress and Englert ran into a lot of

bad weather, but they pushed their way through or around it and made a safe flight back. Unfortunately, no one at Newark turned on the airport lights, so the weary crew was forced to land their little plane in the dark. Total time in the air was 63 hours, 54 minutes; total distance, including detours around weather, was better than 3,500 miles—two new records for a non-stop flight. Ken Kress, Glenn Englert and Piper had proved the Cub was a hardy craft; sales were strengthened accordingly.

The now well-known young flier had received offers from business when he made his decision to work for the agency. He looks back on the choice with pleasure. “I’ve made some goofs in my life, but joining CAA wasn’t one of them.”

He did, however, agree to at least one private offer. That was in 1938, the year of his non-stop roundtrip flight between Newark and Miami on May 17-19. Several months after the flight he received a telegram. The message was short: “Please advise by collect wire if you will accept \$50.00 to state your preference for Kellogg Corn Flakes.” He so advised. —By Don Braun

*Eastern Airlines lent a hand in planning the flight route to Miami and back. Eastern Captain Albert Duke and Piper pilots Kress and Englert check over details before the historic flight.*



*Ken Kress today, affectionately standing by his faithful stand-by, a Piper Cub. At right, Kress is suited up, complete with parachute, for another in a series of practically endless Piper test flights he made in the late 1930s.*







## Finger-Lickin' Balloon

What is 80 feet long, 68 feet tall, made of 1,200 square yards of nylon held together by two miles of stitches, looks like a chicken, flies without flapping its wings and is certificated by the FAA?

It is \$28,000 worth of modified hot-air balloon that a company specializing in carry-out fried chicken hopes will increase its sales by making people think big about chicken. The promotion took place in several southern cities this summer, with the balloon carrying the advertising symbol of a Louisville, Ky., firm, making hard-to-ignore flights where it could be seen by the most people.

What the FAA certificated, according to Ben Davis of the General Aviation District Office in Atlanta, was "a standard hot-air balloon with two appendages."

The appendages are the head and tail of the chicken, which Mike Adams, also of Atlanta, the builder of the bal-

loon, said are made of the same material as the rest of the balloon and inflated the same way. It all holds 66,500 cubic feet of hot air.

The head is 16½ feet in diameter,

has a seven-foot yellow beak, a red comb rising up four feet and a nine-foot wattle hanging from the chin. The tail, Adams continued, is about the same size as the head, with the tip sporting fabric strips that serve as tail feathers.

As one might expect, when Adams made his first flight in the balloon, drifting along at 5,000 feet, a single-engine aircraft came flying by and then circled the balloon. "I'd sure like to have seen his face," Adams said.

Rising to the occasion, Atlanta GADO test pilot Don Keebler showed up for the FAA test in paisley print pants, in which the dominant figure was a chicken. Keebler tested the craft for controllability, which is relatively simple, "because the only thing you can control about a balloon is whether it goes up or down." He also tested its rate of climb and descent, the controls on the burners and the vents for letting out the hot air.

Keebler finally pronounced the chicken safe, saying it handled just like any other balloon, except that "with that head and tail sticking out, it tends to spin when the wind comes up."

Adams said he thinks the chicken is "beautiful," and he hoped it would be good for business.

"We're looking forward to building a lot more strange shapes," Adams added.

—By Fred Farrar

### Mental Minute Answer from page 6

Place each equation in unit time:

A and B can do 1/4 of the job in a day and  
B and C can do 1/6 of the job in a day and  
A and C can do 1/8 of the job in a day,

HENCE,  $A + B = 1/4$   
 $B + C = 1/6$   
 $A + C = 1/8$

OR,  $2A + 2B + 2C = 6/24 + 4/24 + 3/24 = 13/24$

THEN,  $A + B + C = 13/24 \div 2 = 13/48$

THEREFORE, A, B and C working together can do 13/48 of a job in a day,

OR, one job in  $48/13$  days = 3-9/13 days.

# STRESS AND THE CONTROLLER

## a five-year study of its effect on health

A Boston University medical technician monitors the blood pressure of controller Frank Perrotta while he works at the Boston Center. —Photo by Frederick Layne



Cliff Swanson admits that by the time the five hours are up, the arm with the needle in it is hurting. "Particularly," he says, "when you're moving around a lot. And it's kind of hard not to move when you're working."

But he says it's worth it.

Swanson, a controller at Boston's Logan International Airport, is one of 315 air traffic controllers who are voluntarily participating in a five-year study to determine the effect, if any, that the stress inherent in their jobs has on their health.

And the needle, which is used to take samples of blood at times of varying levels of stress is but a part of the study, which also gets into controllers' state of mind, their relationships with their co-workers, supervisors and families, and overall changes in their health during the course of the study.

The object of the study is not only to see if stress can cause illness in a controller but also if it is likely to do so in any particular type of personality and if such people can be spotted and weeded out before they become controllers.

For the public, says Dr. Robert Rose, the research psychiatrist at the Boston University School of Medicine who is directing the study, it could have a spin-off benefit in the form of a better understanding of what effect job stress in other occupations has on health.

The ground work for the study, for which the FAA's Office of Aviation Medicine is paying \$2.8 million, began Dec. 29, 1972, and the actual testing and interviewing of the controllers began a year later. This phase will end



in July 1977, and Rose and his colleagues will then begin putting the data together. The final report is due in June 1978.

By the time the study is completed, each controller will have been visited on the job 10 times by medical technicians who test for changes in blood chemistry and blood pressure caused by stress.

On five of the visits, they insert a needle in one arm, and every 20 minutes for five hours they draw a small sample of blood and make a note of what the controller is doing at the time. The latter usually deals with how many aircraft he is handling and the circumstances, but it could just as easily be a telephone call from home.

The blood is then analyzed for the presence of two hormones—Cortisol and Prolactin—that the body secretes into the blood in higher levels at times of stress. A high level of these two hormones in the blood means that the controller has a high reaction to stress.

The level of Cortisol is of particular interest and importance in the study, because its frequent presence in the blood can suppress the body's mechanism that provides natural immunity to disease.

On the other five visits, the technicians go through essentially the same procedure. The only difference is that they take the controllers' blood pressure instead of blood samples every 20 minutes. Just as the blood samples show that some controllers produce more of the two hormones than others while under the same level of stress, the blood pressures will show higher in some controllers.

So, Rose and his colleagues will keep a close watch on these controllers to see if they develop chronic high blood pressure or a disease that they normally would have shaken off but didn't, because the body's immunity mechanism was suppressed.

In addition, the controllers send in monthly reports on their physical and mental health. And once every nine months, the controllers come into the study's headquarters at the School of Medicine for a complete battery of physical and mental tests.



Study coordinator Mazie Anckle briefs New York Center controller Frank Mulvihill on how the computer eliminates all data that would identify him with his test answers.



New York Center controller Gerald Potter answers questions in computer-run psychological tests by punching a keyboard on a CRT terminal.

This includes a review of a controller's medical history for the last nine months, a complete physical examination, a wide range of blood tests, an interview with a psychiatrist and a series of psychological tests designed to ascertain the controller's state of mind and his relationships with co-workers, superiors and family. These are administered by a computer, with the computer flashing the questions on a screen and the controller punching his answers into a keyboard. The computer selects follow-up questions on the basis of the controller's answer to previous questions.

The answers are coded so that only the computer knows who answered what. Once the results are entered into the data bank, any identifying links with the controller are obliterated.

Two of the controllers—Gerald Potter and Frank Mulvihill of the New York Air Route Traffic Control Center—were in the study's spartan but comfortable headquarters recently for their latest nine-month tests and talked about the study.

Potter, an FAA employee for seven and a half years and the father of three boys, said he was taking part because "I think it would be good for the FAA to know just how much stress there is

Boston Center controller Roger Gauvin looks over at his flight strips, unconcerned with the Boston University medical technician taking a periodic blood sample to detect changes in his blood chemistry. —Photo by Frederick Layne



on a controller. And if there is as much as we think there is, we should let everybody know with concrete proof." He added, "If they find anything wrong with me, it will give me a chance to get it fixed."

Mulvihill, now in his ninth year as a controller, is "fascinated" by the study. "The results should be very interesting," he said. "This is something that should have been done in depth years ago. I don't know which way they will go, but they'll be important no matter what they are."

And out at Logan International, Cliff Swanson said that he is in the study because he thought younger controllers should be represented. "I'd also like to find out if there are any changes physically and mentally," he said.

Dr. Rose, sitting in his book-lined office, which looks out across the Boston skyline, explained his approach. "We know that air traffic control often is a stressful job; other studies have

proven that. What we are trying to do is find out if those that show more stress get sick more and whether we can predict what kind of person is likely to. If so, maybe we can weed them out before they become controllers. This is in their interest as much as the FAA's.

"Or are other factors involved," Rose continued; "something, say, in the way the system works? If so, maybe we can make some changes in the way shifts are assigned, how promotions are made or in the way we manage controllers."

Rose, who has been interested in stress since he was in medical school and who studied it in soldiers in the Viet Nam war, added, "What we find here could have an effect on the general public. Because every job carries with it some degree of stress and the results we get here could have widespread applications elsewhere."

—By Fred Farrar

Research psychiatrist Dr. Robert Rose of Boston University is conducting the study of the effect of stress on controller health.







**Q** What is the status of the bill to permit Federal employees Social Security coverage in addition to Civil Service Retirement?

**A** Once again this year, there is legislation pending on this subject, but observers see it no more likely to be enacted than in previous years. A bill to provide optional Social Security coverage has had hearings. There is also a bill to provide for the exchange of Social Security and Civil Service retirement credits, permitting retirement based on the combination of covered employment, and a bill to place Federal employees under Social Security instead of Civil Service Retirement. Don't hold your breath—the climate isn't right.

**Q** I'm a fairly recent employee of FAA and have just been exposed to what appear to be illogical and inhumanitarian travel policies in my assignment to the FAA Academy for six weeks. Authorized POV (privately owned vehicle) seems to be taboo at NAFEC. Only commercial air and POV constructive cost are permitted. Since the gas shortage has significantly diminished, shouldn't POV be allowed to offset normal family expenses? I even have to use annual leave to drive, since only 1½ days per diem is allowed. On the other hand, I've heard that many areas authorize POV, even though it cannot be shown as advantageous to the government. Shouldn't such travel policies be applied uniformly? On the matter of uniformity, why is an employee taking commercial air allowed taxi fare from the Oklahoma City Airport to his temporary residence, when an employee on POV constructive cost is allowed only limousine service downtown? Finally, does the FAA really expect an employee to stay away from his family for six weeks? I've heard of cases of 21-week separations! How can FAA expect to attract, much less retain, top-notch talent with these ridiculous policies?

**A** NAFEC has not banned the use of POVs. They have determined that driving to the Academy from NAFEC for training does not, in most cases, meet the advantage-to-the-government criteria. Although some regions have issued regional supplements to DOT Order 1500.6, Para. 451, NAFEC has not; nevertheless, any such supplements must support and refine the policy principles. It's clear, however, that different travel situations require different travel entitlements. In determining if the use of a government, private or rental car is more advantageous to the government than other modes of transportation, consideration must be given to the overall advantages and disadvantages, including but not limited to (a) requirements of the assignment, including transporting baggage, tools or equipment; (b) economies or excess costs for transportation, payroll for travel during duty hours and per diem; (c) availability of common-carrier service and adequacy of sched-

ules for timely completion of assignment; (d) temporary duty locality with respect to traffic conditions, routing and weather; (e) location of temporary duty point with respect to location of lodging and meals facilities and the availability of public transportation between these points; (f) economy from having two or more employees traveling in a single car; and (g) the fact that the Aeronautical Center will provide additional bus schedules for students without POV attending classes 11 days or longer. The student service office will arrange for satisfactory housing on the bus route with adequate service facilities for students. Travel policy on POV does not consider the time of separation between an employee and his family. There is no policy requiring separation for training assignments; however, government-wide travel regulations allow reimbursement of only the employee's travel expenses related to training. A household move for purposes of long-term training may be approved when the cost of moving would be less than the total of per diem over the training period. When an employee is allowed to drive a POV as a matter of personal preference, his entitlements are defined through a comparative analysis, which is based on the lowest class of suitable transportation available. Thus, when a limousine service is available, its cost, being less than a taxi, will be a part of the comparative-cost basis.

**Q** According to the Fair Labor Standards Act, employees who work overtime are paid at a rate of one and a half times their regular rate of pay. What about compensatory time off in lieu of paid overtime? Is the rate also one and a half times or only one hour of compensatory time for each hour of overtime worked?

**A** Under both Title 5 of the U.S. Code and the Fair Labor Standards Act, the amount of compensatory time off is equal to the amount of time spent in irregular or occasional overtime; that is, one hour off for each worked. Agency Order 3550.10, Appendix 10, contains detailed instructions on the implementation of the overtime provisions of the FLSA amendments of 1974 and on compensatory-time provisions.

**Q** I am planning on retiring soon, and I have more than 360 hour of "old leave" that was accumulated many years ago. Would I get a lump-sum payment for all of this leave plus the current year's leave—the year I retire—or would I have to take it? How would all this apply on a disability retirement?

**A** Public Law 93-181 provides for lump-sum payments equal to the total legally carried over leave plus the leave accrued in the current leave year. However, you must retire on or before the last day of the current leave year, which ends on Jan. 1, 1977. This is ex-

plained in Federal Personnel Manual Letter 630-22. Disability retirement would not alter this procedure.

**Q** Some employees of the Pacific-Asia Region have complained about the behavior of a supervisor toward subordinates and the absence of any disciplinary action for what they view as personal misconduct.

**A** The very nature of the complaint, dealing as it does with personal antagonisms, places constraints on how much the matter can be discussed here. "Direct Line" should not be considered a channel for airing such matters and charges that might stem from them. Also, there is the consideration of providing adequate safeguards against disclosures that could amount to invasions of privacy. However, we might address the complaint by reaffirming the agency's posture with respect to abusive conduct. The FAA does not condone it; when found, it is to be corrected, if need be, with appropriate disciplinary action. Neither rank nor other aspects of position play any part in deciding on discipline. Higher level, responsible officials could, themselves be disciplined if they knew of clear and serious infractions and failed to act appropriately. Suffice it to say here, there was absolutely no finding of any culpability on the part of the supervisor. Actually, the writers are in error on several of the facts. Exactly what factual circumstances were involved in the case at hand and what considerations were taken into account in deciding its disposition are questions that can be best answered by Pacific-Asia Region officials. We suggest that those who feel aggrieved in the matter present and discuss their feelings with regional officials.

**Q** In my 1975 Class 2 physical examination, the doctor restricted my certificate with the requirement of corrective lenses. I was examined by my own doctor, and he prescribed minimal correction for reading only to the tune of \$86. About a month later, I received an amended medical certificate from the regional flight surgeon with no restrictions. The same occurred in 1976, but this time I had hedged and not spent any money. It seems to me that a grace period should be granted after the exam until the flight surgeon's decision.

**A** Without the medical specifics, we can't provide a definitive answer. However, aviation medical examiners must restrict medical certificates when the examinee doesn't meet the prescribed standards. The authority for granting clearance is held by the regional flight surgeon. It's possible, and intentionally so, that the latter's decision will differ with the private physician's. In the interest of public safety, it's essential that the regional flight surgeon review all borderline or questionable cases. Until such review is made, medical clearance is withheld.

**DEATH & TAXES.** . . . As we approach the fifth anniversary of the infamous D. B. Cooper caper, the wire services have been running stories saying the IRS would like to get its hands on that phantom hijacker as much as FAA and the FBI. According to the news accounts, IRS has computed that Cooper owes Uncle Sam \$218,000 in back taxes on the \$200,000 ransom payment he received in November 1971 when he hijacked a Northwest Airlines jet on a flight to Seattle. Cooper subsequently parachuted into the night and disappeared without a trace. He never even filed a Form 1040. But IRS has told "Small World" that the \$218,000 figure was just something someone had come up with in response to a hypothetical question from an enterprising newsman, and the agency didn't seriously expect to collect any back taxes from Cooper. IRS notes that Cooper probably would go to jail if he were caught and would have no assets to tap after the airline got back what, if anything, was left of the \$200,000 ransom payment. By the way, if anyone is thinking of emulating Cooper, we might mention that many experts believe he perished in that perilous night jump over mountainous terrain. And FAA points out that no one who tried the crime after Cooper ever got away with it. Then, too, there are all those tax problems. . . .

**REMEMBRANCE OF THINGS PAST.** . . . The Southwest Region's Public Affairs Office has published some "Recollections and Reflections" of FAA activities in that part of the country that "Small World" finds intriguing. For example, there's the story about an unnamed controller at the old New Orleans Center who became impatient with the slow rate of climb of an aircraft departing the New Orleans Airport. The impatience showed in his voice and the pilot told the controller that if he wanted the airplane to climb out faster, he would have to do it himself. "Roger," said the quick-thinking controller, not willing to let the pilot have the last word, "Reverse course, clear to the New Orleans VOR, descend and maintain five thousand." That brought an immediate protest from the pilot, who said he was headed for Memphis. "Well," the controller added, "if you want me to fly it, you'll have to come back here." Reportedly, the pilot thought it was almost as funny as the controller did.

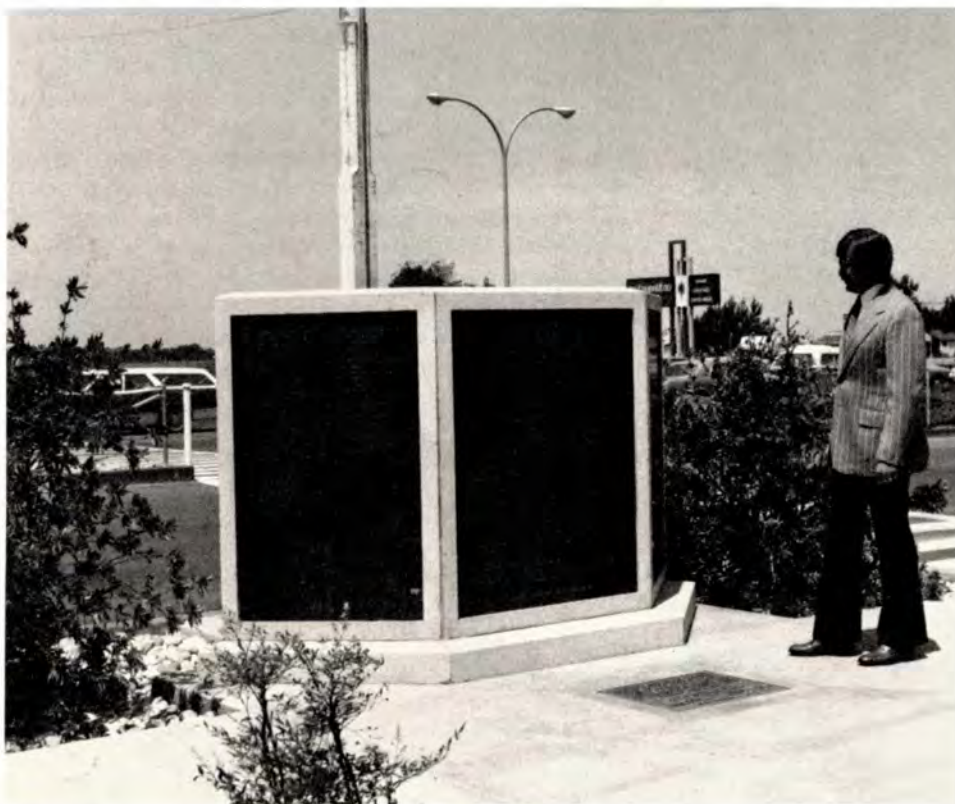
**THE FLESH IS WEAK.** . . . The Salinas, Calif., airport control tower started off the year with all eight employees pledging to give up smoking. By mid-year, seven of the eight were still hanging in there. "Small World" wants to congratulate the seven and offer a word of encouragement to the eighth. Swearing off cigarettes isn't really all that difficult. We've done it two or three times already this year.





AK 99504

## A BELATED HONOR FOR YOU?



Off they went into the wild blue yonder in defense of their country to find fame, honor, death or anonymity. They were the graduates of the Army Air Corps Advanced Pilot School at Stockton Field, Calif., during World War II, now renamed the Stockton Metropolitan Airport.

In the middle of the war, an honor roll was dedicated as a lasting tribute to those pilots who were decorated for bravery in combat, along with a 12-foot-high Cadet Obelisk honoring the cadet classes. With the demolition of the army airfield buildings that had served as the Sharpe Army Depot Annex, the honor roll was moved to the street side of the airport terminal building and the obelisk to the ramp side.

The black granite honor roll lists the names and decora-

tions of 224 graduates cited. Because it was erected in June 1943, many names that should be engraved on the slabs are missing. Ed Harris, chief of the Stockton FSS reports that the airport manager is seeking the names of airmen who trained at Stockton Field during World War II.

He suggests that any FAAers who graduated from the school and who hold one or more of the following citations should contact the airport to have their names added to the honor roll: Congressional Medal of Honor, Distinguished Service Cross, Silver Star, Distinguished Service Medal, Purple Heart, Distinguished Flying Cross, Soldiers Medal or Air Medal and any oak leaf clusters.

Those interested may write to the Airport Manager, Stockton Metropolitan Airport, 5000 South Airport Way, Stockton, Calif. 95206.