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**Palmetto**

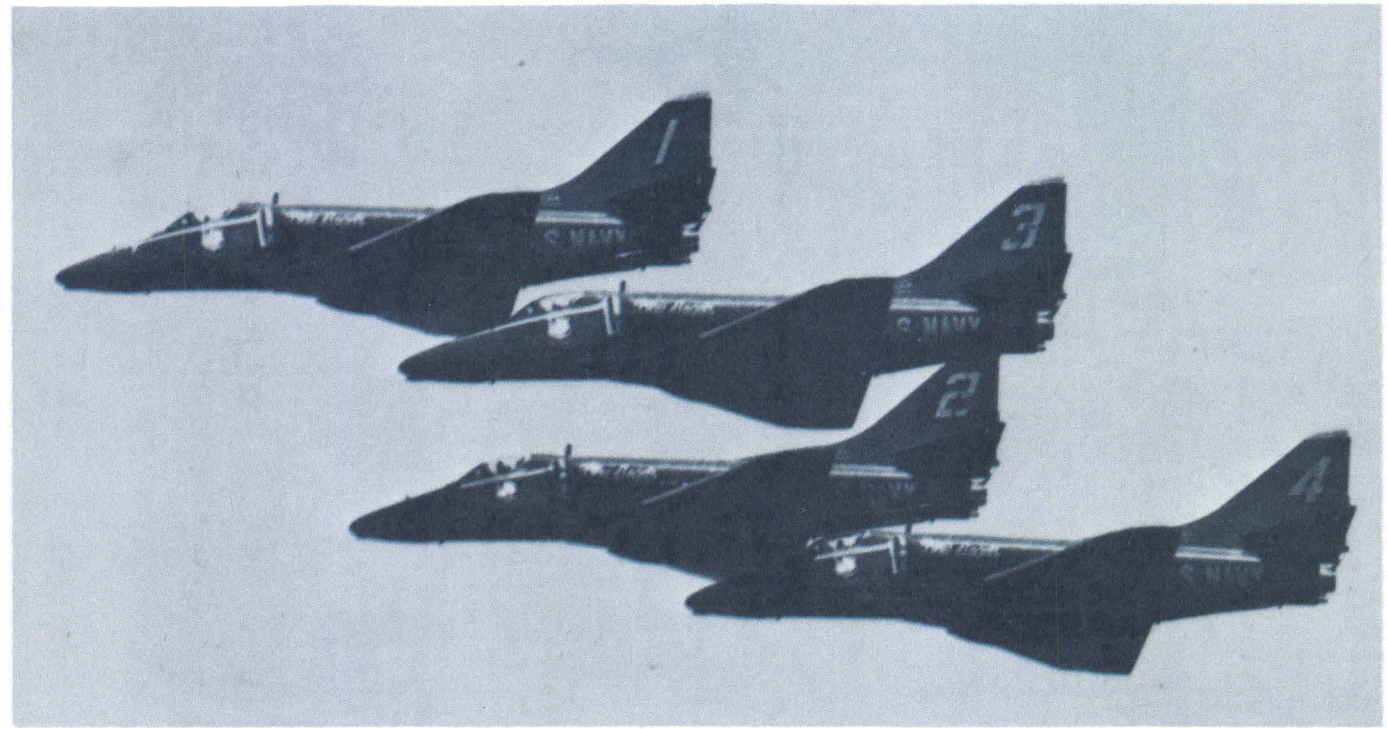
STATE DOCUMENTS

# AVIATION

VOLUME 34, NUMBER 4

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APRIL 1982



**BLUE  
ANGELS  
TO  
PERFORM  
AT  
DONALDSON  
April 10 - 11**

The U.S. Navy Blue Angels, the Army Golden Knights and other aerobatic pilots will perform at a benefit air show Easter Weekend at Greenville's Donaldson Center for the Shriner's Hospitals for Crippled Children.

The shows will begin at 1 p.m. Saturday and Sunday, the 10th and 11th of April. Gates to the industrial airpark will open at 10 a.m.

Also performing during the show will be Bobby Jonte flying a T-6; Kim Pearson flying a Pitts Special and Larry Montgomery of Spartanburg flying a Helio Courier.

In addition to the flyers, there will be a static displays of various Army and Air Force aircraft, and of course, concessions and novelties.

Admission is \$3 per person. All proceeds to to an endowment which supports the Shriner's orthopedic hospitals and burn units.

## Increased engine TBO approved for Arrow IV

Piper Aircraft Corporation has announced that the engine time between overhaul (TBO) for its normally aspirated Arrow IV has been increased from 1,600 to 1,800 hours, providing lower operating costs for owners and operators.

The four-place retractable single is powered by a 200-horsepower Lycoming IO-360-C1C6 engine. The higher TBO will mean an estimated 13 percent reduction in the engine exchange hourly allotment, which is figured as part of total operating costs.

**FAA Proposes  
New Rules For Flight  
and Duty Time  
PAGE 7**



PALMETTO AVIATION is an official publication of the South Carolina Aeronautics Commission. It is designed to inform members of the aviation community, and others interested in aviation, of local developments in aviation and aviation facilities and to keep readers abreast of national and international trends in aviation.

The Aeronautics Commission is a state agency created in 1935 by the S.C. General Assembly to foster and promote air commerce within the state.

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# Airspace system faces radical changes by 2000

The Federal Aviation Administration has released a plan that is expected to significantly change the structure of the National Airspace System by the year 2000.

The National Airspace Review, unlike previous FAA planning documents projecting 10 years into the future, will provide an operational blueprint for the agency for the remainder of the century.

The plan is the product of a nine-month review of the airspace system initiated by FAA Administrator J. Lynn Helms when he took office in March, 1981.

It includes a proposed modernization operation expected to cost more than \$10 billion during the 1980s and less during the 1990s.

A main feature of the plan's ground-based air traffic control network update is the introduction of a new generation of more versatile, faster computers geared toward automation. By 1990, the agency expects this automation to allow reduction of personnel, and a cutback in the number of Air Route Traffic Control Centers (ARTCC) from the present 20 to 16. The New York and Oakland, Calif. ARTCCs would be the first to shut down, with traffic in the New York region divided among Washington, Boston and Cleveland centers. Oakland's traffic would be handled by Los Angeles and Seattle, Wash. centers.

The 188 terminal area control centers would be reduced to about 30 consoles and computers similar to those intended for use in enroute centers.

The number of Flight Services Stations would also be reduced under the plan, from some 300 now to 61.

An FAA official commented on the plan by stating that Helms, who personally made all of the crucial choices, "bit the bullet on several issues that had been crying for top-level decisions

for several years." The agency proposes, for example, to eliminate primary (skin echo) radar for enroute traffic control and surveillance by the year 2000, while retaining airport surveillance radar. Helms, for this reason, proposed that by 1990 all aircraft operating at altitudes above 12,500 feet be required to use a new-generation Mode-S radar transponder, provided with equipment for a two-way data link to cover routine air-to-ground conversations. The NAR plan would require Mode-S transponders to be used on all aircraft operating above 6,000 feet by the year 2000, when primary radar would be phased out.

The Mode-S transponder, formally termed Discrete Address Beacon System (DABS), was originally also expected to provide an Automatic Traffic Advisory and Resolution Service (ATARS), which would give several of the advantages of positive controlled airspace to general aviation pilots flying under Visual Flight Rules (VFR) operating conditions.

But Helms vetoed the agency's earlier plans to deploy a network of ground facilities for ATARS, partly because the new generation of Air Traffic Control (ATC) computers is expected to provide similar service through the Mode-S data link.

The plan proposes the use of a modular "sector suite" display and work console for both hub and enroute centers.

Each individual sector suite will have three large cathode ray tube display units. The first screen will show the traditional plan-view display of aircraft and their positions, each with an accompanying data block to indicate identity, speed and altitude. The second screen will provide an electronic equivalent of flight progress strips. The third will search for potential traffic conflicts. It will also show the outcome of a computer-devised resolution of any arising conflict.

## 'AIRSHOW '82 SET MAY 15

The North American Institute of Aviation in Conway and the Omar Shriners are co-sponsoring Airshow '82, May 15 at the Conway-Horry County Airport.

Many events are planned, including aerobatic demonstrations by Bob Russell, Kim Pearson and Bobby Jonte. There will be static displays of military aircraft, including A-10's from Myrtle Beach AFB and Huey helicopter gunships from the S.C. Army National Guard.

Also sailplanes from South Carolina Sailplanes, ultralights and military sky divers courtesy of the U.S. Army area Recruiting headquarters in Florence.

# AEROSPACE WORKSHOP

## SET APRIL 13th AT TRI-COUNTY TEC

Area educators will have the opportunity to earn three semester hours' credit toward certificate renewal at a special Aerospace Education Workshop beginning April 13 at Tri-County Technical College.

Members of the general public who have an interest in air and space travel and related subjects are also welcome to attend the sessions, which will be held each weekday, Monday through Friday, from 4:00 to 7:00 p.m. through May 3.

Cosponsors for the course, which will be conducted by the United States Air Force, are Tri-County TEC and

## Runway left for Two hours Report says

According to a snow and operations log of the Massachusetts Port Authority, a runway at Logan International Airport in Boston had not been sanded or plowed for almost two hours before a World Airways DC-10 landed in icy rain Jan. 23. The jet, with 210 persons aboard, slid into the Boston Harbor.

The report showed that the runway in question was closed for plowing from 4:30 to 5:36 p.m.

At 7:25 p.m., five minutes before the DC-10 was reported in the water, the log said, "All plowed surfaces wet mostly covered with quarter-inch layer packed snow and ice with widely scattered thin slush patches."

Pilots of aircraft that landed before the World flight had reported braking conditions as being "poor to nil."

Airport officials had said that the runway was to have been closed for plowing and sanding as soon as the World flight had landed.

**The Palmetto Balloon Classic, a gala event featuring colorful hot air balloons in a hare and hound race, sky divers, and antique and experimental aircraft, will be held May 15 in Camden at the Carolina Cup Race Track. See next Month's issue for details.**

Anderson County School District Four.

Subjects studied will include the theory of flight, weather, navigation, communication, history and trade in addition to the economic, social and political implications of space.

Instructors for the workshop will be active and reserve officers of the U.S. Air Force; director for the school will be Royce M. Melvin, aerospace education officer for the Anderson Composite Squadron of the Civil Air Patrol and an instructor for the past 14 years at Tri-County TEC.

Enrollment will be limited to the first 45 persons applying and paying the \$50 registration fee.

For more information regarding the aerospace workshop, or to enroll, interested persons should contact the office of continuing education at Tri-County Technical College by calling one of these toll-free numbers: Anderson County - 225-2250; Oconee County - 882-4412; Pickens County - 859-7033 or Clemson-Pendelton-Anderson - 646-8361.

### Breakfast Club



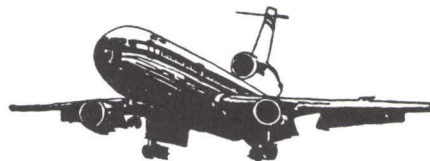
The S.C. Breakfast Club will meet at the following airports in March, April and May:

**Apr. 18** Greenwood Airport

**May 2** Greenville Downtown Airport

**May 16** John's Island

Those attending should plan to arrive before 10 a.m. Breakfast is usually from 10 to 11 a.m. □



## AVIATION CALENDAR

- April 10-11 Blue Angels, Golden Knights at Donaldson Center, Greenville, S.C. to benefit Shriners Hospitals for Crippled Children, \$3 admission.
- April 17-18 Annual Stearman fly in, Clio, S.C. open to all: experimentals, warbirds, factory builds. Contact: Sherman Hanke 586-9225.
- April 20 FAA Safety Seminar, Greenwood Airport, Greenwood, S.C., 7:30 p.m.
- April 27: FAA Safety Seminar, Florence CAP building, Florence, S.C., 7:30 p.m.
- April 30  
May 1-2 EAA Chapter 3 (Antiques and Classics) spring fly-in, Statesville, N.C.
- May 6 FAA Safety Seminar, Bert Bristol's Home, Landrum, S.C., 7.30 p.m.
- May 15 Palmetto Balloon Classic featuring hot air balloon race, sky divers, static displays; Carolina Cup Race Track, Camden, S.C. Contact: Patsy Lewis 432-8133
- May 15 Airshow '82 co-sponsored by the Omar Shriners and North American Institute of Aviation. Conway-Horry County Airport, Conway, S.C. Contact: Stan Frie (803) 397-9111.
- May 16 Cheraw Air Show, Cheraw, S.C. Contact: Jonas Whitley 537-9626.

# HOW DO PILOTS READ ALTIMETER?

The following article, which focuses on how and why pilots read or misread altimeters, was written by Richard Clarke and appeared in the August, 1981 issue of the Flight Safety Foundation's Accident Prevention Bulletin.

A variety of altimeters has been developed over the years to provide pilots with the ability to read out altitudes more rapidly and precisely.

Most have represented improvements based upon lessons learned. Some have been derived primarily through the application of information gained in scientific studies.

A recent U.S. National Aeronautics and Space Administration (NASA) paper on "How a Pilot Looks at Altitude" suggests ways of making altimeter displays clearer and more easily interpreted.

In the paper, Amos Spady, Jr., and Randall Harris, Sr., of NASA's Langley, Va., Research Center, focus on problems in interpreting the drum pointer altimeter. Research by Spady, Harris and others indicates that a misreading of altimeters may have been experienced or observed by a majority of airline pilots. Of the 167 airline pilots participating in one study, 137 reported having misread their aircraft's drum pointer altimeter.

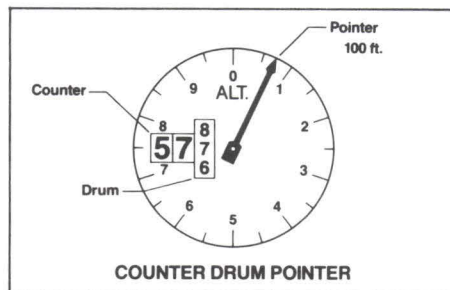
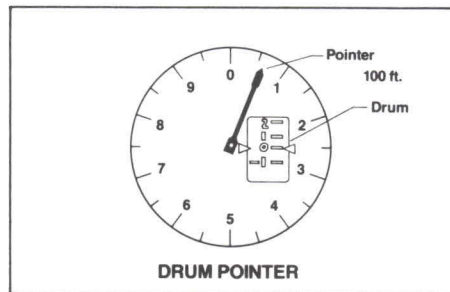
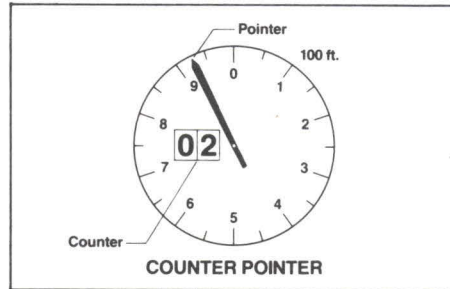
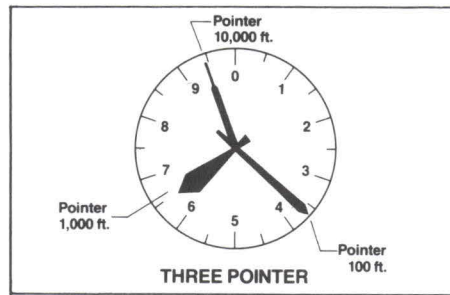
Fifty reported that the misreadings occurred during approach to a runway because of workload demands.

## MISREADING HAZARDS

Altitude is of most concern to the pilot when the aircraft's altitude is, or could be, changing, including both climbs and descents.

During a climb, a misreading of altitude can result in an inconvenience when a pilot arrives at a wrong altitude. The error can result in a violation of air traffic control (ATC) directives or, in the worst case, an unsuccessful test of the "big sky" theory of collision avoidance when two aircraft try to occupy the same space at the same time. Either case is a matter of probability — a gamble.

During descents, the same gambles are present, but one other element plays a part in pilot concerns—the ground. The possibilities of flight violation or mid-air collision are abstract values pilots consider in carrying out their jobs. This is in contrast to the very concrete value of the earth below.



For this reason, pilot awareness of altitude is likely to be particularly intense when the aircraft is descending. Misinterpretations of altitude in a descent can be literally dramatic in their impact.

In the studies conducted by Spady and Harris, pilots rated the altimeter as the third most important flight instrument, ranking behind the flight director and the airspeed indicator. Altitude was considered critical enough by the pilots studied that some estimated that 20-25% of their time during approaches was spent checking the altimeter.

Through observation, Spady and Harris concluded that these same

pilots actually spent 3-6% of their time referring to the altimeter. The two researchers concluded, however, that the contradictory figures probably do correlate.

Key to this conclusion is a statement by a U.S. National Aeronautics and Space Administration test pilot that, "On the glideslope, the altimeter is all but relegated to a backup mode. My sources of information are, first, the raw glideslope data; second, command bars, and, third, where present, co-pilot callouts."

## DEGREE OF CONCERN

His description reinforces the idea that altitude information may be 25% of his concern during an approach, even if the altimeter does not occupy 25% of his instrument scan. During an approach, the glideslope, flight director, vertical speed and passage of time all provide altitude cues to a pilot that permit him, or her, to diminish the frequency of altimeter scan.

Use of the altimeter as cited above should not suggest any lack of importance of the instrument. Lapses of pilot awareness of approach progress can be resolved by information on the altimeter. This is one reason why the co-pilot is required to call out altitudes.

All else failing, a quick glance at the altimeter, and the correct interpretation of it, can mean confirmation that all is well or that it is time to abort an approach.

Division of attention during approaches probably reduces the time spent looking at the altimeter to 3-6%. This observation is reinforced by the statement of a perceptive pilot that, "Misreads seemed to always occur at the lower altitudes when attention is split between more activities."

Spady and Harris, in discussing pilots' altitude awareness, conclude that "the pilot has a running time (mental) history. Consequently, he has a prior knowledge of what to expect when he looks at the altimeter and, therefore, does not have to read the entire altimeter each time he looks at the instrument."

This, in addition to indicating the need for clarity of altitude information, could be a key element in many accidents. If a pilot concentrating on the flight director becomes distracted, time sense and the resultant lack of sense of altitude relative to the ground may be lost. If the co-pilot also is preoc-

## PILOTS - BE ALERT DURING EXERCISE

Ninth Air Force, headquartered at Shaw AFB, will conduct a military training exercise in the Savannah--Ft. Stewart, Ga. area from 7:30 p.m. April 19th through 1 p.m. April 23rd.

The operation, "Quick Thrust 1-82," is designed to test aircrews in a realistic battle environment. Pilots will have an opportunity to practice tactics necessary to penetrate and destroy highly defended targets similar to those they might face in a conflict in Europe or the Middle East.

Over 900 sorties will be flown during the five-day exercise, including approximately 650 high speed, low altitude sorties by A-7 Corsair II's, A-10 Thunderbolt II's, RF-4 Phantoms, F-15 Eagles, F-16 Falcons, F-105 Thunderchiefs and F-106 Delta Darts.

These missions will be supported by numerous O-2 Cessna Skymaster forward air controller sorties, Army and Air Force helicopters, EC-130 airborne command, control and communications aircraft and KC-135 tankers.

The low altitude activity will occur in both published routes and areas and in airspace not normally used for such activities. Ten temporary Military Operating Areas (MOA's) have been developed for the exercise (see map): Stewart I is the largest and extends from 100 feet AGL to 14,000 feet MSL. This airspace will be used for intercepts and transition to target areas in the Ft. Stewart restricted area.

MOA's E, F, G and H have been established above and below existing Stewart A, B, and C MOA's. Two MOA corridors or tunnels, "M" and "N" have been established to connect I with the existing W-157A warning area off the coast. Two shelves, "L" and "J" and a low level entry/holding area, "O" round out the temporary MOA's.

Most aircraft will be entering and departing the exercise area at designated entry/exit points named after fruits. Some aircraft will be entering the exercise via VR routes 94, 1001, 1002, 1003, 1004.

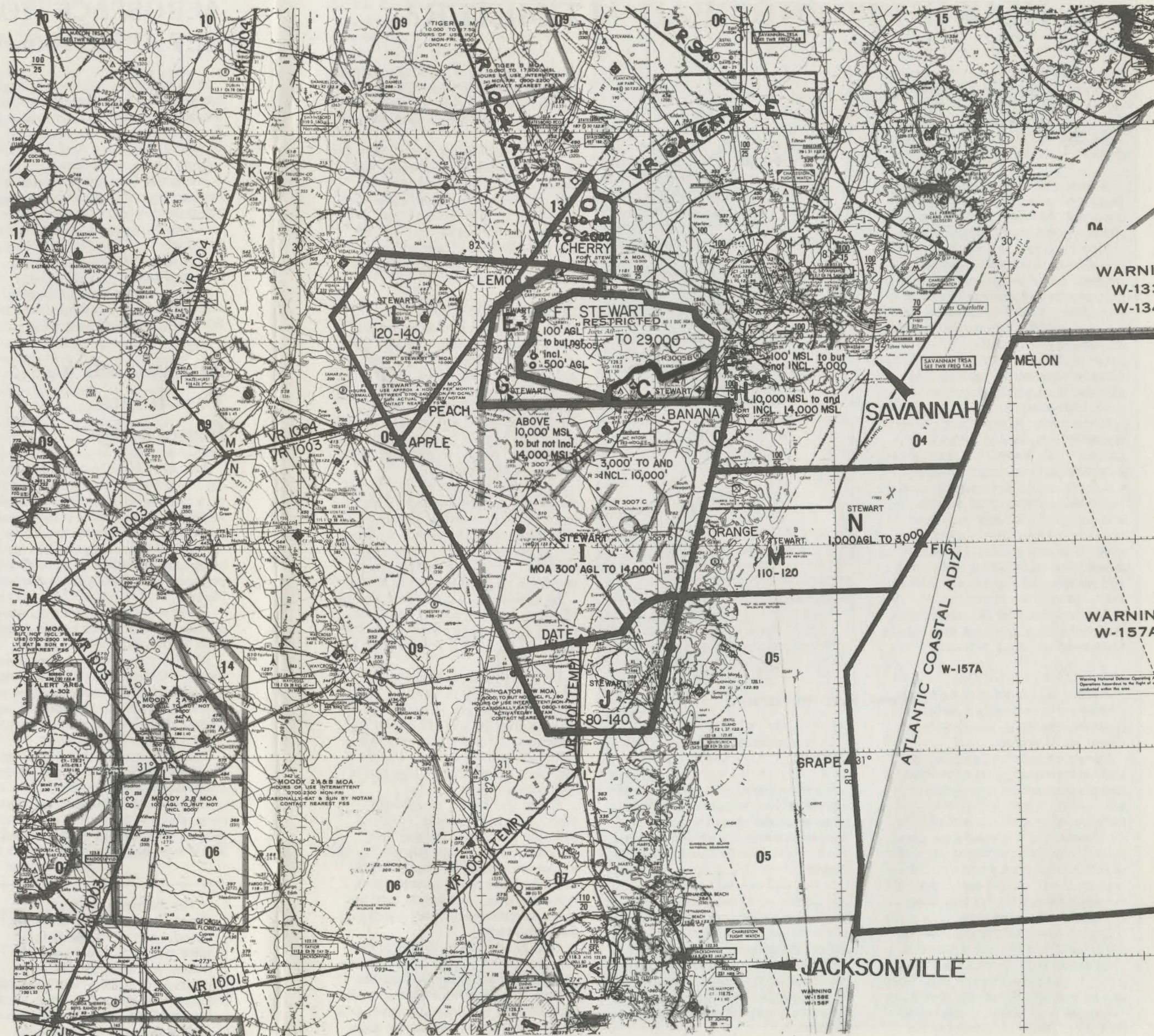
The area of greatest activity will be the "I" MOA south of Ft. Stewart and in and around R-3005 at from 300 feet AGL up to but not including 14,000 feet MSL.

In this area, high speed aircraft will be performing ground attack maneuvers with pop up tactics as well as intercepts and support missions. Area W-157A and "M" and "N" corridors will also have significant activity: aircraft rendezvous, aerial refueling, intercepts, Dissimilar Aerial Combat Tactics (DACT) which involve rigorous high performance "dog fight" maneuvers and simulated raids on participating U.S. Navy ships.

Although none of the exercise airspace is restricted from general aviation use under VFR conditions, the nature and volume of activities scheduled during the week for this exercise should certainly be considered when planning your flights. In the interest of flying safety, extreme caution should be used when flying in the vicinity of this exercise.

### FSS Locations Picked

Terre Haute, Ind., and Green Bay, Wis., are the first two locations to be selected competitively as sites for automated flight service stations under the agency's FSS Modernizations Program. Construction of facilities at these locations is expected to get underway this spring. In all, 61 automated FSSs are planned under this program. Two of the, Cleveland and Denver, will remain at current locations. The other 59 are to be provided by local communities and subsequently leased to FAA. The agency plan calls for communities to compete against each other to secure the location of the stations. Eventually, the existing 317 flight service stations will be consolidated into the 61 facilities. These will initially be staffed by approximately 50 employees each, but this number will gradually be increased to about 80.



cupied, the situation becomes worse.

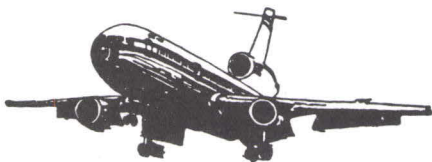
Spady and Harris suggest that altimeter interpretation is strongly influenced by the pilot seeing what is expected to be seen. This is confirmed when one compares altimeter scan dwell times. In one test that only required pilots to accurately read altitudes from an altimeter, the pilots' eyes stayed on the altimeter for an average of 1.38 seconds. Yet, in another test which required pilots to fly an approach and read an altimeter, the dwell time was between 0.3 and 0.4 seconds. In such a short time, pilots do not read what the altimeter shows, they read part of the information and infer the rest.

#### ALTIMETER SCAN TIME

In testing pilot scan of drum pointer altimeters, Spady and Harris found that the pilot used the 0.3 to 0.4 second dwell time to gain information such as the orientation of the needle. The ILS approach flown in the simulator study took approximately three minutes to execute, during which the altimeter needle was on the left side of the altimeter for about one fourth of the time. Despite this, the pilots in the study spent about 48% of their altimeter dwell time looking at the left side of the instrument. Spady and Harris feel this indicates that altimeter design should favor display of information on the left side.

As to clarity of information, Spady and Harris feel that the small window displaying the altitude text on a drum pointer altimeter, which is covered by the needle during part of its arc, adds difficulty to the task of altitude interpretation. In their study, reading of the information in the window took 0.5 to 0.6 seconds, almost double the time required for typical altimeter readings.

Based upon their studies and experimental work, Spady and Harris favor altimeters that provide drum or counter/drum information on the left side, utilize narrow pointer needles, which do not obscure digital information on the drum, and utilize larger digits on the drum.



## FAA PROPOSES NEW RULES FOR PILOT FLIGHT, DUTY TIME

FAA's new flight and duty time proposal would provide a single standard for all commercial pilot work and rest rules, including commutators and air taxis, and update 30-year-old regulations that have created a "batleground" between airlines and employees, the agency said.

Proposed rules mark what one industry spokesman called a "dramatic departure" from earlier proposals, the most recent of which was scrapped by FAA Administrator J. Lynn Helms.

In keeping with Helms' promise to come up with an alternative that would be both "less complex and burdensome," FAA re-examined its role in regulating flight time and related matters and decided to propose rules "which are the minimum necessary for safety," leaving other issues for resolution "between operators and their employees." New rules also would eliminate current weekly and annual flight time limits.

#### FLIGHT TIME LIMITS

Basic rules would limit flight time in any 30-day period to 100 hours, prescribe minimum hours of rest in any 24-hour period and require 24 consecutive hours of rest at least once during any seven consecutive days. Rules would set a minimum of eight consecutive hours of rest for pilots who have flown eight hours or less in any 24-hour period and at least 10 consecutive hours of rest when flight time exceeds eight hours in any 24-hour period (DAILY, March 9).

The current rules are "enormously complicated," causing confusion to both operators and flight crew members and resulting in "an endless stream of requests for interpretations," FAA said. The agency had to issue over 1,000 pages of interpretations, most of which involved "disputes between an operator and its employees" which placed it in a position "somewhat similar to an arbitrator resolving a dispute over conditions of employment."

The uniform limitation of 100 hours of commercial flight time during any consecutive 30 days "should provide flexibility to operators and prevent cumulative fatigue," the agency said.

Commentators objecting to the 100-hour, 30-day period limitation will be asked to "provide safety justification and economic impact data" supporting some other limitation, FAA said.

#### REST SCHEDULES

Rest periods will be based on scheduled flight time instead of actual flight time under the new rules. For example, a flight crew scheduled to fly for 7.5 hours - which would require a rest period of eight hours - whose flight is extended more than eight hours "due to reasons beyond the control of the certificate holder" would not be required to extend the scheduled rest period. "The required rest period remains the same as scheduled, but not less than eight consecutive hours of rest," FAA said.

A rest period is defined as "a continuous period of time during which no required assignment is performed for the certificate holder." Deadhead transportation "can be by air or surface means to transport flight crew members between airports," but in either case it "does not constitute part of a rest period." One clause states that "the mere receipt of a communication" from the certificate holder during a rest period for rescheduling of a flight does not interrupt the rest period, meaning "such receipt does not constitute a duty assignment," FAA said.

Proposed rules would allow extended flight time between required rest periods in "specific cases" involving long-range flights by Part 121 operators. If an airline wants to schedule a single flight, the length of which makes compliance with the rest requirement impossible, the director of flight operations may specify "as appropriate to the particular operation, crew size, inflight rest facilities, flight time, duty time and crew rest times," FAA said.

Initial comment deadline is July 9, with reply comments due by Aug. 9. Comments should be mailed in duplicate to FAA, Office of the Chief Counsel, Attention: Rules Docket (AGC-24), Docket No. 22745, 800 Independence Ave. S.W., Washington, D.C. 20591.



## SOUTH CAROLINA AERONAUTICS COMMISSION

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### FORMULA ONE EDGES F-104

It wasn't your classic grudge race, not when the Italian Air Force became involved. But then again, the Italians can be anything but rational at times. Anyway, for the benefit of some 100,000 spectators at a village called Istrana some 250 miles from Milan, the Italian Air Force staged a face-off between one of its Lockheed F104 Starfighter jets and five different Formula One cars. The object was to see who was the quickest in a one-kilometer distance from a standing start. Participating were Gilles Villeneuve in a Ferrari 126C Turbo, Nelson Piquet and Ricardo Patrese in Brabham BT49s and Bruno Giacomelli in an Alfa V-12. The winner? Nelson Piquet in 17.95 seconds. The F104 recorded a time of 18.5 but was rapidly gaining momentum at the finish line.

*Autoweek Magazine*

### LANDING FACILITIES INCREASE IN 1981

The number of airports, heliports and other landing facilities available to civil aircraft in the United States and its possessions increased to 15,476 in 1981, the Federal Aviation Administration reported. This represents a net gain of 315 from the previous year.

Privately-owned landing facilities accounted for the increase, going from 10,347 in 1980 to 10,678 in 1981. Publicly-owned facilities decreased slightly from 4,814 to 4,798. The number of landing facilities available to the general public was 6,290, a decrease of 229 from 1980.

Included in the 1981 year-end totals were 12,427 airports, 2,507 heliports, 485 seaplane bases and 57 short takeoff and land (STOL) airports or runways. Both civil landing facilities and military facilities that permit civil aircraft operations were counted in the total.

There was an overall increase

despite the closing of 377 landing facilities during 1981. Closed were 283 airports, 80 heliports, 1 stolport and 13 seaplane bases.

Texas continued to lead all states with 1,431 landing facilities, followed by Illinois 929, California 832, Pennsylvania 698, Alaska 689, Ohio 674, Florida 506 and Minnesota with 493. South Carolina has 70 airports open to the public.

Lighted runways were provided at 4,795 locations and paved runways at 5,002.

A total of 771 facilities are served by air carriers that hold certificates of public convenience and necessity issued by the Civil Aeronautics Board and certificated under Part 139 of the Federal Aviation Regulations. Included in this total are 59 military airports. Of the 771, there are 472 locations served by scheduled CAB-certificated air carriers, and 299 that are served by unscheduled air carriers.

### OMB ALLOWS WEATHER STATIONS TO STAY OPEN

The Aircraft Owners and Pilots Association has hailed a decision by the Office of Management and Budget allowing forty-five National Weather Service stations to remain open despite an earlier call to close them.

The plan, slated in the Administration's proposed 1983 budget, would have closed 25 full-time weather stations and 20 on part-time schedules.

AOPA assailed the plan as recently as last Tuesday in testimony before a House Science and Technology subcommittee.

The Association's president, John L. Baker, called the decision "gratifying," adding:

"The projected economies were false and would have prejudiced aviation safety had they been allowed to take place."

Despite the large number of stations involved, projected savings would have totaled but \$2.8 million and apparently would have been accomplished through consolidation with other weather activities.

The OMB decision was said to have been based on assurances from the Department of Commerce, parent agency to the Weather Service, that the savings could be achieved elsewhere in programs less safety oriented.