Interceptor

AUGUST 1972

A FIGHTER PILOT

. . *see page 5*

Interceptor

FOR THE MEN RESPONSIBLE FOR AEROSPACE DEFENSE

VOL 14
NO 8

SPOTLIGHT

Look around! The one you don't see will get you. Israeli AF

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OUR COVER

There have been countless changes in the fighter business since it first began. Planes, armament, and techniques have improved by means of a continual evolution. One thing that has remained constant — because it was as good then as it is now — is the fighter pilot attitude. In this issue a W.W. I "jock" discusses the feelings and attitudes of fighter pilots then and lets us compare them with those that are present today. Our cover depicts the subject of this month's interview, Commander Reginald Sinclaire, a fighter pilot with the Lafayette Flying Corps, as he experiences one of his actual air victories over a German Pfalz in 1918. The fuselage insignia on his Spad is of the French Spad Squadron No. 68.

"Accidents which at first sight seem enormously complicated can become very clear with the introduction of truth."

Sir Arthur Conan Doyle, the creator of Sherlock Holmes, once wrote ". . . when you have eliminated the impossible, whatever remains, however improbable, must be the truth." From that point I would like to discuss the very serious subject of honest admission of errors which result in an accident, near accident, or incident.

Have you ever heard of a fighter pilot admitting to being anything less than the world's greatest pilot, regardless of age, rank, and experience? Probably not. And yet, despite this innate tiger spirit, it is well recognized that pilots are a critical lot when it comes to appraising not only their own professional ability but that of their contemporaries. On the other hand, there have been occasions, following a mishap, when their first reaction was to construct a "credible" defense to avoid a tarnished image. Probably the classic example is the pilot who lands gear up, but steadfastly maintains the gear was down and locked. Yet, when maintenance jacks up the bird, the wheels go up and down as designed.

Some people have the erroneous idea that an accident investigation board is like a trial in criminal court. Not so! Accident boards are simply in the business of accident prevention — to gather the facts that will shed light upon those "unsafe" acts and conditions that cause accidents and to introduce recommended corrective actions to preclude a recurrence. There is no prosecutor and no defendant. Witnesses are not placed under oath and their testimony cannot be used for punitive action. Our boards are designed to function this way — with enough freedom for credible fact-finding untempered by the fear of self-incrimination.

So, what are the side effects when we stretch the truth, use evasive answers, eliminate facts, or tll "little white lies" in an atmosphere where our integrity and honesty should be a fundamental premise. Obviously, we compromise the credibility of our ranks both individually and collectively, we waste hundreds of manhours we can ill afford, trying to correct malfunctions and materiel failures which never existed, and worst of all, we may place the lives of comrades in jeopardy by our short-sighted negligence.

When a person makes a mistake, it does not mean he is inhuman. He turns on his own kind only when his mistake is not analyzed and discussed with others to see if there is a lesson to be learned. Accidents which at first sight seem enormously complicated can become very clear with the introduction of truth.

COL. JOHN M. VARGO
Chief of Safety

HOT LINE

"WHEN YOU'RE HOT, YOU'RE NOT REALLY." Recently a T-bird aborted a flight when on run-up, the engine EGT topped out a little over the allowable 715° Centigrade. While maintenance was running a routine Dash 6 inspection for the overtemp, they discovered that 11 of the 14 turbine wheel bearing support studs had failed due to fatigue. They also found evidence of milling on the turbine wheel outer rim and bucket bases. The Turbine Unit Assembly had shifted aft of its normal position in the air diffuser section until it ground against the turbine wheel. This aft movement occurred mainly when the engine was running and the assembly would move back to the normal position when the engine was off. (This is what is suspected to have caused a recent fatal T-33 accident and what started the intensive one-time inspection of all J-33 turbine unit assemblies that led to grounding the fleet.) While most of us who have been flying the T-bird for a while correlate that nice high EGT with a "goin' Jenny," Section V of the T-33A-1 tells us that ". . . the exhaust gas temperature is by no means an accurate measure of thrust." And, whether we like it or not, engine specialists agree that here is a definite relationship between high EGT and premature engine troubles. While our engines are allowed to operate within the full range of the temperature limits, there is usually a reason when they start rising toward the upper limit of the operating range. A new engine will normally develop a given thrust at a lower EGT than an engine that is worn (all other factors being equal). An unusual increase in EGT usually indicates a reduction in engine efficiency and could portend an engine malfunction or failure.

P-40 "WARHAWK" PILOTS REUNION. A newly formed organization, the P-40 "Warhawk" Pilots Association, will hold their first reunion at the Imperial House North in Dayton, Ohio September 15, 16, and 17, 1972. For information contact Herbert O. Fisher, President, The Port Authority of New York and New Jersey, 111 Eighth Avenue (Room 1409), New York, NY 10011, telephone (212) 620-8396.

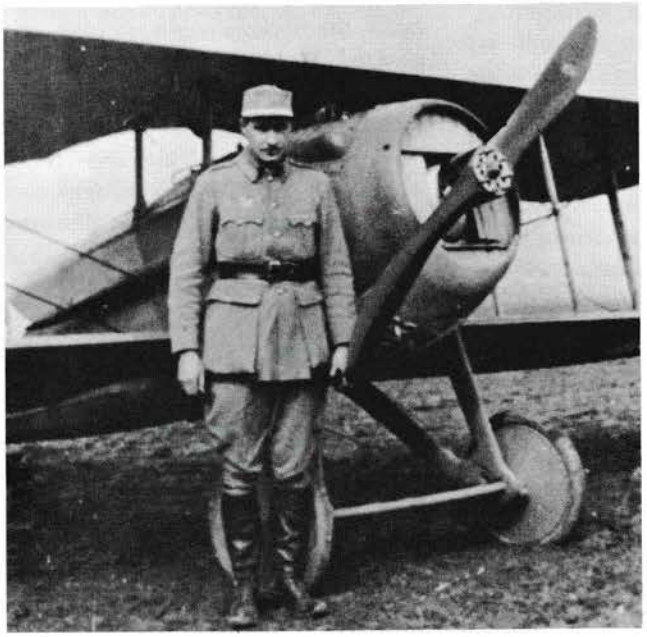
TWO HEPS AND AN "URP." Even though the pitch trim seemed to be operating, the nose seemed very heavy. The pilot in the Deuce declared an emergency and headed for home. As he neared the base the trim seemed to change and it now took a great amount of forward stick pressure to hold the proper attitude. He lowered the gear and decided to disconnect the trim to ease the situation. With the trim off it was worse — in fact on final at 170 knots it took both hands to keep the nose down. Them as he pulled off his power over the threshold, the nose rose even more. This then stimulates the imagination to the interesting phenomnon of having to *push the stick forward* in the flare. At any rate, he landed safely and turned the aircraft over to maintenance. In their search for the fault, they discovered and replaced two faulty Hydraulic Elevon Pack (HEP) valves. This didn't fix the malfunction. They then replaced the rudder amplifier and this fixed the system. This situation where a faulty rudder amplifier caused such random transients in both coincidentally failed HEP valves is statistically rare, but illustrates the extent to which maintenance must sometimes go to get to the bottom of a mysterious malfunction.

TAKE A DEEP BREATH AND OPEN YOUR WALLET. The IG reports recently that a lot of flying types are violating AFM 60-1 by failing to complete their annual physical examination within three months preceding the last day of their birth month. It seems that the main offenders are the Code 3 guys who don't fly currently right now but still get flying pay as long as they stay physically fit. Personnel is supposed to use their "Mechanized Personnel Procedures" to notify us that it's that time of the year again, and it is easy to forget the flying physical when you're no longer flying. But, like most other things, getting the physical on time is the "Individual's responsibility." It would be a shame to lose flying pay because we went noncurrent for a flying physical. If it's less than 90 days until your birth *month* and you haven't been notified, call and ask the CBPO.

INTERCEPTOR INTERVIEW:

A FIGHTER PILOT

One of the originals concludes that the fighter pilot attitude hasn't changed in half a century.



There are few men in the world who can claim a vista of aviation history like the subject of this month's interview. Commander Reginald Sinclaire's flying career began in the second decade in American aviation history and spans to the present day.

The scion of a co-founder of the Corning Glass Company, Commander Sinclaire whetted his appetite for competition and victory on the playing fields of St. Paul's School in Concord, New Hampshire, and Yale University.

The siren call of adventure proved irresistible and, though he was married and a father of a young son, he volunteered for the American Air Service when it seemed that the United States would enter WWI. When the American Air Service would not guarantee him a flying assignment because he had not yet earned his degree, he volunteered for and was accepted by the Lafayette Flying Corps. After completing fighter training at the French Flying School (then the largest in the world — over 1000 students*

trained at one time), he reported to the front in Spad Squadron 68. Here he flew until the Armistice where he amassed 167 combat missions, 30 air battles, 3 confirmed kills, and 8 probables.

When the war ended, Commander Sinclaire returned to his New York home and then, for reasons of family health, moved to Colorado Springs where he now resides. His love for flying never flagged and by 1928 he had built a racing plane of his own design. He flew this plane in the National Air Races that year and placed second in his class.

In 1930 Reginald Sinclaire took up ranching when he bought a large "spread" between Denver and Colorado Springs. He and his family actively ranched this land until 1970 when he sold the ranch and retired.

When World War II broke out, he was given a direct commission in the U.S. Navy and tasked with establishing the Naval Aircrew (enlisted) Gunnery Instructor program at NAS Pensacola. In August of '42 he was sent to Hawaii where he established advanced training schools at NAS Kaneoe Bay, Barber's Point, Hilo, and Midway Island. Returning to Washington, DC, Commander Sinclaire ran the aircrew gunnery training program for the Chief of Naval Operations Staff until the end of the war. He stayed on inactive duty until he retired in 1958.

Having retired from both ranching and the Navy, this man's "retired life" routine would leave most of us dragging at the end of the day.

He is president of the Survivors of the Lafayette Escadrille and Flying Corps association and is a member of the Board of Governors of the Lafayette Escadrille Memorial Foundation. In this latter capacity he is concerned with the operation of the memorial to those brave American men who fell while serving France. This beautiful tribute stands a short distance from Paris and is a popular tourist attraction. He is also responsible for maintenance and disbursement of funds from the foundation which maintains the Memorial.

At 79 years of age he is still active in both Daedalians and Quiet Birdmen and he piloted his own twin-engine private plane until just a few years ago. He has piloted the T-33 and recently took a max performance ride in an F-4. (It was only a Navy "B" model, but what the hell.)

When he is at home, he lives with his lovely wife in the Broadmoor section of Colorado Springs. We drove through the entrance gate and up the drive to his home and were impressed with the quiet dignity that we found aptly reflects this man.

As his housekeeper ushered us into his study, our eyes fell on what seemed a composite history of Reginald Sinclaire's life. One wall held decorations from the French government and the U.S. Navy. The other held photos and drawings of vintage aircraft. Near the door hung the Kepi of a French airman flanked by the gold-braided cap of a Navy Commander. The shelves at the other end of the room held books on a myriad of subjects and trophies for polo, steeplechasing, and show horse breeding.

As he rose from his desk to greet us, we were momentarily taken aback by his height. The man stands a good six feet, four inches and his posture is as straight now as it was when he flew the Spad. (He told us that he had to remove the seat cushion in the Spad so he could fit into the cockpit.) His handshake was firm and his eyes sparkled as he directed us to comfortable chairs before his desk. We had sent him a letter asking for the interview and had submitted several general questions about the attitude of a fighter pilot from several wars ago. He seemed eager to get to his topic so we started right in. As he held forth on the many subjects that follow, we were greatly impressed by his almost computer-like recall of names, places, dates, altitudes, and airspeeds. Through a half-century, these events are obviously as vivid to him now as they were then.

Listen carefully to what "Reggie" Sinclaire has to say about fighter pilots. We think you'll find that planes change — pilots don't. When the interview ended and we were walking to our car, he wondered aloud if Bangkok today is as good an R&R town, as Paris was in 1918.

**Ed. Note: The Lafayette Flying Corps consisted of all the American volunteers who flew with the French during World War I. On the other hand, the Escadrille Americaine, organized in May of 1916, was the only squadron in the French Air Force consisting solely of (but not commanded by) Americans. This squadron (No. 124) was renamed the Lafayette Escadrille in November 1916. There were seven original American members of the Escadrille, but never more than 15 at any one time. A total of 39 Americans flew in Squadron 124 while approximately 210 Yanks flew in French Squadrons in the overall Flying Corps.*

LAFAYETTE FLYING CORPS

Total enlistments		*266*
Released before serving combat		*56*
Combat duty with French		*210*
Were shot down	*40*	
Killed in accidents	*25*	
Prisoners	*16*	
Wounded	*19*	
Total	*100*	
Pilots credited with official victories		*72*
Total official victories		*199*
Transfers to U.S. Air Service		*95*
Transfers to U.S. Navy		*26*
Remained with French		*33*
Total		*154*

INTERCEPTOR: *Do you feel that, as a fighter pilot, you could do things that others could not?*

CDR SINCLAIRE: I think so. Our fighter planes, the Spads and Nieuports, could perform much better than the multi-seated bombers and reconnaissance planes and we had to depend on ourselves. When you're alone in an airplane, you're *really* on your own. When the bombers and recce boys went out, they went on a specific mission. We mainly went out on what we called "Free Patrols." Oh, there were times when we were given specific duties, like strafing enemy positions, but on many missions we were free to roam throughout our sector in search of enemy planes.

INTERCEPTOR: *You've associated with flyers ever since you began flying; we suppose the experience has been constant in your racing days and through your experiences in WWII. Is there anything that you would say typifies fighter pilots?*

CDR SINCLAIRE: I think it's entirely an attitude. I notice when talking to some of your fighter pilots today, they're proud of the fact that they are fighter pilots. They like to say, "I am a Fighter Pilot." But I don't think you could typify him. I don't feel you could pick out a fighter pilot by his looks or particularly by his actions. I know guys who were wonderful fighter pilots and were very modest and never said anything about it; then there were others.

INTERCEPTOR: *Does physical dexterity, like that of an athlete, contribute to the traits of a good Fighter Pilot?*

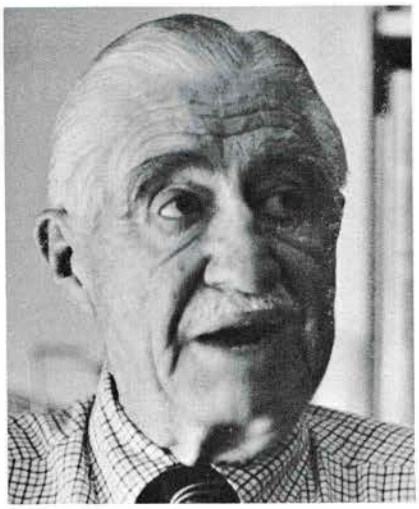
CDR SINCLAIRE: Perhaps an athlete might tend to be more aggressive because he's been in competition. It undoubtedly wasn't quite as "life and death" as aerial combat, but he probably understands the competitive attitude. Physical dexterity and coordination are important, but athletes aren't the only ones who have that. I've seen fellows with no apparent athletic ability become excellent fighter pilots. But, in either case, it's difficult to generalize. I think athletes lend themselves to becoming good fighter pilots if they think aggressively. Mental attitude is so important. You've got to want to win.

INTERCEPTOR: *Were you aware of the need for physical fitness in WWI?*

CDR SINCLAIRE: We didn't have any "setting up" exercises or anything like the physical conditioning program you have in the service today. But a lot of us were athletes before the War. I had played football, rowed on the crew, played hockey, and threw weights on the track team. I was accustomed to eating at a training table and I was well aware of the value of good nourishment and physical conditioning. But it was a demanding life, and I think that most of us realized the advantages of good physical conditioning even though it wasn't as formalized as it is now.

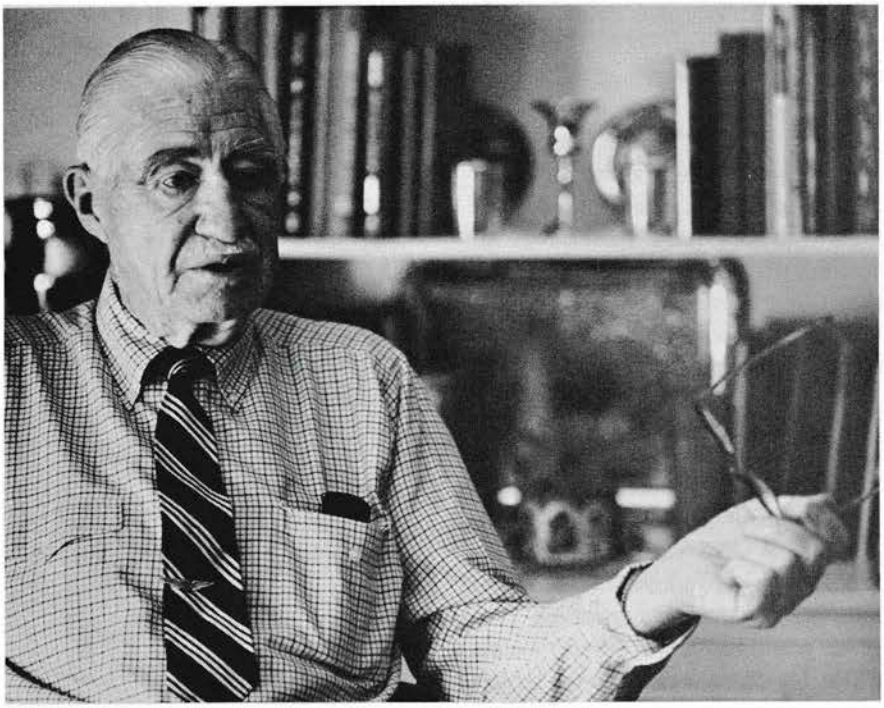
INTERCEPTOR: *Is self-discipline more important to a fighter pilot than to, say, a bomber pilot who has a whole crew with him?*

CDR SINCLAIRE: When you fly by yourself there is no one but you to keep you working. You have to remind yourself to keep looking around, to keep track of your position, and how much fuel you have. And to do this, you have to make all these things almost a habit. Years after the war I would be riding on a train and I'd find myself looking at the passing fields in reference to whether or not they were suitable



"Mental attitude is so important. You've got to want to win."

PHOTOS BY SGT RICHARD THOMAS



"Years after the war I would be riding on a train and I'd find myself looking at the passing fields in reference to whether or not they were suitable for a dead-stick landing."

for a dead-stick landing. And I had quite a few engines quit on me so I *knew* when I could or couldn't make a field. I never broke a wire and I felt that I could handle it. Oh, granted, there were a couple of times when I was lucky to have a nice piece of ground right in front of me, but I still felt that I made the landing.

INTERCEPTOR: *Is there any way to develop self-confidence without actually going through some unpleasant experiences?*

CDR SINCLAIRE: There is no lesson as dramatic as actually experiencing something. Let me tell you of my first "lesson." I was out alone on a patrol behind the German lines when I spotted a German troop train. I started letting down to strafe him. I was still new so I really concentrated on that train and failed to keep looking around. Just as I was about to roll in on the train, I heard a machine gun behind me. Very quickly I turned around to look over my shoulder — I was quite startled. There was a German Albatross right on my tail. I hadn't seen a German anywhere that day. Well, I immediately made a sharp turn and straightened out. As soon as I leveled out, there was another one on my tail. Then I saw that *four* Albatrosses had dived on me. I wanted to know what aerial combat was like, but I hadn't planned to start learning at the short end of four against one odds. Well, I want to tell you that I made that Spad dance. But every time I straightened out to try to get home, one of the Germans would get on my tail and would start shooting. One of them passed in front of me. As he did I tried to shoot him, but my machine gun gave two "poofs" and quit — I had gotten two shots off at this guy and the gun jammed! Well, I was too damned busy at that time to try to clear it. When I finally got a second, I reached up and pulled the clearing handle, but the gun wouldn't clear. So I put myself in a spin — I had really been making that airplane perform — I spun down to the tree tops and straightened out. For some reason they didn't follow me down—and I went home. There wasn't one bullet hole in my plane so you can bet I had been moving around. But I learned from that first experience that in combat you can never assume that no one is shooting at you.

INTERCEPTOR: *Because you flew alone, you were forced to gain your experience by yourself. Because you needed to depend on no one*

else, did that help you to gain self-confidence?

CDR SINCLAIRE: They say you learn from experience and since, in most cases, no one else shared the experience, no one else can share the lesson. I guess there are two ways you can handle an unpleasant experience. You can drive this unpleasant experience out of your thoughts, or, if you're smart, you can learn from it. When I landed that day after the encounter with those four Albatrosses, I really thought about it and tried to be constructive about the incident. That is, how could I have been better? Well, in this case, it was a simple lesson: Don't ever be taken by surprise. But I had to learn it the hard way and I was damn lucky to get safely out of that mess. So I tried to use everything I had learned from my own experiences as well as from hearing about the experiences of others and I began to get smart. My experience gave me self-confidence. I felt that I could take care of myself. I knew how to fly a Spad and knew what a Spad would do.

If you paid attention to what you were doing while you were in combat, you could take care of yourself. And, as I gained experience, I wouldn't let myself get into an untenable situation. As I learned those lessons, I became more aggressive because I was confident in my ability and confident because of this experience.

Aerial combat in World War I was a quick thing — it didn't last very long. Whatever you had to do had to be done in a hurry. The successful fighter pilots knew what they wanted to do *before* the fight began. Of course, we'd always try to take the other fellow by surprise by coming at him out of the sun. But you had to work at what you were doing. I knew guys who were shot down by German pilots who weren't nearly as good as they were. But these guys would come back and fool around and a couple of times the Germans got off a lucky shot and our guys went down.

But a smart fighter pilot always tries for the advantage and the best way to get the advantage is to start out with it. We would often attack numerically superior German patrols. But we'd attack from above with all the speed we could get. You know a Spad would only fly at about 140 mph in level flight, but you could dive them up to 300 (mph). I've terminal dived a Spad and it's a very unpleasant sensation. The scream of those exposed wires is not nice at all and it takes all the strength you've got to pull out. Those controls got as stiff as a board and it would take two hands to get it out of a dive. But speed is a great advantage in an attack.

INTERCEPTOR: *When you went into battle, what was your attitude toward that particular battle?*

CDR SINCLAIRE: Well, it was like just before the kickoff in a football game. There was anxiety, and then you calmed down. You might shake a little, be excited, but once you got into it, you weren't excited any more. I always felt that I had a superior airplane to what the opposition had. We could fight higher than they were willing to. We could maneuver better above 4500 meters than the Fokker D-7s could. They could fly higher, but they didn't like to fight higher.

INTERCEPTOR: *How did you feel the first time you engaged a single enemy fighter?*

CDR SINCLAIRE: Although it happened over 50 years ago, I recall every moment of it. It happened on February 17, 1918. Remember that I had previously had that bad experience when the four of them jumped me. Well, that scared the hell out of me and I hadn't forgotten it. My friend and I were up on patrol together in the Toul sector. When we were just over the lines, we looked down and saw a German patrol of two two-seaters and three fighters. We immediately attacked—I was on my friend's wing and we dove together. As he began firing, the German formation began to turn to the left—all except one fighter who turned the other way. Well, I picked him and started to follow him. I thought, "If he continues like that, he's going to be lost." I climbed above him and I could see him looking over his shoulder at me. By now he was quite a distance from the formation, so I dove at him. Before I could shoot at him, he made a 180° turn and passed under me. I was in my Spad and he had an Albatross so I could outfly him. I repositioned myself behind him, but this time I got further back. When I dove on him again, he made the same maneuver again. Well, I must have made five or six passes and each time I'd get a little further out and each time he'd make the same maneuver. Finally I pulled lead on him and started into the first part of an outside loop. I was thrown up out of my seat hard against the shoulder straps. The next thing I knew something hit me in the face. My face and windshield were covered with oil. I pulled out of the maneuver, raised my goggles, and started looking for the German. He was gone. I never could find him. What happened with the oil—as I was to find out when I got back to my field—was that my mechanic had forgotten to replace the oil filler neck baffle when he serviced

the engine that morning. The baffle kept the oil from coming out the filler neck when we were inverted or pulled negative G. My outside loop had forced the oil out the filler neck and all over the windshield and me. I was really angry at having lost a kill because of this oil. My Captain came over to tell me that he had received a call from the front in our sector saying that there had been an air battle over them. They reported that the German had been shot down and had fallen *into* the trenches. I hadn't even claimed it. Incidentally, my French mechanic got six months without pay for forgetting to put in that baffle.

INTERCEPTOR: *Did you ever have a chance to fly against Von Richtofen's Flying Circus?*

CDR SINCLAIRE: Yes, against the Flying Circus. I flew against Goering many times after he took over the command. Richtofen was killed in June and I never saw him in the air. Richtofen usually had his plane painted all red, and the rest of his squadron had the noses painted red. I'd met up with them, but I never saw an all red airplane in the squadron. Richtofen was a very cagey fellow, you know. He didn't get mixed up in dog fighting. He'd pick on a single plane or a disabled fellow, and he'd be very careful how he did it. Finally it was a novice who got him — a Canadian, named Brown. Of course, an antiaircraft battery also tried to claim shooting him down.

On the 18th of September, 1918, my friend and I were out on free patrol; it was quite late in the afternoon and the sun was low. We'd spotted a lone German two-seater coming from the east. He had penetrated the lines, and apparently was ordered to take some photographs of our positions. He saw us, too. We were about the same altitude, about 3500 meters, the German was watching us. So we flew south and then east, trying to get behind him so he couldn't get back without our meeting him. When he saw us turning east he made a 180° turn and he went back. We made the same maneuver again. We went south, then east, but we went a little further this time. He turned again 180 and went on again back east; well, we did this the third time. By this time the sun had set; we finally cut him off. It was a lot lighter up at 3500 meters, but it was pretty dark on the ground. My friend and I split and we went at him from two sides and both attacked simultaneously. Just as we closed on him, and our bullets were going where we wanted them to, we saw tracer bullets coming up from the dark background underneath the German. Well, he went down, and we went home. We later found that the plane that had attacked from underneath was Frank Luke. Evidently all three of us had shot the plane down. Luke landed where the German plane went down. He spent the night with the remains, and got credit for the kill.

INTERCEPTOR: *What did you consider to be the best fighter, on either side?*

CDR SINCLAIRE: The Spad. I know a lot of people wouldn't agree with me, but I flew several hundred combat hours, something like 167 fighter missions, and about 30 combats (air battles), and I thought the Spad was just great.

INTERCEPTOR: *What advantage did it give you?*

CDR SINCLAIRE: Well, it could outclimb the German fighters. The first combat I was in — the spring of '18 — the German offensive came down from positions on the Chemin des Dames. I was kind of apprehensive because I hadn't met up with their crack squadrons before. I'd had my initiation in a really quiet sector. It was Fokker D-7s that I met up with. We were a patrol of five or six and we met up with an equally sized patrol at about the same altitude, but we were at low altitude. Both patrol leaders turned away and we both started climbing. We came back together at about 4500 meters, and we were 300 meters on top of them. We had the advantage, we were on top of them and our flying speed was much greater than theirs. We could dive on them and shoot, regroup, come back in.

INTERCEPTOR: *In other words, you kept your combat in the vertical plane and didn't try to out-turn them?*

CDR SINCLAIRE: Oh, yes we did. If you make a dive, you have to make a turn to get away.

INTERCEPTOR: *What was the best German aircraft?*

CDR SINCLAIRE: Oh, I think the Fokker D-7.

INTERCEPTOR: *What was your personal evasive maneuver if a German got on your tail?*

CDR SINCLAIRE: Usually a dive.

INTERCEPTOR: *Were you faster than the D-7 in level flight?*

CDR SINCLAIRE: I believe so, but when you're in a medium such as air, you don't stay level very long; you have to try to outclimb him or

be defensive. What we'd try to do is surprise them. Take the sun; in the morning they'd have it; in the afternoon, we'd get even with them.

INTERCEPTOR: *Can you describe the feeling you got when you shot down a plane?*

CDR SINCLAIRE: Pleasure — at winning — and having done what I was supposed to do. But I had no other emotional feelings about shooting him down. I was never really angry at any German pilot. I realized that the fellow I was shooting at was probably a nice fellow that had gone to University just like I had and he was trying to do the same thing I was trying to do. Why should I hate him? But I was elated when I could shoot down an enemy plane. I remember one particularly active day in June when I was in a flight of five on patrol at about 3500 meters when we spotted five German Pfalz single-seaters below us in a single file. I was on the leader's wing and we dove toward them together. Suddenly my leader pulled up and away from the Germans. (I found out later that both his guns had jammed.) I continued to dive and pulled in about 50 yards behind the last German in the flight. I don't think he ever saw me because he never tried to evade. So I just put my sights slightly in front of his nose and gave him a good burst. He sort of rolled off on a wing, black smoke began pouring from his plane, he started down, and the whole thing burst into flames. I wanted to go after the rest of them, but none of the rest of my flight had attacked, so I pulled off. Then the rest of our flight joined on me. We all waggled our wings and went home. We could have had them all.

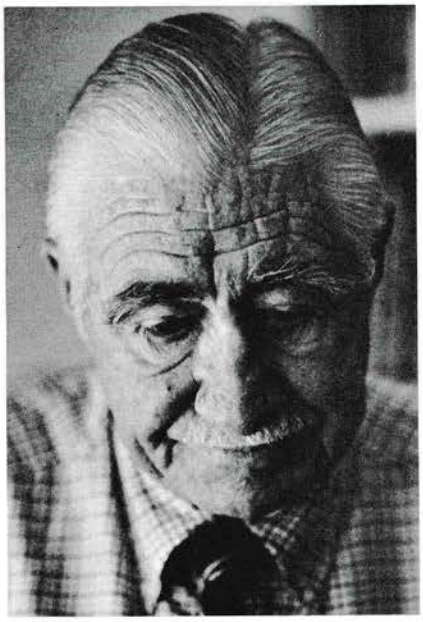
INTERCEPTOR: *You said the more you flew, the more self-confident you became. Do you feel that you still carry that self-confidence that you gained as a combat fighter pilot?*

CDR SINCLAIRE: Yes, definitely. I still feel confidence in myself. I'll be 80 on my next birthday and, if I've lost anything, it's some aggressiveness. But self-confidence is an elusive thing. I don't think anyone can fully define it, tell you where it comes from, can tell you where you get it, or how you keep it.

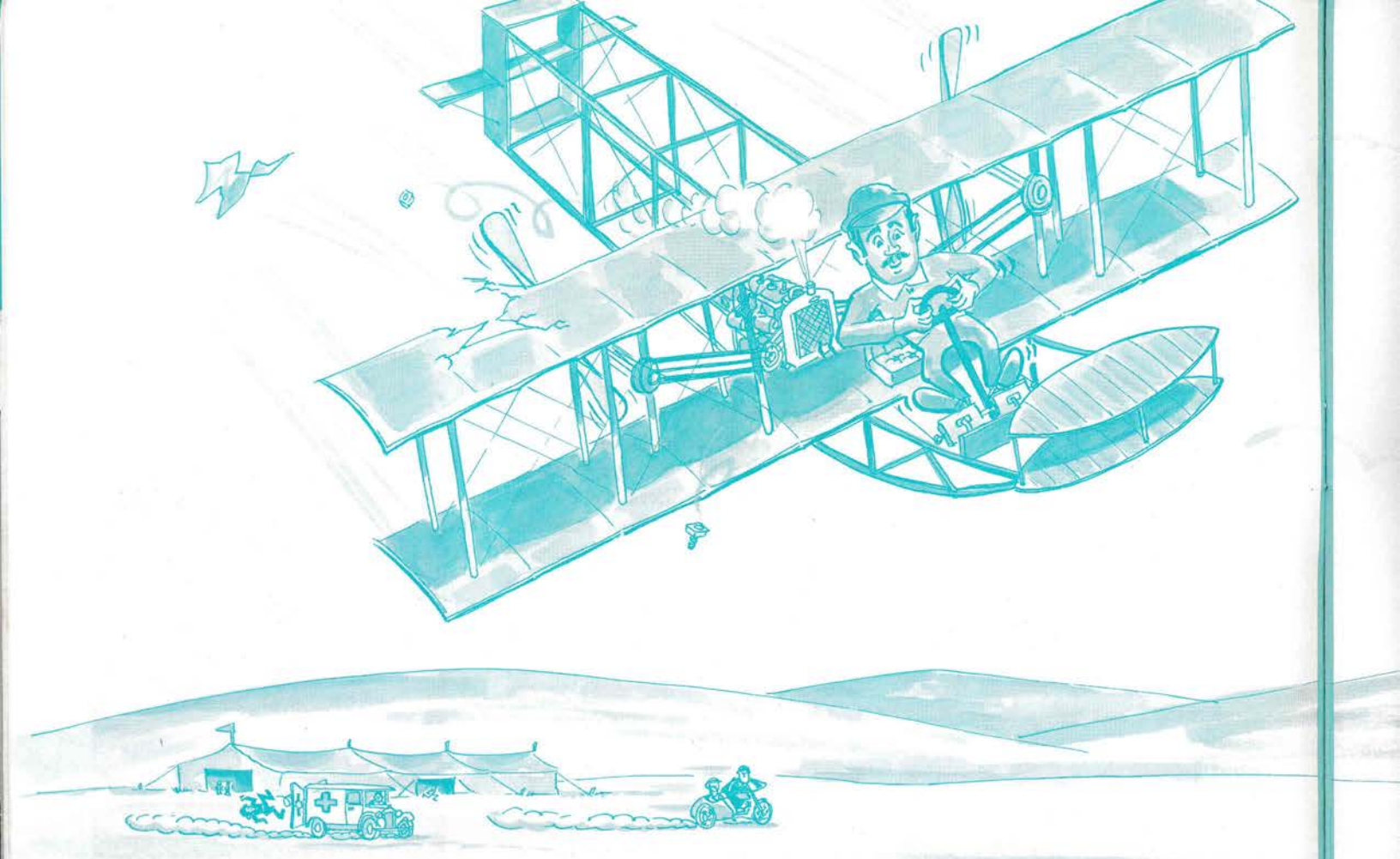
Everybody in France then who trained to fly learned in fighters . . . several of my friends came to me and said that they were going to transfer to bombers. When I asked them why, each one said that they didn't have confidence in their flying ability. Some didn't like acrobacy and there were other factors. I don't think it was a matter of attitude except that they didn't have self-confidence. One of these friends had been an All-American football player, but told me that he didn't feel that he was good enough to be a fighter pilot. It certainly wasn't a matter of guts, because daylight bombing then was infinitely more dangerous than flying fighters.

INTERCEPTOR: *What can cause a fighter pilot to become self-confident?*

CDR SINCLAIRE: Good training is undoubtedly the keystone to allowing a man to become self-confident. When I left flying school and went to the front, I had about 90 hours of pilot time. I was confident in the aircraft and my ability to fly it. I met British pilots who had seven hours of training, then went into combat. You can imagine how much self-confidence they had. ★



"I wanted to know what aerial combat was like, but I hadn't planned to start learning at the short end of four to one odds."



When The Heat's

This article originally appeared in the March 1960 INTERCEPTOR. Written by Captain (now Colonel) Roy H. Jackson, it has been adapted by numerous publications throughout the years. Here in a new version, we give you some of the same old story.

Precautionary landings have been around since Wilbur clicked his heels and said, "Let's take her up again, Orville. If this thing's a success, we'll be able to buy the farm." . . . And it was a success; and many farms have been bought. Too many while recovering a bird with a red light in the cockpit.

Just what is a precautionary landing? Well, for the purpose of this bit, it's any landing from any airborne position where the pilot discovers he's got a sick bird and wants to get it on the ground before it crumps out entirely. This could be an oil pressure warning light on takeoff (or any other time in flight), a fire warning light when there are no other indications of fire, control problems induced by a faulty hydraulic system, a rough engine, etc. About all the good book says on these landings is, "Land as soon as practicable." Too often pilots construe a precautionary landing pattern as a simulated flameout pattern. The decision to go this route is one the pilot has to make after a quick appraisal of his problem. About half the time it is not practical or even sensible to go to a high key.

For instance, hydraulic problems call for a straight-in final with minimum flight control movements to conserve available hydraulic pressure. On the other hand an oil pressure malfunction gives you a choice.

s On

The F-106 flight manual advises to use a flameout pattern, if practical, and minimum thrust. So it would be unlikely that you would want to use full mil to climb if you were in a position to make the runway at a reduced power setting.

Variations in precautionary patterns are limitless depending upon the pilot's imagination, proficiency and composure. It really doesn't make a whole lot of difference what you do as long as you get the airplane established on a final approach so that it will land in the proper configuration, in the proper attitude and at the proper airspeed and touchdown point. The one important thing to do is to let others know that you are doing something non-standard (and why) so that you will at least have priority to the airspace and runway. Along with this, don't disregard the facilities which can help you get set-up right, even though you might be thrashing around VFR, e.g., VASI, ILS, UHF/DF, etc. You want to get the aircraft on the ground safely as well as quickly if it's practical. Yes, practicality is important also. Landing with a full load of fuel can really become exciting if the drag chute fails and your airspeed is a tad above the norm. Other conditions may also require you to think twice about plunking it down right now (See "Your Weight is in the Balance, Interceptor, March 71).

Heading for a high key from an advantageous position is OK as long as you don't stick to your simulated flameout procedures — "shoot for one-third to one-half the way down the runway" and then expect a normal landing roll with uneventful stop. You just won't hack it! The simulated flameout pattern is predicated on the belief that it is better to roll off the far end at 20 knots, or engage the barrier, than to hit short at 170 knots. An SFO pattern that results in a long, hot, and hard touchdown can cause more damage to the aircraft than the original emergency.

OK, we know what you are thinking — what if I lose the only engine I've got after selecting to land 1,000 feet down the active? At this point we are often depending on the power supplied by the engine to accomplish a precision landing, and a loss of power means a sure short landing. Let's fall back on past experience and weigh the merits of taking this calculated risk.

ADC Safety Analysis supplied the following figures covering the first six months of 1971. Would you believe that we had 556 precautionary landings in single engine jet aircraft? Would you also believe that not one engine failed completely despite the fact that 138 of these landings were a result of an inflight engine problem. Believe it or not, both are facts.

A lot of the accidents we have had during precautionary landings in the past were needless. The pilots had operable engines when they landed; but the "pucker factor" entered the picture, and our troops goofed. These pilots knew their landings weren't going to be successful and that they were way out of the landing envelope. But rather than chance a power increase for a go-around, they went ahead and took the accident anyhow.

The answer to this "pucker factor" lies in the one word — training. We train for the actual flameout; we should also practice the precautionary pattern. The more natural and habitual a procedure becomes, the less chance there is of mistakes due to nervousness and tension. This training should include frequent discussions of the type pattern you would use under various situations. Tell war stories, hangar fly, try landing straight-in from ten miles out, starting at 5,000 feet above the terrain. Supervisors should monitor all phases of this training until they are sure their troops are intimately familiar with the precautionary landing peculiarities.

Not too long ago on one of our bases, a lad was making a precautionary landing. As he passed the alert barn on the far end of the runway, still airborne, the ever-watchful squadron commander was heard to mumble, "I thought he was making a high-speed pass!"

HARD facts of landing

An article appeared in the 7 April 1972 edition of the TIG Brief that discussed hard landings in some detail. We called John Parsons, the editor, and he allowed as how they had originally seen it in the MAC Flyer and felt that there was information here that should be presented to pilots in all the commands, not just to the Military Airlift Command pilots. When we read it, we suspected that it had been written with the big airplane driver in mind (there was a reference to beginning the rotation to the landing attitude at an altitude of approximately 50 feet). While that and a couple of other details gave us pause, we agreed that there is some valid valuable information here and that it would interest ADC pilots. So we adapted it for fighters, taking out such foreign terms as "yoke" and "wheel" and like that. We feel that the information is as valid for the T-bird/F-106 jock as it is for the C-5 driver.

When we're coming down final with no wind and the throttle set, our aircraft is pretty stable and the rate of descent fairly constant. At the right altitude above the runway we begin to flare and gradually reduce the rate of descent toward zero. As we do this, the airspeed is going to decrease even though we leave the power set where it was on final. Eventually the airspeed will drop so low that, even with the increased angle of attack, the wings can no longer generate enough lift to support the aircraft. Hopefully, by this time the wheels are just a few inches above the runway and we "kiss" it on for another "grease job." Most "jet jocks" also pull off the power during the flare. This, of course, decreases the airspeed more quickly and brings the touchdown point up closer to the approach end of the runway. Here, by pulling off the power and

reducing the descent, we have created a couple of variables.

We aren't really conscious of it while we're doing it, but in the flare we have to deal with as many as four variables. They are thrust, angle of approach, airspeed, and attitude. These four can become hopelessly intermingled unless one of the controlled items is removed. It is most convenient to eliminate thrust, because if the airspeed, attitude, and angle of approach are correct, then the thrust **must** be right. Controlling angle of approach, airspeed, and attitude generally produces good landings. Completing the "circuit" of control depends on controlling thrust.

If we recognize that thrust is the most effective tool to make the other factors more exact, then we can examine each of these other factors in detail. Of course, we must also assume that our altitude is correct and that we arrived over the threshold at the right height to begin our flare.

As we said before, if we hold a constant thrust as we begin our flare, the airspeed will decrease. If the airspeed has been steady just before we begin the flare, we can predict the amount of this airspeed decrease with reasonable accuracy. Even if we retard the throttle when we flare, we can pretty well predict the decrease even though it will be more pronounced.

But what if the airspeed is already decreasing before we start to flare? Now the rate of airspeed decay is anybody's guess, but it will be high — sometimes very high. So if you want to be just about guaranteed a hard landing, cross the threshold with your airspeed falling off rapidly.

Naturally, the best way to **avoid** a hard landing is to keep your airspeed as constant as possible during that last part of the approach — just before you begin your flare.

Under normal conditions, the pitch attitude of any particular aircraft descending on a three-degree glide slope is a reasonably constant number of degrees. We can read these degrees directly from our attitude indicator. All pilots should have this attitude "picture" for the bird they're flying. And if we don't have that "picture" pinned down to, say, a half a degree of attitude, maybe we should pay a little closer attention to the attitude indicator and angle of attack gauge during our next coupled ILS approach. Once we learn how many degrees we have to hold, get this picture in our mind, and use these data on our manual approaches, most of us find that the bird sticks to the glide slope in an almost uncanny way, if the wind and other factors are constant.

So here we are at the start flare point with the correct airspeed, attitude, and angle of approach. We smoothly increase the pitch and reduce the thrust. The rate of descent and airspeed **slowly** decrease as the aircraft **slowly** nears the numbers. Once we're in ground effect, just before touchdown, the aircraft pitches forward very slightly (analysts have observed this slight nose-down phenomenon in the best landings) and — if we hold the elevator constant —the aircraft will nose over almost impercepibly to the perfect touchdown. Isn't this beautiful? The entire flare maneuver is smooth and unhurried as we rotate to the landing attitude.

A flare that fails to raise the nose of the aircraft enough, or a flare started too close to the ground, can produce a hard landing — a simple case of too little, too late, or both of the above. Landings after these flares will usually be firm, but seldom hard enough to damage the aircraft. The kind of flares that **do** damage airplanes are the "snatched" flare or what could be described as the old "too **much,** too late" trick. In this maneuver we really "honk" back on the stick and if the bird touches down during that type "rotation," it will probably hit hard enough to bend it. When a pilot suddenly realizes that he's closing with the ground more quickly than he thought he was, it is almost instinctive to pull back on the stick. Unfortunately, when he applies up elevator, the first thing that happens is that the tail goes down — actually increasing the rate of descent momentarily. The time between the control input and the desired result is on the order of one second. This maneuver is sometimes described as driving the wheels into the ground."

In situations like this, things can — and often do — get even worse. Since the plane's center of gravity is forward of the main gear, it is only natural for the nose to come down shortly after the main gear touch. If the main landing gear hits hard, as in the above example, the normal nosedown tendency is accentuated and the nose gear literally slams into the runway.

And if it's really going badly, the aircraft then bounces back into the air with a nose-low attitude and not much airspeed left. Meanwhile the pilot is actually applying **down** elevator. That second touchdown, in a situation like this, is often disastrous.

If you maintain a constant airspeed during the last part of your final approach along with a constant pitch attitude **until** you begin your flare; if you maintain a normal (familiar) glide slope and smoothly begin your flare in plenty of time at as close to the same point each time as you can, you will have come a long way in eliminating the hard landing problem. ★

WILLIAM TELL '72

From our history of Strategic Defense file, we get this story of the legendary 14th century Swiss patriot, Wilhelm Tell. Herr Tell and his indigenous rebel forces were struggling to free their country from Austrian rule when he committed an error in guerrilla tactics. He refused to salute the cap of the Austrian puppet governor because by doing so he would be showing allegiance to Austria. This patriotic show of bravado may have gone over big with the rebels, but the Governor couldn't see the humor in it. He quickly sentenced Willie Boy to shoot an apple off the head of William, Jr. Tell quickly accomplished this feat (with a crossbow, for shame, poor Robin Hood); and, had Tell's lip been as tight as his bowstring, he would have been in the clear. However, when the Governor noticed Wilhelm's second (backup) arrow and asked its purpose, Tell replied, "To shoot you, if I had killed my son." Moments later, Herr Tell began an extended jail term. He was later rescued by his men and went on to free his country. We are grateful that things turned out that way, for today, had he not prevailed, we might be eating ham and Austrian cheese sandwiches, and calling this weapons meet the "Governor's Match."

From the beginning of man's recorded history, leaders of independent nations have displayed their country's defensive forces during periods of national celebration. Whether these displays were in the form of archery matches in a wooded glen, tournaments between mounted knights on the local field of honor, or marching columns of soldiers through the main street of town, these events have always been both a gala affair and serious business. For it is during such tests that the military man gets an opportunity to demonstrate to his countrymen his degree of training, his state of readiness, and his ability to do

what he is paid to do — defend his country. Next month the United States Air Force, during the celebration of its 25th anniversary, will present just such a display — a tournament of champions — called William Tell 1972. Air defense units from the continental United States, Alaska, Canada, and Iceland will send teams of their most highly qualified personnel for this "World Series" of air-to-air marksmanship.

The Aerospace Defense Command will host this year's William Tell Weapons Meet at Tyndall AFB, Florida, and the operation will have a manifold purpose. At the end of the completition, the free world will recognize the best aircrew/maintenance, controller, and weapons loading teams in each of the air defense weapons system categories. The meet will also allow the Air Force to collect data and evaluate each competing Air Force unit's ability to maintain, handle, load, and accurately fire our nation's best air defense weapons. And foremost, these events will demonstrate to the public the capabilities of our finest air defense interceptor weapons systems.

This year's teams will compete strictly within their own weapons system category and the judges will not select an overall meet winner. However, individual aircrew/maintenance sub-teams will compete for top gun honors.

Each FIS/TFS will field a team which consists of a GCI controller sub-team, four aircrew/maintenance sub-teams, and a weapons loading crew sub-team. The team's composite score will be the total points scored by each of the individual sub-teams. On the basis of these scores, the judges will select the winning team and the top sub-teams in each category. In addition to this category competition, all aircrew/maintenance sub-teams will be competing for the William Tell 1972 top gun honors. Since some past top gun aircrews have fired perfect scores, this particular competition promises to be extremely keen again this year.

Team captains have selected and identified their sub-teams prior to the competition because the rules of the meet prohibit any substitutions during the competition except for serious illness or similar reasons. Each team will consist of four aircraft, eight officers (12 for F-101 and F-4 teams), and 30 airmen. One aircrew, one fire control specialist, and one APG crew chief will compose each aircrew/maintenance sub-team. Three GCI controllers and their technicians will make up the controller sub-team. This year's competitors are:

During the meet the teams live-fire missiles and rockets at drone and towed targets. They will also make night simulated firings passes against an ECM aircraft.

As in the past, this year's William Tell promises to be an extremely exciting and competitive event. We can think of no better way to celebrate the Air Force's 25th anniversary than this live display of North America's finest in air defense. ★

WILLIAM TELL 1972

CATEGORY I, F-101

Unit	Representing	Location
132 FIS	Maine ANG	Bangor, ME
178 FIS	North Dakota ANG	Fargo, ND
425 AWF	Canadian Forces	Bagotville, Quebec

CATEGORY II, F-102

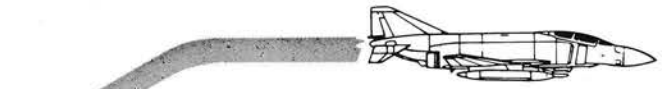
Unit	Representing	Location
57 FIS	Iceland	Keflavik, Iceland
134 FIS	Vermont ANG	Burlington, VT
176 FIS	Wisconsin ANG	Madison, WI

CATEGORY III, F-106

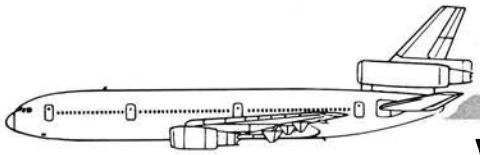
Unit	Representing	Location
2 FIS	ADC	Wurtsmith AFB, MI
5 FIS	ADC	Minot AFB, ND
87 FIS	ADC	K. I. Sawyer AFB, MI
95 FIS	ADC	Dover AFB, DE
318 FIS	ADC	McChord AFB, WA
460 FIS	ADC	Grand Forks AFB, ND

CATEGORY IV, F-4

Unit	Representing	Location
43 TFS	AAC	Elmendorf AFB, AK



PREVENTING COLLISIONS



With the T/F CAS

by **FREDERICK J. LAUBER** ● *McDonnell Douglas Electronics Company*

On 8 June 1960, two F-101s collided in the vicinity of Lambert-St. Louis Airport. This incident triggered the McDonnell Douglas search for an effective collision avoidance system (CAS) for all airspace users. Initial collision prevention investigations considered the use of various techniques such as radar, infrared, and interrogate/respond schemes. All of these approaches were discarded, since they did not provide positive protection in all air traffic environments. It was finally concluded that the airborne collision problem could best be solved with a synchronized time/frequency (T/F) system. Such a system was successfully test flown in 1964 and was named EROS, an acronym for Eliminate Range Zero System. EROS I became operational in 1965 and shortly thereafter became a mandatory safety-of-flight item for every F-4 test flown in the St. Louis area. Over 17,000 flights have been flown to date.

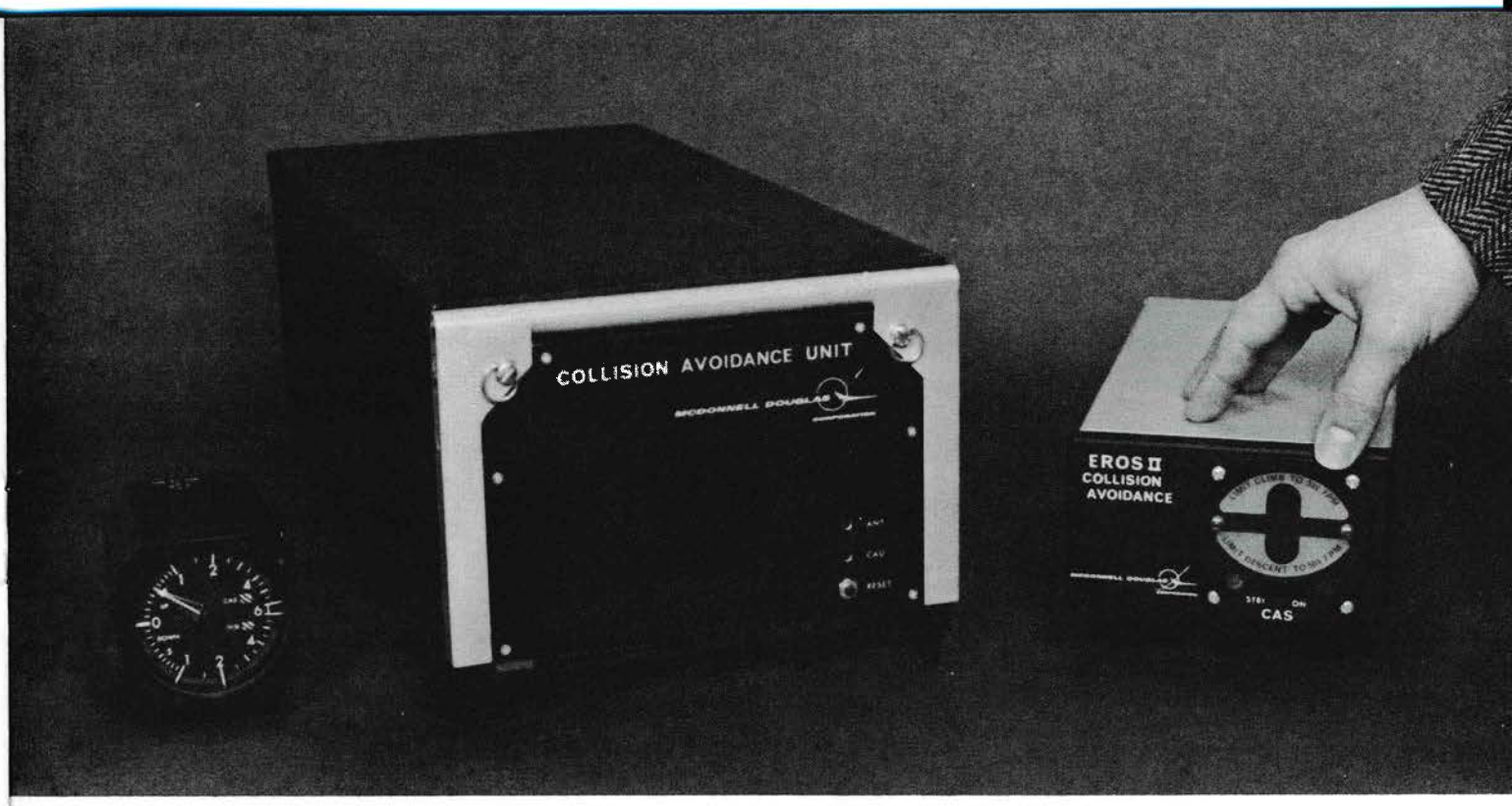
The success of EROS I provided a basis for the Air Navigation/Traffic Control Division of the Air Transport Association to adopt the T/F CAS as its standard and to issue an Airborne Collision Avoidance System Report, ANTC 117, in June 1967. This report led to the generation of an airline equipment specification, ARINC Characteristic 587, which was accepted by the airlines on 23 April 1970.

McDonnell Douglas offered T/F CAS for sale to the airlines on 14 October 1970. This equipment, which meets ARINC requirements, is designated the EROS II Model 2000 Collision Avoidance System. The system consists of a collision avoidance unit, an integral CAS maneuver indicator/vertical speed indicator, and two antennas — one for mounting on top of the fuselage, and the other for mounting on the bottom.

The Model 2000 has the capability of providing collision protection for equipped aircraft in traffic densities of up to 2,000 aircraft within a 90 mile radius. Positive collision protection limits were selected to accommodate aircraft speeds of up to 1800 knots TAS (3600 knots closing).

Collision threats are determined from range, range rate, and altitude measurements between aircraft. This data is transmitted every three seconds in time-ordered fashion among all T/F CAS equipped aircraft in the airborne community. When not transmitting, the CAS is listening and evaluating received information. The pilot is alerted to the presence of another aircraft only when there is a possibility of a collision.

Since all CAS maneuvering is in the vertical plane, the vertical speed



The Collision Avoidance Unit and the CAS maneuver/vertical velocity indicator, coupled to two antennas, make up the total time/frequency avoidance system. Contrasting in size and cost, the unit on the right is designed for the general aviation fleet.

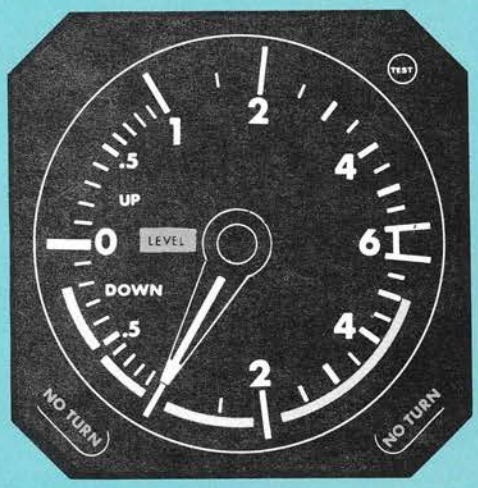
indicator (VSI) was selected to display the CAS maneuver commands and advisories. This approach provides an unambiguous display in addition to conserving panel space and reducing instrument crosscheck.

CAS maneuver commands are simple and straightforward. They consist of a beeping warning tone and a flashing red symbol on the face of the VSI. This symbol may be either a CLIMB arrow, a DIVE arrow, or a LEVEL OFF bar. In addition, two red NO TURN segments illuminate, indicating that turns are restricted during CAS maneuvering. (See illustration for Maneuver command displays.) The pilot responds to a CAS maneuver command by immediately reducing the bank angle to less than 10 degrees and establishing a vertical maneuver so that the VSI pointer covers the flashing red symbol. When safe vertical separation is attained, normally after an altitude change of 300 - 400 feet, the CAS command terminates and normal operation may be resumed. Whenever CAS maneuvering is performed, each encountering aircraft receives a reciprocal command. This minimizes the amount of altitude change required for each aircraft.

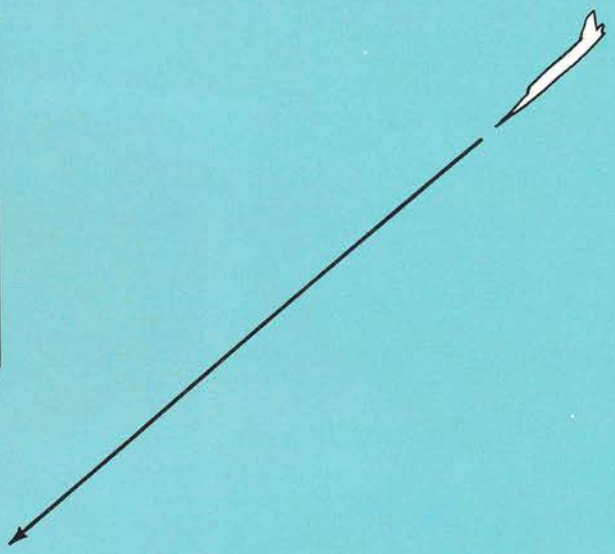
CAS advisory information is displayed as yellow illuminated segments on the face of the VSI, accompanied by a short audio tone initially, and also whenever the status changes. These segments denote vertical speed restrictions due to the proximity of an aircraft above, below, or at the same altitude; but far enough away so that a vertical maneuver is not required as long as the aircraft is not turning. (See illustration for advisory displays.) Vertical speed restrictions may be either 200, 500, 1,000, or 2,000 ft/min, depending upon the vertical separation between aircraft. In the co-altitude condition, the red NO TURN segment illuminates. The NO TURN may be extinguished by maneuvering away from the yellow segments. When the NO TURN is not on, the pilot is free to maneuver in any direction, as long as the vertical speed does not exceed that indicated by the leading edge of the yellow segment. In other words, the pilot must keep the VSI pointer out of the yellow. If the yellow advisories are violated, a red maneuver command will usually result.

CAS maneuvering may be summarized by two simple rules. For red commands, always cover the flashing symbol with the VSI pointer. For advisories, always keep the VSI pointer out of the yellow segment.

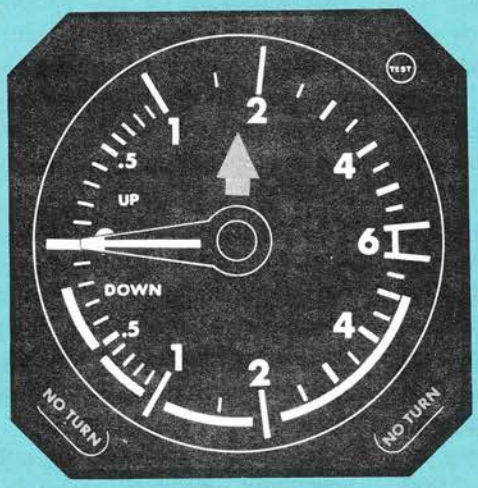
In addition to providing collision protection between aircraft, the EROS II can also provide protection from fixed obstacle hazards



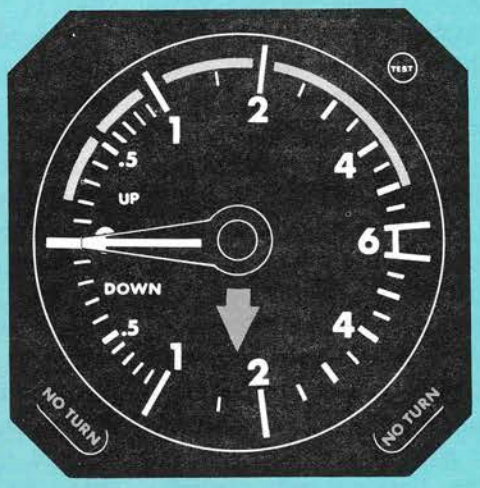
HOLD ALTITUDE
OR LEVEL OFF



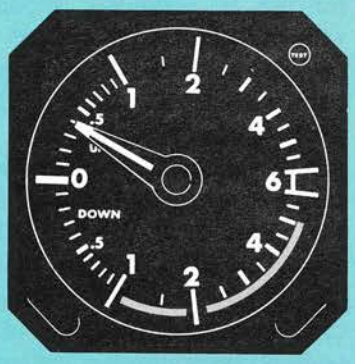
CAS MANEUVER COMMANDS



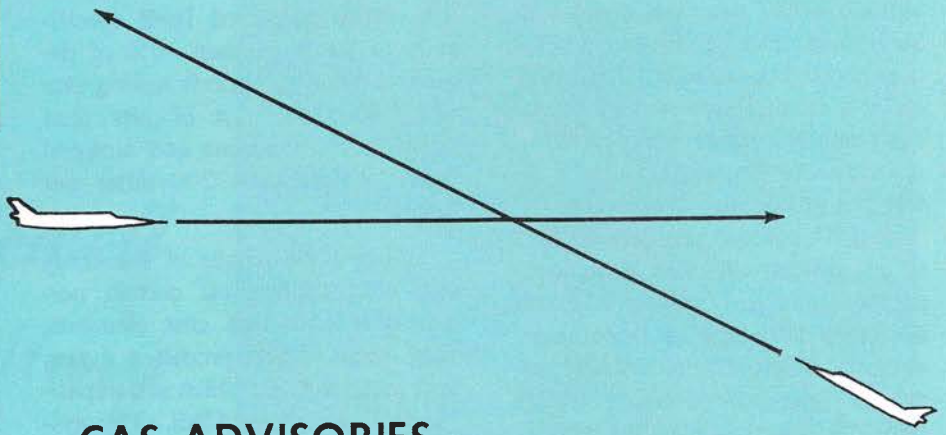
CLIMB



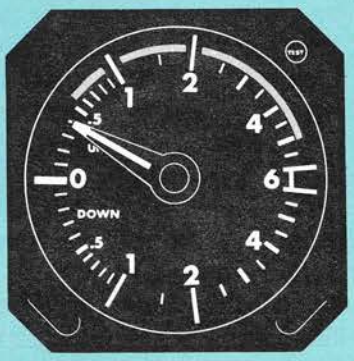
DESCEND



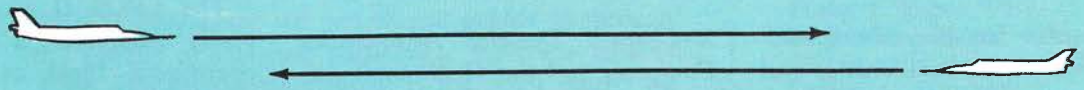
AIRCRAFT BELOW
Restrict descent to less than 1,000 ft./min



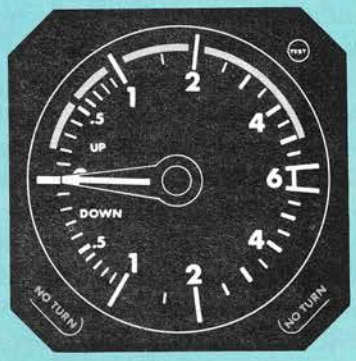
CAS ADVISORIES



AIRCRAFT ABOVE
Restrict climb to less than 500 ft/min



AIRCRAFT CO-ALTITUDE
TURN PROHIBITED



such as mountains, buildings, towers, or other ground obstructions. All that is required is the installation of a low cost T/F beacon on top of the natural or man-made obstacle. This beacon will give warning to aircraft approaching at an altitude below that considered safe. Such an aircraft will receive a climb command. Approaching the obstacle at a safe altitude will produce a limit-rate-of-descent advisory. When the obstacle has been cleared, the warning or advisory disappears.

A T/F beacon properly located at an airport will also protect all runway ends and provide a useful landing aid for EROS II equipped aircraft. In effect, the beacon provides a three-dimensional protection ring (doughnut) around the airport. When an aircraft enters the body of the ring below a minimum altitude, it will receive a climb command. As it flies over the protection ring, it will receive a limit-rate-of-descent advisory. When it enters the "hole" in the ring where the airport is located, the warning or advisory disappears.

As stated previously, an effective collision avoidance system must provide protection for all airspace users. Obviously, the general fleet cannot afford, and does not need all the capabilities that the airline EROS II Model 2000 provides. McDonnell Douglas studied the requirements for a general aviation system under the auspices of the National Aeronautics and Space Administration (NASA) in 1970. The study addressed itself specifically to the more than 70% of the general aviation aircraft having rate of climb limitations of less than 1,000 feet per minute and airspeed limits of less than 200 miles per hour.

Utilizing the results of this study and after trading off certain performance and high cost elements, they designed and produced a general aviation CAS which is compatible with the airline CAS. This system is designated as the EROS II Model 2002 Micro-CAS and consists of one small panel mounted unit with indicator and a single antenna. Collision threats are sorted, using range and altitude data only. Maneuver commands include climb, dive, and hold altitude. Advisories include limit climb or descent rates to less than 500 feet per minute only. The Micro-CAS retains the obstacle avoidance feature of the airline CAS.

CAS T/F technology provides a tremendous future growth potential for use in additional applications without obsoleting present CAS equipment. Some of these applications include Air Traffic Control Aids, Station Keeping, and Precision Navigation. For air traffic control, a synchronized ground station can obtain range, bearing, altitude, positive identity, and 80 additional bits of data from the existing T/F CAS message. Since this data is available without interrogations, the familiar problems of over-interrogation, fruit, and lost or overlapped replies are eliminated. Station Keeping may be incorporated by adding an indicator which displays range and altitude differences from another aircraft whose identity has been set into the system. Bearing information relative to the other aircraft can also be provided by the addition of a second receiver module. Precision Navigation can be achieved by using the T/F CAS time base for determining range to selected range stations.

On 22 June 1971, Piedmont Airlines, establishing a milestone in aviation safety, became the first U.S. carrier to order EROS II CAS to protect its fleet against mid-air collisions. Equipment deliveries will commence in 1973, following their Boeing 737 CAS system certification in the spring of 1972.

The EROS II Model 2000 recently completed a three month operational flight evaluation program at United Air Lines using one of their Boeing 727s. Culminating this program, on 15 February 1972, public demonstration flights were made using the Model 2000 equipped Cessna 172s. These flights have demonstrated conclusively that equipment is available today for preventing mid-air collisions between large high-performance aircraft, as well as small limited performance aircraft of both commercial and military variety. ★

ABOUT THE AUTHOR

Mr Lauber has 19 years of electronics equipment maintenance and product support experience. Presently, he is the Aircraft Electronics Maintenance Engineer in the Product Support Department, CNI Project, McDonnell Douglas Electronics Company. He has been associated with the Collision Avoidance Systems Group for three years and has performed Maintenance/Maintainability Engineering tasks throughout the development of the EROS II, Model 2000. Previous work assignments have been in the McDonnell Douglas Astronautics Company and the McDonnell Aircraft Company on various spacecraft and aircraft electronics systems.

Prior to joining McDonnell Douglas, he worked as a Field Service Representative for six years on Bombing and Navigation Systems and Fire Control Systems. During the period of time of these various field assignments, he was assigned to the Air Defense Command and the Strategic Air Command.

Farewell to Mary

For the past 8 years you who have telephoned ADC's Safety Education Division have been greeted by a cheery, "Carol Channing-like" voice saying, "INTERCEPTOR, Mary Conover." And for those past eight years she has served as our Managing Editor, Executive Secretary, Grammar Corrector, Magazine Organizer, Advisor and friend. She has taken raw fighter pilots from the squadrons and, with liberal doses of diplomacy, wit and charm, guided us through the pitfalls of dangling participles, indefinite antecedents, and faulty punctuation to the point where we felt that we were putting out a readable product and becoming real-live editors. She sometimes even made us feel that *we* were getting the magazine out each month. Mary is now retiring having completed a distinguished career in Civil Service. Those editors who served here before us remember her wisdom, grace and dignity as we now do. Her deep sense of integrity, faithfulness and sincere concern for the INTERCEPTOR have been an inspiration to all the editors who have had the pleasure of working with Mary.

We wish her the peace and enjoyment of her justly deserved retirement. We will miss her.

OPERATIONAL READINESS INSPECTION TEAM

HQ, ADC

Who, Me - - an Inspector!

Two years ago, I received the word that I was to become a member of the ORI team. My reply was, "Who, me — an inspector! After commanding several fighter squadrons I wasn't too attuned to the idea that those ORI guys were there to help me. Well, believe it or not, I too have now been partially brainwashed. No commander likes to be inspected. But in these days of complicated weapons systems, shortages of qualified personnel, and decreasing money for mission support, the commander's management problem is extremely demanding and complex. There are times when he might inadvertently overlook certain aspects of unit operation. Here an inspector does provide help when he identifies these areas to the commander. If the inspectors' findings are properly handled, the corrective actions enhance mission effectiveness. This is really the inspector's goal — to help build a better outfit.

The rules we go by are designed to enable the ORI team to evaluate the capability of the unit to perform its assigned mission. Are these rules some mystical set of guides to be followed once every year or so? One might think so by the changes that are made in a unit just prior to the arrival of the ORI team.

What does the ORI team really look for? Nothing more than what the Commander, Chief of Maintenance, and all supervisors should be looking for on a day-to-day basis. If the daily training sorties are not fully productive or truthfully evaluated for "weapons system" success, then the unit may go into an ORI with many unknown quantities. No one would expect the San Francisco Forty Niners to practice all year using soccer rules to prepare for a football game. Neither can we expect a squadron to perform at peak efficiency during an ORI when their "practice" or day-to-day procedures have been geared to other commitments.

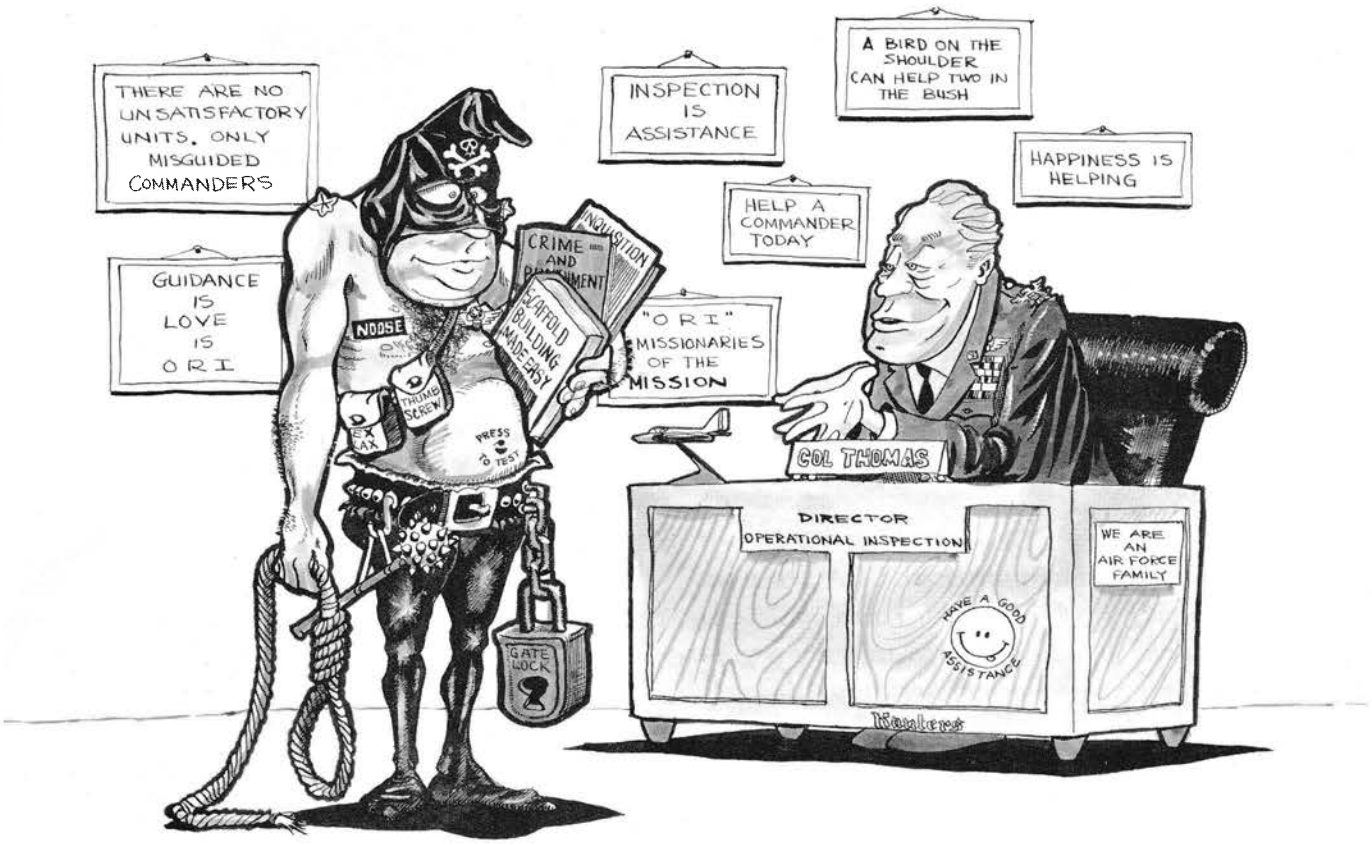
Unfortunately some units seem to fly only to support sortie and flying hour requirements while ignoring quality maintenance. As a result, the brunt of the maintenance effort is focused upon the minimum necessary to keep the aircraft in commission while scheduled maintenance takes a back seat because it may adversely affect the OR rate. Aircrews are reluctant to call an airplane out of commission during the day with the thought that although the bird is sick, sick, sick, it's better than nothing. If the debriefers call an aircraft out of commission for evaluation problems, they are sometimes accused of "breaking the bird" unnecessarily. When this non-scheduled maintenance is deferred, it usually winds up in the hands of the swing or graveyard shift where there is less supervision, and sometimes less skilled people who have fewer spares to work with. So what happens? When the aircraft appears on the next day's schedule without being completely repaired, it will probably not make the schedule, or will wind up as a nonproductive broken sortie. The process repeats itself as the airplanes continue to break at a faster rate. Consequently, a 12-15 hour workday becomes necessary to correct repeat deficiencies. People get tired, both physically and mentally, fatigue clouds judgment and stifles motivation.

Here are some questions I asked when my team evaluated a unit:

1. How effectively are evaluators scheduled and used?
2. Is a highly skilled pilot and/or WSO part of the maintenance debriefing team?
3. Does Workload Control schedule priority work effectively and, where feasible, is the maintenance effort combined by having more than one shop work on the aircraft simultaneously?
4. Are maintenance supervisors closely monitoring repeat writeups and how many times will they accept the same corrective action before they try a different approach?
5. Does the Operations/Maintenance schedule reflect an honest well thought out plan for launching, recovering, and maintaining the fleet?

Here's what I found:

1. As an ADC average 25% of all evaluators sched-



"Frankly Major, while I appreciate enthusiam from my staff, I'm afraid you've missed one important concept."

uled and loaded are never fired for one reason or another.

2. More often than not an expert aircrew is not part of the debriefing team to assist the maintenance debriefers. Obviously, a well organized debriefing team which includes someone who can accurately assess film/NADAR can pinpoint deficiencies more accurately and quickly and prevent wasted manhours or parts.

3. Several times I've found a lack of communication between Workload Control and specialists. Incoming and offgoing shifts in Maintenance Control or out where the work is being performed simply do not talk to each other. In other cases, where several systems required maintenance on the same aircraft, work orders were not assigned with a logical overall plan of repair.

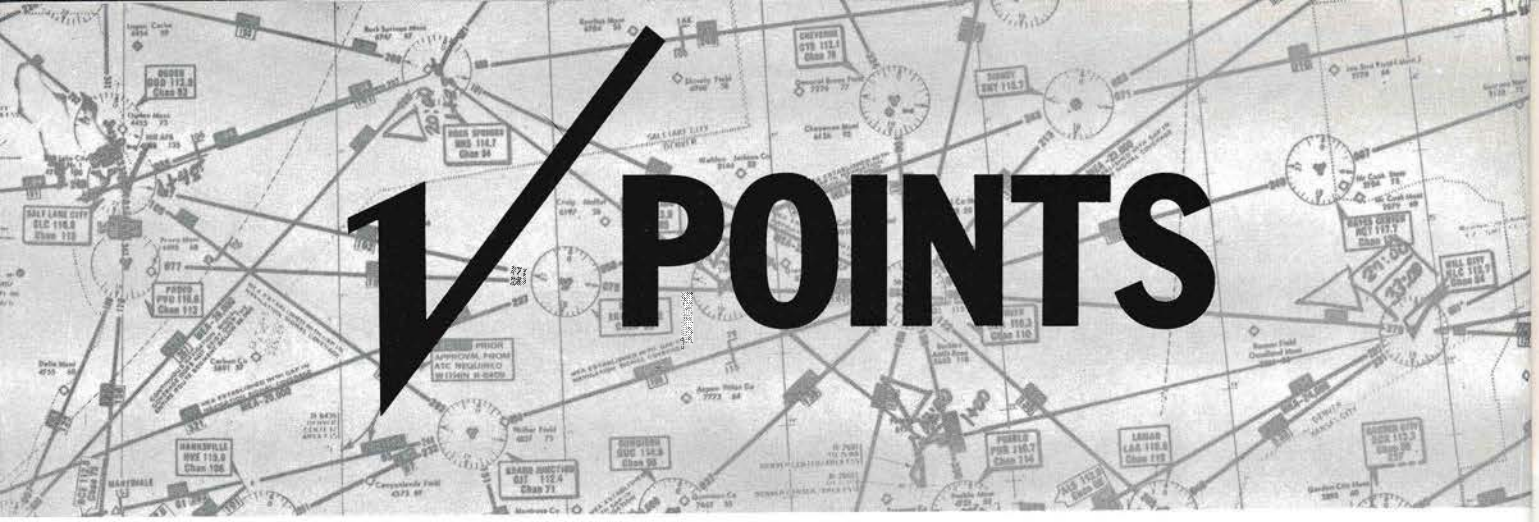
4. Many times we've found that the maintenance effort is wasted repairing the effect rather than the cause. For example, I know one unit that changed seven F-106 starters before they found the trouble was not with the starters but with something else.

5. Frankly, a well thought out Operations/Maintenance schedule that reflects all the factors and variables will help insure that you're ready the next time the team comes to visit you. Some units don't do this. For example, one unit I visited scheduled the same flying hours per sortie regardless of the type of mission, e.g., ACT and refueling. As a result maintenance people either arrived early waiting for the birds to recover or were not available when the bird landed unexpectedly. This all adds to the confusion, disorder, and wasted time. It's tremendously important that everyone knows where he is supposed to be at a given time so that the workload flows smoothly and that you accomplish your objectives at a pro rata rather than sporadic rate. This will help keep you well across the board. By establishing a well thought out plan and sticking to it — come what may — you're going to be able to identify your weakness, and make appropriate corrections, long before the ORI arrives.

Now I'm leaving the ORI team for greener pastures and I hope this sage overview will help make your next test a piece of cake. I'd like to thank you "good guys" in the field for all the support you've given us, both during inspection and in providing us "black hatters" with aircraft to "UE Honk."

Buena Suerte.

JAMES M. THOMAS, Colonel, USAF
Director, Operational Inspection



V POINTS

We would sincerely appreciate your inputs mailed directly to:
The Editor, INTERCEPTOR, Hq ADC (SED), Ent AFB, CO 80912

V The term "minimum fuel GCA" has no meaning in standard Air Force communications. If you are in a minimum fuel situation, then you should have enough fuel to land in the normal traffic sequence. If your fuel state is less than minimum fuel, then you are in an emergency situation. In this case you should immediately declare an emergency and tell the controller exactly what type of pattern you require. Example: "I request a vector direct to a five mile precision radar final approach." Your friendly radar controller will assist you if you let him know you need help and what kind of help you need. The call for help is "emergency," not "request minimum fuel GCA." (SED)

V Our boy Murphy has really "done it" this time! Life support personnel have found a small number of "strobe lights" (PE personnel fondly refer to them as the SDU-5/E, Light Marker Distress unit) that work beautifully in the daylight, but not at night. That's right; that's what we said; these night signaling devices go out in the dark like a candle in a windstorm. But light a match, and they begin flashing like a machine gun. We don't know why these particular units malfunction the way they do, and the depot experts have not, as yet, come up with the answer. But if they don't find the answer soon, we may become independently rich from bets at the bar. "Hey, Colonel, I'll bet you five bucks this strobe light won't work if we turn out the lights . . . !" (SED)

V When an F-106 recently lost its external tanks on takeoff, it started many days of fruitless checks and test flights. In the end, the investigators could not duplicate the malfunction, and they offered the possibility that the pilot may have inadvertently hit the jettison button. To prevent a recurrence of this situation, maintenance personnel are installing thin, red, plastic covers over the jettison buttons. These covers will not prevent the pilot from jettisoning the tanks, either purposely or inadvertently; but they will be a great trouble-shooting aid. If you land without your tanks and that cover has been broken, you may be as innocent as a vestal virgin, but you'll have a lot more trouble getting someone to belive you. (SED)

The term "minimum fuel" seems to mean a different quantity of fuel to different people and this confusion periodically causes problems to pilots and controllers alike. What the term actually describes is a flight condition, not a particular fuel balance. Most MAJCOMs publish a list of minimum and emergency fuel reserves and these are sometimes mistaken for the "minimum fuel" condition. Not so. AFM 60-16 defines minimum fuel as "a flight condition in which the remaining fuel supply may be needed to insure a safe landing in normal sequence with other traffic. If at any time the remaining usable fuel supply suggests the need for traffic priority to insure a safe landing, the pilot will declare an emergency." ADC and most other MAJCOMs further define fuel "to insure a safe landing" by supplementing the basic manual. ADC Sup 1 to AFM 60-16 states: "If, **in the pilot's judgment,** the final landing will be completed with less than the fuel reserves required by this manual, he will so inform the controlling agency by declaring 'minimum fuel'

Aircraft	Minimum Fuel Reserves
T-33	85 gallons
F-101	1800 pounds
F-102	1000 pounds
F-106	1200 pounds
T-39	800 pounds
B-57	1500 pounds

"In addition to the foregoing, the pilot will declare an emergency . . . and land as soon as possible if the final landing will be completed with less than the fuel quantities indicated below

Aircraft	Emergency Fuel Reserves
T-33	60 gallons
F-101	1200 pounds
T-102	600 pounds
F-106	800 pounds
T-39	600 pounds
B-57	1000 pounds

Example: Joe T-bird jock is on a cross-country flight from point A to point B with a weather alternate, point C. After a prolonged delay on the ground and a route deviation during climb-out, he recomputes his fuel. He will have 80 gallons of fuel remaining on landing if he has to go to his alternate. With 550 gallons of fuel on board, he is now in a minimum fuel condition. (SED)

SAGAS SING THEIR SAD SATIRE

NO SWEAT

One of the great air stories of World War II concerns a B-26 that was flown into North Africa via Natal and Ascension Island. Its skeleton crew was a Second Lieutenant pilot, age 20, and an old time master sergeant crewchief, age 40. On takeoff from lonely Ascension, the eager lieutenant raised the landing gear a little prematurely. The aircraft settled a bit, both props touched the runway, but there was enough speed to recover and keep going. When the scared crewchief was able to speak, he said, "Sir, on that takeoff the props cut into the runway. Don't you think we'd better go back?"

And the lieutenant said, "Ah, the heck with it, let them fix their own runway."

what happens when you RUSH

It was Saturday night, about 2130. The squadron badly needed an engine. The Jet Engine Base Maintenance crew had just completed tying down a J-75 engine in the test cell to make a vibration check. They knew that they had to complete the run-up quickly because the Wing had a policy that prohibited engine runups after 2200 hours. The crew made one last walk around to make sure all was in order. Satisfied with their work, the NCOIC of the operation went to call the weather station for the current conditions. His helper started the engine and as it wound up, he pulled the throttle back to stabilize the RPM. The engine accelerated to 60%, jerked the throttle out of the helper's hand, and thrust itself off the test stand. When it hit the ground, twenty-one feet later, it burst into flames. The three men ran away from the test cell fearing that the 5,000 gallons of fuel stored there would explode. The NCOIC tried a frantic phone call to the fire department but he couldn't get through. Either the intense heat of the fire had burned through the wires or the NCOIC was too panic-stricken to dial properly. Unsuccessful here, he sent one of his men to get help. The runner bypassed an emergency phone nearby, jumped in his car and drove a half a mile to the fire station. The fire department responded immediately and extinguished the fire.

What happened? Simple. The crew neglected to install the thrust restraining rods, so the engine was never tied down.

This accident is a classic example of what happens when pressure, parts shortages, and poor supervision at the operator level join forces. The Squadron was in a world of hurt for an engine. The Chief in charge of the JEBM was forced to work his men overtime because the C rating was suffering. Parts for the engines had been in short supply — sometimes due to supply mixups, and sometimes non-availability. It was nearing 2200 and the crew knew they would have to get a waiver to run the engine past that time if they didn't hurry. In their haste, they forgot to bring the T. O., which gave the step by step instructions for the engine setup and the tie-down procedures, on the test stand. But, since the NCOIC had set up and run several engines over the past months, he decided to rely on his memory. Along with this lapse, he also decided to let his unqualified helper do the engine runup.

So there we have it. The engine, QEC kit, a Shaw Estes Control Kit and a Jet Cal Analyser were destroyed along with the associated test cell equipment. Fire also caused severe damage to the interlock electrical system in the test cell. Total cost $312,316.03.

This is what happens when we rush and don't follow the tech orders. ★

THE WAY THE BALL Bounces

ACCIDENT RATE

	ADC	ANG
1 Jan — 30 Jun 1972	3.0	11.4

MAJOR ALL AIRCRAFT

ON TOP OF THE HEAP

MO	ADC	MO	ADC	MO	ANG
57	49 FIS Griffiss	40	4713 DSES Otis	55	158 Ftr Gp Burlington
51	57 FIS Keflavik	39	5 FIS Minot	50	163 Ftr Gp Ontario
46	4650 CSS Richards/ Gebaur	33	2 Fis Wurtsmith	45	115 Ftr Gp Truax
45	552 AEW&C McClellan	29	95 FIS Dover	32	141 Ftr Gp Spokane

ACCIDENT FREE

CUMULATIVE RATE

BOX SCORE

ACCIDENTS FOR JUN / CUM TOTAL

UNITS DIRECTLY UNDER HQ ADC

	ADC	ANG	20 AD	21 AD	23 AD	24 AD	25 AD	26 AD	ADWC	552	4600	4650	4677 4713	ANG
JET	2.8	12.4												
CONV	3.3	0.0												
F-101	0	25.3												3
F-102	0	4.2												1
F-106	0													
T-33	4.8	20.0							1					1
B-57	14.0												1	
EC-121	0													
CONV	4.9	0									1			

RATE = MAJOR ACCIDENTS PER 100,000 FLYING HOURS ALL RATES ESTIMATED

MINOR ACCIDENTS THIS PERIOD — 1
MINOR ACCIDENTS CUMULATIVE — 3

we point with

1/LT Dennis M. Dallman
87 Ftr Intcp Sq
K. I. Sawyer AFB, MI

PRIDE

F-106 NOSE GEAR-UP LANDING

First Lieutenant Dennis M. Dallman was returning to K. I. Sawyer AFB, Michigan, after completing a radar training mission. About forty miles out from home plate he noticed the AC power fail light flickering. A short time later the secondary hydraulic system failed.

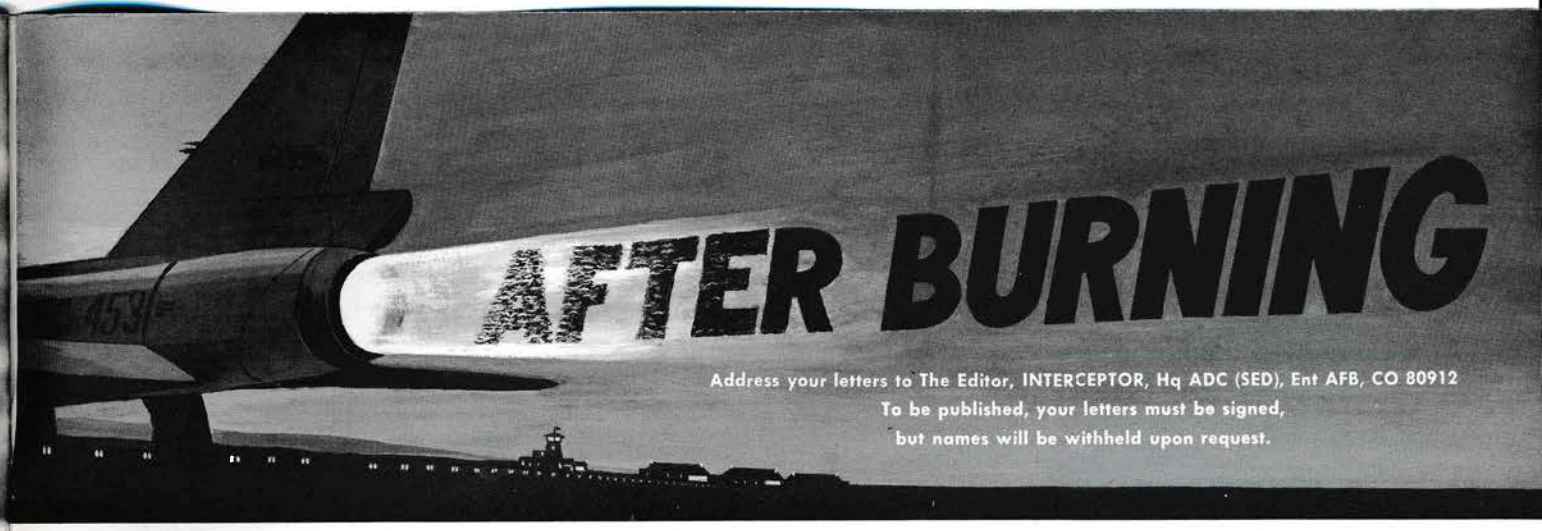
Lt Dallman declared an emergency and set up a straight-in approach for runway 01. When he pulled the emergency gear extension handle, both main gears went down, but the nose gear did not fully extend. He yawed his F-106 and loaded it with positive and negative Gs hoping that the nose gear would fall out and lock, but it wouldn't budge.

With 3,000 pounds of fuel remaining, he began orbiting the field while the fire fighters were foaming the runway. During this period both the A/C power fail and pneumatic pressure warning lights came on. When his fuel got down to 1,000 pounds, he set up on final once again.

With the A/C power failure, the speed brakes would not extend, so he had to pull the power back farther than normal to slow the airplane to final approach speed. The rpm fell below 83% causing the flight instruments to freeze because the air turbine generator dropped off the line. Lt Dallman was then required to complete the remainder of his landing approach on the standby airspeed indicator and altimeter.

He made an excellent landing and gently lowered the nose of the aircraft to the runway just past the 3500 foot mark. (Note: The fire truck had a malfunction and was only able to foam the runway between the 2000 and 3000 foot markers.) He kept the airplane dead on center and let it roll to a stop using minimum braking. The aircraft was damaged very slightly requiring only eight manhours to repair it.

The cool, professional airmanship exhibited by Lt Dallman in this critical emergency prevented a major aircraft accident. We point to him with pride.



AFTER BURNING

Address your letters to The Editor, INTERCEPTOR, Hq ADC (SED), Ent AFB, CO 80912
To be published, your letters must be signed,
but names will be withheld upon request.

STILL DOING IT BETTER

A belated note of explanation and proper acknowledgement of a fine bit of journalistic philosophy is in order for the "Fighter Pilots Do It Better" centerfold in the March INTERCEPTOR. It was "found" scrawled on a plain piece of paper and tacked to the wall in the III CCTS operations room at Ellington AFB, Texas. The author at that time was anonymous and not discovered until after the fact. It turned out that the piece was written in the Sep 71 issue of the 20 AD newspaper "Rampart" in answer to the question, "I've seen a number of signs saying, 'Fighter pilots do it better.' Do they really and exactly what"? The man who answered was Major Dave Pinsky, then Director of Aircrew Evaluation, 20 Air Div, now Commander, Det 2, 48 FIS, Homestead AFB, Florida — A Fighter Pilot who does it better!

Maj Robert D. Goertz
Ch, Intcp Br, Eval Div
Hq ADC

***Our thanks to you for finding the author and to Major Dave Pinsky for finding words for what many of us feel. The "Fighter Pilots Do it Better" centerspread has become one of our most popular presentations. So far we have sent over 1,500 reprints to people who have written from as far away as Australia. We've gone into a second re-printing and we'd be glad to send copies to those who write to:**

Editor, INTERCEPTOR
ADC/SED (FP)
Ent AFB, CO 80912

FIGHTER PILOTS ETC.

In the May 1972 issue of INTERCEPTOR you offered to supply a limited number of the March 1972 centerspreads, "Fighter Pilots Do It Better," to legitimate requests. I am one of two USAF exchange officers at RAAF Base Williamtown in Australia and am the Flying Safety Officer in 77 Sq at Williamtown. As you can imagine, once the offer for reprints was made, I was deluged with requests. I realize this is asking a lot — but — would it be possible to get a mass order of reprints, 70 total. There are two Mirage figher squadrons at Williamtown (the only two in Australia; they have the rest of their fighter force — two more Mirage squadrons — at Butterworth in Malaysia), one Operational Conversion Unit for the Mirage and an Air Staff. This totals approximately 68 fighter pilots. Even if all of the pilots do not want the reprints now, six to eight are PCS'd each Christmas and I will easily distribute all 70 by January 1973. This request is made partly as FSO for 77 Sq, but mainly as an American goodwill gesture. Any consideration you can give to the request will be appreciated.

Capt Thomas H. Walsh, Jr.
Exchange Officer
RAAF Base Williamtown
APO San Francisco 96209

***Yankee Air Pirates are good guys — spread the word.**

HELP WHEN NEEDED

In an effort to help our fellow service, a copy of your November '71 issue is forwarded.

Your publication is widely read and respected by my flight crews. Deepest appreciation for including us on your distribution list.

LCdr J. H. Hulm
Ftr Sq 161
FPO San Francisco 96601

***Thanks for the magazine and your kind words. We needed both.**

FLIGHT SURGEONS APPRECIATION

We wish to express our appreciation to the INTERCEPTOR staff for permission to utilize many of the INTERCEPTOR articles in our teaching program at the United States Air Force School of Aerospace Medicine.

We use the articles to provide supplementary information for topics discussed in lecture sessions. In addition, we have reproduced a number of articles for distribution to our student flight surgeons for later use as sources for presentations at flying safety and other aircrew meetings. We hope, through utilization of this material to enhance the effectiveness of both our training program and presentations by flight surgeons in support of the flying safety program.

Please express our gratitude to the INTERCEPTOR staff for making their outstanding material available to us.

Col Evan R. Goltra
USAF School of Aerospace Medicine
Brooks AFB, Texas 78245

***And we express our gratitude for the many flight surgeons who have contributed articles for publication. Without their inputs we'd be just another flying safety magazine.**

STARCHING NOMEX FLIGHT SUITS

I read with interest your Check Points article concerning Nomex, which appeared in the May 1972 edition of INTERCEPTOR.

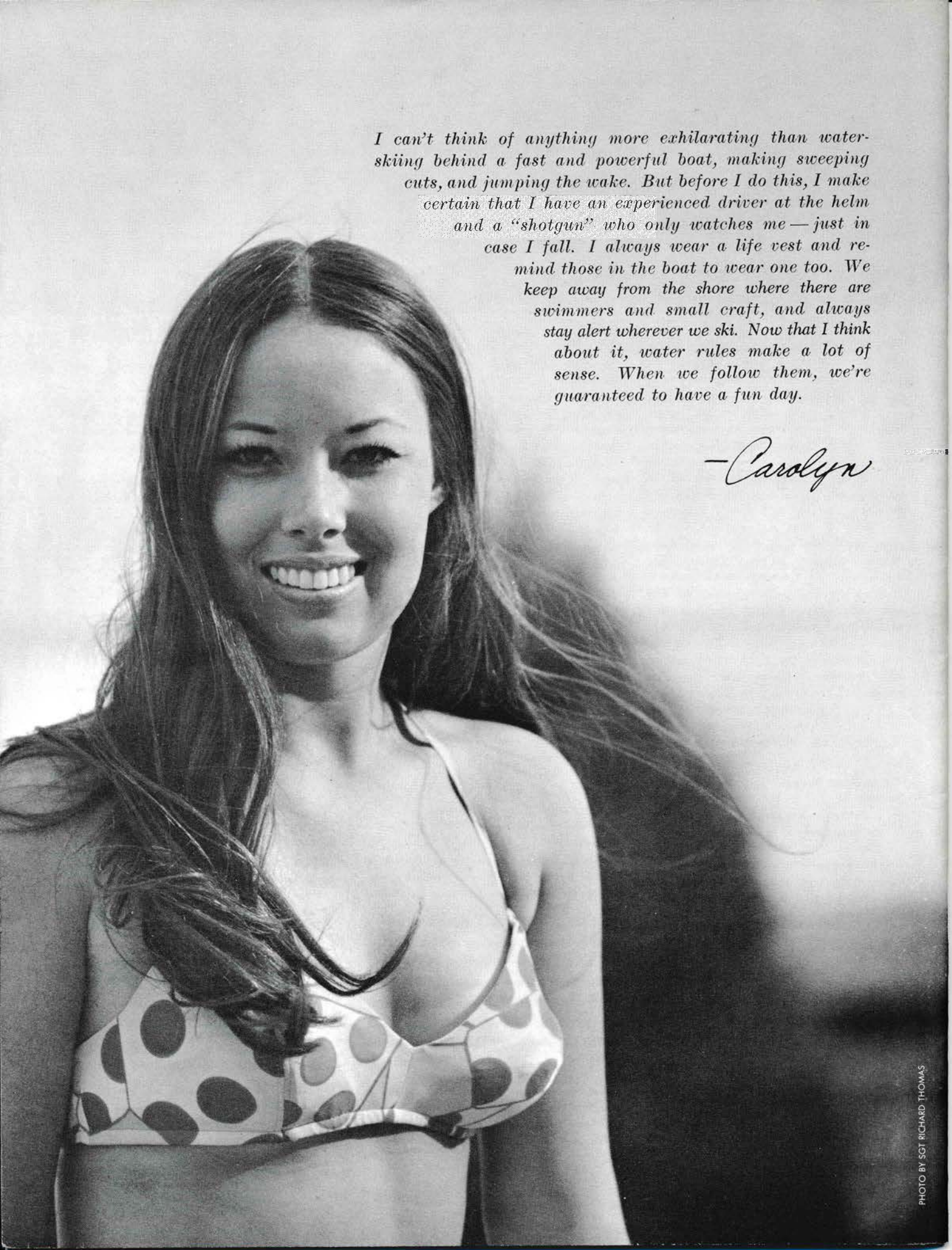
I have taken the liberty of enclosing a copy of the U.S. Army Aviation Digest which identifies a problem the Army encountered in 1971. Pilots starched their Nomex flight suits, erroneously thought the suits were no longer effective, and threw them away.

I would recommend a follow-up article to let your aircrewmen know that washing a starched Nomex flight suit will restore its fire retardancy. This may help prevent a problem similar to the one the Army experienced — loss of numerous, good (but starched), expensive Nomex flight suits.

Maj Alfred G. Borth
Ch, Life Sciences Division
USA Agency for Aviation Safety
Fort Rucker, AL 36360

***You've said it as well as we could. Thanks for your inputs. For those going to SEA, make certain mama san understands, no starch in the Nomex.**

☆ U. S. GOVERNMENT PRINTING OFFICE 1972 — 784-107/1



I can't think of anything more exhilarating than water-skiing behind a fast and powerful boat, making sweeping cuts, and jumping the wake. But before I do this, I make certain that I have an experienced driver at the helm and a "shotgun" who only watches me — just in case I fall. I always wear a life vest and remind those in the boat to wear one too. We keep away from the shore where there are swimmers and small craft, and always stay alert wherever we ski. Now that I think about it, water rules make a lot of sense. When we follow them, we're guaranteed to have a fun day.

—Carolyn

PHOTO BY SGT RICHARD THOMAS