18 OM Stutts

# Interceptor


NOVEMBER 1968

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FOR THE MEN RESPONSIBLE FOR AEROSPACE DEFENSE

# Interceptor

volume 10
number 11
ADCRP 127-2



## spotlight

**The essence of a free government consists in an effectual control of rivalries.**

**John Adams**

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**OUR COVER**

NIEUPORT 17 FRENCH FIGHTER. Le-Rhone 110 HP; 1 crew; 27½ foot span; 19 feet long; 158.8 square feet, 825 pounds empty, 1233 gross; 107 MPH at 6500 feet; 1 Vickers, 1 fixed Lewis machine-gun — typical of a long series of one and two seat fighters produced from 1914 through 1917. The Model 17 was such a good fighter that models captured in 1916 were copied and placed in production by German Siemans and Euler firms as Model D-1. See page 19 for 35 minutes in this nostalgic old bird.



Hq ADC Field Printing Plant
Ent AFB, Colorado

# memo
## from the CHIEF OF SAFETY

### SO LONG, JOHN

Remember the days of the fifty-one? Well, I can remember them because I flew the airplane. It was a great bird — as classic a flying machine as ever was built — a real fighter pilot's dream. When you taxied up to Base Ops with that old four-bladed prop chunking away and the engine sounding like Chris Craft, you really felt important — kind of John Wayne important, a real live helmet, goggles, and guns hero, a little scared once in a while, but important, nevertheless. The "51" days were when flying was fun, but we dinged a lot of airplanes and killed a lot of good troops during those "fun" days.

Since then, at great expense, we've learned that airplanes aren't play-pretties, they're weapons! — fantastically expensive weapons! One of today's interceptors costs more than a squadron of "fifty-ones" — and properly executed can inflict that much more damage on hostile intruders to our continent.

Today's fighter pilots are a different breed of cat — no longer a hell-for-leather image of the hot rock jock, but the more responsible, eminently better trained, far superior equipped professional aircrew of today's Aerospace Defense Command. Oh, we still have a few who think the image of the amateur is the way to go, but we're weeding them out. Either they kill themselves by attempting to prove their pitifully fallacious point or they get politely "screened" away from the action. This current philosophy applies as well to those few "hot rocks" among the large group of good troops returning from Southeast Asia who have the attitude that they know it all back home — that the CONUS mission is kid stuff. Again, this is nothing new. I've seen history repeat itself after a war and two police actions now, so don't you go down in "history." Well, as I said, there are a few — and if you're one of these, or one of the immature who still thinks of himself as a John Wayne, I have this to say to you — So long, John.

COL H. C. GIBSON

# HOT LINE

## VOODOO EGRESS

During a recent F-101B accident involving ground escape, the pilot and RIO were unable to locate and/or properly activate the survival kit release handle. The kit release handle, a small spring loop on the right forward side of the survival kit, requires an up and aft movement to fully release. The pilot was able to accomplish the "up" movement without difficulty, but the "aft" movement was restricted by interference of the ejection seat armrest limiting movement of the pilot's elbow. By not fully completing the release cycle, the pilot was held in the burning aircraft by his personal leads until he physically tore himself free.

Because of intense fire, the RIO had only one chance to reach for the release handle. He couldn't locate it and made his escape carrying the survival kit with him. The handle, in most cases, is covered by the crew members right thigh, and because of a tight fit against the sleeping bag, it is extremely difficult to locate by feel.

It is important that all crew members be made aware of the problems that may be encountered while attempting a ground egress in the F-101B.

## WEARING OF THE UNIFORM

The Secretary of the Air Force has specified that Air Force members will not wear the uniform at any public meeting, demonstration, or interview if they have reason to know that a purpose of the meeting, demonstration, or interview is the advocacy, expression, or approval of opposition to the employment or use of the Armed Forces of the United States.

## AN ODE TO IGNORANCE

Missiles are red.  
WSEMs are blue.  
If you don't know the difference,  
Believe me, you're through.

## LOST DOOR

The Command recently experienced an F-106 incident involving loss of the right engine accessories door. On preflight, the pilot noticed that the door was not completely secured and asked maintenance personnel to secure it. For some reason this was not done and the pilot did not recheck it before engine start. While taxiing, the pilot turned the wrong way, so the tower cleared him for takeoff on the opposite runway. Last Chance was located at the other end, therefore inspection was not performed. The engine door was subsequently lost in flight.

It cannot be emphasized enough that the Last Chance Inspection does not relieve aircrews or maintenance personnel of their preflight responsibilities in any way. It is designed to uncover malfunctions which develop between the chocks and the end of the runway. For this reason, Last Chance procedures must be followed in accordance with AFM 66-1.

Hopefully, the engine door in this incident was not left unbuttoned because of "pass-the-buck" fever.

## HYDROPLANING AND RCR

Two things can trap the unwary pilot during a wet runway landing. The first is that the Air Force system of determining runway condition by using RCR decelerometer reading is not perfect. The RCR may not reflect the actual braking conditions which exist. Therefore, extreme caution should be used when going into short strips, especially where the rollout is computed to be greater than half the length of available runway.

The second point is that two runways of equal length may not provide the same coefficient of friction under wet conditions. Some surface textures are more conducive to hydroplaning than others. Even though experience has shown that the bird can stop easily on one runway, it should not be assumed that the same conditions will prevail on all runways of equal length.

# "HOME OF ANDY GUMP"

If you are a "deuce" pilot, or have driven the "dog," you are probably aware of "Nulli Secundus," the motto of Perrin GCI more commonly known as "Andy Gump." Its mission is to provide ground control intercept support to Perrin Air Force Base's F-102 interceptor program. In this respect, its unique position within ADC is of considerable importance to the overall air defense capability of this command. The 4780th Air Defense Squadron has accomplished many outstanding achievements in the intercept field during the period 1 January 1967 through 31 August 1968. Total target sorties controlled were 6,927, of which 2,030 were ECM. These ECM targets consisted of T-33s, B-57s, B-52s, and B-58s. Total interceptor sorties controlled were 14,428; of which 4,907 were in an ECM environment. The total number of intercepts conducted by Andy Gump during this period was 94,798; of which 23,889 were in an ECM environment. The average intercepts per sorties was 6.0, which is reportedly the highest continuous rate within ADC. It is obvious that to attain this average, the intercept director must hack ten to twenty intercepts per sortie during a 50-minute mission to compensate for aborts. Also during this period, the unit averaged 16 weapons controllers in an operationally-ready status. The average intercepts per controller was 4,622. The intercept control operations of the 4780th Air Defense Squadron are without parallel within the Aerospace Defense Command.

The most interesting aspect of Perrin GCI's operations is the attention and emphasis placed on flight safety operations. The 4780th Air Defense Wing, like all ADC bases, is confronted with the problems of supersaturated airspace. Tactical operations are difficult to absorb in areas where civil traffic reaches peak volume commensurate with tactical airspace utilization requirements. Perrin has taken some impressive measures to minimize these conflicting demands.

Perrin GCI operations established a scope position manned by an "Air Traffic Coordinator." This individual maintains constant surveillance over GCI airspace and aircraft. He also furnishes traffic and area information to Perrin aircraft operating in the VFR/acrobatic area. The Air Traffic Coordinator has direct voice-page communications with Perrin Radar Approach Control and Fort Worth Air Route Traffic Control Center, within whose sector Perrin aircraft operate. These two Federal Aviation Agency facilities feed air traffic information to this position on aircraft traversing Perrin intercept areas where conflicts in altitudes and flight paths could occur. The Air Traffic Coordinator coordinates this information with GCI controllers, who direct their aircraft to avoid the FAA controlled flights. In order to aid ARTCC in identifying Perrin GCI controlled aircraft, two IFF/SIF Mode 3 codes are utilized by Andy Gump. One code is used for operations between 6,000 and 10,000 feet. A separate code is used from 10,500 to FL 23.5. Fort Worth ARTCC readily adopted this system which has afforded a greater degree of flying safety to Perrin and Center's operations than is achieved through routine procedures. Andy Gump also has special IFF/SIF Mode 3 codes which are used specifically in the high and low altitude areas. The low altitude squawks were granted by

Perrin GCI Air Traffic Coordinator, SSgt David C. Frye, receives advisories from ARTCC and RAPCON on enroute air traffic. Movements are integrated with current intercept operation to insure flight safety for civil and military operating within the same airspace. This NCO efficiently and effectively coordinates GCI activities formerly requiring nine MPAD authorized positions.


Colonel Russell D. De Mont congratulates 2d Lt Frank F. Simpson III upon the successful completion of the 900,000th intercept conducted by Perrin. Andy Gump Hero Medals were presented to the controller and pilot, 1st Lt Jim P. Eisenmenger (second from left). Major Terry H. Gries (right) was the instructor pilot on the aircraft.

NORAD, and the high altitude squawks are designated by Fort Worth ARTCC.

The Air Traffic Coordinator position resulted in side benefits to the wing's cost reduction program. This central coordinating position eliminated the need for an airman associated technician assigned to each weapons controller position. A four month test period conclusively proved the one position had a greater span of control with less coordination effort than the previous method. Accordingly, the squadron MPAD was reduced by nine airman spaces. This reduction amounted to a total Air Force savings of $129,800, the largest single savings in the 4780th Air Defense Wing.

In addition to these procedures, the 4780th Air Defense Wing has striven to achieve a completely IFR operation from takeoff to recovery for all its operations. Again, some notable achievements have been made in the flight safety aspects of this operation. At present, two-thirds of Perrin GCI operations are conducted within a completely IFR environment. High altitude intercepts (FL 240 to FL 600) are conducted in a Special Operating Area, provided by Fort Worth ARTCC in joint agreement with the 4780th Air Defense Wing. Sorties scheduled for this area depart under an IFR slot plan. RAPCON controls the climb out to FL 220 and a scope-to-scope handoff is made to GCI. Perrin GCI coordinates entry into Area Positive Control with ARTCC. The intercept portion of the mission is conducted within the SOA which has been granted to GCI by altitude blocks and times.

Recoveries are coordinated out of area positive control by GCI with ARTCC. A scope-to-scope handoff is made between GCI and RAP-

ON for an IFR approach. The same type of operation is conducted for aircraft scheduled for low altitude missions (1,200 feet to 5,000 feet). This IFR area is provided by Perrin RAPCON (FAA) to the 4780th Air Defense Wing. Procedures for entry and exit are similar to those for high altitude. The complete IFR environment for these two areas is significantly important to flight safety. All aircraft movements are integrated into the overall control system for this airspace. At a time when "near misses" are of national concern, Perrin has an enviable position. Planning and coordination is presently underway between the wing and ARTCC to reach a similar agreement for medium altitude sorties. While many problems confront a workable agreement for use of this airspace, a solution appears reasonable and within capability.

A record formerly held by Perrin GCI controller, Captain Jack Coleman, was broken last week by another Andy Gump controller. Second Lieutenant Robert J. Grunnah, 4780 Air Defense Squadron, controlled a total of 1,264 intercepts during the month of August. This record is noteworthy since ADC requirements for an operational-ready intercept director are 156 intercepts per year. Colonel Walter R. Hardee presented Lt Grunnah a trophy in recognition of his outstanding achievement.

The "Andy Gump" weapons controllers share a large measure of the credit for Perrin's efforts in the field of flying safety. A new record was set during the month of August, this year, when 2/Lt Robert J. Grunpah accomplished the all-time high of controlling 1264 airborne intercepts in the 30-day period. That's a lot of controlled safety in the sky for one man to handle in that length of time . . . even for a Second Lieutenant! Fort Worth Air Route Traffic Control Center supervisors have frequently commented on the "exceptional degree of professionalism of the Perrin GCI controller." The unit prides itself on featuring "the finest intercept control service within the Air Force," in keeping with its motto, "Second to None." Skeptics are requested to contact the nearest Perrin graduate. And, if you're concerned with flying safety and GCI control, stop in for an enlightening visit. ★

"Andy Gump Points With Pride" to one of the two operational crews.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AEROSPACE DEFENSE COMMAND
ENT AIR FORCE BASE, COLORADO 80912

SUBJECT: Acceptance of Command Responsibilities

TO: All ADC Personnel

Training for future command of flying organizations begins at the lowest echelon of flying - from "Blue Four" to Commander of Flight, Squadron, Group, Wing, numbered Air Force, and eventually higher command. The wingman who moves up to become lead in a flight of two becomes a Commander at that instant. The active ingredient in command is authority, as with command is given the authority to enforce orders on others. The measure of a man's stature to command lies in his acceptance of responsibility commensurate with the authority vested in him.

Our business is operating flying equipment and leading people who are operating flying equipment in a manner which results in equipment and people performing in a professional manner. The Commander's function of thinking ahead, planning for mission accomplishment, and preparing for the contingencies which may arise in mission accomplishment, comprise his initial tasks. Steadfast leadership in execution and follow-up to assure adherence to sound professional methods at each stage in preparation for, execution, and recovery from missions follows.

The earlier Command opportunity comes in a young officer's career, the more experience in Command accrues to him and the better is his potential as a Commander for his own good and for the good of the Air Force. From the aspect of Squadron and higher Commanders of flying organizations, stalwart use of Flight Commanders offers the best opportunity for close supervision, leadership, and evaluation of our young flying personnel.

The Flight Commander should be given full authority and backing to assure that he has the opportunity to succeed in his task of Commanding a flight. A good Flight Commander is better able to recognize the strengths and weaknesses of the men under him than any other individual in our structure. He must demonstrate his ability to identify the outstanding, the acceptable, and the unacceptable under his command and the strength of character to act in accordance with these identifications. He is best able to perform the task of leading to greater growth those capable of being so led. When they are potentially dangerous or damaging to themselves and the equipment with which they operate, he must take action to assure that the individual is led to a correct attitude and technique or denied the opportunity to damage or destroy himself or his equipment. He must learn to detect those human characteristics which can lead individuals to other than rational, mature conduct. The newly returned combat pilot who has failed to adjust to the rules and conditions that govern the Continental Air Defense mission, or who has not adequately cooled off from his recent experiences must be led to mature conduct or denied the opportunity to fly.

The Squadron Commander grows when he fully accepts the Flight Commander as a Commander, delegates to him, guides him, judges him, and requires peak performance from him. The measure of the Flight or Squadron Commander is professional knowledge and attitude, plus the strength of character to act when one's professional understanding of a matter indicates that action with people is necessary. Discipline, transfer, demotion, compliment, award, promotion are his media. Prompt, stalwart action with regard to each of these are key measures by which superiors judge him.

Today's aircraft require solid engineering knowledge of aircraft, armament, and equipment, plus professional adherence to precision and discipline. The professional knows his equipment, acts with care and deliberation, and follows procedures and check lists as a matter of professional pride. Flying and Command are sheer fun. We must have safety and mission performance in them. Flight and Squadron Commanders who learn to adhere to the rudiments while leading to enthusiastic, aggressive, professional performance in the air and on the ground are valuable to us and are on the road to higher command.

ARTHUR C. AGAN, Lt General, USAF
Commander

# FOOD PROCUREMENT

*by* MSGT GLENDON B. DUSTIN / 4600 Operations Sq • Peterson Field, Colorado

With the average pickup time for a downed crewmember of 30 minutes, food procurement doesn't really seem like it presents much of a problem. But we have to remember that in computing the average pickup time, there were some cases in which it took individuals 10-11 days of actual survival before rescue was accomplished. It has been stated in magazines and manuals that as long as water is abundant, man can live for weeks without any food. That should be qualified since in the arctic areas, for instance, food is required to provide heat for the body and a man may not be capable of going without food for that long a period of time.

Generally speaking, food procurement in a survival situation is not as much of a problem as most people think; but being able to eat it is a problem. If a person puts his mind to it, and practices the procedures outlined in the many survival manuals, he will be able to get food. The big catch is food aversion. A man who is deathly afraid of and despises snakes will find it hard to eat one. Normally, food aversion is a psychological factor. Once an individual knows that a certain species is edible, he may have to force himself to eat it.

The basic rule for edibility under survival conditions is that anything which swims, flies, creeps, or crawls is a source of food. There are, of course, exceptions to this as to any other rule, but the chances of stumbling across non-edible varieties are slim enough so as not to worry about it. Don't be afraid to apply the rule.

Animal foods require different preparation procedures than those for plant foods. All animal foods

. . . who's eating whom?!!

should be cooked because if they are carriers of a disease, the cooking will eliminate the danger. However, if a plant is poisonous, cooking may make no difference. A plant can be poisonous when eaten raw, and edible when cooked, or vice versa. There are roughly 300,000 varieties of plants, many of which are poisonous. It depends on the location. Since it's almost impossible for the average crew member to know the difference with certainty, there is a standard edibility test for the survivor who is faced with a long stay in the boonies. The first consideration when making this test is to be sure there is an abundant supply of the plant variety to be tested. Otherwise, forget it. The test is as follows:

A. Take a small amount of plant food, cook it, place it in your mouth, and hold it there for a while. Wait for a burning sensation. If you get none, swallow it. Now wait eight hours for any ill effects. If you have none, proceed to step B.

B. Prepare another small amount, place it in your mouth and again wait for a burning sensation. If none, swallow, and wait another eight hours. If no ill effects, proceed to step C.•

C. Prepare a larger amount than previously. Place it in the mouth, and wait for a burning sensation. If none, swallow and again wait eight hours. If after this period there are no ill effects, then it can be assumed that the plant is edible. Caution: Always prepare the plant in the same manner as you did while testing it.

And now a word on the ever-popular, garden fresh mushroom. Everyone likes mushrooms with steak, but to go into the woods and pick mushrooms to sustain yourself in a survival situation is asking for trouble. It takes an expert to distinguish an edible mushroom from a non-edible one. Since there is no food value in mushrooms, your best bet is to leave them alone.

There are a few rules of thumb for plant foods. If a plant has a milky sap, it should be avoided. If a plant has a bitter taste, it should also be avoided. But again there are exceptions, as dandelions have a milky sap and grapefruit is bitter. Try this . . . if it looks like a banana, peels like a banana, and tastes like a banana, then more than likely it is a banana.

*. . . funniest experience of your survival situation*

Animal foods are best procured through the use of traps and snares. Check survival manuals for the best type. The simpler the snares, the better off you will be. If you make them simple, you will be able to set more and increase your chances of procuring game. The easiest animal to catch will be the rabbit. When sitting around the campfire, make your snares and traps. It will keep the mind occupied.

Birds can be caught by using a fishing line and hook. Place a small amount of bait (worms, etc.) on the hook and put it where birds will be able to see it (near berry bushes, etc.). When the bird takes the bait, you will probably have the funniest experience of your survival situation. As you start reeling him in, use caution and protect your face.

The following are some additional tips on food in survival:

- All salt water fish can be eaten raw.
- All fresh water fish must be cooked.
- Boiling is the best means of cooking. You retain all the juices and preserve food value.
- Kit survival rations should be used as a last resort. First attempt to procure food by other means and supplement the rations with what you have caught. Pemmican, some people say, was designed to taste bad so it wouldn't be eaten all at once.
- With food procurement, remember that if you can get by the smell and the taste, you will probably gain weight. ★

*. . . wait for a burning sensation*

# HOW MANY MEN IN THE COCKPIT?

"The number of crew members required to perform an operational mission is, among other factors, a function of avionics reliability." These are the words of Mr. Leo F. Hickey of The Boeing Company, Seattle, Washington, and supervisor of Crew Utilization studies made under contract with the Naval Air System Command, Department of the Navy. In short, these studies were conducted to help determine whether future fighter/attack aircraft cockpit design is best suited to single or dual place concept. Full mission, flight simulator tests were run using advanced cockpit and avionics design concepts for future multimission fighter/attack aircraft.

During a visit with Boeing, the INTERCEPTOR staff was privileged to receive a comprehensive indoctrination on the methods and resources which were used to investigate the problem. State-of-the-Art, Part IV, is our report on that visit.

One man versus two man cockpit configuration has been the subject of formal and informal investigation for many years. As mission requirements became more demanding, sophisticated equipment was developed to give aircrews the necessary means to meet the challenge. Hardware purchases became an expensive proposition. As a result, procurement selectivity has been critically dependent on cost-effectiveness considerations.

The old prejudices involving single man, single engine concepts will have little practical value in the future unless they are put to test and are proven valid by state-of-the-art research. In simpler terms, mission requirements will demand performance which cannot be achieved by capitalizing on crew member capabilities exclusively. One case in point is low level navigation under conditions such as night, weather, and high speed. Without reliable avionic subsystems, this mission would be hazardous, to say the least, regardless of how many crew members were employed. Add target acquisition and accurate ordnance delivery prerequisites, and the magnitude of the problem becomes evident.

Cost-effectiveness studies sometimes have a way of producing criteria which appear inconsistent with the objective. This happens when cost and effectiveness are viewed as separate entities and not as interacting elements. For example, the cost per unit of hardware may seem excessive until weighed against the measure of effectiveness purchased.

On the other hand, drawing-board effectiveness must become a reality in the finished product in order to justify high unit cost. For this reason, system reliability is an important input to these studies and should be predicted with some confidence before final decisions are made. In other words, state-of-the-art design commitments should not incorporate unknown quantities. A pilotless aircraft may be technically feasible in the distant future, but in the meantime, aircraft design can only be evaluated on the basis of known capabilities, namely, the most effective combination of reliable equipment and crew member participation.

To lend direction to any in-depth study, it is essential to define the problem as much as possible. For a starter, Boeing research people came up with these questions on crew utilization:

• What equipment and cockpit integration are required for advanced single place and two place

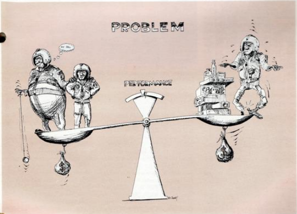


FIG. 1

multimission aircraft?

- Will the state-of-the-art provide the necessary equipment automation and integration?
- Assuming a single place aircraft is possible, does the addition of a second crew man improve multimission capability enough to be cost effective?

Addressing these questions now would provide a needed baseline on which to prepare further research and development of practical hardware for the future, not hard and fast concepts to be pursued without exception. Trade-off criteria used by Boeing to investigate these questions included both crew-equipment performance and system cost. The performance factor is influenced by both equipment state-of-the-art and crew training. System cost is a function of crew support, crew selection and training, and equipment reliability. Since the avionics subsystem has the major impact on crew utilization, emphasis was placed on the effect of avionics on crew capability. Figure 1 illustrates the problem.

The research program was conducted in two phases over a period of almost three years. Phase I was preliminary in nature and consisted of a joint effort in gross analysis and configuration development. North American Aviation/Autonetics was tasked to develop a representative avionics system concept and assist in establishing related operator functions. Boeing was responsible for integrating this system into a multimission aircraft concept and evaluating the relative effectiveness of one and two man cockpit configurations.

The study provided two cockpit and avionic concepts — a single place and tandem two place. Side-by-side configurations were excluded from this study. Side-by-side versus tandem was considered a separate study for some later effort pending results of this research activity.

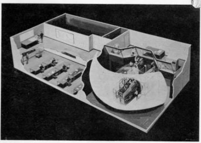

FIG. 2

Phase I configurations were evaluated in terms of equipment feasibility, cockpit geometry, crew workload, and training. A mission analysis was also accomplished which provided a set of detailed scenarios and system tasks for the subsystem studies.

At the conclusion of Phase I it was determined that neither of the configurations was acceptable, and that full multimission flight simulation tests would be required to provide meaningful crew performance data.

Phase II was begun and consisted of three parts. Part A studies resulted in cockpit and avionics improvements which were acceptable, and initial simulator construction was begun. Part B provided test data on the single place and two place cockpit and avionics configurations operating under IFR conditions. Part C provided test data on target acquisition with these cockpits operating under VFR conditions.

In order to gather legitimate data on crew utilization, a simulator had to be designed and built to accurately represent the performance of a multimission fighter/attack aircraft of the future. The project was limited only by present day simulation state-of-the-art and the availability of two integrated flight instruments. Suitable substitutions were made for these instruments.

The simulator facility (Figure 2) is a remarkable achievement in design and functional capability. The crew station (Figure 3) is surrounded by a 160 degree screen which receives the VFR imagery from a 70mm projector mounted to the rear. The cockpits can be changed from single place to two place configuration, or back, in one hour. All displays and controls in the cockpits are active. They are driven by a hybrid computer located nearby.

The area above and behind the crew stations is a glass-inclosed soundproof, test engineer statio...

FIG. 3

Adjacent to the station is an office area for test engineers and crews. Below the office area is a briefing and training room. All areas are tied together by a communication system under control of the test director.

The one and two place simulator cockpits (Figures 4, 5, and 5a) are so realistic that it is difficult to think of them as belonging to a theoretical aircraft. They incorporate the newest principles in instrument arrangement and design, system displays and monitoring, switch and control accessibility, and crew comfort.

A wide variety of sensor displays are available, such as forward-look radar, IR, TV, and side-look radar. There is a moving map display and a fully integrated navigation subsystem. The simulator also has two types of terrain-following display.

The flight displays consist of the contact analog Vertical Situation Display with a number of command symbols and a horizontal heading scale, and standard instruments. Engine instruments consist of vertical scales and digital readouts.

Communications, navigation, and identification (CNI) displays and control are fully integrated with keyboard insert and alphanumeric readouts.

The weapons control subsystem has on-board, completely flexible programming inserts and summary alphanumeric readouts.

A fly-by-wire flight control subsystem is installed along with a multimode autopilot.

The simulator also has a complete set of auxiliary displays.

The one and two place simulator configurations were designed to function as a high mach, swing-wing aircraft (Figure 6) with a low gross weight. Airframe and engines were scaled to each configuration to produce approximately the same overall performance and thrust-to-weight ratio.

The Phase II, Part A, analysis identified critical crew tasks. These tasks comprise the major activity which crews engaged in during the test missions:

- Target Acquisition
- Mission Progress Assessment
- Terrain - Avoidance
- Degraded Mode Operations

Twelve Navy crews participated in the Phase II, Part B, IFR simulator missions. They were all combat qualified and many had SEA experience. This sample consisted of six crews with two place and six with single place experience in current jet aircraft. Each of these crews flew both cockpit configurations.

Sixteen different Navy crews participated in the Phase II, Part C, VFR tests. All were combat and jet qualified. Eight were current in two place and eight in single place aircraft. However, in order to reduce training time, two place crews flew only the two place cockpit, and single place crews flew only the single place cockpit.

Training for the crews participating in the IFR tests was more extensive than for VFR participants. One week prior to arrival, all test subjects received a study document which closely resembles an aircraft Dash One. The total

FIG. 4
single place

FIG. 5A two place (rear)

FIG. 5
two place (front)

training program for each IFR subject consisted of 8 hours of classroom lectures on aircraft performance and subsystems operation and management, one hour of cockpit orientation and familiarization, two hours of radar target interpretation with reconnaissance film in the classroom, and five hours of flight time in the simulator. The VFR subjects did not receive the radar target interpretation or flight training. They were given one training flight of about 30 minutes.

Each IFR test crew flew ten missions, five in each cockpit configuration, with different checkpoints, targets, bogeys, and system failures. Each mission (Figure 7) was self-escort, long range interdiction segment requiring a flight time of 35 minutes, involving attack against a prebriefed ground target and air combat with a surprise bogey. The missions presented a full task load to permit a strong comparison between single and two place concepts, a highlighting of any task allocation errors, cockpit design and equipment deficiencies, and identification of possible deficiencies in training recommendations.

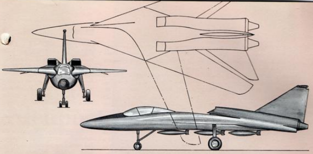

FIG. 6

Degraded mode operation was emphasized.

Each VFR test crew flew two twenty-minute flights in the configuration in which they were qualified. The missions were self-escort, recon-interdiction for the primary purpose of low altitude, visual acquisition of prebriefed targets while time-sharing realistic cockpit tasks. Simulator maneuvering during VFR runs was somewhat limited, 15 degrees in pitch and 40 degrees in roll, due to the size of the projection screen.

The primary purpose of the IFR and VFR tests was to validate the Phase II, Part A, Crew Utilization analysis. Comparative data on each assigned crew task were obtained by applying a unit value to errors in performance. Thus, a two place average error of 65 units obtained for the IFR navigation update mission phase indicated better performance than the single place average error of 81 units.

In general, the two place configuration results provided the best performance for both IFR and VFR missions. Differences were especially noticeable during degraded

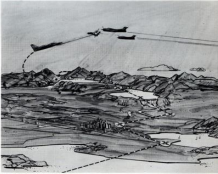

FIG. 7

mode operations and where system monitoring and control required additional pilot attention during difficult portions of flight. As can be seen in Figure 4, the single place cockpit is a crowded affair compared to the two place. The single place pilot is heavily dependent on avionic subsystems. When critical subsystems begin to fail, reduced effectiveness inevitably follows, as proven during the IFR tests where all crews flew the single place configuration. The two place cockpit maximizes division of duties and programmed task-sharing between front and rear seats. As a result, increased workload had less impact on performance.

Although test results appreciably favored the two place concept, there was not enough conclusive data to discount the feasibility of a single place configuration. In some cases, the difference between configurations was so slight as to indicate no significance statistically at the 5% level. Given a larger sampling for testing, however, some of these differences might have proven significant. In other instances, comparison factors that were significant offered little basis for definite conclusions. One example is that the two place crews visually acquired a ground target on the average of 2.4 seconds prior to the single place pilot, but both delivered ordnance equally well.

On the whole, test director observations and crew comments indicate that both configurations were fairly easy to learn. IFR test crews who were only single place qualified were surprised at how much easier the two place version made the missions. Conversely, the IFR two place crews were amazed that they could perform the missions in a single place cockpit. During IFR tracking tasks, it was noted that fighter pilots performed better, on the average, than attack pilots by some 3400 units of error (6000 versus 9400 respectively).

Close air-to-air combat was not examined during simulator testing. Special simulator capability is required involving two moving base simulators flying against each other under both IFR and VFR conditions. However, during IFR test missions, the time required to convert from ground attack after bomb release and complete lockon to a surprise bogey was measured. The two place crews were able to average lockon completion in 5 seconds less time than the single place. Test engineers also noted that pilots flying two place flew less erratically during this transition than they did when they flew single place.

The Crew Utilization studies, which have been briefly touched upon here, have provided an improved understanding of the full multimission fighter/attack aircraft problem. If any conclusion can be made, it is that a few important follow-on studies are needed to further define detail cockpit and avionic requirements and to lock up final decisions concerning the most cost-effective crew complement. In other words, decisions concerning the feasibility of single place aircraft still hinge on developing better data concerning equipment reliability and the cost and flow time necessary to develop this reliability.

With a little effort, the mechanics of this study can be applied to the ADC environment. From the beginning, mission requirements and state-of-the-art have fathered the interceptor of the day. Configurations have run the gamut from the relatively primitive P-61 interceptor, specifically designed for air defense, to the ultra-sophisticated F-12A. Frequently, one and two place concepts have traded positions of prominence in a mixed design inventory and avionics development has played a major role in the process. As mission requirements became more demanding, "black boxes" assumed a greater share of the workload and therefore system reliability became more critical. Finally, a point has been reached where the aircrew is of limited operational value unless the automatic, integrated, computer-fed nightmare functions as advertised. Avionics reliability is essential for mission accomplishment, e.g., a weather intercept with a blank scope will be aborted.

The key crew tasks identified by the crew utilization study are applicable in ADC, although mission parameters are different. The aircrew must actively participate in:

*Target Acquisition.* Includes identification and lockon under varying conditions of weather, altitude, speed, and countermeasures.

*Mission Progress Assessment.* The air battle picture including target information and interceptor tactics.

*Terrain Avoidance.* Assuming interceptor capability requires pursuit at low levels.

*Degraded Mode Operations.* Manually overcome the loss of automated subsystems.

As in the case of the multimission fighter/attack aircraft, the crew utilization problem of future interceptors involves crew-equipment performance and system cost. Sentimental preference cannot answer this question, stated in ADC terms: "Assuming a single place aircraft is possible, does the addition of a second crewman improve aerospace defense capability enough to be cost effective?" State-of-the-art, Part IV, doesn't answer it either, but it presents the facts and shows the way.

# 35 minutes in a Nieuport 17

By CAPT W. R. LONG, CAF

Vintage: Gathering of grapes, or any output of a season.

*Despite what your Funk and Wagnalls says, the vintage aerodynes seen overhead in Canada last year were not scouting for, gathering, or mashing the joy-juice berries. And the ones sticking out of the turf in various poses were neither the end result of the grape nor the total output of the season.*

A variety of antique aircraft were flown in Canada by the RCAF during 1967 for Canadian centennial celebrations and to mark the fiftieth anniversary of military flying in Canada. These aircraft included the Avro 504K flown by the Golden Centennaires aerobatic team, and the National Aeronautical Collection's (Rockcliffe) Sopwith Camel, Sopwith Snipe, Fleet Finch, and the Aeronca C2. Two other aircraft, the Sopwith Triplane and Nieuport 17 of the National Aeronautical Collection were flown briefly but did not fly in any air display. The Nieuport crashed after an engine mount failed; the Triplane was found suffering from a cracked engine mount and was grounded. While all the other aircraft of the National Aeronautical Collection were originals, the latter two were exact reproductions using genuine engines. While the engine mount problems were due to faulty welds there was also a design deficiency in that the mounts were only butt welded rather than reinforced by a collar in an area of high stress. This deficiency was probably modified in the original aircraft, but the two reproductions were built from original plans and the modification sheets were most likely long lost.

Maybe they don't make pilots the likes of those "magnificent men" any more, but our safety-of-flight record for the Canadian Forces' vintage variety was outstanding yes, it stood out, all right: an accident rate *270 times* the present-day military rate!

Flying these kites was, to say the least, different. My comments will apply mainly to the Nieuport 17 and reflect a wealth of experience on this aircraft: 35 minutes flying time and two landings — one on wheels and the last one not on wheels (see photo).

A brief general description may be in order. The first noticeable point is the rotary engine. The crankshaft is fixed to the aircraft; the whole engine — and with it the propeller — rotates. As you can imagine, this imparts interesting gyroscopic and torque effects to the aircraft.

Engine handling, controls, aids, and ancillaries are strictly elementary. Both throttle and mixture controls must be moved almost simultaneously or the noise level is either drastically reduced as the engine quits, or drastically increased as the engine backfires and vibrates. The Nieuport's control range was about 350 rpm with a top rpm of 1200. Fuel and oil flow are gravity fed; a sight gauge shows the amount of fuel remaining. Lubrication is provided by castor oil mixed with the fuel, pumped through the engine, and expelled through the exhaust valves. No oil instruments are needed; oil flow can be confirmed by the film on the lower wing leading edge and on the windscreen — not to mention the pilot's face and goggles.

The instrument layout makes for an uncluttered cockpit. A tachometer is mounted on the right forward side of the cockpit (on the Nieuport) and a ball—no needle—is mounted on the top of the cockpit cowling hard against the bottom of the windscreen. As a concession to my tender years and perhaps also to help me feel more at home, one modern, sophisticated modification was added; an airspeed indicator. It was placed atop the cockpit cowling ahead of the windscreen and could be read through the oil—I mean, the windscreen. The time it was really required it couldn't be used as the vibration made it unreadable.

In the cockpit there's a primitive fuel valve below the tank, an ignition switch, and a "blip" switch on top of the control column. The fuel cock is a simple on/off tap controlling fuel flow from the tank. The two switches controlled the ignition. The actual ignition or mag switch was attached to the left side of the cockpit and resembled an old wall-mounted electric light switch, circular in shape, with a simple on/off paddle in the centre. The engine has only one set of plugs so a mag check isn't much use. Either full rpm was developed on runup and you went flying, or full rpm wasn't developed, and the mechanics started skinning their knuckles.

The blip switch controls the ignition also, but is used mainly for landing. It's a plunger-type switch, spring-loaded up, and controlled by the pilot's right thumb. The Nieuport control column is a hollow metal tube with the blip switch filling the hole at the top. As the engine idled fairly fast on approach, the rate of descent and speed could be adjusted by depressing the blip switch. This cut off the ignition until the engine was needed, at which time the blip was released and the engine roared into life. This was used in conjunction with sideslipping for nearly all approaches and landings. On the flare or round-out, the switch was again depressed and the landing completed.

The blip switch also controlled taxi speed; however, taxiing was avoided with most of the aircraft because of the narrow track undercarriage, no brakes, no tailskid steering, and a shortage of replacement wingtips, etc. We were warned about the possible consequence of holding the switch down for too long. During cut-out, the engine still gets fuel, which makes for fumes under the cowling and when the switch is released, the pilot is in for a surprise. That hazard and a pilot's understandable reluctance to fly sans engine-power meant that the switch was used for only a few seconds at a time.

The taxiing problem was solved by marking out wide areas on the infield that were fairly level and without groundhog holes, etc., and then towing the aircraft into position facing into wind for flying. After an into-wind landing and shutdown, the aircraft were then towed out of position. Enough areas were marked to handle any possible wind direction.

With the exception of two mainplanes, a tail skid, and one or more machine guns mounted externally about the front end, the aircraft is readily recognizable as one of the ancestors of today's aircraft. The Snipe even had an elevator trim system similar to the Sabre's.

The handling characteristics were generally straightforward and predictable, considering that rotary engine. The only exception was the Camel whose reputation, according to its pilot, Wing Commander Hartman, had not been exaggerated over the years. Very light and touchy on the controls, unlike the others, it turned with the stick held neutral or slightly forward depending on the power setting, speed, etc. Control response on the Nieuport was light on the elevators, heavy on the ailerons, and very light on the rudders. There is no trim. The aircraft becomes progressively more tail heavy as the speed is increased above 70 knots and requires constant forward pressure on the control column to counteract this. If you try to change hands to rest your right arm, be sure you have lots of height. There is no friction lock on the throttle quadrant, and, as your left hand is removed from them, the throttle and mixture will usually vibrate closed and stop the engine. Unless you have long legs, the only way to rest your right arm is to make a very swift hand change and assume a strait jacket pose with the right arm running across your body to hold the throttle and mixture while the left hand flies the aircraft. For once I was thankful for having long legs as I soon found I could brace both my knees against the control column while keeping my feet on the rudder bar and so leaving my right arm free for a rest. It was awkward, but solved the problem. Incidentally, the absence of a needle-and-ball is hardly noticeable; the airflow suddenly striking the pilot's face on one side or the other promptly informs him that all is not right.

Takeoff for the first time is startling. The aircraft gives the impression of being airborne even before takeoff power is reached. With 300 feet of roll, liftoff speed is

...ched — 45 to 50 knots indicated — and increases quickly to a comfortable climb speed of 70. The aircraft would probably climb faster at 60 knots, but the extra 10 provides a much better view over the nose. Rate of climb is only academic since the aircraft has no vertical speed indicator or altimeter. Turns can be done in a surprisingly small amount of space and can be entered quickly—even with the heavy ailerons. Rudder must be blended in smoothly as always; I noticed the ball was always in the centre while en route to and from both extremities.

Landings are fairly simple once the pilot becomes accustomed to using the blip switch; without it, the aircraft feels like it will fly all day at idling rpm. On roundout or flare, depress the blip switch and the drag from the windmilling propeller puts the aircraft on the ground in short order. We were cautioned not to try fly-on landings but to concentrate on 3-pointing the aircraft. This is because the C-of-G sits almost over the main wheels and a slight miscalculation by the pilot could send the aircraft tail over teakettle onto its back.

Surface wind direction was carefully noted; takeoffs and landings are always into wind. Otherwise, lack of wheel-brakes, and in most of the aircraft, no steerable tail skid, would almost certainly result in the pilot having to do some explaining on an aircraft accident report form. All flying was done off the grass; space is no problem since landing rolls were always less than 500 feet. As a matter of fact, my *last* landing used only about 15 to 20 feet!

These aircraft provided an unforgettable experience — a once-in-a-lifetime chance to see what flying was really like soon after its inception. Whether my remarks confirm or deny the impressions you may have gained on seeing The Magnificent Men in Their Flying Machines, I'll leave to the reader's judgment.

From a superstitious point of view, one good thing that resulted from my last landing was the disproving of the adage that accidents always come in threes. Six days later, while I was driving down the highway, another car was driven into the back end of my car. It has now been over a year since all that, and nothing more has happened. Personally, I don't think anything would have happened had I gone boating, but in any event I shunned boats for the rest of the year. ★

*Capt Long was flying his second practice trip in a Nieuport 17 when, at approximately 300 feet around 75 knots, he heard a loud bang from the lower left side of the engine. The noise was followed by very heavy engine vibration; pieces of cowling fell off the aeroplane. Capt Long's forced landing was complicated by a troop of RCMP horsemen directly ahead. He completed 150 degrees of an attempted 180 when his aircraft stalled, fell on the left wingtip, and came to rest on its nose. Having no shoulder harness or hardhat, Capt Long struck his head on the gun and was injured.*

*The lower left engine mount had factured at the weld where it is bolted to the firewall. This weld was of poor quality and not up to the heavy strains placed on it by the rotory engine.*

*Capt Long's quick response and cool-headed judgment in a tight spot was good old-fashioned flying at its best!*

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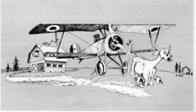
FLIGHT COMMENT.

Capt Long received his wings in 1955 and instructed till 1958 on Harvards at Claresholm, Alberta. He then moved to 111KU and flew Dakotas and Cosmopolitans on search and rescue and transport duties. Since 1964 he has been the Base Flight Safety Officer at Uplands, and presently is assigned to NORAD.



# ORI

**OPERATIONAL READINESS INSPECTION TEAM**
**HQ, ADC**

ADC ORI TEAM

## No More Free Rides

A Free Ride in the card game of "Black Jack" or "21" occurs when a player other than the dealer hits a black jack and rather than take the deal to which he is now entitled, he allows the present dealer to keep the deal in turn for a free hand in the next round of play. If the player beats the dealer on the next round, the player wins the amount of his last bet; if he loses, however, he doesn't lose any monetary value because he didn't invest any money. Until recently, a Free Ride in the ADC interceptor business occurred when an interceptor, properly paired and positioned in the front hemisphere, aborted the intercept or otherwise could not complete a successful pass and converted to the stern. As long as the interceptor crew had not expended a weapon or activated an irreversible signal to the weapons system, the front attempt was not charged and only the stern intercept was assessed.

As of 1 September 1968 you may still get a Free Ride in a friendly game of "Black Jack" but you won't get one in the intercept business. Each pass is one for one and you'll have to get the hack on the front or you'll be assessed a "Missed Intercept." Of course, GCI errors will still be excluded from your hack rate. This isn't anything new, just a throwback to a couple short years ago. The only difference is present interceptor crews experience more opportunities to run in the "front," therefore more chances for MAs or MIs in this environment. Since front attacks appear to be more difficult to many crews, the results may appear to be obvious: more MIs. Now, if you automatically assume the result is more MIs, then you're not necessarily being realistic, but you're certainly giving u before you've given it a good try. Sure fronts a. harder, range rates, time element, reactions, marginal equipment, etc., being what they are, but all of you have hacked the front at one time or another. So the problem becomes not "How can we convince the Headquarters Weenies the front isn't the answer?" but "How can we hack more fronts and prove that we *can* hack it?"

There are probably many answers to this question involving tricks, subtleties, and well-founded procedures, but in the final analysis, the answer becomes basically one of practicing well-proven techniques coupled with reliable fire control systems. How do we accomplish this? I'm sure there isn't one unit in ADC that doesn't have the necessary talent to come up with the answer to the "well-proven techniques" bit. So find it, practice it, and perfect it. You training flight types know the answer, so dig it out and run it up the "pole" again. I know it gets old, but someone's not getting it, so tell him every time you brief on fronts. Maybe some of you older heads have forgotten more about fronts than some of the new troops have learned, so jog your memory a bit, and share it with that new SEA returnee who needs a good tip from an old pro.

When it comes to more realistic fire control s tems, I guess we could sit up all night on alert trying

"... HE'S OK DURING DUTY HOURS, BUT I JUST CAN'T GET HIM TO FLY THE THING AT NIGHT OR ON WEEKENDS!"

to figure out ways to straighten out that radar maintenance shop across the ramp. Point is, as little talent as some of us Ops types may think they have over there in maintenance, they have more than enough know-how to improve the breed. If you've heard it once . . . make comprehensive write-ups. Tell the debriefer exactly what you think is wrong, so he'll have some background info for the fix. Now you've got to follow up that fix, noting trends toward repeat malfunctions, discussing airborne environments with your buddies to determine that environment's effect on the mission and countless other little details that may contribute to the answer as to why the FCS didn't do its job. Talk to your operations supervisors so they can get with their maintenance counterparts and discuss the problems in a mature manner.

Now that we've reviewed the necessary techniques to successfully complete a front attack, coupled with that "improved" radar the "inspired" maintenance section has given us, let's go get MAs on the front. It's going to take a more concerted effort on everyone's part but we've all tightened the belt so many times before that this one isn't going to hurt much.

Let's all show some more of that "Fighter Pilot Attitude" that we're all capable of and hack the front with more regularity.

TOM WILLE, Colonel, USAF
ADC ORI Team Captain

# DOWN and out

## F-106A UNDETERMINED

A student in a Combat Crew Training Squadron was scheduled to fly a radar qualification mission in an F-106A. He was briefed for a formation lead takeoff and departure after which front and stern snap-ups were to be accomplished against a high altitude chaff target. Preflight, engine start, and taxi as a flight of two were normal. "Last Chance" inspection did not turn up any discrepancies on either aircraft.

After a slight delay for traffic, the flight was cleared on the runway. Departure and climb to altitude were satisfactory. After the first pass during the intercept training phase, the instructor pilot in the second aircraft elected to return to base because of a radar malfunction. He was flying with another student in an F-106B. Before leaving the area, he advised lead to continue the mission as briefed.

The solo student made another intercept and when asked by GCI whether he wanted another set-up, he replied in the negative and asked for RTB. A fuel state of 3900 lbs was reported. A hand-off to center was accomplished at FL-300 approximately 35 NW east-northeast of home plate.

Center descended the aircraft to FL240 on a 260° heading and shortly afterwards the pilot called level. At the request of RAPCON, Center gave a left turn to 160° and a descent to 5000 feet. In the descent the aircraft was handed off to RAPCON. The pilot requested an ILS approach. When asked for altitude, he replied level at 5000 feet. Immediately thereafter he was given a right turn to 340° and a descent to 3000 feet. In the turn, when asked to confirm type of approach, the pilot replied that he wanted a low approach after which he would go to tower for a VFR recovery. The pick-up controller then handed the aircraft over to the feeder controller on the same UHF frequency for control to the final approach course. The feeder controller made two attempts to contact the pilot without success. SIF and radar contact were lost shortly after the second attempt. The pick-up controller then attempted six times to reestablish UHF contact without success. He alerted the Crash Net. The aircraft impacted the water 16 NM southeast of the base approximately one minute and fifteen seconds after the pilot's last transmission.

The investigation and analysis could not uncover with certainty the cause of this accident. A lengthy and thorough examination of testimony and recovered wreckage produced barely enough information to make an educated guess on the most probable cause.

It is known that the pilot was not forced into an impossible recovery situation as a result of aircraft systems malfunction or structural failure. Recovered components and structural analysis showed that aircraft control and systems operation were available at impact.

The pilot was unaware of his proximity to the water until possibly just prior to impact where it seems that he made an attempt to recover. This was substantiated by witnesses who saw the aircraft in a level attitude heading toward the water. Also, the pilot made no attempt to eject. A last minute attempt to recover was indicated by instrument readings and flight control positions. The combination of airspeed at 242 knots, nose high attitude, high angle of attack, high positive "G" forces, and aft position of the elevon controls could have produced a high sink rate before impact. The vertical speed showed a high rate of descent.

Cockpit distractions were present. The pilot could have been preoccupied to the extent that he neglected flight instruments and aircraft control. The most probable major distraction was operation of the aircraft radar system. This is the one distraction that could occupy the pilot's attention long enough to allow him to inadvertently descend from 3000 feet to the surface of the water. The electronic cooling light was illuminated but applying corrective action would not require the pilot's attention for that long a period of time. The radar control switches were found in positions which indicate that the radar was being operated during the recovery. It could have been ground mapping or an attack against an airborne or ground target. The armament selector was on "missile all", the scan was single bar and the range selection four mile. The fact that post-attack radar checks are particularly stressed and graded in CCTS supports the theory that the radar was being operated. The armament and scope selection could indicate that an attack was being flown against a C-45 which was in the immediate area or a marker buoy which was close to the point of impact. In any event, an ILS had been requested by the pilot, but it appeared that the incorrect frequency had been selected.

Outside visual reference with the ground was limited due to a descending turn over water and reduced visibility because of haze. It is possible that spatial disorientation contributed to the pilot descending to a dangerously low altitude. A descending turn over water during reduced visibility in haze creates a faulty reference of height above the water, especially if the pilot is preoccupied and is only periodically cross-checking outside the aircraft.

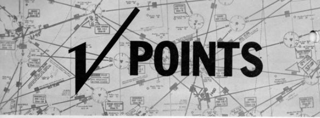
Cockpit fogging as well as canopy fogging could have occurred during the rapid descent from 30,000 feet to 3,000 feet. The position of the cabin air switch (on) and the cabin temperature knob (auto range, cold position) indicated no corrective action was taken if the problem did occur. Due to the temperature and relative humidity existing at the time, this is considered a possibility. It would also aggravate the pilot's ability to accurately judge his altitude by visual reference.

Pilot incapacitation was considered as a possible factor. However, the pilot's activities and physical condition prior to the flight were normal and no positive determination could be made.

The primary cause of the accident is unknown. The most probable cause was considered pilot factor in that, through preoccupation with operating the aircraft radar system, he neglected his flight instruments to the extent that he descended to a position over the water where recovery was impossible.

This accident is the second of its type to occur within a six month period of time. The other aircraft was an F-101B (Down and Out, June 1968). Striking similarities are evident. The airmanship of both pilots was considered above average. Both aircraft struck water during penetration to final approach. Weather conditions caused reduced visibility in haze. Until radar contact was lost, nothing unusual was reported or noticed. No attempt to eject was made, both aircrews apparently unaware of their proximity to the water. Examination of wreckage in both cases could not develop evidence of malfunction in the flight controls or other systems. No one survived to tell what happened.

There must be a message somewhere. ★



# √ POINTS

**We would sincerely appreciate your inputs mailed directly to: The Editor, INTERCEPTOR, Box 46, Ent AFB, Colorado 80912.**

√

Deuce jocks: It always helps to have a few simple checks that verify the operation of your machine prior to takeoff. Should the idle jet in your F-102 fuel control be clogged or damaged it could cause some anxious moments including a possible flameout. Some of you may be doing something similar to this already. If not, we think the procedure at the 112th Fighter Group (ANG) is pretty good. It is designed to check minimum fuel flow during taxi prior to flight. Their procedure is as follows:

1. Stabilize rpm at 70 to 75 percent.
2. Smartly retard the throttle to the idle stop.
3. While doing Step 2, note the fuel flow indicator. It should not drop below a minimum of 600 pounds of fuel flow. There is no maximum and the normal reading will be between 650 and 700 pounds.
4. If the fuel flow drops below 600 pounds when the throttle is retarded to idle, abort and investigate.

The pilot can also get a good indication of the aircraft's minimum fuel flow setting by watching the fuel flow needle closely during the start. When the throttle is brought around the horn, the fuel flow indicator will come up to a first peak and stop. It will remain at this first peak for a few seconds before continuing on to the idle setting. The reading on the fuel flow indicator at this first peak will be the minimum fuel flow setting. (ADCSA)

√

Too often, the Safety Officer fails to use the UR system, especially during an accident investigation. Submitting a formal report recommending the Air Materiel Areas take certain action won't get the job done. He must submit a UR if the problem qualifies as a materiel deficiency under the provisions of T.O. 00-35D-54. This Technical Order explains the USAF Materiel Deficiency Reporting System, clearly specifies when a UR or an EUR is required, and to whom it should be sent. Properly used, the UR is a valuable tool. (TIG Brief)

√

24 July 1957. Two Central Air Defense Force pilots, flying F-102A aircraft, placed first and second in the Bendix Trophy Race flown from O'Hare International Airport, Chicago, to Andrews Air Force Base, Maryland. (ADCPS)

Fall presents a variety of weather as the transition from summer to winter takes place. A period of clear skies and warm, sunny but hazy days with cool nights in the middle or late fall known as Indian Summer, provides a break between a sample of winter and the real thing. The frequent summer thunderstorms occur much less often in September and October and by November the thunderstorm season is over. The hurricane season reaches a maximum in September, tapers off in October, and ends in November. September and early October hurricanes track into the Gulf States or northward along the east coast. In late October and November they tend to move farther out to sea, but sometimes close enough to affect the east coast. Frosty mornings may be expected through much of the Rocky Mountain region early in September and along the U. S.-Canadian border by mid-September. By late October or early November frost may occur as far south as a line eastward from the Texas Panhandle. Snowfall is to be expected at northern bases in October and to extend southward over much of the country in November. Winter-type storms increase in frequency and intensity as the fall season progresses. Temperatures lower about 10 degrees from September to October and 15 to 20 degrees from October to November. Daylight decreases about 4½ hours in the northern border states and 2½ hours along the Gulf Coast from the first of September to the last of November. Daylight at Fairbanks, Alaska, reduces by almost 10 hours in the same period. But at Thule, Greenland, the 18 hours of sun on 1 September goes to zero by the first of November. (4WW)

The present requirement for ground egress training is once every six months (ADCR 501-5). This is not because the Life Support types enjoy watching you throw your sacroiliac out of joint. There is a reason: ground egress accidents for 1967 were double those of **any** previous year! Additional psychological stress is added by the presence of fire in approximately 50% of ground egress accidents. As most of you ejection seat types are already well aware, some of our aircraft require 6 to 9 separate actions to unhitch from your aircraft. Experience and statistics have proven time and again that training and practice and practice and training are the best insurance against a fatal or major injury while in an emergency egress situation. (ADCSG)

## BLUE ZOO

**LAST CHANCE - "No Wonder your gear won't come up, they left the pins in!"**

# safety officers'

# FIELD REPORTS

**F-106A, OIL PRESSURE FLUCTUATION.** Oil pressure fluctuation (38-42 PSI) accompanied by the oil pressure warning light illuminating intermittently occurred 30 minutes after takeoff on a Functional Check Flight for an engine change. The incident occurred at 47,000 feet. An emergency was declared and immediate recovery initiated. When aircraft descended below 25,000 feet, oil pressure fluctuations and oil pressure light illuminating intermittently ceased. Oil pressure indications were normal for remainder of the recovery and until engine shutdown. Investigation revealed internal failure of the boost element of the main oil pump.

**T-33A, OVERHEAT LIGHT.** The aft section overheat light came on during climbout. The throttle was retarded and the overheat light went out. An aircraft emergency was declared and a landing made without further incident. Investigation revealed that the bolts on the tail pipe adaptor assembly were loose allowing exhaust gases to deflect against the heat detector. Bolts were torqued and tail pipe clamp retorqued.

**T-33A, BLOWOUT.** Right main tire blew at touchdown. Examination revealed a single flat spot worn through the tire. The wheel and brake assembly were examined and were normal. Pilot states that his feet were not on the brakes at the time. Reason for blown tire cannot be determined. No directional problems were encountered during the rollout.

**F-101B CONTROL PROBLEM.** During an FCF the manual flight controls became extremely "stiff" in pitch, especially nose up. With gear and flaps down at 250 KIAS excessive pressures were needed to bring the stick aft. Autopilot was selected for a precautionary approach. An uneventful landing was made. Investigation revealed that the speed brake hose was rubbing the stabilator torque tube. The hoses were tied away from the torque tube. Replaced viscous damper (break out force too high on old damper). Ops checked satisfactory.

**F-101B, UTILITY FAILURE.** F-101B suffered a utility hydraulic system failure as the gear was retracted on takeoff. The gear would not retract and utility pressure was observed fluctuating between 1000 and 1500 lbs. Use of the emergency gear system was necessary and the flaps were extended about 10 minutes prior to landing. The flaps extended very slowly taking roughly 5 minutes. A normal landing was accomplished using emergency brakes. The failure was caused by the separation of the up line to the right main gear uplock assembly. The line separated at the flare inside the sleeve and lock nut. Overtorquing was evident, probably over some period of time. As a result the squadron performed a one-time inspection of all lines to the uplock assembly, 49 lines were defective.

**F-102A FLAMEOUT.** Aircraft had been airborne [illegible] about 35 minutes on a practice intercept mission and was completing a stern reattack when the throttle stuck at 91% and AB. Due to the excess fuel burned while returning to the base in AB, the aircraft ran out of fuel on final approach and the pilot completed a flameout landing. Cause of the stuck throttle was frozen moisture in the teleflex cable and the AB cut-off lock which prevents moving the throttle inboard in max AB.

**T-33A UNSAFE LEFT MAIN LANDING GEAR INDICATION.** The aircraft was on the return leg from an out and back and had experienced no difficulties until the landing gear was extended for landing. The left main gear selsyn indicator remained in an intermediate (unsafe) position; the gear unsafe (red) light remained on, and the gear warning horn continued blowing. Recycling and use of the emergency system had no effect on the indication, and after having the Mobile Control Officer visually confirm that the gear was apparently down and locked, a landing was made. Pins were installed on the runway without difficulty and a post-flight inspection of the system revealed that the left main gear downlock switch was out of adjustment. When the switch was adjusted, the system function[illegible] properly.

# THE WAY THE BALL Bounces

## ACCIDENT RATE

| 1 JAN THRU 30 SEPTEMBER 1968 | ADC | ANG |
|---|---|---|
| Thru September 1968 | 3.5 | 5.1 |

MAJOR — ALL AIRCRAFT

## ON TOP OF THE HEAP

| MO | ADC | MO | ADC | MO | ANG |
|---|---|---|---|---|---|
| 60 | 62 FIS | 41 | 408 Ftr Gp | 81 | 132 Ftr Gp |
| 53 | 48 FIS | 41 | 4677 DSES | 68 | 162 Ftr Gp |
| 51 | 4600 AB Wg | 23 | 5 FIS | 66 | 112 Ftr Gp |
| 42 | 18 FIS | 22 | 1 Ftr Wg | 56 | 141 Ftr Gp |

**ACCIDENT FREE**

## BOX SCORE

| ACCIDENTS FOR Sept / CUM TOTAL | 1st AF | 4th AF | 10th AF | ADWC | 4600 | ANG |
|---|---|---|---|---|---|---|
| CONV | / 1 | | | | | |
| T-33 | 1 / 1 | / 1 | | | | |
| F-100 | | | | | | |
| F-101 | / 2 | / 1 | | | | |
| F TF-102 | / 2 | | | | | / 5 |
| F-104 | / 1 | | | | | |
| F-106 | / 1 | | | / 1 | | |
| B-57 | | | | | | |
| F-89 | | | | | | |
| EC-121 | | | | | | |

MINOR ACCIDENTS THIS PERIOD — 2
MINOR ACCIDENTS CUMULATIVE — 8

## CUMULATIVE RATE

| 1 JAN THRU 30 SEPTEMBER 1968 | ADC | ANG |
|---|---|---|
| JET | 4.5 | 5.5 |
| CONVENTIONAL | 1.1 | 0 |

| BY AIRCRAFT | ADC | ANG |
|---|---|---|
| T-33 | 2.5 | 0 |
| F-89 | | 0 |
| F-100 | 0 | |
| F-101 | 6.7 | |
| F TF-102 | 8.0 | 7.3 |
| F-104 | 25.0 | |
| F-106 | 4.8 | |
| B-57 | 0 | |
| EC-121 | 0 | |

RATE = MAJOR ACCIDENTS PER 100,000 FLYING HOURS

# we point with PRIDE


Captain Stephen B. Croker
4782 Cbt Crew Tng Sq
Perrin AFB, Texas

**F-102 MULTIPLE MALFUNCTIONS**

Captain Croker was flying his initial solo (checkout) flight in an F-102 with an instructor pilot flying chase in a second aircraft. After completing the required airwork in the local area, the flight returned to base for a series of traffic patterns and low approaches. During these patterns, Captain Croker received unsafe indications for both main gears, followed immediately by indications of a secondary hydraulic system failure.

The chase pilot confirmed that the left main gear was partially extended, and the right main was completely retracted. When pneumatic extension was attempted, the nose and left main gear extended to a down and locked position, but the right main remained up and the pneumatic pressure low warning light illuminated. The hydraulic oil hot light came on shortly thereafter as "G" forces and yawing were used in attempting to lower the right gear. Not knowing which hydraulic system was overheating and causing the warning light, the worst was assumed, and failure of the primary system was anticipated.

A decision was made to attempt an approach end engagement of the BAK-9 arresting barrier. Captain Croker proceeded to perform a precise approach and touchdown, arresting the barrier cable four feet from runway centerline. The aircraft came to a stop in 712 feet, sustaining a minimum of damage.

Materiel failure of the right main landing gear door forward actuating cylinder had depleted hydraulic and pneumatic pressure, preventing extension of the right main landing gear.

Captain Croker, though inexperienced in the aircraft, negotiated a series of serious malfunctions by maintaining complete and calm control of himself, his aircraft, and the situation at all times. His professional judgment and exceptional flying skill prevented the loss of an aircraft and possible injury to himself and others. To Captain Stephen B. Croker, "We Point with Pride."

# AFTER BURNING

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

### DISTRIBUTION PROBLEMS

In the past North American Rockwell Corporation, Los Angeles Division has received your fine publication. However, recently it has been noted that copies have not been received in our Department. Therefore, we request to be put on direct distribution for two copies. In turn, if it is desired, we will include you on our mailing list for the Los Angeles Division's Operation and Service News.

A. C. Snyder, Chief
Publications, Logistics & Support
Los Angeles Division
North American Rockwell Corp
International Airport
Los Angeles, California

***According to AFR 5-5, paragraph 56, a yearly review is made of distribution. Cards to check mailing list verification and retention will be mailed shortly. Be sure and return these cards as soon as possible with any corrections or additions to insure continued receipt of this magazine.**

### RESEARCH AND PILOT TRAINING

During a recent visit to Nellis AFB, I came across a copy of "INTERCEPTOR" and found its contents particularly relevant to our research programs in pilot training. I wonder if this organization may be placed on the distribution list for one copy of "INTERCEPTOR."

If special requisition procedures are required, or if there is a cost to this organization, please let me know and we will be happy to comply.

Herbert J. Clark
Chief, Operator Training Branch
Training Research Division
AF Human Resources Laboratory
Wright-Patterson AFB, Ohio

***Flying safety is our business, and we will publish magazines to those whose missions are the same as ours.**

### A NEW ACADEMY

The Air National Guard NCO Academy at Knoxville, Tennessee is a fledgling organization currently building its operation. We are now in the process of securing various publications for use by the students. Since many of our students are affiliated with the ADC at their home stations, we feel your publication would be beneficial to us. Therefore, if possible, would you please add our name to your distribution list.

Thank you very much.

SMSgt Hamilton C. McConnell
Tenn ANG, Administrative
Supervisor
ANG NCO Academy
McGhee Tyson Airport
Knoxville, Tennessee

***Best of luck to your new school.**

### PRAISE FROM THE 444TH

The 444th FIS, Charleston AFB, SC, will be inactivated on 30 September 1968. Please stop distribution of the INTERCEPTOR magazine to this unit.

In my opinion the INTERCEPTOR is an outstanding magazine, and has probably done more for professional unity and accident prevention than any other single factor in ADC. Press on — (and don't lose your sense of humor)!!!

Major William W. Dutcher
Flying Safety Officer
444 Ftr Intcp Sq
Charleston AFB, SC

***Thanks, and we won't.**

### SCROLLS STILL AVAILABLE

Scanning our copy of the July INTERCEPTOR, I noticed a letter entitled "The Fighter Pilot." Although I am unfamiliar with Captain Tucker's article, the Kincheloe reputation is known to us all. If possible, would you kindly send me several copies of the aforementioned interpretation.

LTJG K. E. Carson
Public Affairs Officer
Fighter Squadron EIGHTY FOUR
FPO New York 09501

***We recently had a reprint of these popular scrolls and will furnish copies of this tribute to the fighter pilot upon request.**

### OUR NAVY FLYERS

Just a short note to let you know that the flying jocks of VF-102 sincerely appreciate receiving your monthly copies of INTERCEPTOR. Many of the safety items and general interest items apply to jocks of all service components.

I would also like to assure INTERCEPTOR readers that the Air Force does not have a monopoly on fighter pilots. There are some pretty good Naval aviators around who qualify as members of the "Tiger Elite."

I would like to request 10 copies of "Fighter Pilot."

Lt R. J. Gingras
VF-102
FPO San Francisco 96601

***We salute the SEA TIGERS.**

### THE MARINES AND SAFETY

Please add this organization to the distribution list of your excellent publication.

I have enjoyed the INTERCEPTOR over the years and feel it certainly adds to any aggressive Aviation Safety Program.

Capt R. E. Milliron
Aviation Safety Officer
VMFA-513, MAG-14
MCAS Cherry Point, NC

***See above comment.**

# the Cold Hard Facts...

| WIND SPEED | | EQUIVALENT CHILL TEMPERATURE CHART | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KNOTS | MPH | TEMPERATURE (°F) | | | | | | | | | | | | | | | | | | | | |
| CALM | CALM | 40 | 35 | 30 | 25 | 20 | 15 | 10 | 5 | 0 | -5 | -10 | -15 | -20 | -25 | -30 | -35 | -40 | -45 | -50 | -55 | -60 |
| | | EQUIVALENT CHILL TEMPERATURE | | | | | | | | | | | | | | | | | | | | |
| 3-6 | 5 | 35 | 30 | 25 | 20 | 15 | 10 | 5 | 0 | -5 | -10 | -15 | -20 | -25 | -30 | -35 | -40 | -45 | -50 | -55 | -65 | -70 |
| 7-10 | 10 | 30 | 20 | 15 | 10 | 5 | 0 | -10 | -15 | -20 | -25 | -35 | -40 | -45 | -50 | -60 | -65 | -70 | -75 | -80 | -90 | -95 |
| 11-15 | 15 | 25 | 15 | 10 | 0 | -5 | -10 | -20 | -25 | -30 | -40 | -45 | -50 | -60 | -65 | -70 | -80 | -85 | -90 | -100 | -105 | -110 |
| 16-19 | 20 | 20 | 10 | 5 | 0 | -10 | -15 | -25 | -30 | -35 | -45 | -50 | -60 | -65 | -75 | -80 | -85 | -95 | -100 | -110 | -115 | -120 |
| 20-23 | 25 | 15 | 10 | 0 | -5 | -15 | -20 | -30 | -35 | -45 | -50 | -60 | -65 | -75 | -80 | -90 | -95 | -105 | -110 | -120 | -125 | -135 |
| 24-28 | 30 | 10 | 5 | 0 | -10 | -20 | -25 | -30 | -40 | -50 | -55 | -65 | -70 | -80 | -85 | -95 | -100 | -110 | -115 | -125 | -130 | -140 |
| 29-32 | 35 | 10 | 5 | -5 | -10 | -20 | -30 | -35 | -40 | -50 | -60 | -65 | -75 | -80 | -90 | -100 | -105 | -115 | -120 | -130 | -135 | -145 |
| 33-36 | 40 | 10 | 0 | -5 | -15 | -20 | -30 | -35 | -45 | -55 | -60 | -70 | -75 | -85 | -95 | -100 | -110 | -115 | -125 | -130 | -140 | -150 |
| WINDS ABOVE 40 HAVE LITTLE ADDITIONAL EFFECT | | LITTLE DANGER | | | | | INCREASING DANGER (Flesh may freeze within 1 minute) | | | | | | GREAT DANGER (Flesh may freeze within 30 seconds) | | | | | | | | | |
| | | DANGER OF FREEZING EXPOSED FLESH FOR PROPERLY CLOTHED PERSONS | | | | | | | | | | | | | | | | | | | | |

### INSTRUCTIONS

**MEASURE** local temperature and wind speed if possible; if not, **ESTIMATE.** Enter table at closest 5°F interval along the top and with appropriate wind speed along left side. Intersection gives approximate equivalent chill temperature; that is, the temperature that would cause the same rate of cooling under calm conditions.

### NOTES

**WIND** 1. This table was constructed using miles per hour (mph); however, a scale giving the equivalent range in knots has been included on the chart to facilitate its use with either unit.

**ACTIVITY** 2. Wind may be calm but freezing danger great if person is exposed in moving vehicle, under helicopter rotors, in propeller blast, etc. It is the rate of relative air movement that counts and the cooling effect is the same whether you are moving through the air or it is blowing past you.

3. Effect of wind will be less if person has even slight protection for exposed parts—light gloves on hands, parka hood shielding face, etc.

Danger is less if subject is active. A man produces about 100 watts (341 BTUs) of heat standing still but up to 1000 watts (3413 BTUs) in vigorous activity like cross-country skiing.

**PROPER USE OF CLOTHING** and **ADEQUATE DIET** are both important.

**COMMON SENSE** There is no substitute for it. The table serves only as a guide to the cooling effect of the wind on bare flesh when the person is first exposed. General body cooling and many other factors affect the risk of freezing injury.

This chart is adapted from AFP 161-1-11

## CHILL FACTOR