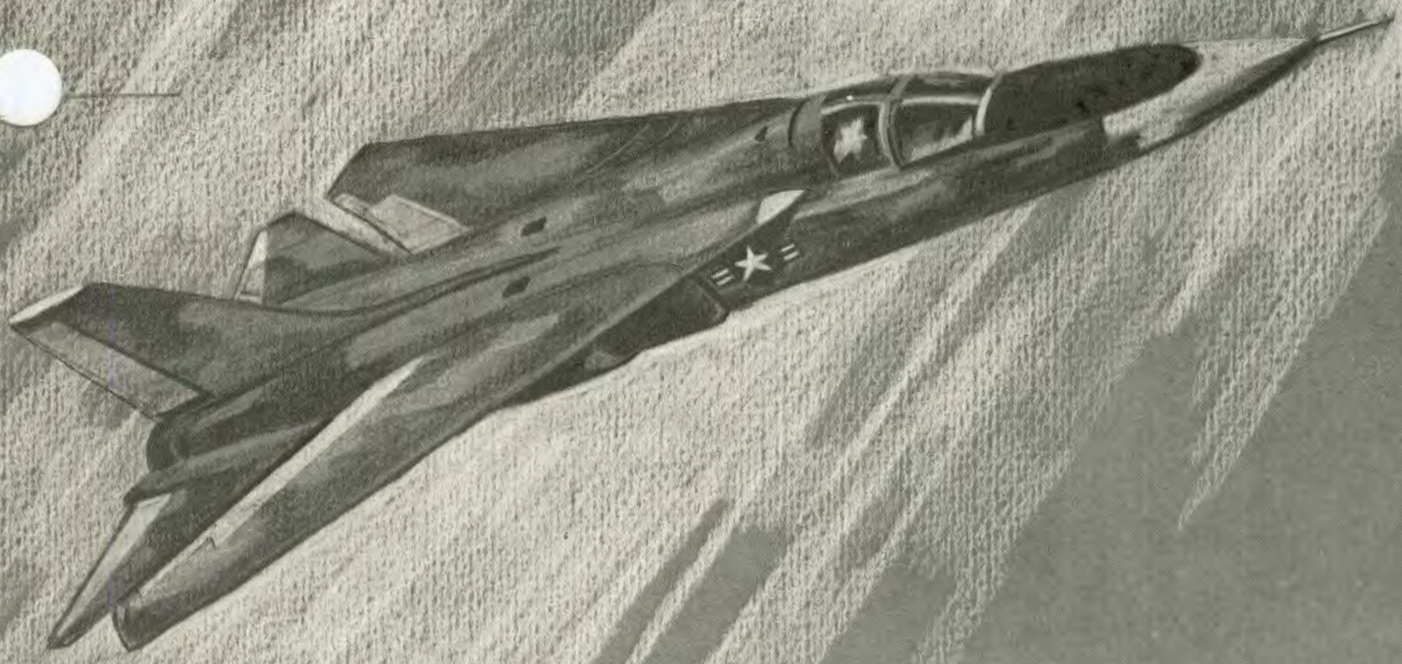
TAC ATTACK

JUNE 1971



SWING WING DEPARTURES...Page 4

for efficient tactical air power

TAC ATTACK

JUNE 1971
VOL. 11, NO. 6

Tactical Air Command

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Jamie sez:

Have you ever wondered why a man is issued two ears and only one mouth?

current interest

departments

TACRP 127-1

Articles, accident briefs, and associated material in this magazine are non-directive in nature. All suggestions and recommendations are intended to remain within the scope of existing directives. Information used to brief accidents and incidents does not identify the persons, places, or units involved and may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. Names, dates, and places used in conjunction with accident stories are fictitious. Air Force units are encouraged to republish the material contained herein; however, contents are not for public release. Written permission must be obtained from HQ TAC before material may be republished by other than Department of Defense organizations.

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Angle of ATTACK

ISOLATED CASE?

How many mishaps or incidents have you observed through the years that caused injury to people, involved the loss of valuable equipment, or disrupted the orderly conduct of our work? Think back – how many of these were "isolated, couldn't happen again in a million years?" Read on for I have a few facts to convey about "isolated" cases.

In analyzing the worldwide message reports of aircraft mishaps, I find numerous incidents each month, all from different units, that are reported as "isolated," and often followed by the comment, "No UR/EUMR submitted." Examination of these incident reports frequently reveals information which may indicate a trend. Such incidents include failure or malfunction of the same part or maintenance error possibly caused by confusing tech data. During one recent week, nearly identical messages were received from two widely separated units with the same type aircraft. Each reported the failure of the same item of equipment under identical conditions. Both were reported as isolated with no EUMR action.

Dropped objects are a major hazard. You name it, we've dropped it during flight. During the past several months, external tanks, travel pods, fairings, doors, panels, drag chutes, and canopies have plummeted to earth from TAC aircraft. Something is causing these parts/equipment to fall off – negligence, materiel failure, pushing the wrong switch. Could they all be "isolated" incidents?

Inadvertent release or firing of munitions is an area that gets real nasty and one a year is too many. But on my desk are reports of several such happenings during the last six months in this command alone. Would you believe that some were initially reported as "isolated" incidents?

I think you get the message. A squadron or even a wing may in all sincerity think they have an isolated mishap or incident, but when reports from units throughout this command and all over the Air Force are compared the picture is often quite different. In some cases it takes only one incident to start a flurry of activity and bring about a solution, while in other cases it may take dozens before corrective action is deemed necessary. But if these are not reported, or are inadequately reported, those individuals in positions to take action remain unaware of the problem.

Here are the steps to take:

Identify and report all incidents promptly and properly.

Take appropriate corrective action.

Suggest ways to prevent recurrence.

Follow up with UR/EUMR, if appropriate.

Don't be a party to our overburdened term "isolated incident." Instead, let's identify the problems so solutions can be developed before the serious accident occurs.

GERALD J. BEISNER, Colonel, USAF
Chief of Safety

SWING WING DEPARTURES

In the T-33, it is called "the tumble." Tony LeVier, in a December 1969 article for TAC ATTACK called it "the thing." In aerobatics competitions it is called "the Lomcevak." The F-4 experiences a "post-stall-gyration." Regardless of the term used to describe the maneuver, it can be a serious problem in any airplane. To operate his particular airplane safely, the pilot must understand the how and why of these characteristics.

Over the past several years, words such as post-stall-gyration and yaw divergence have become part of the "fighter-pilot lingo." These flight characteristics are not brand new things peculiar only to our modern aircraft, but the modern machines are easier to get into a flight region where there may be a problem. Any aircraft, at high enough angles of attack, will exhibit some sort of departure in either roll and/or yaw.

The F-111, both the bomber and the fighter versions, will "depart" if they exceed certain angles of attack. This article is written to let you know some of the whys of how you get there, what you may see if you do depart, and what you can do to give yourself the best chance of recovery. The deep stall investigations in the F-111 are still continuing at the Air Force Flight Test Center, so this is written to bring you up to date on where we are at the present time. As the tests continue, more positive data will be provided to the using commands.

First of all, how do you get there? If you adhere to the published Flight Manual angle of attack limits, you'll never get there. Some things, however, are peculiar to the F-111 and make these angle of attack limits easier to exceed than in some other aircraft in the inventory. The first of these items is the shape of the lift curve.

Figure One presents an approximate lift curve for both F-111 and a T-33. Note that the T-33 curve exhibits a definite break where lift begins to decrease as angle of attack increases. In the cockpit you see this as the point at which the nose begins to fall or as a G break. Not so with the F-111. As angle of attack continues to increase, so does lift. This is due to the lift contributions of the wing glove and fuselage. You need to add a new term to your vocabulary at this point, and this is usable lift. Usable lift can be understood by comparing Figure One and Figure Two . As the curve for directional stability goes through zero, the airplane no longer exhibits the "desire" to fly straight ahead. This is caused by a number of factors, but the easiest way to visualize this is by considering that the vertical tail is blanked out by the fuselage at this high angle of attack. In the case of the T-33, we saw a stall and its associated flight characteristics before we lost directional stability. In the case of the F-111 lift continues to increase beyond the point at which we lose directional stability, so prior to the aerodynamic stall, in the classical sense, the airplane will turn "sideways." Any increase in lift beyond this point is useless – thus the term usable lift.

With the F-111 the point at which directional control goes to zero is somewhere around 25 degrees angle of attack with wings level, and no aileron or rudder inputs. The exact number is not yet available, but since the

Figure one

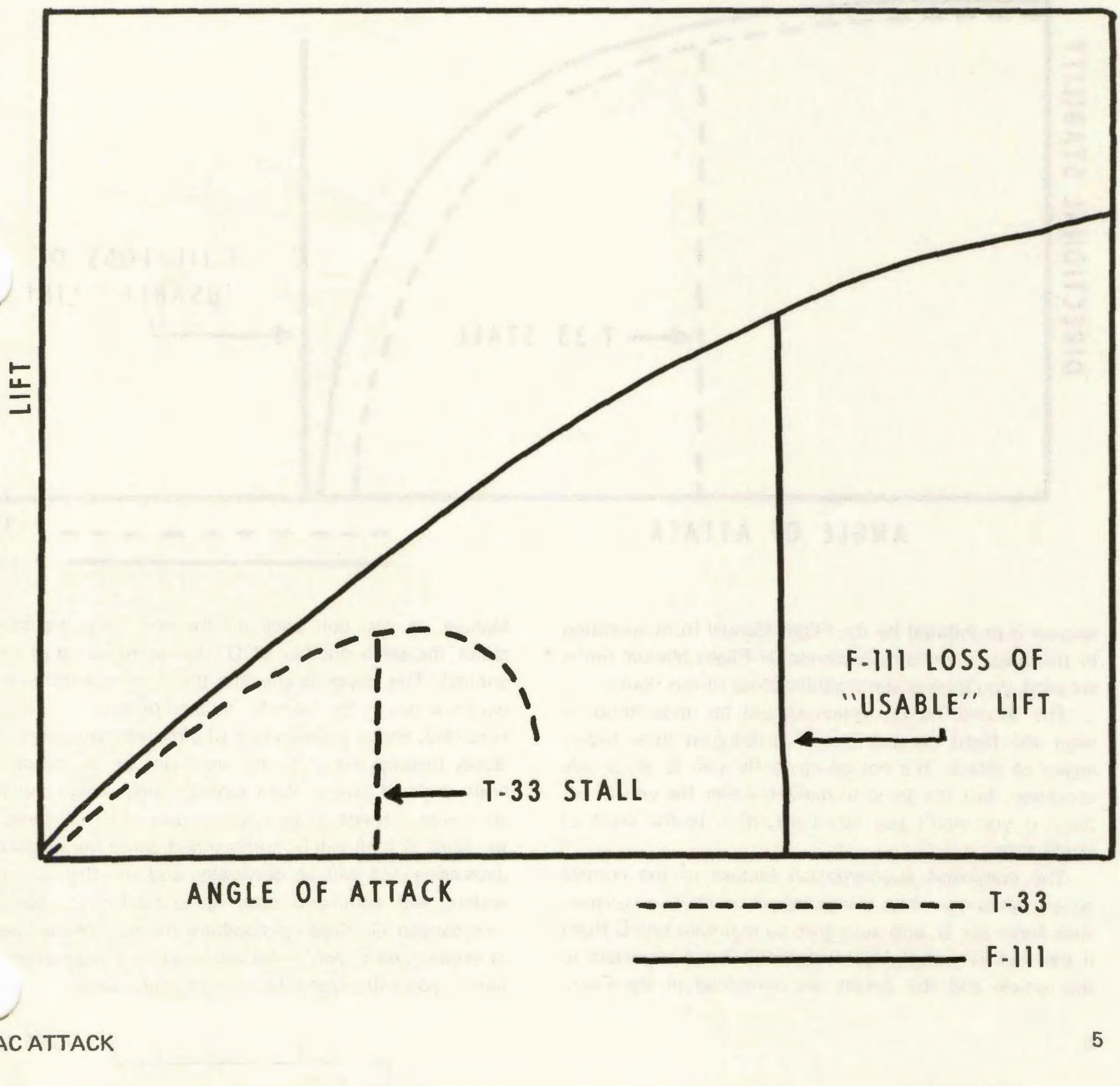
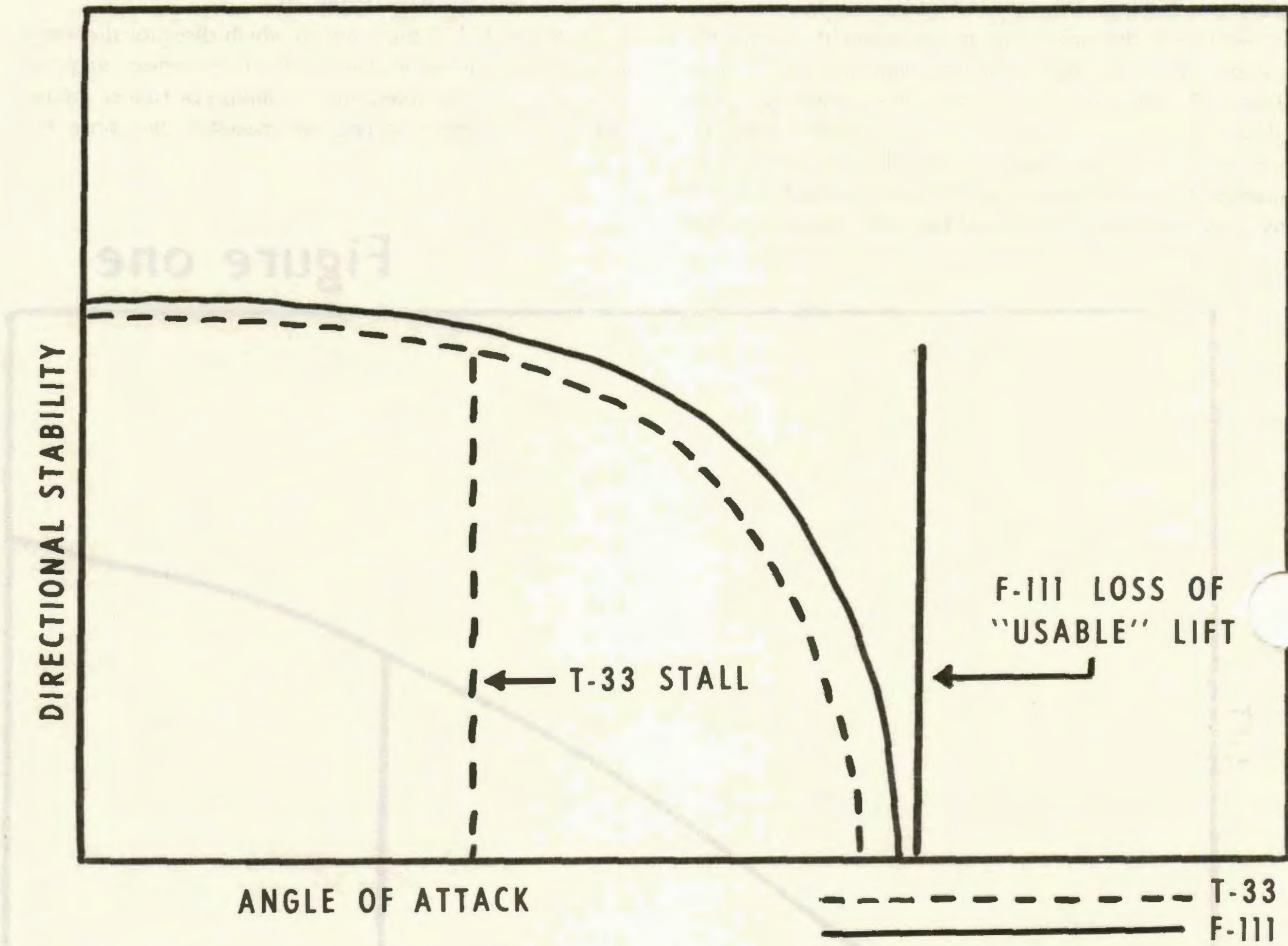


Figure two



aircrew is prohibited by the Flight Manual from operating in this area, it remains academic. If Flight Manual limits are used, you'll never see anything close to this figure.

The second factor, which should be understood, is what the flight control system is doing at these higher angles of attack. It's not going to fly you to an unsafe condition, but it's going to make it easier for you to get there if you don't pay strict attention to the angle of attack tape.

The command augmentation feature of the control system gives you two things: approximately a constant stick force per G, and auto trim to maintain one G flight if the stick is neutral. How it does this is not important to this article and the details are contained in the Flight Manual. If you pull back on the stick you should get about the same number of G's for each pound of force applied. This happens anytime the flight control system switch is not in the takeoff and land position, or the slats extended, and is independent of airspeed, wing sweep, or stores loading. Assume you are flying at the handbook limit angle of attack. Your induced drag is high and you are losing airspeed. If you do not push the stick forward, the same G load will be commanded. Since the airspeed is decreasing, G's will be decreasing and the flight control system will command nose up stabilator to maintain commanded G. Nose up stabilator means increased angle of attack, and if you're not watching your angle of attack tape – you will exceed the angle of attack limits.

Another situation which also must be considered is the e in which the aircraft is stabilized at one G. If the rspeed is decreasing, the aircraft is going to attempt to maintain one G flight and this means that the angle of attack will be increasing. Again, if you're not watching your limits, you can fly into the area where you don't belong.

So, if you're watching your limits, you will never have any problems. Due to the aerodynamic characteristics of the aircraft, and due to the design of the flight controls, the aircraft can easily be flown through the angle of attack limits. It's conceivable to imagine a pilot, who is not monitoring his flight instruments, getting into this area where he doesn't belong.

What happens if you get there? Again, this area is still being investigated, but some things can be said at this point. Buffet is usually present, even below angle of attack limits, so this is not a good cue. The intensity of the buffet is dependent on airspeed, wingsweep and G loading, so again buffet intensity is not a good indication. Heavy buffet should be avoided. If you encounter it, you're getting beyond where you should be. Lateral instability or wing rock, is also not a good cue. As the angle of attack increases, airflow will begin separating from the wings and wing rock would start, except for the roll dampers. The roll damper is designed to correct for ommanded roll deviations, and it does an excellent . This same roll damper that makes the airplane fly like a Rolls Royce at high speeds on the deck, is masking the initial indications of increasing angle of attack. By the time you actually perceive wing rock, your dampers will have already been deflected to their maximum authority, and things are getting serious very fast. As mentioned previously, there is no break in the lift curve, so unless you watch the alpha tape, your actual indication of stall may be when the aircraft departs.

Other than the alpha tape, the rudder pedal shaker is a positive indication of very high angles of attack. There are some things, however, which you should keep in mind regarding this system. At wing sweeps forward of 45 degrees, in the clean configuration, rudder pedal shaker will not actuate until you're already beyond the handbook limit. Also, the rudder pedal warning will probably be masked by airframe buffet. The warning system sums both pitch rate and true angle of attack, so if you are maneuvering, you will find that it actuates below the published angle of attack limit. Including pitch rate in the warning system gives you a greater safety margin in the maneuvering environment. When you feel the rudder pedal shaker, make a positive forward stick movement to decrease angle of attack and monitor your alpha tape. Because it may be masked by buffet, don't count on the er exclusively, especially when maneuvering.

Suppose, for some reason, you discover yourself at a high angle of attack. What should you do? First of all, do not use aileron or rudder, as these control inputs may induce enough yaw to contribute to a departure. If you simply release the stick the aircraft is going to assume you want one G flight at that pitch attitude and respond accordingly. If you are climbing, and airspeed is decaying, you will continue to climb and angle of attack will continue to increase. The solution to the problem is nose down on the stick. Regardless of trim settings or damper positions, you always have nose down stabilator authority. Maintain these controls until angle of attack is below handbook limits.

What about the departure? Flight tests indicate a very smooth departure. Test pilot comments are to the effect that they really felt that the aircraft was controllable, even after departure was verified by the flight test data. This was because the departure was not violent or radical, as might be expected. All during this departure, however, angle of attack, yaw rate and roll rate are continuing to increase.

The rudder is not effective, but the stabilators are, so forward stick must be used to decrease angle of attack. If you put the stick forward, and then relax forward pressure when you note a decrease in angle of attack, you may not have solved a thing. Due to the design of the angle of attack probe, the airflow around the aircraft may cause the indicator to decrease at high angles of attack. You must maintain nose down stabilator until you get other indications that you are really flying again. This other indication is airspeed. Maintain full forward stick until airspeed is well above 200 knots and increasing. Any other control inputs during the recovery could easily result in a spin or another departure.

Prior to a departure, the damper system will attempt to oppose any aircraft disturbances in roll, pitch or yaw. After the departure the roll damper will hinder the post-stall recovery and tend to induce a spin, and it should be turned off after the stick is full forward. It should be emphasized, however, that the stick should be held full forward and no aileron or rudder inputs should be introduced while the roll damper is being turned off.

The F-111 does not exhibit previously undiscovered flight characteristics. You must, however, pay close attention to your angle of attack. If you find yourself outside of the established limits, get back to where you belong as rapidly as possible, as the situation may get worse. If the airplane departs, use the published recovery procedures immediately, and give them plenty of time to work. All indications are that the post-stall-gyration recovery procedures will work if you give them a chance. Finally, if you are below your minimum recommended ejection altitude, don't be a hero. →

TAC TIPS ...interest items, mishaps

POSITIVE CONTROL AREAS (PCA)

You may have heard about the FAA plan to lower the base of positive control airspace to 18,000 feet over the entire United States by the end of this year. In view of this expansion, now may be a good time to take another look at PCA rules, procedures and operating practices. You may not believe this, but even with a PCA floor of FL 240, we still receive reports of pilots (either intentionally or unintentionally) wandering into PCA territory without proper clearance. This, of course, is not only in violation of FAR 91.97, but is extremely hazardous since PCA is one place where the controller and other pilots are not expecting "unknown traffic." Here is a schedule of the current effort to lower PCA from FL 240 to FL 180:

notice of proposed rule making

FAA Center Areas Affected	Issued	Comments Closed	Implementation Date
Seattle, Minneapolis and Great Falls	6 Jan	6 Mar	Completed
Los Angeles, Salt Lake City, Denver	18 Mar	17 May	22 July
Kansas City, Ft. Worth Albuquerque, Houston	3 Apr	2 June	16 Sept (estimated)
Washington, Atlanta, Memphis, Miami, Jacksonville	4 May	3 July	14 Oct (estimated)

with morals, for the TAC aircrewman

FLIGHT CONTROLS

This crew flew their entire mission in clouds. They broke out about 5000 feet on GCA final. At seven miles the stick jumped forward without warning. The front-seater recovered and while they were trying to figure out what happened, it did it again. The paddle switch was pressed and stab aug was disengaged. They went around and landed visually with no more problems.

Investigators found the bellows probe heater inoperative and an air leak in the pick-up probe line. They guessed that ice had formed in the bellows probe and the problems occurred while it was melting.

IT WENT THATAWAY...

The F-4 made a normal touchdown somewhere in SEA and after rolling 1500 feet, the back-seater observed a nose wheel departing the runway to their left. The rest of the landing roll was uneventful. They could find no damage or sign of failure of the nose wheel axle, the attaching nut was not found.

The primary cause was undetermined with possible causes of material failure of the retaining nut; or personnel failure to attach the locking screw and safety wire to prevent the nut from backing off.

As for the nose wheel, it was not found. It was last seen crossing the base perimeter at a high rate of speed.....

F-4 FLIGHT CONTROLS-AGAIN

After leveling at FL 330, the aircraft could not be trimmed to level flight. With full nose-up trim, level flight could not be maintained if the stick was released. They took it home and found the same problem on GCA final – the aircraft could not be trimmed to stay on glide path. Stab aug had no effect, no precipitation was encountered during the flight.

An investigation of the flight control system revealed grease on the bellows piston and a loose clamp on the bellows intake hose. These discrepancies were fixed and the trim linkage was ops checked OK in accordance with the TO. This flight was the first, following the ferry flight home from IRAN.

The next morning the bird flew again and encountered the same problem – but it wasn't as severe. They went back to the drawing board and this time they found a small segment of rubber seal blocking the bellows venturi inlet. With that FOD removed the bird flew like a champ.

UNIT ACHIEVEMENT AWARDS

In accordance with TACM 900-1, dated 26 April 1971, nominations from the field for the Tactical Air Command Unit Achievement Award are no longer required. Upon completion of 12 consecutive months of accident-free (major or minor) flying, awards will automatically be forwarded to eligible units by Hq TAC (SE).

the technique of landing

Last January we revived "The Sinkhole," John Shacklock's award winning effort of 1966. Recently, we found another article dealing with much of the same subject – but from a different point of view. It followed the discussion of an accident concerning a civilian airliner that landed short, bounced, and bounced again, then broke up and burned.

This article is unique because it's written by a Captain in Flight Development of a large international airline. He examined the records of crash recorders covering good and bad landings, sprinkled them with large doses of experience and knowledge of flying, and drew his conclusions. You'll benefit from his observations no matter what you fly, be it an O-1, F-4, or the C-5A. Following is a condensation of his paper – THE TECHNIQUE OF LANDING . . . presented through the cooperation of our friends at the Flight Safety Foundation. Ed.

EXAMINATION OF THE FLARE MANEUVER

The forces acting upon an aircraft even in steady flight are extremely complex. It is possible, however, to reduce this complicated situation to basic terms.

During the approach to land in still air at constant thrust the aircraft is in equilibrium and the rate of descent is sensibly constant. During the flare maneuver, at about the 50-foot point, the rate of descent of the aircraft is gradually reduced to zero. In these circumstances, even if thrust is maintained, the airspeed will fall and go on falling. As the airspeed continues to fall, a point is reached when insufficient lift can be generated and the mutual attraction between the aircraft and the earth is such that the two masses move together and a landing results. It is usual, of course, to commence a reduction of thrust at the 50-foot point which contributes to the rate of decay of airspeed and moves the landing point somewhat nearer to the downwind end of the runway.

This is a problem in the mathematic sense. One can establish ground rules for its solution, but the pilot is required to come up with an answer while being totally unaware of the numerical quantities. He achieves his solution by empirical means backed by an arbitrary amount of experience. The pilot can help himself by keeping the equation as simple as possible, by avoiding the trap of adding in additional variables which will contribute to his having to make a unique decision. In other words, the pilot can contribute to a more simple solution of an extremely complex problem by seeking to arrive at the flare point on every approach at the right speed and the right attitude so that each flare maneuver tends to be as like any other flare maneuver as makes no difference.

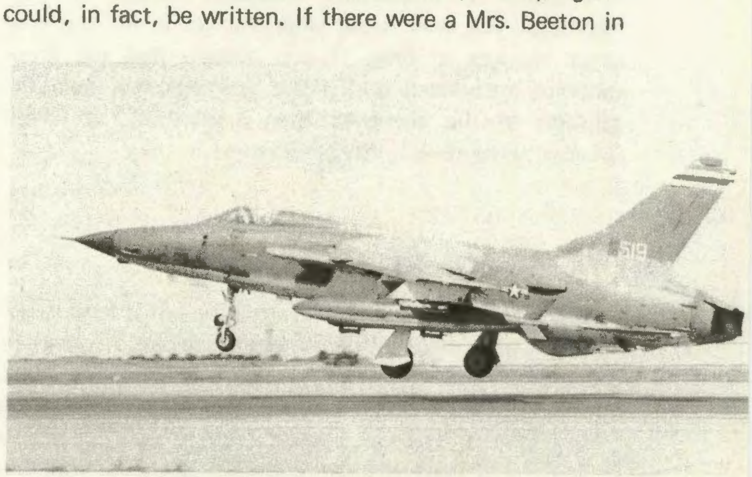
Whatever the complexities of the black boxes, the initiation of the flare in an automatic landing is a somewhat crude operation. At a predetermined point the nose is raised and the thrust is reduced to idle. Admittedly, there is a somewhat sophisticated regime from this point onwards but the flare itself is crude. But this flare works and goes on working. In other words it has predictable repeatability. The reasons are that before the aircraft commences the flare it has been on a steady glide path and the speed and attitude have been reasonably constant. If a sudden change of airspeed was dialed up immediately before the flare, you can be assured that the aircraft's behavior would be anything but predictable and the description of the landing anything but repeatable!

There are four values in the basic flare equation over which the pilot has direct control — thrust, angle of approach, airspeed, and attitude. These become inextricably intermingled unless one of these control inputs is removed. It is most convenient to eliminate thrust because when angle of approach, the airspeed and the attitude are correct, thrust — the opponent of drag — must be right. On the other hand it may be argued if the pilot sets the correct attitude and airspeed, his ultimate control input is thrust alone. This is a fact, but the proposed argument remains valid. Absolute control of angle-of-approach, airspeed and attitude produces good landings. The closing of the loop of control depends upon thrust. The interrelation between the three requirements for repetitive good landings and the final requirement, thrust, is the reason pilots are pilots. Exclusion of thrust from the discussion does not seek to negate its importance but is seen as a convenience in the closer inspection of the other parameters. If thrust is recognized as an ultimate tool in the making the other factors exact, each of these may be examined in detail. Additionally, one must assume that the pilot has arrived over the threshold at 50 feet either by skill or low cunning.

AIRSPEED

As the flare is initiated, if constant thrust is maintained, the airspeed will fall. If the airspeed immediately before the commencement of the flare has been steady, that is to say that the aircraft has been in equilibrium, the rate-of-decay of airspeed is predictable. If, as is usual in the flare, thrust is reduced to minimum, the decay in airspeed is still predictable. The human computer can cope.

On the other hand, if at the moment of flare initiation the airspeed is already falling, the rate-of-decay of airspeed is anybody's guess and the human computer is being asked to perform a task for which it has not been programed, and it is doubtful whether any such program could, in fact, be written. If there were a Mrs. Beeton in



the technique of landing

the flying business, she would surely write one recipe for a hard landing – cross the threshold with a falling airspeed.

There is almost always a wind blowing and we choose to land into the wind if we can. Significant winds introduce the wind gradient effect which causes some loss of airspeed close to the ground. For this reason we add to the threshold speed a number of knots dependent upon the wind and gust factor. We add this increment because we know that we are going to lose it. It is worth bearing in mind that picking up a tailwind in the last 50 feet has exactly the same effect as running out of headwind. At certain airfields there are topographical features which can produce local effects which will accentuate any errors in technique.

It seems reasonable to state that it is an absolute requirement that the airspeed should be held as nearly constant as possible during the last part of the approach before the flare is attempted.

ATTITUDE

Assuming average conditions, the attitude of any aircraft type descending on a 3 degree glide slope is a reasonably fixed number. Pilots ought to know what this number is and those who do not have it pinned down to within a half degree might care to pay some attention to the attitude instrument during an auto-coupled approach. When this number is established it is of extraordinary value in manual approaches. Once set up the aircraft will stick to the glide slope in an almost uncanny way.

Attitude is important because changes of any magnitude not only cause large changes in lift but even larger changes in drag. If one accepts that the fewer variables introduced during the approach the easier the solution of the equation, then a constant, or nearly constant, attitude is a very great help.

THE ANGLE OF APPROACH

When there is glide slope information pilots tend to use it and when there is no external assistance, pilots in general fly a glide slope of approximately 3 degrees. There are circumstances which can persuade some pilots into a false judgment. This can happen if the runway appears to be short or if there is something nasty at the far end, like a deep gully or the ocean, which could lure a pilot into the thought that a flatter-than-normal approach produc a shorter landing distance. This is not to say that th purpose of this advice is to seek to persuade pilots to carry out steep approaches! The point is surely that if the approach path is correct and the speed and attitude are right at the threshold, there must be enough pavement available. If there is not, then the landing should not have been attempted.

Experience shows that it is more difficult to land from a flat approach. The attitude of the aircraft is more 'nose-up,' there is more 'over-flare' producing a step function in the rate of closure with the ground. These stepped flares are also prolific producers of firm landings.

THE PERFECT FLARE

Having arrived at the flare point at the right angle of descent, at the correct attitude and airspeed, a smooth and coordinated flare is possible. Thrust is removed and the airspeed begins to fall. The attitude of the aircraft is slowly modified so that even as the airspeed falls life continues to be generated, permitting the aircraft to close gently with the ground. In ground effect the aircraft tends to pitch forward very slightly and if the elevators are he at a constant angle just before touch, the aircraft will r over almost imperceptibly in the perfect touchdow Analysis indicates that all the best landings result from a very slight nose-down pitch immediately before the touch . . .

Thereafter, the pilot-author examines a series of tracings and finds that in good landings the approach is well controlled. The airspeed is held accurately to the commencement of flare and there is a very tight control of attitude in the last 200 feet. The flare is smooth and unhurried as the aircraft is rotated into the landing attitude. Just before touchdown the nose-down pitch phenomenon is manifest and a perfect landing results. The pilot continues . . .

THE IMPERFECT FLARE

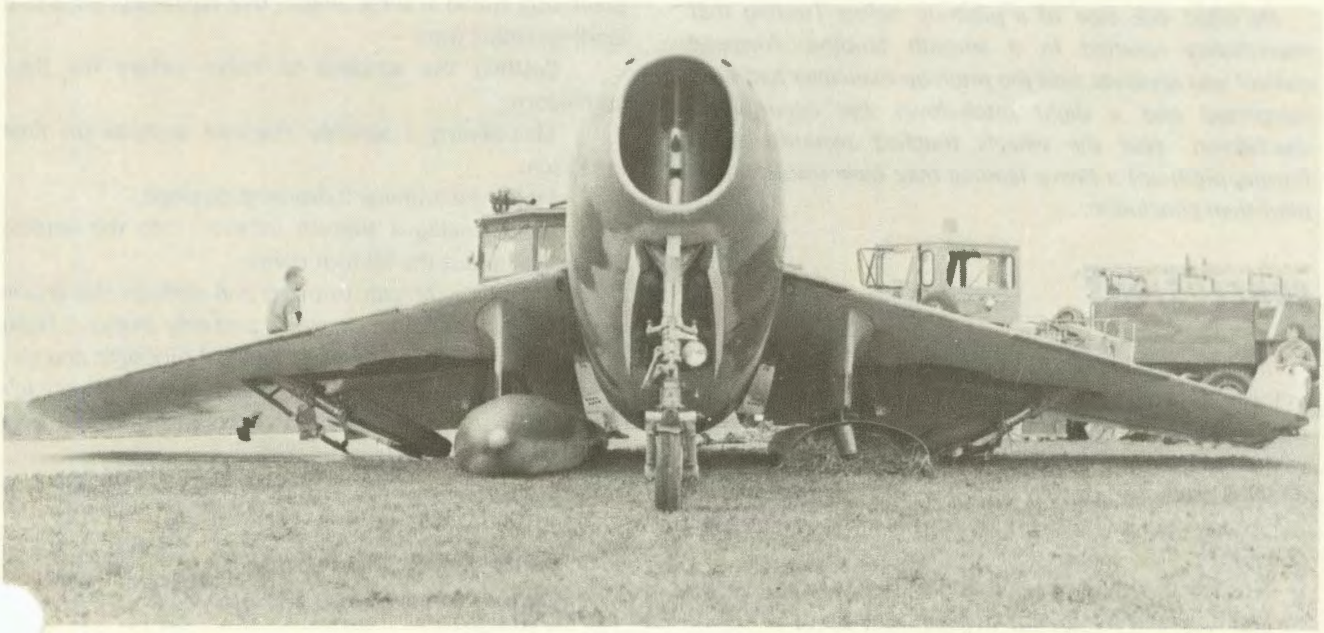
Hard and heavy landings can of course result from a flare which fails to raise the nose sufficiently, or a flare started too near the ground – a case of too little or too late or a combination of both. These arrivals may be destructive to a pilot's ego but they seldom cause structural damage to the aircraft. What appears to cause damage is the 'snatched' flare or, to put it another way, too much too late. This produces a very high rate rotation and if the aircraft strikes during this rota structural damage can result.

When the pilot recognizes that he is closing with the ground rather more quickly than he intended, it is instinctive to pull back on the pole. He hardly has time to work out what he is doing but one imagines that he means to change the angle-of-attack to produce more lift. Unfortunately, in order to change the angle-of-attack it is necessary to increase the down-load on the tailplane (this is the direct effect of up-elevator) and this increase of the down-load on the tailplane actually increases the rate-of-descent momentarily. It is difficult to put actual numbers on this effect but the time lag before the desired result is achieved is of the order of one second.

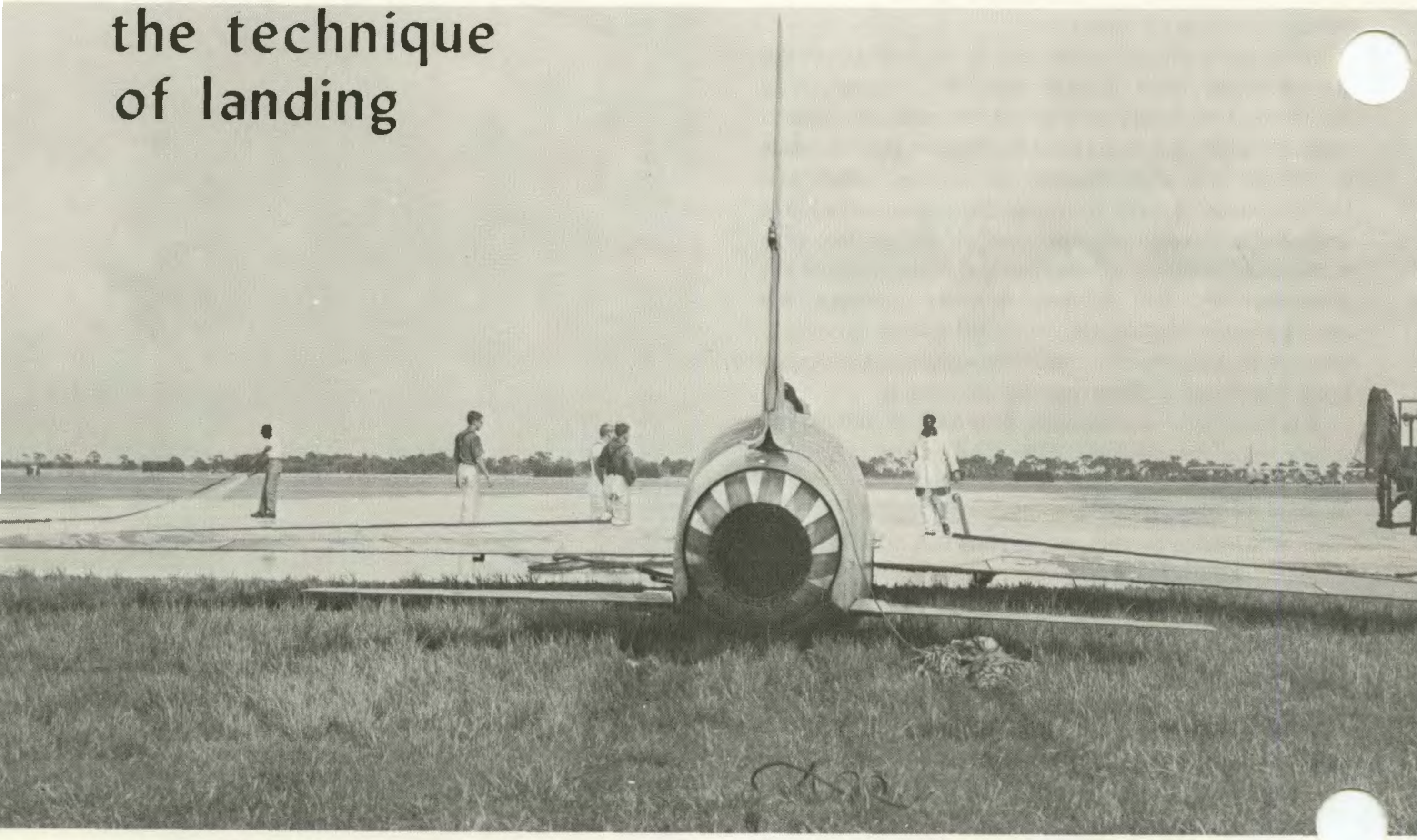
This maneuver is sometimes described as 'driving the wheels into the ground.' While this is not a strictly accurate description of what happens, when one is thinking in basic terms it is extremely graphic and in terms of avoiding bending the aircraft it is perhaps worth accepting as a truth.

Because the C of G is forward of our main wheels, the natural nose-down tendency is considerably reinforced. Pushing forward on the stick at or immediately after a heavy impact produces an additional couple as the down load on the tailplane is reduced. One does not need much imagination to predict the result, and if the aircraft has bounced back into the air, such a control input could be disastrous.

He then looks at traces of heavy landings and finds there is a rapid decay in airspeed just before touchdown which, in itself, could cause a hard landing. He is more interested in attitude as he finds the control of attitude to be coarse and a series of stepped changes in pitch take



the technique of landing



place with the aircraft striking the ground during a pitch-up maneuver. He finds that a firm landing can be converted into something a good deal worse by a high rate of rotation at the moment of impact.

He cited one case of a pitch-up before landing that nevertheless resulted in a smooth landing. Airspeed control was accurate, and the pitch-up maneuver had been completed and a slight pitch-down was occuring at touchdown. Had the wheels touched seconds earlier (during pitch-up) a heavy landing may have resulted. The pilot then concludes . . .

CONCLUSIONS

In order to complete the story, it would be of great interest to examine three more parameters in the flare maneuvers, radio height, elevator angle and thrust. These values are available on some recordings and a much more detailed study is possible and may even be desirable. In the interest of clarity this study has been kept as simple as possible.

It is worth making one additional point. In attempting to codify the technique of the flare one tends to talk in terms of ideal conditions rather than those which are somewhat difficult, for instance a landing in a limiting crosswind. On the other hand the correct basic technique is right for all conditions and the recordings indicate, as previously stated at some length, that repeatable good safe landings result from —

Settling the airspeed to target before the flare commences.

Maintaining a sensibly constant attitude on final approach.

Holding a nominal 3 degree glide slope.

Commencing a smooth rotation into the landing attitude at about the 50-foot point.

All of this is known to pilots and perhaps this article overstates the obvious. However, properly analyzed flight recordings provide the priceless extra of hindsight and give us the chance to learn from our own and other people's mistakes in a way never possible before. It would be a shame not to use so elegant a tool.

Flight Safety Foundation
Accident Prevention Bulletin 71-5

Tactical Air Command

Crew Chief of the Month

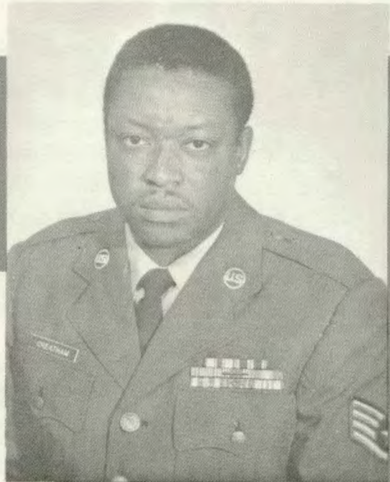
Sergeant Daryl O. Hammond, 425 Tactical Fighter Training Squadron, Williams Air Force Base, Arizona, has been selected to receive the TAC Crew Chief Safety Award. Sergeant Hammond will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.

Sgt Hammond

Tactical Air Command

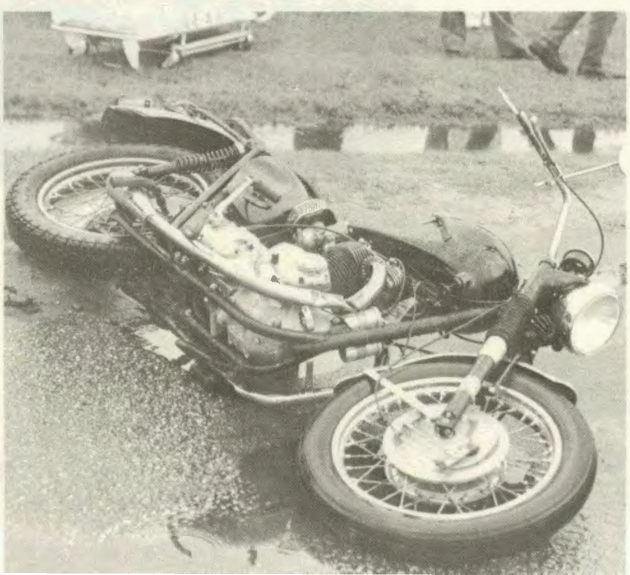
Maintenance Man of the Month

Staff Sergeant Kenneth Cheatham, 834 Field Maintenance Squadron, Hurlburt Field, Florida, has been selected to receive the TAC Maintenance Man Safety Award. Sergeant Cheatham will receive a letter of appreciation from the Commander of Tactical Air Command and an engraved award.



SSgt Cheatham

let's talk muscle vehicle insuran traffic violation



By working in ground safety I have become involved almost every aspect of private motor vehicle operation, accidents/incidents, violations and inspections, in addition to all of the problem areas that involve registration of vehicles on base including vehicle condition and insurance.

Some of the things that bug us safety men is to see a fellow put his last dime in a motorcycle and have no money left for eye protection or an approved helmet that may save his life. Buying a car with a beefed up engine without thinking about the cost of insurance, good tires, brakes or eight miles to the gallon. But the thing that probably bugs us most is the results of that old standard phrase, "I only had two beers."

We note the large number of vehicles parked outside the base entrances that cannot be driven on base due to lack of insurance, vehicle condition and/or violations. In many cases we have found that personnel didn't get all of the facts regarding the additional costs involved in the purchase of a vehicle and wind up short of cash for insurance and money to maintain the vehicle in an acceptable standard.

Also, we have found that our military personnel were not aware of the changing procedures coming out of Washington D.C. dealing with traffic violations that have a definite bearing on our everyday lives and our future.

First, what is a "muscle machine?" It's a hi performance car with a weight to horsepower ratio of

machines,
ce and
s

LESTER L. NEUMAN
Chief, Ground Safety Branch
57 Ftr Wpns Wg, Nellis AFB NV

one or less, which means it has substantially more power than that required for everyday driving. It means a vehicle capable of accelerating zero to sixty in eight seconds or less. This high performance classification is for insurance rate adjustments and wow, does it ever make a difference in the premiums you pay. Another very important consideration that affects the cost of insurance and in many cases determines whether a company will write a policy at all is: altered or specially built cars such as a vehicle which has been modified by raising or lowering the suspension, changing the steering geometry, or changing the engine or drive train for the purpose of increasing speed or acceleration. Also, little things that help put a vehicle in a high priority cost rate are stripes, decorations and symbols on a vehicle; they may not make your car faster, but try and tell that to an insurance agent. Now that we get the picture of how muscle machines and altered vehicles affect our insurance rates, let's see what is happening with traffic violations.

The Department of Transportation in Washington D.C. maintains a National Drivers Registration (NDR) computer data bank. The register provides a master list of all drivers in the United States who have had their vehicle operator license denied or revoked during the past seven years. State licensing officials can run the name of any license applicant through the computer to see if he has been denied a license elsewhere.

Did you know that states can do as they please with information stored in the NDR computer data banks, including selling it to private insurance companies or other concerns? The Department of Transportation wants new legislation to allow employers to determine if an applicant for a job as a driver has a history of license revocations, and also to allow judges to check NDR records before imposing sentences on traffic violators.

We had an example of the speed of the NDR computer information service just last month. We had a young airman suffer fatal injuries when he was hit head-on by a truck which was driving up the off-ramp of an interstate. The local police had the driver records of the personnel involved within two hours. We found the civilian driver had eleven driver violations that included six DWIs (driving while intoxicated) that occurred in five states in the past six years. With this driver violation information readily available to insurance companies, judges, and future employers, we can see how our present activities can be affected by a bad driving record as well as affecting the possibility of future employment in civilian life.

I dig the Indianapolis 500, A.J. Foyt, Swede Savage, Sam Contina, and all the pro's in the racing business. I also believe we should be cognizant of all the facts and information that affects us in the purchase and the driving of our vehicle. The moral is: check every detail and drive safe, "the pro's do." ➤

Tactical Air Command

UNIT ACHIEVEMENT AWARD

Our congratulations to the following units for

106 Air Refueling Wing, Suffolk County Airport, New York
1 August 1969 through 31 July 1970

4500 Air Base Wing, Langley Air Force Base, Virginia
24 January 1970 through 23 January 1971

175 Tactical Fighter Group, Baltimore, Maryland
1 January through 31 December 1970

4533 Tactical Training Squadron (Test), Eglin Air Force Base, Florida
29 January 1970 through 28 January 1971

121 Tactical Fighter Group, Lockbourne Air Force Base, Ohio
27 February 1970 through 26 February 1971

123 Tactical Reconnaissance Wing, Standiford Field, Kentucky
1 January through 31 December 1970

135 Special Operations Group, Martin Airport, Baltimore, Maryland
1 January through 31 December 1970

143 Special Operations Group, Theodore Francis Green Airport, Rhode Island
1 January through 31 December 1970

152 Tactical Reconnaissance Group, Reno Municipal Airport, Nevada
1 March 1970 through 28 February 1971

193 Tactical Electronic Warfare Group, Olmsted State Airport, Middletown, Pennsylvania
26 February 1970 through 25 February 1971

927 Tactical Air Support Group, Selfridge Air Force Base, Michigan
1 January through 31 December 1970

930 Special Operations Group, Grissom Air Force Base, Indiana
1 January through 31 December 1970

completing 12 months of accident free flying:

430 Tactical Fighter Squadron, Nellis Air Force Base, Nevada
10 March 1970 through 9 March 1971

18 Tactical Reconnaissance Squadron, Shaw Air Force Base, South Carolina
4 March 1970 through 3 March 1971

104 Tactical Fighter Group, Barnes Municipal Airport, Massachusetts
27 March 1970 through 26 March 1971

134 Air Refueling Group, McGhee-Tyson Airport, Knoxville, Tennessee
1 April 1970 through 31 March 1971

511 Tactical Fighter Squadron, Myrtle Beach Air Force Base, South Carolina
1 April 1970 through 31 March 1971

427 Special Operations Training Squadron, England Air Force Base, Louisiana
1 January through 31 December 1970

180 Tactical Fighter Group, Toledo Express Airport, Ohio
6 April 1970 through 5 April 1971

122 Tactical Fighter Group, Baer Field, Indiana
9 April 1970 through 8 April 1971

442 Tactical Fighter Training Squadron, Nellis Air Force Base, Nevada
9 April 1970 through 8 April 1971

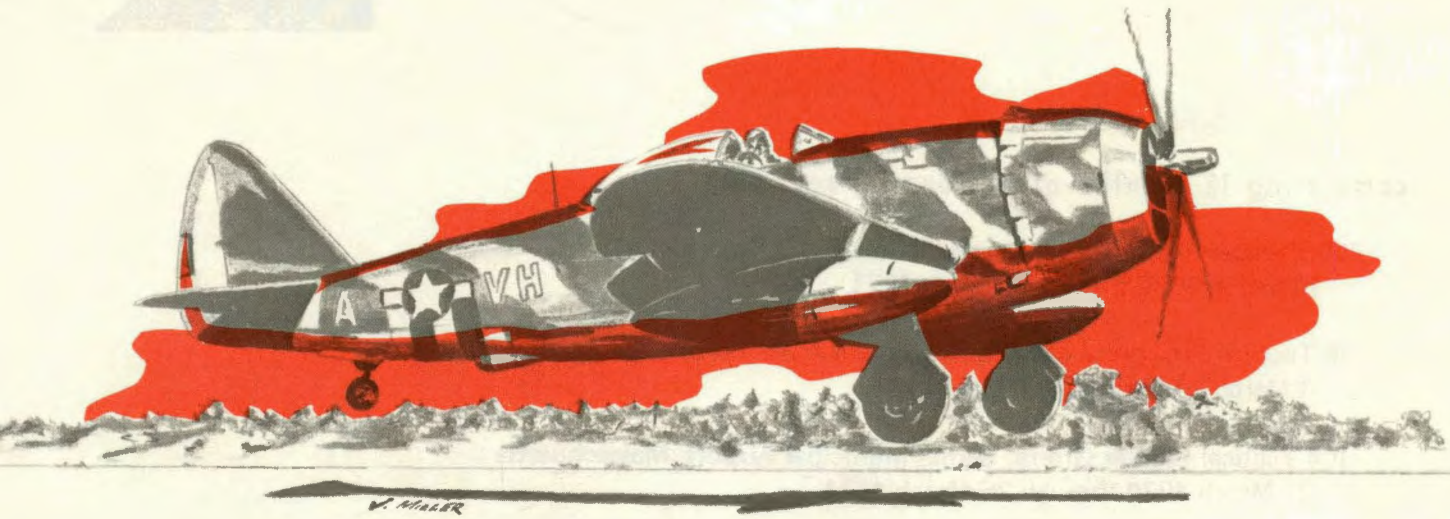
550 Tactical Fighter Training Squadron, Luke Air Force Base, Arizona
11 April 1970 through 10 April 1971

146 Tactical Airlift Group, Van Nuys Airport, California
11 April 1970 through 10 April 1971

115 Tactical Airlift Squadron, Van Nuys Airport, California
11 April 1970 through 10 April 1971

continued on page 22

THE LONG REACH



By 1st Lt C. A. Vitali
360th Fighter Squadron
356th Fighter Group
P-47

You reach out and pick up this VIII Fighter Commander tactics "Manual" dated 29 May 1944 with a respect bordering on reverence. You scan pages eagerly and recognize pictures of the fighter pilot contributors, names and faces ranking among our country's greatest World War II aces. The acronyms KIA and MIA appear all too often in their brief "biogs." You marvel at the obvious youthfulness and their friendly smiles, realizing that they have learned much about flying and compressed a lifetime of air battles into a time period of months, not years. They are trying to "reach," to teach, to impress those follow-on generations of fighter pilots who must follow them, and are as yet untrained in aerial combat maneuvering. They recount experiences, tactics, and pilot techniques proven in aerial battles beginning as mass formations in crowded skies and ending in single-ship or element versus element hassels. Not all of their tactics and techniques still apply, some are now impractical. However, they do present and show surprising agreement on some fighter pilot fundamentals. We think you will learn much in reading their personal accounts about flying "into the wild blue yonder," and respect the contribution they have made to a proud profession: the fighter pilot!

I received your letter today requesting my personal points of view on combat tactics and am answering immediately in the hope of being of some assistance to you.

First, concerning individual combat tactics when on the defensive. If I were being attacked from dead astern by superior numbers, I would break immediately and violently to the side and down and would keep going either into a layer of cloud, changing my course, or straight to the deck. If I were attacked by a single enemy aircraft, I would break in speed for a good zoom and would pull back up as steeply as possible, and wing-over into a tight turn at the top. After that I would be on the offensive. If attacked from the quarter or beam I would turn into the enemy aircraft and if unable to meet him head-on, I would always turn in the direction from which he were coming in order to engage him in a circle with the hope of out-turning him or at least giving him a very difficult shot. I find that the tightest turn may be obtained in a pinch by putting the prop in very fine pitch with manual control if necessary, lowering about ten degrees of flaps and trimming the ship in the turn. If ever bounced by superior numbers while on the deck, the

"When on the offensive and attacking a superior force, I would use only the hit and run method of attack."

possible thing left is evasive action by zooming, diving, corkscrewing, skidding, etc. If I were attacked by a single enemy aircraft on the deck, I would immediately break and try to out-turn him. Some airplanes, the FW 190 for one, have a very violent steep-turn stall characteristic, consequently their pilots are either timid about turning too sharply or they make the fatal mistake of reefing it in the snap-stalling on the deck. I would never hit the deck unless attacked by superior numbers or as a last resort, as altitude is most valuable and, when lost is hard to regain.

When on the offensive and attacking a superior force, I would use only the hit and run method of attack, making one swift pass from above and astern and continuing on through and down. I consider it inadvisable to attack such a force from the same level, from below or from any angle but astern, as they would be able to turn into you and would also have as much speed or more with which to overtake you. On the other hand, when making a surprise attack on a single enemy aircraft or slightly superior force, I would get to the stern position and slightly below (a ect blind spot) as fast as possible, and would then ottle back almost to his speed to prevent overshooting and at the same time allow myself to trim and take perfect aim. I would not try to fire at all from out of range, lest I warn him of my approach, but rather would get as close as possible and then open up and hold it for a sure thing. In making a deflection shot I would fire short bursts, observing the results if any, of each burst and making a correction after each burst if necessary. When I finally got what I was after, then I would bear down on the trigger.

I believe the best position for a wingman to fly is well out and well up almost line abreast, thus assuring perfect cross-cover and making it impossible for an enemy aircraft to make a hit-run attack on both ships.

Concerning formation combat tactics, we have found that from the formup, throughout the climb to the enemy coast, the easiest squadron formation to fly is a tight one. It tends to eliminate dropping single ships, elements, or flights behind, and eliminates large boost corrections to catch up. When altitude or the enemy coast is reached, then three of the four flights spread out as near line abreast as possible, as do the elements. The fourth flight continues climbing to a position three or four thousand feet above and up-sun from the rest of the squadron to break up any possible attack on the squadron or to cover ttacks made by the squadron.

When escorting bombers, the formation changes to four flights in trail which travel alongside and up-sun from the bombers and in the same direction. As each flight in succession passes the front of the bombers it makes an orbit around to the end of the line and repeats the process. The advantages of this type of escort are that it eliminates cross-weaving, allowing more attention to be paid to the bombers, other aircraft, and the sun. It enables the planes to maintain more speed, a very important thing, and each flight has a flight before and behind it at all times and also a flight going in the opposite direction toward the rear of the bombers. Everyone is covered at all times from all directions.

Except in the case of an organized attack on a formation of enemy aircraft, in which the squadron leader delegates a flight or an element to attack, any flight or element is free to make a bounce providing the leader making the bounce calls it on his way down so that he may be covered or at least later accounted for. Wingmen should never peel off on their own, as elements should be keep intact as long as possible so that element leaders may be covered while attacking and shooting, and also for defensive reasons.

When attacking a twin-engine aircraft in the vicinity of bombers, a top cover for the attack on it is particularly important, as these twin-engine aircraft almost invariably have their own private escort covering them from up-sun. One squadron, or at least a flight or two, out of a group escorting bombers should fly at the same, or below bomber level as the enemy sometimes make repeated attacks from below the bombers and out of sight of the top cover. If I were leading a flight and saw a flight of enemy aircraft which had an advantage of altitude and position, I would start a fast climb away from them without turning my back to them until I got to their level. Then I would start toward them, still climbing until close enough for a bounce. I would pursue an attack to the limit providing the bombers had some cover left and gas permitting. The most effective way to break up an attack by enemy aircraft that have already started for the bombers is to make yourself seen by getting in front and turning into them and firing guns regardless of aim, rather than follow them down after they have attacked the bombers.

I hope that these personal opinions and ideas are more or less what you wanted. If at anytime I can be of some service I will be very happy to cooperate. →

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Tactical Air Command

UNIT ACHIEVEMENT AWARD

Our congratulations to the following units for completing 12 months of accident free flying:

195 Tactical Airlift Squadron, Van Nuys Airport, California
11 April 1970 through 10 April 1971

123 Tactical Reconnaissance Group, Standiford Field, Kentucky
23 April 1970 through 22 April 1971

425 Tactical Fighter Training Squadron, Williams Air Force Base, Arizona
21 April 1970 through 20 April 1971

547 Special Operations Training Squadron, Hurlburt Field, Florida
2 May 1970 through 1 May 1971

174 Tactical Fighter Group, Hancock Field, New York
3 May 1970 through 2 May 1971

150 Tactical Fighter Group, Kirtland Air Force Base, New Mexico
8 May 1970 through 7 May 1971

418 Tactical Fighter Training Squadron, Luke Air Force Base, Arizona
9 May 1970 through 8 May 1971

111 Tactical Air Support Group, Willow Grove NAS, Pennsylvania
9 May 1970 through 8 May 1971

155 Tactical Reconnaissance Group, Nebraska ANGB, Lincoln, Nebraska
11 May 1970 through 10 May 1971

419 Tactical Fighter Training Squadron, McConnell Air Force Base, Kansas
11 May 1970 through 10 May 1971

23 Tactical Fighter Wing, McConnell Air Force Base, Kansas
11 May 1970 through 10 May 1971

417 Tactical Fighter Squadron, Holloman Air Force Base, New Mexico
12 May 1970 through 11 May 1971

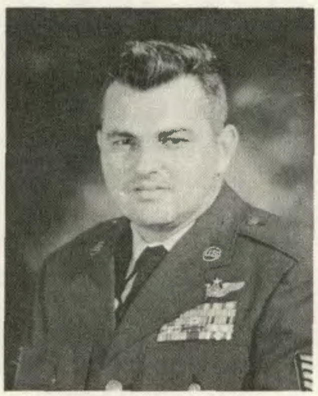
TACTICAL AIR COMMAND

AIRCREW ACHIEVEMENT AWARD

Capt George A. Van Otten
Pilot

1st Lt Daniel Paracchini
Copilot

Capt George W. Marshall
Navigator



MSgt John H. Campbell
Loadmaster

SSgt David J. Marcotte
Flight Engineer

SSgt Robert T. Darney
Crew Chief

The C-130 crew of Captain George A. Van Otten of the 61 Tactical Airlift Squadron, Little Rock Air Force Base, Arkansas, has been selected to receive the Tactical Air Command Aircrew Achievement Award.

Captain Van Otten and his crew were flying an airlift mission from Athens, Greece to Incirlik Air Base, Turkey. Approximately 50 miles west of Incirlik at 14,000 feet over mountainous terrain, approach control cleared them to descend to 7000 feet. During the descent in IFR conditions, an explosion occurred followed immediately by a blinding flash of light and a loss of power on all engines. All crew members were temporarily blinded but maintained their composure and calmly reported to Captain Van Otten. When their vision was regained, the aircraft was found to be in a shallow descent of 200 feet per minute and they had lost 1500 feet of altitude. The aircraft had been struck by lightning near the right wing dump mast, exploding residual fuel fumes and damaging the right wing tip and aileron. The crew members assessed the damage and found all compass systems were completely unreliable. Captain Van Otten requested and flew a "no gyro" weather GCA and completed an uneventful landing at Incirlik Air Base.

The immediate crew response and professional teamwork displayed by Captain Van Otten's crew merits their selection for the Tactical Air Command Aircrew Achievement Award.

CHOCK TALK ...*incidents and incidentals*

chock talk ..incidents and incidentals

PANELS AGAIN

Following a normal training sortie 5.4, which included instrument work up to FL 200 and touch-and-go landings, the C-130 ground crew found the right aft main gear brake uplock inspection panel (that's a mouthful) missing. It was torn loose at the hinge because only one of the eight fasteners had been secured.

This aircraft had just completed the fifth phase inspection and it is suspected that someone opened the panel for reasons known only to him (it's not a card item) and didn't bother to secure it. Subsequently, this condition went undetected through the secondary structure inspection, the Dash Six preflight and the Dash One inspection.

C-7 OVERBOOST

The aircraft was being ferried from IRAN where it had just received depot maintenance. While making a 360 for spacing in the pattern the pilot noticed the number one engine didn't respond to throttle movement. Very shortly, the MAP increased to 51 inches. The throttle and prop controls had no effect on the engine so it was shut down.

Maintenance troops found that a self-locking nut on the throttle control arm had come off and allowed the throttle control to move to full open. The engine had 226 hours on it and no maintenance in this area had been performed locally. They can only suspect that a defective or used self-locking nut had been installed originally.

FOR WANT OF A PIN

This C-123 was on its fourth shuttle, a little over five hours after initial takeoff. As the flaps were lowered for landing, the ailerons began to oscillate. The IP in the right seat took control of the aircraft, suspecting either a flap problem or control cable loss due to ground fire. The scanner reported that both ailerons were going up and down — it didn't make sense. The aircraft was leveled off and the flaps were retracted but the oscillations didn't stop. On final they decreased in intensity so the pilot held a little more airspeed and lowered his flaps in increments to insure aircraft control.

On the ground, they found that the cotter pin holding the airleron trim actuator rod in place had never been installed. The end that came loose was lying inside the left aileron.

THEY'RE FOR THE EARS!!

The F-100 jock landed after a routine flight home to find his left main gear door missing. While trying to figure out what happened they found a set of ear protectors (MSA Mark II) wrapped around the left main gear strut. The muffs prevented the left gear fairing door from latching up — airloads subsequently tore the door off. Guess a transient alert troop at his departure base re... didn't like to wear those things . . .

with a maintenance slant.

F-4 FOREIGN OBJECT

During takeoff the mobile control officer noticed an abnormal afterburner flame pattern, it seemed to be brighter and longer. The pilot was advised of this and at the termination of afterburner, the problem stopped. He made a precautionary approach and landing with no problems.

The bird was pulled to the trim pad and it did it again. Then they noticed that the abnormal flame pattern was caused by venting fuel igniting in the afterburner exhaust. The engine was shut down and cooled, they found a small metal cap 3/16 inch in diameter jamming the afterburner vent valve to the open position. They guessed that it passed through the afterburner fuel pump on its way to the vent valve. No other foreign objects were found in the fuel system — they're still trying to identify the source of the cap.

HOW NOT TO BE HELPFUL

After strapping the F-4 back-seater in, the crew chief removed the remaining cockpit safety pins and secured them in the safety pin bag. The pins could not be stowed in their normal place due to the installation of some extra electronic equipment so they were stowed in the map case. The Nav asked the crew chief to help him zip it up — the crew chief did, and as he was clearing the cockpit they both heard a sound like an initiator firing. The canopy initiator had fired — the crew chief's arm or a part of his clothing moved the canopy internal/external jettison actuating linkage or the associated cable. TCTO 1F-4-874 (Cockpit Initiator and Linkage Mechanism Protective Device) had not been completed on this aircraft.

Hey! pass it along... nine others are waiting.

THE GREATEST STORM ON EARTH

Have you, as an Air Force pilot, ever had to evacute your aircraft from a base because of an approaching hurricane? Perhaps not, but if you are stationed in one of the coastal states, the time may come, and your knowledge of hurricane effects can be helpful. Each year hurricanes cause widespread destruction and loss of life. These hurricanes develop from cyclone disturbances which have formed over tropical waters.

THE SEASON

Since 1879 over 700 Atlantic tropical cyclones have been observed. Approximately 80 percent of these have developed during the months of August, September, and October. Another 14 percent developed during June and July, and 4 percent were reported during November. Since this accounts for 98 percent of all occurrences, the season of tropical cyclones is considered to begin in June and last through November.

STAGES OF DEVELOPMENT

During the season various states of cyclone development may be heard over the radio/television network. The two most important to the pilot are the tropical storm and the hurricane, for either could necessitate an aircraft evacuation depending on the critical winds for your base. These are specified in your base Disaster Preparedness Operations Plan. By international agreement, the stages of development of tropical cyclones are classified according to their intensity.

TROPICAL DISTURBANCE	–	**A slightly rotary circulation with no strong winds.**
TROPICAL DEPRESSION	–	**Highest sustained surface winds of 33 knots or less.**
TROPICAL STORM	–	**Highest sustained winds of 34 – 63 knots.**
HURRICANE	–	**Highest sustained winds of 64 knots or greater.**

WORLDWIDE HURRICANES

The Atlantic Ocean is not the only area where hurricanes occur. They develop in different oceans and hemispheres and bear names given locally; "baguio" in the Phillipines, "typhoon" in the Pacific, and "cyclone" in the Indian Ocean.

This century's most tragic weather event was caused by one of the Indian Ocean cyclones. On 12 November 1970, a cyclone moved off the Bay of Bengal and devastated parts of East Pakistan. This was considered one of the most deadly, if not the deadliest, storm ever to strike a coastal area. The official death toll was 200,000 confirmed by burials. Unofficial estimates ran as high as 500,000. Numerous bodies were still being washed ashore after the catastrophe, and ships in the Bay of Bengal were reporting bodies at sea several hundred miles south of East Pakistan. Unbelievable? Yes, but history is filled with such tragedies.

OCCURRENCES IN THE U.S.

Since 1879 approximately 429 Atlantic hurricanes have been observed. About 223 of these affected some portion of the U.S. coast between Texas and Maine with strong winds, high tides, or heavy rains.

Figure 1 shows the number of hurricanes, by month, that have affected a particular coastal area. These hurricanes either made landfall in the geographical area indicated, or passed just offshore so that their effects were experienced on land. Note that the higher occurrences are along the Gulf coastal states between the Gulf side of Florida and Texas. It is also remarkable that during the last six years, three of the five all-time most destructive hurricanes have affected the central and western Gulf coast areas. Also 52 percent of all hurricanes have affected some portion of the Gulf coast states.

Florida, because of its shape, has experienced the effects of more hurricanes than any other coastal area. To date, 37 percent of all Atlantic hurricanes have affected some portion of Florida. Along the Atlantic coast, North Carolina ranks next in the number of hurricanes affecting east coastal area. A total of 27 hurricanes have affected the state of North Carolina. This may be due, in part, to the jutting out of the land mass into the Atlantic seaboard. The mid-Atlantic and New England states have experienced the effects of the least number of hurricanes.

Along the Gulf coast, hurricanes have occurred throughout the season, while along the Atlantic coast, the occurrences have been during mid-season (Aug – Oct).

HURRICANE DAMAGE

Although the loss of lives from hurricane effects has decreased over the years, damage to fixed facilities/property has been increasing. This is most likely due to the increase in urban development in areas susceptible to hurricanes. Since 1965, two hurricanes have each caused more damage than any other hurricane in U.S. History. Hurricane Betsy smashed through Florida, Alabama, Louisiana, and Mississippi in September 1965,

the greatest storm on earth

taking 75 lives and causing property damage of $1.42 billion. This was the first time ever that a single hurricane had caused damage that reached the billion dollar level. Again, in 1969 Camille ravaged Alabama, Louisiana, and Mississippi; then moved inland to cause Virginia's worst floods in the history of that state. Overall damage reached an estimated $1.427 billion, the highest ever from a single hurricane. There were also 256 lives lost, half of which were attributed to the disastrous Virginia floods. As the remnants of Camille moved into northern Mississippi, she decreased in intensity and was classified as a tropical depression. Although the wind in this stage is relatively weak, other hazards are still present.

HURRICANE HAZARDS

We know that a hurricane is a large revolving storm that originates over tropical waters with highest sustained winds of 64 knots or greater. The name was well chosen, for *in Carib, it means* "big wind." And, when residents of a community are informed of an impending hurricane threat, they begin preparations against wind damage. However, few *people realize* that floods produced by hurricane rainfall are more destructive than the associated winds; and that the storm surge (tides) is the hurricane's worst killer.

The typical hurricane drops 6 to 12 inches of rainfall along its path, and resulting floods cause great damage and loss of life. In 1955 Hurricane Diane produced floods in Pennsylvania, New York, and New England, which resulted in 200 deaths. Property damage reached $700 million. Some stations reported 10 to 12 inches of rainfall. Near Stroudsburg, Pennsylvania, floods killed 75 persons when rapidly rising waters of the Broadhead Creek swept away a summer camp. In 1969 Camile, the most destructive U.S. storm on record, dropped two to seven inches along the Gulf coast states with one report of 10 inches. However, as the tropical depression moved across Tennessee and Kentucky into Virginia, rainfall reached catastrophic proportions in the mountainous regions of Virginia. The storm moved across the area during the night, as the unsuspecting residents of the mountain hollows and towns slept. Rapidly rising streams and mudslides caused by the unprecedented rains destroyed homes as occupants slept. Large trees were uprooted and hurled down the mountainsides acting as battering rams. They crashed through houses, overturned automobiles, sparing nothing in their paths. Entire families were swept away in the raging waters. Whole sections of mountainsides slid down in the form of mud heaping tons of silt on houses and their inhabitants.

The previous record rainfall for the state had been eight inches in a twelve-hour period. Camille had dropped 12 to 14 inches in many sections with recordings of 27 inches in an eight-hour period. An unconfirmed report of 31 inches was also relayed by one county. The Virginia part of Camille was one of nature's rare events. It is estimated that the rainfall in Virginia associated with the remnants of Camille has a return period well in excess of 1,000 years. But, flashflooding from hurricane rainfall is still not the greatest danger for coastal residents.

The storm surge has resulted in the greatest loss of life associated with hurricanes. This rapid rise in water is the result of onshore hurricane winds and falling barometric pressures. The surge may be as little as three or four feet, or as high as 20 to 25 feet. The most destructive situation occurs when the surge coincides with high astronomical tides.

In Asia the loss of life from the storm surge has been tragically high. In 1737 surges killed 300,000 near Calcutta, and another 50,000 in 1864. In 1876 100,000 to 400,000 perished when a 40-foot surge hit Backergunge, India. In 1881 30,000 persons were killed in Haifung, China, and in 1970 from 200,000 to as many as 500,000 were lost when surges associated with the cyclone hit East Pakistan.

The United States has had its share of lives lost due to the storm surge. In 1893 a great wave drowned between 1000 and 2000 persons in Charleston, S.C., and in October of that same year a surge drowned 1800 along the Gulf coast. In 1900 15-foot surges hit Galveston, Texas, taking 6000 lives. In 1928 nearly 2000 drowned when a hurricane caused Lake Okeechobee to overflow. In 1938 a severe New England hurricane killed 600. Another 390 perished when Audrey struck Louisiana in 1957, and in 1969 Camille drowned 110 in western Virginia with another 41 persons declared missing and presumed dead.

Storm tides and floods account for over three-fourths of the deaths and much of the destruction associated with hurricanes, and deserve special attention. It can be seen by the statistics that the loss of lives has decreased over the years. The people have begun to realize the dangers associated with hurricanes. Better communications and improvements in the warning system employed by the National Hurricane Center in Miami have certainly helped in reducing these casualties.

OCCURRENCES OF TROPICAL STORMS/ HURRICANES AT CERTAIN BASES

The number of tropical storms and hurricanes that have passed within 60 nautical miles of a particular base are tabulated below. These include all occurrences since 1900. At coastal stations highest tides on record are also included.

STATION	FIELD ELEVATION	TROPICAL STORMS/ HURRICANES	HIGHEST TIDES (ABOVE MEAN LOW WATER)
Bergstrom	541'	9/1	—
Eglin	85'	15/10	—
Ellington	40'	10/12	None
England	26'	07/3	—
Homestead	7'	07/24	*10 feet (1945)
Hurlburt	35'	15/10	None
Langley	10'	10/8	10.5 feet (1933)
MacDill	13'	12/18	*10.5 feet (1921)
Myrtle Beach	25'	19/12	None
Pope	218'	13/5	—
Seymour Johnson	109'	12/8	—
Shaw	256'	20/6	—

*Occurred before the bases were activated, but in the same general area. In 1848 a 15-foot surge destroyed Ft Brooke, location of present-day Tampa. In 1945 a 13.7 foot tide hit the coast east of Homestead, and moved inland to the vicinity of present-day Homestead where tides were near 10 feet (two to three feet above the field elevation).

THE FUTURE

The toll of lives from hurricanes has diminished encouragingly over the years, while damage to fixed facilities has increased. The majority of people have come to recognize the dangers associated with hurricanes. Many base Disaster Preparedness Offices distribute brochures containing excellent hurricane protective measures. Many coastal communities have formed Hurricane Preparedness Committees. Part of their responsibilities include educating the public on the hazards of hurricanes and the protective measures to be employed.

Hurricane research is in progress to determine whether such severe storms can be weakened or neutralized. Advances in hurricane forecasting techniques continue to be made. Weather satellites orbit the earth detecting such disturbances as they develop, thus giving maximum warning time. Aerial reconnaissance and modern radar aid in detecting and tracking tropical disturbances.

The hurricane may dominate weather over thousands of square miles, and winds may reach 175 knots (200 mph) or more. Its lifespan is measured in days or weeks, not hours or minutes. No other atmospheric disturbance combines duration, size, and violence more destructively. Until that day in the future when hurricanes no longer pose a threat to coastal communities, the hurricane will continue to be appropriately termed, "The Greatest Storm on Earth." ➤

By CMSgt Carl J. Smelgus
NCO, Climatic Services, 5WW
Langley AFB, Va.

LETTERS to the EDITOR

STANDARDIZATION – AGAIN

In your April issue there appeared a letter entitled, "Standardization," which pointed up a situation about which I have felt uneasy for some time.

The writer maintains that standardization is a good thing; indeed, vital to any safety program. Your reply asserts that, however vital it may be, standardization is no substitute for sound judgment. This is a real breath of fresh air, and I wish more people believed it; especially in the matter of bold-face-emergency procedures.

Ever since I started flying in the Air Force (not a very long time, actually – three years) I have been taking bold-face quizzes. How many flyers, I wonder, have heard a statement like this:

> All right, gang, the Stan/Eval team is coming next week and they're giving a bold-face quiz, and it's going to be verbatim.

Now the stan/eval quiz itself is not always verbatim. Often the stan/eval team is satisfied if all the steps are presented in the correct order, and "the guy obviously knows what to do." Unfortunately, the tests given in preparation for the stan/eval visit usually are verbatim, even to the punctuation. Then, when the stan/eval team arrives, very rarely do they test anything else besides the bold-face emergency procedures. In my opinion, this approach is oversimplified, and in emphasizing the bold-face emergencies to the detriment of the non-bold-face, we are not getting a true picture of the "emergency procedure potential." If training consists only of practicing to write down bold-face procedures, there is going to be a bad moment in the air someday.

I do not mean to say that the bold-face is not important; but rather, that we cannot simply say, "Memorize your bold-face and fly safely." There is more to it than that. The two closest calls I have had in the air were during non-critical emergency situations, and I wish these could receive "equal time" in the safety program, or at least more than they get now. I appreciate your bringing this up.

Sincerely,

Captain William H. Wingo
Eglin AFB, Florida

By the time you read this, you should have already been informed of the steps taken by TAC and USAF to alleviate the things you speak of. I refer you to the following messages: TAC/DO CRITICAL EMERGENCY PROCEDURES, 072351Z Dec 70; X00TFB ALMAJCOM 557/71 CRITICAL EMERGENCY PROCEDURES, 111953Z Mar 71; and IGDSFF CRITICAL EMERGENCY PROCEDURES, 191844Z Apr 71.

They collectively state that it is not the intent of AFR 60-9 to require rote, verbatim responses which may be meaningless to the aircrew under immediate reaction requirements. And further, that "OXYGEN – 100%" completely satisfies the bold face terminology of "OXYGEN REGULATOR DILUTOR LEVER – 100% OXYGEN." Some of our checklists have already changed to reflect this philosophy.

In the area of training, the Safety troops at Norton are way ahead of you. They have found that some units do not adequately use their flight simulator in training and evaluation of aircrews in emergency procedures. The idea is that the ability to recall the written word may not reflect the full capability to actually perform the task. Use of the simulator in emergency procedures training and evaluation is an item of interest during their current inspection cycle.

And remember, regardless of the quality of your local training – in the end it's up to you. YOU are responsible for the knowledge contained in your Dash One. You can't hang it on a reg, or a person, or your headquarters. That final moment of terror belongs to you alone, no one else will experience it. Ed.

DISTRIBUTION

I am asked by my commanding officer, Wg Cdr J.C. Sprent, if we could be placed on the distribution list for your publication TAC ATTACK. We are in the process of forming as a Phantom Strike Squadron in Germany and would be grateful for any back numbers that are available for our library.

Flt Lt D. Pollington
31 Squadron, RAF
Bruggen
BFPO 42

You're on the list and back copies are on the way.

TAC TALLY

AIRCRAFT ACCIDENT RATES

* Estimated

MAJOR ACCIDENT RATE COMPARISON

	TAC		ANG		AFRes	
	1971	1970	1971	1970	1971	1970
JAN	1.6	4.8	16.1	5.9	0	0
FEB	1.6	3.9	11.6	2.6	0	0
MAR	3.1	4.6	7.0	1.7	0	0
APR	2.7	4.9	4.9	2.4	0	0
MAY	2.5	6.2	6.0*	3.6	0	0
JUN		5.5		3.6		0
JUL		5.1		6.1		0
AUG		5.0		6.9		0
SEP		4.7		6.6		0
OCT		4.5		6.8		0
NOV		4.6		6.7		0
DEC		4.6		6.6		0

UNITS

	THRU MAY			THRU MAY	
	1971	1970		1971	1970
9 AF	2.8	2.3	12 AF	1.3	7.0
4 TFW	0	0	23 TFW	0	9.1
1 TFW	0	5.5	27 TFW	0	8.3
33 TFW	0	0	49 TFW	0	12.5
31 TFW	10.4	9.4	479 TFW	0	16.4
354 TFW	0	0	474 TFW	0	0
4403 TFW	29.0	—			
363 TRW	0	6.8	67 TRW	0	17.4
			75 TRW	0	0
316 TAW	0	0	64 TAW	0	0
317 TAW	0	0	313 TAW	0	0
464 TAW	0	0	516 TAW	0	0
68 TASG	0	0	58 TFTW	4.5	24.3
			4442 CCTW	0	0
			4453 CCTW	7.8	0
			71 TASG	0	0
TAC SPECIAL UNITS					
1 SOW	7.3	8.6	2 ADG	0	0
4409 SUP SQ	0	0	4500 ABW	0	0
4410 SOTG	0	0	57 FWW	0	0
USAF TAWC	0	—			

TAC SUMMARY

	MAY 1971	THRU MAY	
		1971	1970
TOTAL ACCIDENTS	2	12	14
MAJOR	1	7	13
MINOR	1	5	1
AIRCREW FATALITIES	0	4	11
AIRCRAFT DESTROYED	0	4	12
TOTAL EJECTIONS	0	5	9
SUCCESSFUL EJECTIONS	0	5	5
PERCENT SUCCESSFUL	0	100	56


FLEAGLE
HARDISON
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HA HA ! THIS OLE JOCK LEARNED HIS LESSON LAST YEAR.
"HE FORGOT ABOUT THE HAIL"
"YEP"