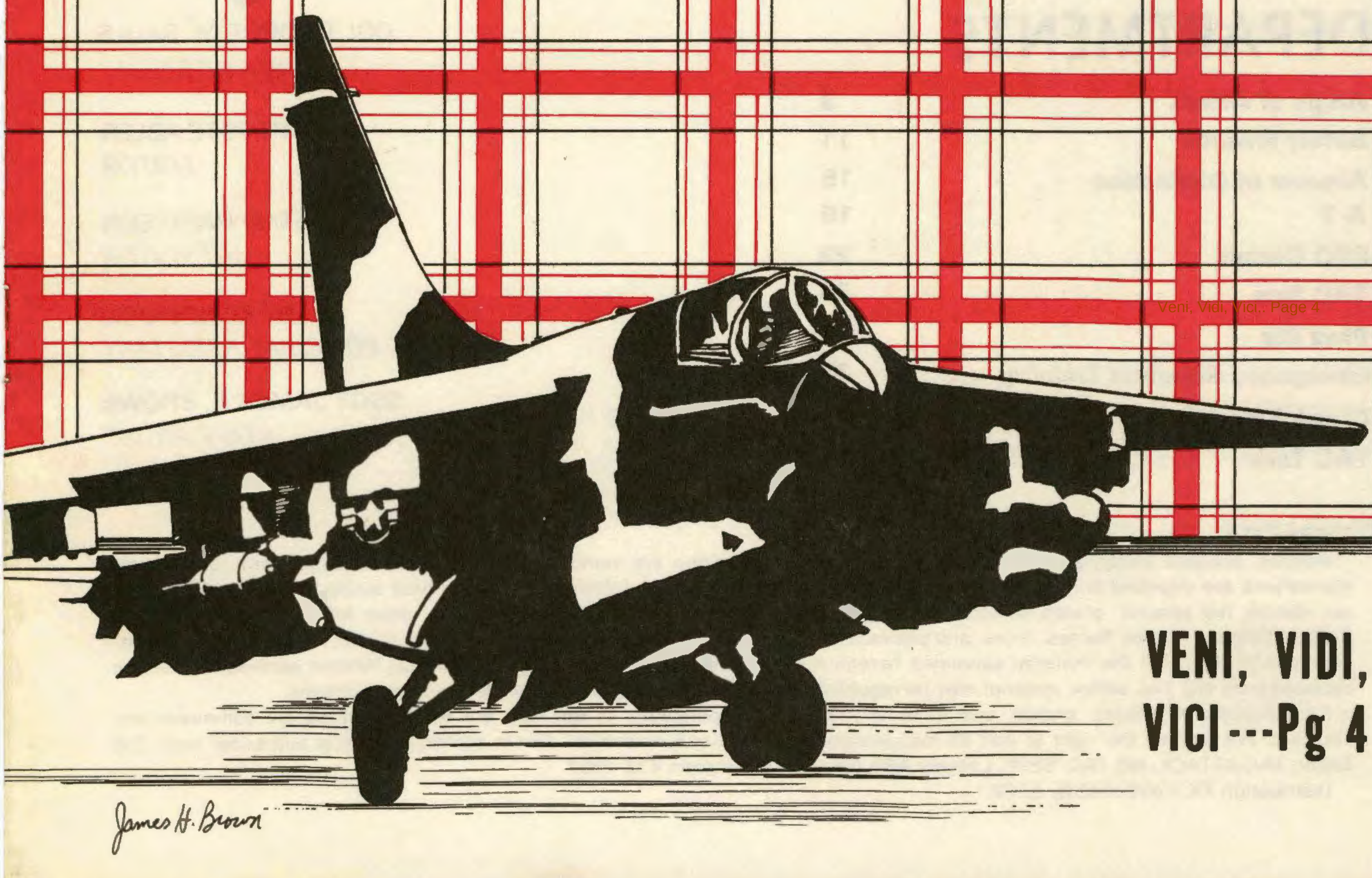
TAC ATTACK

FEBRUARY 1978



VENI, VIDI, VICI---Pg 4

TAC ATTACK FEBRUARY 1978 VOLUME 18 NUMBER 2

FEB

FOR EFFICIENT TACTICAL AIR POWER

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FEATURES

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TACRP 127-1

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Angle of ATTACK

FOD-THE INSIDIOUS PHENOMENON

One of the subjects that is most difficult for any supervisor to explain is foreign object damage (FOD) because there just doesn't seem to be a totally acceptable explanation. Formulating reasons for FOD is like trying to determine why a highly qualified aircrew flew a properly operating aircraft into the ground. I'm not going to bore you with statistics on our 1977 FOD rate or the associated costs. Our loss was significantly greater than during previous years. We cannot allow this adverse trend to continue.

FOD incidents can occur due to materiel failure of rivets or other types of fasteners; however, the vast majority of FOD is caused by lack of training, lack of supervision, carlessness, inattention to tech data, or lack of self-discipline. One fact remains; FOD is preventable. Newer aircraft, more advanced engines, and sophisticated avionics systems demand a more comprehensive prevention program. It is incumbent upon all supervisors to formulate and administer an effective program. It is also necessary to detect and correct the shortcomings of program structure and administration.

FOD prevention must involve personnel at all levels of operation. The most effective FOD program does more than create posters, fabricate FOD pouches and cans, and increase the ramp sweeping schedule; it instills a sense of awareness in every individual. This awareness creates an attitude of self-discipline which is reflected by a crew chief who obtains the proper clothing prior to performing an intake inspection, or a crewmember who searches for the pencil he dropped in the cockpit no matter how long it takes him to find it.

The success or failure of our prevention program rests with each individual. We must be consciously aware of the FOD hazard at all times -- its incidence, its cost, and most importantly, the ways to prevent it. Be imaginative -- if you have ideas on how to improve prevention operations at your base, submit them to your supervisors. Learn from other units' experiences by reading and analyzing mishap reports. Take action in your unit before it happens to you. The effort is insignificant compared to the potential savings and the possible prevention of a tragic and needless loss.

FOD prevention is easy. Explaining a FOD incident is hard. Do yourself a favor, take the easy route.

GEORGE M. SAULS, Colonel, USAF
Chief of Safety

Veni, Vidi, Vici

VENI VIDI VICI

I CAME, I SAW, I CONQUERED

Translation is provided for those with bad memories of Latin. But memories aside, for those of the tactical fighter persuasion, further translate "I" to "we" and "we" to "TAC." (The "we" is important; follow it through the prose.) Now for the question, "What did we conquer ?" Read on...

A lot of you have probably heard by now of the 1977 Royal Air Force Tactical Bombing Competition (RAF TACOMP), October 5 to 10. This was the second annual affair sponsored by the Brits, but the first invite for a TAC unit. Contestants were six RAF teams (Jaguars and Buccaneers), one USAFE (F-111Es) and one TAC (A-7Ds); 48 aircraft total. Employment was from RAF Lossiemouth on the northern coast of Scotland. The 23 TFW "Flying Tigers" were privileged to represent TAC -- to represent you -- and what we did is in the title. In a nutshell, we won every trophy we were eligible for -- the Sir John Mogg Team Trophy for the overall winning team; the British Aircraft Corporation Trophy for leadership in bombing and navigation; the Top

I CONQUERED

Gun Trophy for strafe and the Weapons Trophy for individual bombing. Deeper than that, we took the first four plus sixth place in strafing, the first four plus seventh place in bombing, and the first two places in leadership (with only two men per team eligible).

TEAMWORK WORKS

The key to victory? No real secret here -- teamwork, preparation, and practice which led to confidence. And that's the purpose of this article, to give you some hints as to how we did it -- you may get the chance yourself some day! What this article won't do is rehash the competition itself -- both AIRMAN and MAINTENANCE magazines have good descriptions of the events themselves.

Let's look at what we did in three basic areas: Training, Maintenance, and Equipment. (A brief disclaimer is required here. The nuts and bolts of the preparation were considerably more complicated than this article allows, but the 23 TFW will gladly entertain questions in more detail.)

TRAINING

First and foremost, was timing. We started a good six months before the event -- 12 aircraft were identified, 10 to deploy, 2 spares, and the initial flying team selected. By 4 months prior, the support element was picked and the entire package was formed as essentially a separate unit. The support element included a team of four officers who built scenarios, coordinated deployments, and graded our practice missions. The payoff from this group cannot be overestimated. Eight weeks prior to deployment, we finalized the pilots for the team lineup, a four-ship and a two-ship, and we stayed with that lineup. CONUS practice deployments and competition rehearsals (we had two full-scale practices at Myrtle Beach) were completed about 1 week prior to deployment to give us time for final maintenance actions. (For future reference, we recommend more time, 3 to 4 weeks, for this phase.) Three weeks prior to the competition itself, we deployed to the UK and flew 12 - 14 sorties to gain exposure to the local geography, ATC rules, 250-foot low-level flying, and use of larger scale maps.

Now, training preparation. Low-level navigation and visual-target identification (ID) were key elements of the competition, so we worked these areas hard. We changed routes and targets daily, and our "lend lease" RAF inflatable T-62 tank proved to be a real boon here. On the practice deployments, we concentrated on unfamiliar routes, visual ID, and worked against F-15 aggressors. Interestingly, we learned that low-low was not necessary or even effective all the time.

Along the same lines, we practiced real-time mission tasking -- map preparation, TOTs, target location, tactics. (The TACOMP rules involved tasking 90 minutes prior to takeoff.) An interesting aspect of this was that we had to have our own low-level and range weather minimums waived to (1) contend with our own weather and (2) prepare for the TACOMP minimums of 1,500 - 2½. As events ultimately turned out, the weather in Scotland was a graphic introduction to the infamous European scenario.

You can probably tell from the above that level, high drag (HD) bomb deliveries were "in" for TACOMP -- required, in fact. A lot of effort went into this area, and the still unsatisfied requirement for a good HD simulated weapon was dramatically reinforced.

In all the bomb delivery events, we emphasized first-run attack scores, because TACOMP scoring was weighted toward the first attack. We've found that this is a pretty good approach for ORI preparation as well!

TACOMP strafe was against a 15 x 15 foot panel, so we set one up on our own range. If you haven't strafed on one of these in awhile, it's challenging. About half the scored area of the standard 20 x 20 target, but closer to real world (ZSU-23-4) requirements.

MAINTENANCE

The gut issue in the maintenance area was something we can all get next to -- a close operations/maintenance relationship. We had the ultimate: each pilot had his own airplane, one crew chief and two specialists who stayed with it all the way. He flew the same bird every time, every day. Great for a one-time go, you say? We're not that far away right now (for those in POMO) -- it's up to us to make it work.

There were some other equally important aspects of the maintenance preparation. With contractor support, we put each airplane through a complex "groom" -- and learned some interesting lessons. After discovering serious calibration problems between boresight kits, we started footprinting the weapons delivery system first before using the kit on any other aircraft. We also learned the value of good hydraulics and automatic flight control (AFCS) peaking. What our maintenance corps learned in this special program has enabled us to initiate a "groom" on all our wing aircraft.

Operational turnarounds, something we should all be familiar with, got daily attention in the months of preparation. The competition in Scotland involved two teams per unit fueling, loading 20 mm and MK 82s, and accomplishing an abbreviated thru-flight inspection. (The competition was waived to fuel and load simultaneously.) Turning in less than 20 minutes with no penalties gave maximum points. The effort paid off -- we were one of only two units to earn that maximum.

PRACTICE OPERATIONAL TURNAROUND OR PRACTICE MAKES PERFECT

EQUIPMENT

The equipment area involves some aspects peculiar to the A-7; as stated, we're available to answer specific questions. Some elements have broader applications though, such as the aircraft camouflage scheme. Based on tests at Red Flag, flying against Aggressors, we went to a full camouflage scheme (including MERs) to get rid of the white underbelly. During the TACOMP training, aggressor pilots said it gave them serious problems, and ground observers added an interesting note that the full camouflage made it hard to judge turn direction.

The boresight problem has already been mentioned; we found some real serious difficulties in our kits. During aircraft peak-up, we really had to watch the tolerances and calibration. Even then, an immediate footprint mission was the only way to verfiy kit accuracy.

As in any bombing competition, bombs that don't spot, unpredictable weapon releases, and questionable ballistics all conspire to do you in. To overcome this, we got permission to use the improved BDU-33 practice bomb still being tested. With great lateral cooperation, we were also able to locally manufacture BDU-33 MER sway brace adapters and eliminate an overtorquing/bent fin problem. The end result -- we weren't done in.

All in all, the preparation and the competition centered on realistic training -- just what we're into in TAC. It can be done safely and effectively.

Why is the "we" important throughout? The individual winners and the 23 TFW take justifiable pride in what we accomplished. But we also made TAC look good -- that makes USAF fighter pilots look good -- and we're proud of that! At varying times, "we" encompassed everyone, from lateral wings to Ninth Air Force, to HQ TAC. Without that support, the record book would undoubtedly read differently. It was a TAC team effort. For that reason, you won't find the standard credit section at the end of this article. What you will find is a summary of the TACOMP results. The "credit" goes to everyone. ->

NOTE: The ultimate tribute came from those who provided the inimitable British hospitality at TACOMP,"--and at least your Team had the diplomacy to come from England AFB."

AWARD WINNERS

Sir John Mogg Trophy
Overall Winning Team
TAC -23TFW-A-7D

BAC Trophy
Best Leadership in Bombing and Navigation
Capt John Miller, 1st
Capt Bob Gatliff, 2d

Top Gun
Strafing
Maj Ron Brekke (plus 2d, 3d, 4th and 6th places)

Weapons Trophy
Best Individual Bombing Score
Capt John Miller, (plus 2d, 3d, 4th and 7th places)

23TFW TACOMP TEAM, LEFT TO RIGHT

KNEELING: CAPT W.W. TURNER, LT CMDR MIKE SULLIVAN, CAPT BOB GATLIFF, CAPT HYMIE ORAM

STANDING: CAPT JOHN MILLER, 1LT AL FRIERSON, LT COL DAVE EBERT (TEAM LEADER), MAJ RON BREKKE

FIGHTER AIR REFUELING

By SSgt Larry L. Strong
41 AREFS/416 BW/Stan-Eval
Griffiss AFB, NY

"Racer 51 flight, this is Task 81 Boom Operator radio check, how copy?"

"Roger, Task 81, Racer 51 reads you loud and clear."

"Two's loud and clear."

"Three's loud and clear."

"Four's loud and clear."

"Roger, Racer 51 flight, Task 81 reads you loud and clear. 51 is cleared precontact; Two, Three, and Four are cleared to the observation position."

The relationship between fighter pilots and boom operators over the years has been quite a unique one. And, as you can see from the introduction, it is usually a very controlled one. From the time the receivers roll out behind the tanker and start to close, through the end of air refueling and the receiver's departure, the tanker boom operator is watching the receiver aircraft's every move.

Refueling between tankers and fighters has been changing drastically in the past few years. The experience level of today's crewmembers cannot compare with that of three to five years ago. The days of Southeast Asia, with 2 refuelings or more a day for pilots and 16 receivers per sortie for boom operators are gone. With this decline in crewmember experience, strict adherence to air refueling procedures is a must to insure a successful and safe refueling.

The basic procedures for air refueling are outlined in the applicable Tech Order for the series of aircraft flown plus command and local directives. Receivers should also be familiar with the tanker's procedures. From the time the boom operator completes his one-half mile radio call, until the boom operator calls, "stabilize," procedures are the same for all aircraft. During normal training missions, the boom operator has two options as to how the tanker signal system will be configured. In "normal," when boom contact is effected, the receiver advances the tanker's system to contact through a signal coil in the boom nozzle. When this occurs, envelope limit switches are activated and the receiver director lights illuminate, indicating the receiver's position within the air refueling envelope. The air refueling pump relays are also energized to enable fuel offload. In "tanker manual," the boom operator physically advances the tanker signal system until contact is made. The receiver director lights are activated and the air refueling pump relays are energized. The envelope limit switches are NOT activated in this configuration, and the boom operator must be constantly aware of the receiver's position within the envelope so as not to let the receiver exceed any limits. No receiver briefing is required for either of these two procedures.

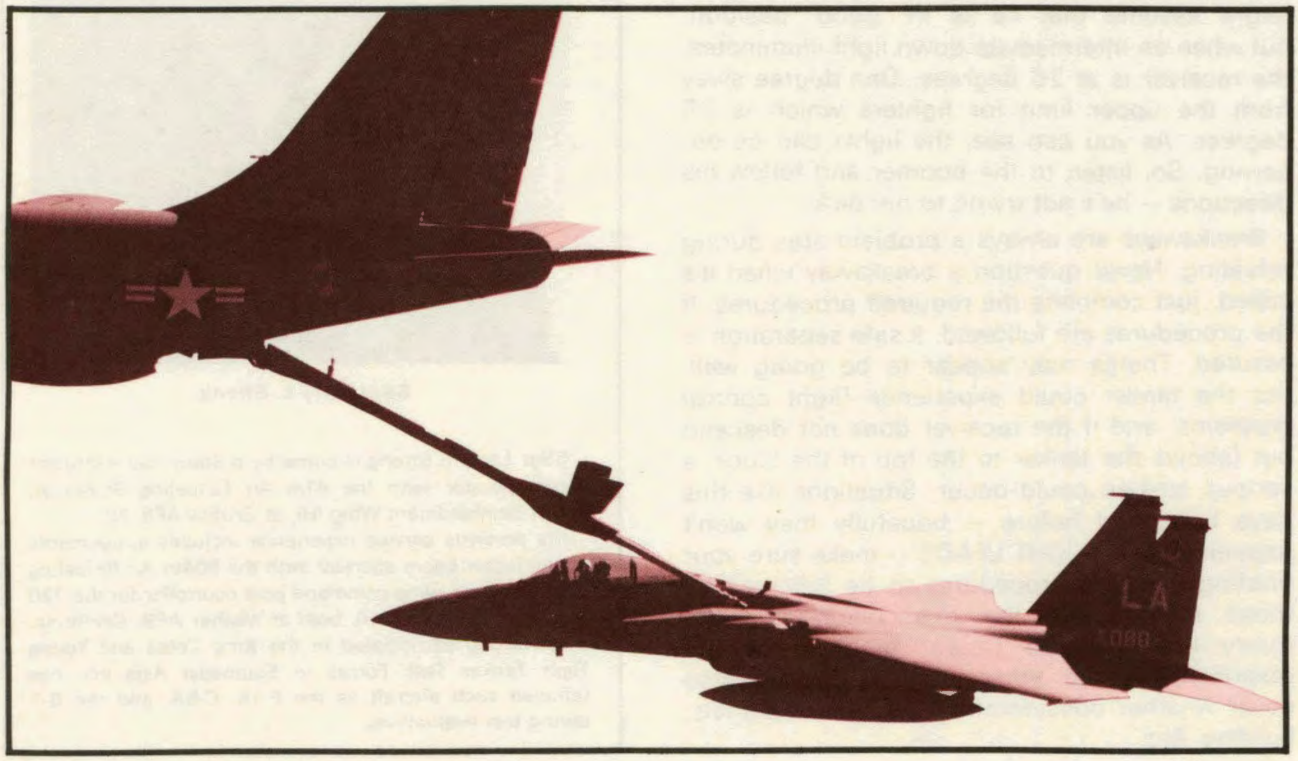
If either aircraft is experiencing difficulty establishing contact, and mission requirements dictate offloading fuel, there are emergency procedures to which the boom operator can revert:

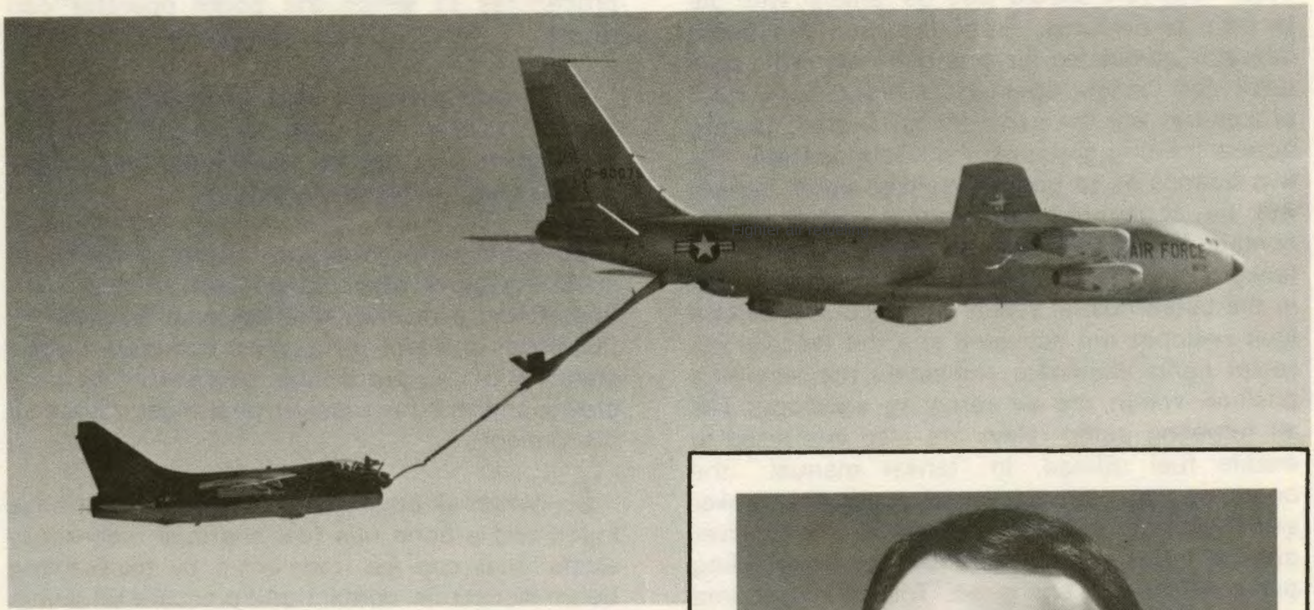
1. Tanker manual without disconnect capability is used when the tanker signal coil is inoperative. The normal system of the receiver may be used in this configuration.

2. Emergency/manual boom latching is another way of effecting contact. In both configurations, a receiver briefing must be given by the boom operator to insure a complete understanding of the procedures being used by both crews, and that the receiver pilot must initiate all disconnects.

3. When all other means of fuel transfer have failed and a bona fide fuel shortage emergency exists, fuel can be transferred by maintaining boom receptacle contact and pressure refueling. This is accomplished by the boom operator holding slight extend pressure on the telescoping lever to keep the boom nozzle seated in the receptacle. Again, the boom operator will brief the receiver pilot and thoroughly coordinate the procedures to be used. Both tanker and receiver crews must monitor the refueling with extreme caution.

The receiver director lights deserve further





explanation. The director system informs the receiver pilot as to his relative position within the air refueling envelope. They are designed to outline the limits of the tanker, not the receiver. During a fighter refueling, for example, the receiver pilot may receive an intermediate down light, and the boom operator might transmit a "down 5" correction. The receiver pilot might assume that he is in good position; but when an intermediate down light illuminates, the receiver is at 26 degrees. One degree away from the upper limit for fighters which is 25 degrees. As you can see, the lights can be deceiving. So, listen to the boomer and follow his directions -- he's not trying to nit-pick.

Breakaways are always a problem area during refueling. Never question a breakaway when it's called, just complete the required procedures. If the procedures are followed, a safe separation is assured. Things may appear to be going well, but the tanker could experience flight control problems; and if the receiver does not descend but follows the tanker to the top of the block, a serious mishap could occur. Situations like this have happened before -- hopefully they won't happen again. FLIGHT LEADS -- make sure your briefings include procedures to be followed by those receivers in the observation position. Every man on the tanker must know his responsibilities in emergency situations. Also cover weather considerations, radio-out signals, lighting, etc. >

SSgt Larry L. Strong.

SSgt Larry L. Strong is currently a Stan/Eval instructor boom operator with the 41st Air Refueling Squadron, 416th Bombardment Wing (H), at Griffiss AFB, NY.

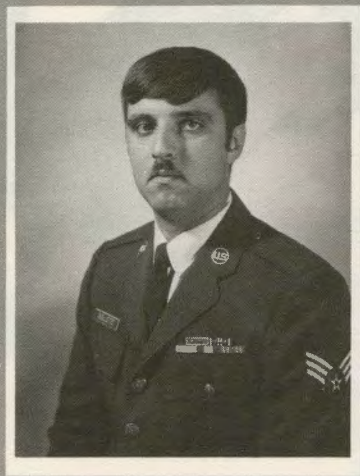
His previous service experience includes assignments as instructor boom operator with the 904th Air Refueling Squadron and wing command post controller for the 320 Bombardment Wing (H), both at Mather AFB, California. SSgt Strong participated in the King Cobra and Young Tiger Tanker Task Forces in Southeast Asia and has refueled such aircraft as the F-15, C-5A, and the B-1 during test evaluations.

TAC

SAFETY AWARDS

INDIVIDUAL SAFETY AWARD

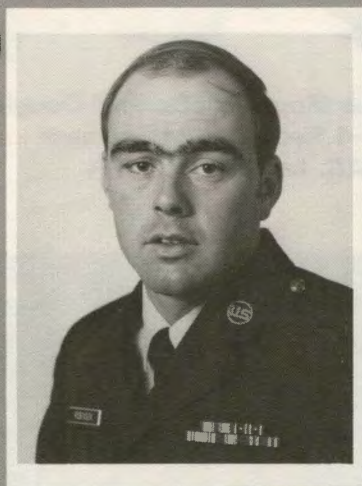
Sergeant Ricky L. Ouellette, 355th Equipment Maintenance Squadron, 355th Tactical Fighter Wing, Davis Monthan Air Force Base, Arizona, has been selected to receive the Tactical Air Command Individual Safety Award for this month. Sergeant Ouellette will receive a desk set and letter of appreciation from the Vice Commander, Tactical Air Command.



Sgt Ricky L. Ouellette

CREW CHIEF SAFETY AWARD

Sergeant Ronie T. Robinson, 4th Aircraft Generation Squadron, 4th Tactical Fighter Wing, Seymour Johnson Air Force Base, North Carolina, has been selected to receive the Tactical Air Command Crew Chief Safety Award for this month. Sergeant Robinson will receive a desk set and letter of appreciation from the Vice Commander, Tactical Air Command.



Sgt Ronie T. Robinson

DEFUEL VALVE--

By Bob Moore, McDonnell Douglas
F/RF-4 Field Service Engineer
HQ TAC, Langley AFB, VA

The incident aircraft was number four on an air refueling training mission. The inflight refueling (IFR) door was opened, tape and counter readings checked good at 6.0 over 6.5, and the readings appeared stable. Hookup with the tanker was completed, but fuel was not offloaded because the tanker emergency disconnect circuit failed to check satisfactorily. The student in the front seat executed a normal disconnect, closed the IFR door and began moving into the wing position on number three.

As number four was crossing behind number three, the Master Caution and Fuel Low Level lights illuminated. Tape and counter were checked at 4.0 over 4.3 and decreasing. The crew checked the fuel system switchology; and when the switches and circuit breakers all checked OK, the IP in the rear cockpit called for recycling of all the switches. The fuel readings continued to drop to 300 over 1,000, at which time the tape and counter began to increase slowly. The aircraft completed an uneventful landing at a divert field.

OPEN OR CLOSED?

The cause of reverse fuel transfer in this incident was a maintenance-induced short circuit at the defuel valve connector which resulted in the defuel valve opening. As with all reverse transfer malfunctions, the culprit is the defuel valve; and if it opens at the wrong time, it can ruin your whole day.

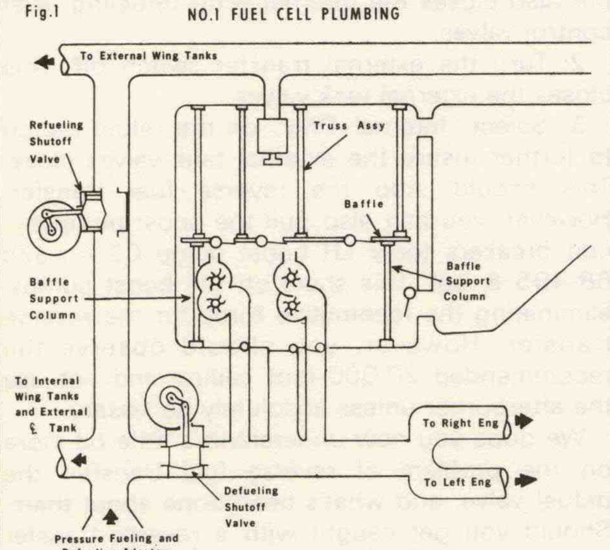
An open defuel valve can cause two problems: damage to the number-one fuel cell, or reverse fuel transfer during flight. Let's take a look at both of these problems and see what's being done about them.

DAMAGE TO THE NUMBER-ONE FUEL CELL

The number-one fuel cell contains a baffle assembly which separates the fuel cell into upper and lower cavities. This assembly is a divider which traps fuel in the lower cavity during inverted flight operation and contains check valves and supporting structure (Fig 1). On all F-4 aircraft prior to Block 41, there was a common boost pump manifold and check valves below each boost pump. These check valves prevented fuel recirculation through an inoperative boost pump. Block 41 and subsequent aircraft have a "survivable split manifold" which eliminated the need for these check valves (Fig 2). Without this check valve, if the defuel valve is open and the aircraft is refueled, refueling pressure flows through the open defuel valve and the left boost pump into the lower cavity of the number-one fuel cell, and exerts damaging refueling pressure on the tank baffle and structure (Fig 3). The structure supporting the baffle is not designed to withstand this pressure from an opposite direction and has been found distorted and failed, causing rupture of the internal baffle. More severe cases have occurred which resulted in rupture of the number-one and -two fuel cells and plumbing, and structural damage.

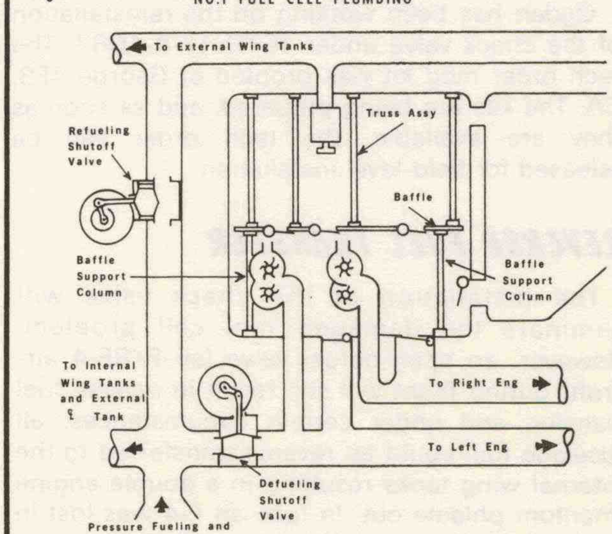
In order to preclude damage from an inadvertent refueling slipup, i.e., an open defuel valve, a McAIR Engineering Change Proposal (ECP) 8141 was made to reinstall the check valve below the left boost pump. The ECP was

Fig.1 NO.1 FUEL CELL PLUMBING



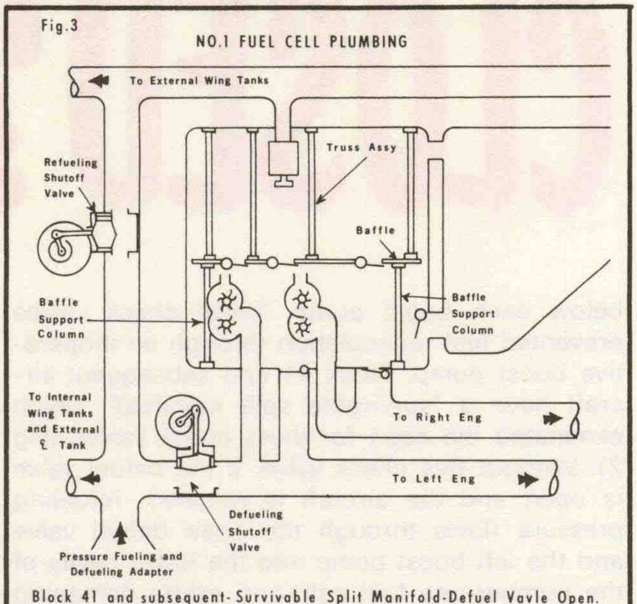
Prior Block 41-Common Manifold-Defuel Valve Closed.

Fig.2 NO.1 FUEL CELL PLUMBING



Block 41 and subsequent-Surviable Split Manifold-Defuel Valve Closed

DEFUEL VALVE- OPEN OR CLOSED ?



Block 41 and subsequent- Survivable Split Manifold-Defuel Vavle Open.

disapproved in January 1972.

During the September - December 1973 time-frame, several aircraft in PDM were reported to have damaged number-one fuel cells. In December 1973, TAC issued a one-time inspection to check all aircraft, Block 41 through 45, for number-one fuel cell damage. Ogden ALC (OO-ALC) followed in February 1974, with TCTO 1F-4-1041 which was identical to the TAC inspection. In July 1974, TAC requested that OO-ALC reinstate ECP 8141. This request was prompted by the large number of TAC aircraft found with damaged number-one fuel cell baffles during both the TAC and Ogden inspections.

Ogden has been working on the reinstallation of the check valve under TCTO 1F-4-1087. The tech order mod kit was proofed at George AFB, CA. The kits are being prepared, and as soon as they are available, the tech order will be released for field-level installation.

REVERSE FUEL TRANSFER

The installation of the check valve will eliminate the damaged fuel cell problem. However, an open defuel valve (all F/RF-4 aircraft) during flight will still result in reverse fuel transfer; and under certain circumstances, all fuselage fuel could be reverse transferred to the internal wing tanks resulting in a double engine Phantom phlame-out. In fact, an F-4 was lost in June 1967, due to the depletion of number-one cell fuel by reverse fuel transfer through a defuel valve which had inadvertently opened.

A fast fix to this problem was to close the defuel valve and disconnect the electrical plug to prevent a shorted circuit from opening the defuel valve. Unfortunately, the fix was not "Murphy"-proof, and a significant number of flame-outs and incidents involving reverse fuel transfer (including the loss of one F-4) occurred because the valve was not returned to the closed position prior to plug removal.

Because of the high rate of incidents which resulted from disconnecting the plug, OO-ALC modified the defuel valve circuitry to resolve the "Murphy" problem. TCTO 1F-4-878 modified the defuel valve open circuit by breaking the open wire to the valve which assured that no power is applied to the open circuit during flight. A shorting plug is required on the ground to complete the circuit and open the valve. Once defueling operations are complete, the shorting plug is removed and the electrical circuit to open the valve is incomplete. However, even this system is not completely "Murphy"-proof because a short circuit can defeat the system and open the valve after the shorting plug is removed. This is what happened in the incident mentioned at the beginning of the article.

Since the Air Force F-4 Dash One doesn't contain the emergency procedure for reverse fuel transfer, here's a quick review of what to do when the tape and counter rapidly start to decrease when you open the IFR door:

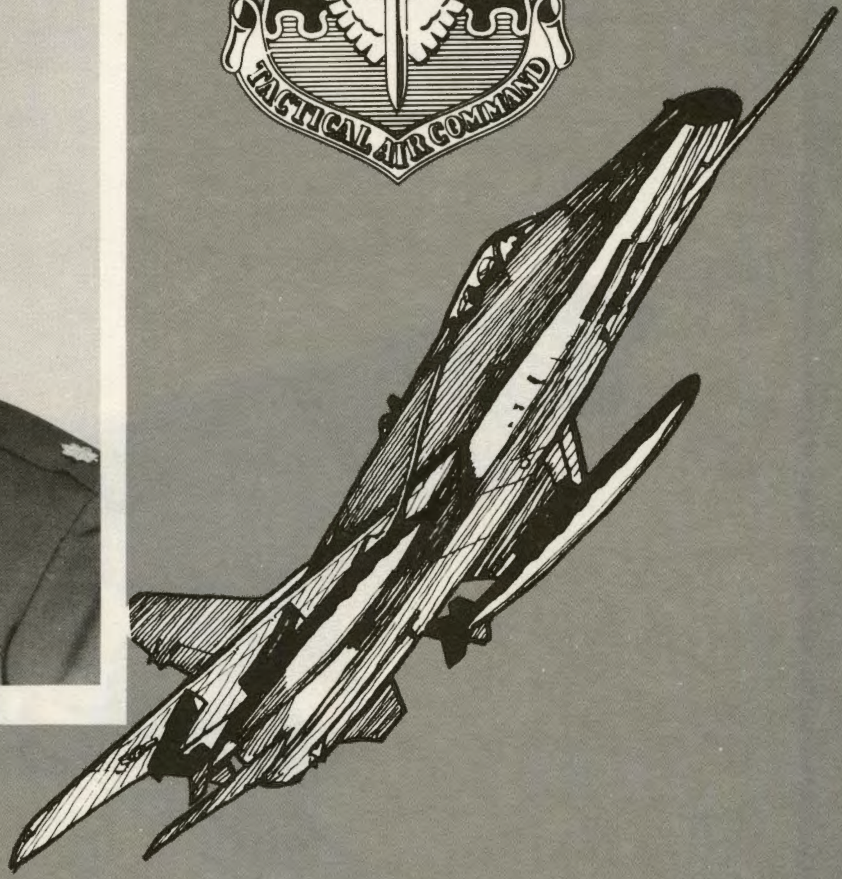
1. Activate the refuel switch to retract the receptacle. This not only pressurizes the tanks, but also closes the internal wing refueling level control valves.

2. Turn the external transfer switch off. This closes the external tank valves.

3. Select "Internal Only" on the refuel switch to further insure the external tank valves close. This should stop the reverse fuel transfer. However, you can also pull the boost pump circuit breakers (only LH boost pump CB on a/c 68-495 & up). This shuts off the boost pumps, eliminating the locomotive force for the reverse transfer. However, you should observe the recommended 20,000-foot ceiling and not use the afterburner unless absolutely necessary.

We hope you now understand a little bit more on the problem of reverse fuel transfer, the defuel valve, and what's been done about them. Should you get caught with a reverse transfer problem, you'll be better prepared to cope with it and get the bird safely back. ⟶

AIRCREW of DISTINCTION



Maj John M. Egan
181 TFG (ANG)
Hulman Field, IN

On 1 November 1977, Major John M. Egan was flying as an instructor pilot in the front cockpit of an F-100 on a routine instrument training mission. Engine run-up was uneventful with all engine instruments indicating normally.

After takoff, as the aircraft passed 1,200' AGL, Major Egan heard a loud explosion accompanied by a sudden loss of thrust. He terminated afterburner and checked all engine instruments but could not find any abnormal indications.

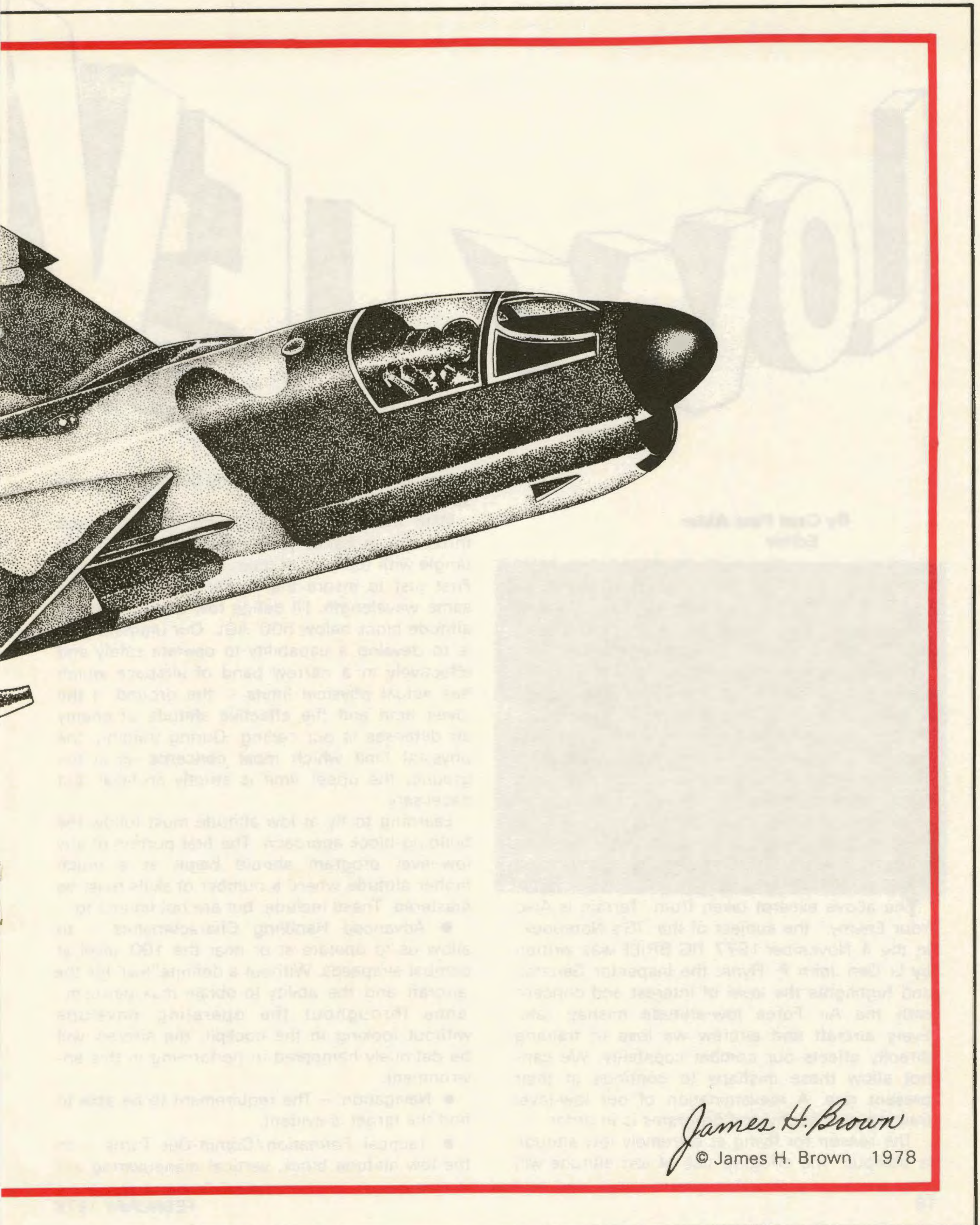
Major Egan turned back towards the departure runway but realized he was too close for a safe landing in reverse direction. As he transitioned to a downwind position, he was forced to sacrifice altitude to maintain 190 kts at military power. As he continued on downwind, a staccato engine vibration developed. Major Egan briefed the backseat pilot on ejection options and procedures and elected to fly a descending turn to final.

Major Egan selected half-flaps in an effort to slow his altitude loss and completed the final turn safely, accomplishing the landing without further difficulty.

Postflight analysis revealed that the first stage turbine wheel was the only normally functioning part of the turbine. The second stage was damaged and the last stage had disintegrated.

Major Egan's rapid analysis of the problem and execution of the emergency landing resulted in the saving of a valuable fighter aircraft. His actions qualify him as the Tactical Air Command Aircrew of Distinction.

A-7D


James H. Brown

LOW LEV

By Capt Pete Abler
Editor

In air warfare, the enemy doesn't care if he kills you or you kill yourself. He simply wants you dead so as to enhance his chances of victory. In the ambience of combat training, too often we become captured by the moment and throw normal caution to the winds. The reason is quite understandable. In combat, or in training for combat, we more readily accept the idea that we must take greater risks. Thus, we are inclined to "let it all hang out," or at the very least, relax normal cautions to some extent. We get so engrossed with the notion of "getting the kill" or "getting to the target" that we drive ourselves to a situation where luck, rather than skill, is the major determinant.

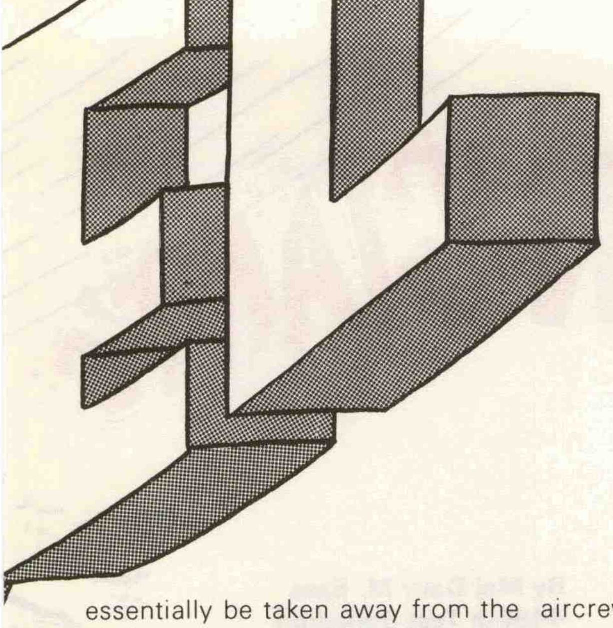
The above excerpt taken from "Terrain Is Also Your Enemy," the subject of the "IG's Notebook" in the 4 November 1977 TIG BRIEF was written by Lt Gen John P. Flynn, the Inspector General, and highlights the level of interest and concern with the Air Force low-altitude mishap rate. Every aircraft and aircrew we lose in training directly affects our combat capability. We cannot allow these mishaps to continue at their present rate. A reexamination of our low-level training philosophy and programs is in order.

The reason for flying at extremely low altitude is obvious. The effective use of low altitude will increase our combat capability by improving our survivability.

With these thoughts in mind, and stick and throttle(s) in hand, you're ready to go out and tangle with the best of them -- well not quite yet. First just to insure that we're operating on the same wavelength. I'll define low altitude as that altitude block below 500' AGL. Our ultimate goal is to develop a capability to operate safely and effectively in a narrow band of airspace which has actual physical limits -- the ground is the lower limit and the effective altitude of enemy air defenses is our ceiling. During training, the physical limit which most concerns us is the ground; the upper limit is strictly artificial, but necessary.

Learning to fly at low altitude must follow the building-block approach. The first portion of any low-level program should begin at a much higher altitude where a number of skills must be mastered. These include, but are not limited to:

- Advanced Handling Characteristics -- to allow us to operate at or near the 100' level at combat airspeeds. Without a definite "feel" for the aircraft and the ability to obtain max performance throughout the operating envelope without looking in the cockpit, the aircrew will be definitely hampered in performing in this environment.
- Navigation -- The requirement to be able to find the target is evident.
- Tactical Formation/Comm-Out Turns -- In the low altitude block, vertical maneuvering will



essentially be taken away from the aircrew. The ability to make nearly level tactical turns must be perfected at altitude. Additionally, to protect frequencies for the times you'll really need them, comm-out operations will be the rule.

● Visual Lookout/Mutual Support -- These skills must be second nature. Crews must be disciplined and know when they must clear, check for bandits, navigate, and accomplish the other myriad tasks. Inattention or complacency in this area can prove to be very painful.

● Crew Coodination -- A must for two-seat aircraft. Along with flight integrity, this attitude and skill must be developed from Day One in RTU. A real aircrew working together can easily accomplish the mission; two individuals working by themselves can foul up the whole operation.

Accompanying the initial flying program must be an extensive academic program. Every area involving flying skill must be thoroughly explored and understood before more advanced missions are attempted. The Fighter Weapons School has made two valuable videotapes; one on low altitude flying, and the other on low-level navigation and pop-up maneuvers. These two tapes, Tactics Manual 3-1, and Tactical Analysis Bulletins should be included in the academic portion of any low-level training program.

Once these two facets have been thoroughly completed, the individual is ready to undertake the most difficult portion of the training -- the actual low-level missions themselves. Any low-level checkout program must be designed strictly on a proficiency basis. Not everyone can or should be expected to become low-level "qualified" in a program consisting of "X" number of sorties. Every opportunity must be taken to point out and reinforce the hazards associated with low altitude flying -- and more importantly, the methods of coping with these hazards.

Varying terrain, weather, and the sun are among the greatest hazards in low-level flying. Rolling, jagged, flat, or slightly sloping terrain all require some adjustment in the methods used for low-level flying. Each must be explained in the training program. Weather can cause further problems. When cruising at high altitude, weather hazards can usually be seen far in advance; but at low altitude, fog, low stratus, dense haze, or smoke could be encountered over the next hill or after the next turn point -- so be prepared to take immediate action. Remember, if it doesn't feel right, get some altitude.

Once your unit establishes an effective low-level training program, the biggest hazard of all emerges -- complacency -- the feeling that you've got the program wired. Keep on top of your program. Your continuation program must continue to reinforce skills and attitudes learned in the basic checkout program. The complacent aircrew seems to be the one that is always caught by the hazards which they didn't anticipate. They either become a statistic or return with some fantastic war stories. Either way, we aren't doing our job.

Flying squadron supervisors and training personnel play the key role in this entire scheme. The training program will be formulated with their inputs and the responsibility for execution is theirs. It is up to the supervisors to know the program, to know their crews, their abilities and limitations, and to insure that neither is exceeded.

Only the surface of a very involved subject has been scratched here. We've talked about some items which must be considered in formulating a training program for low-level flying. The purpose is to point out to you, the aircrews, the need for intense preparation and cautious execution when undertaking low-level training. As Lt Gen Flynn concludes:

Remember, in peacetime, terrain is our enemy ... when we go into combat, terrain may well be our friend, and our knowledge of it may leave us with only one enemy -- the foe. ➤

Portions of this article were extracted from Fighter Weapons School videotape, "Low Altitude Flying."

JOLLY GREEN GIANT'S GOLF BALL

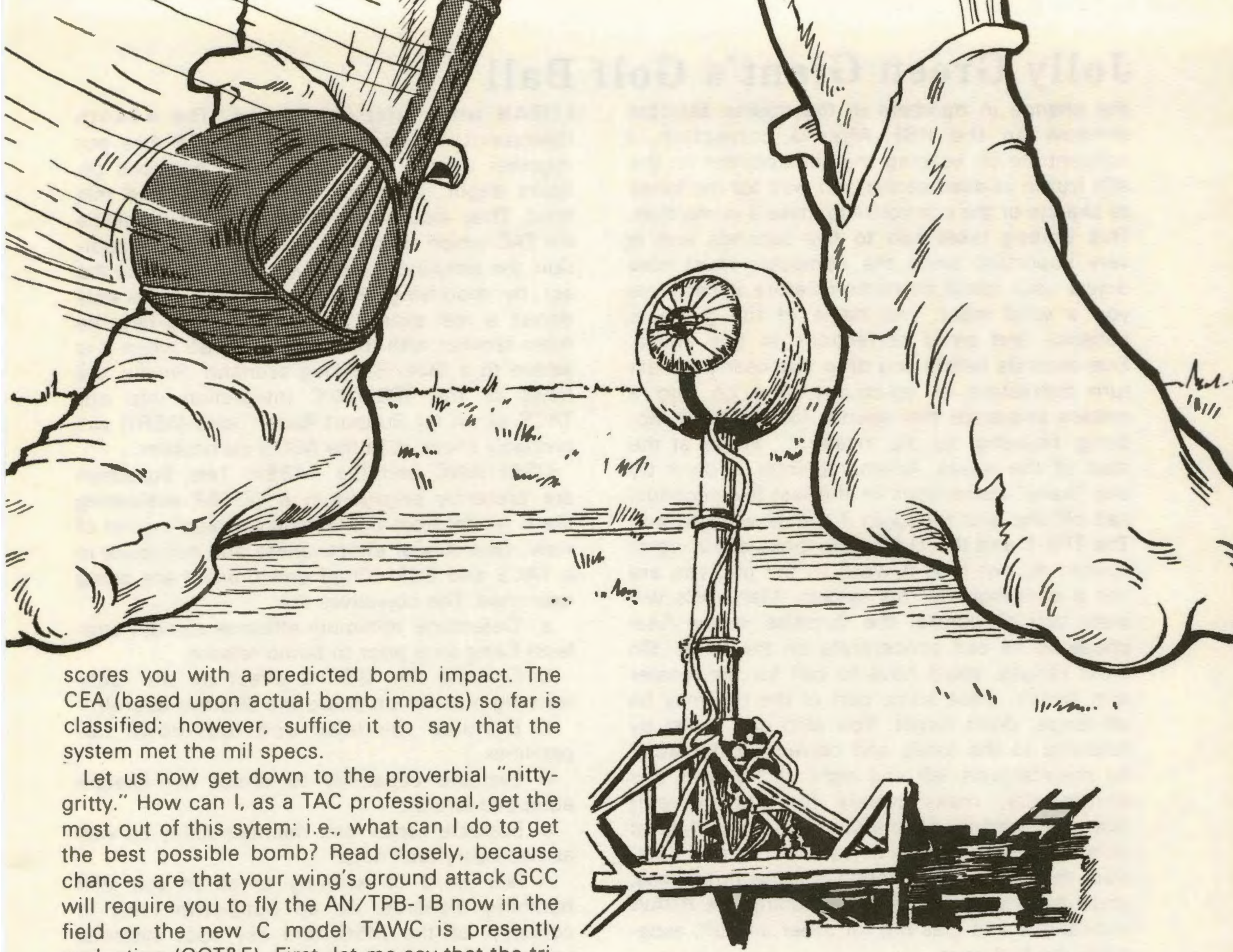
By Maj Davy M. Bass
4485th Test Squadron
Eglin AFB, FL

In the first of this series of articles, starting last month, I told you the story of the 4485th Test Squadron. I tried to whet your appetite with a promise of follow-on articles covering some new systems the Tactical Air Warfare Center (TAWC) is testing. The first system chosen has been understandably nicknamed the "Jolly Green Giant's Golf Ball," by those who have seen it; the "beep, beep machine," by those who have heard it; and the AN/TPB-1C Ground Directed Bomb System (GDBS), by the "little old lady in tennis shoes," who makes up such acronyms.

No matter what you call it, what it is, is the latest precision automatic tracking ground radar system. Now that you know what it is -- what does it do? It is designed to track and direct aircraft in all weather, day or night, to any given point. That point may be a navigation point, an IP, a computed bomb release point, an aerial release point, or a target. The airplane could be a TAC recce or fighter, a MAC fixed-wing or helicopter (airdropping cargo or troops), or a SAC bomber. So you say, "What's new? We did that with the old MSQ in the F-100, the 'sky spot' in SEA, and the 'beep, beep' in USAFE." The new part is that AN/TPB-1C GDBS has greater accuracy and tactical flexibility than ever before.

Your question now is, "So, big deal! What does that mean to me?" It means that, unless you are one of our few all-weather, day/night F-111 aircrews, you will also have a job to do in the next "big one" when the clouds gather or the sun goes down. In addition (although I am not as big on roles and missions as some), I think this system could fulfill TAC's JCS mission to provide a tactical ground delivery system.

Enough of the whys and wherefores, let's get down to the details of how the AN/TPB-1C works. The aircraft is tracked through a precision I-band radar whose antenna is located in the golf ball. The aircraft must have an I-band beacon on board for long range work; or at short ranges, skin track can be used. The radar data is fed into a computer where it is smoothed; and such black box magic as coordinated transformations, weapon ballistics, and wind velocities are computed to derive where you are and where you want to go. Based upon this information, guidance signals are generated and transmitted to the aircraft. This guidance has several forms -- a bearing from your present position to the desired point displayed by the TACAN bearing pointer; and verbal tones in the form of an A (·-) meaning turn right, or an I (··) meaning turn left, or a steady tone for on course. These tones started the "beep, beep" nickname. If the point to which you are being directed is a bomb release point, the TPB/1C, when fed manual data such as bomb type and winds will precompute the desired release point for your current airspeed, altitude, and heading. When it figures you are as close to hitting the target as you are going to get, it sends out a weapons release tone sequence which starts 5 seconds before release point. If you are not on a weapons delivery run, this same release tone will be broadcast when you arrive at your turn point, IP, etc. Another black box does its magic by digesting your final release parameters and

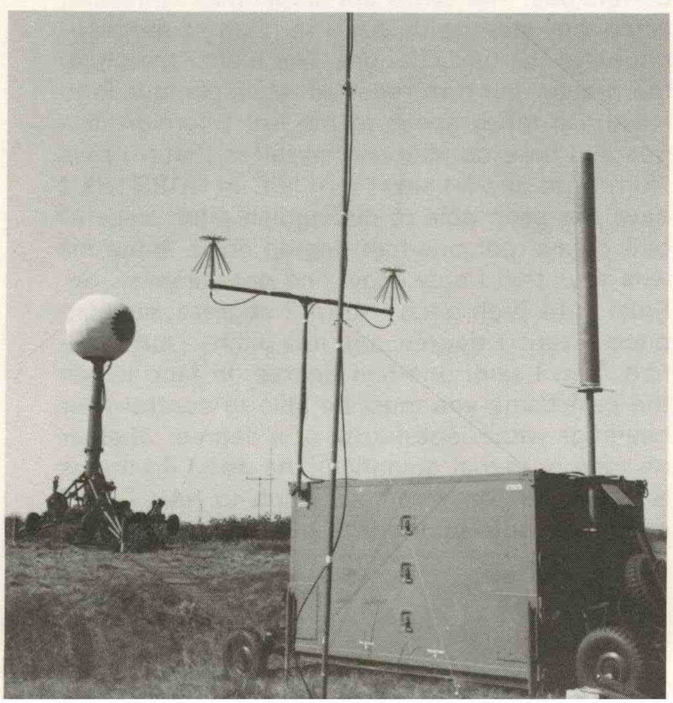


scores you with a predicted bomb impact. The CEA (based upon actual bomb impacts) so far is classified; however, suffice it to say that the system met the mil specs.

Let us now get down to the proverbial "nitty-gritty." How can I, as a TAC professional, get the most out of this sytem; i.e., what can I do to get the best possible bomb? Read closely, because chances are that your wing's ground attack GCC will require you to fly the AN/TPB-1B now in the field or the new C model TAWC is presently evaluating (QOT&E). First, let me say that the tri-command manual 55-4 will soon have some directions covering GDBS procedures. But until then, I would like to pass on some techniques I found to be useful.

A run or event can be broken down into two phases -- initial course guidance and final precision guidance. In the first phase, you reference the TACAN bearing needle for bearing to the target. You may use smooth variations of heading, altitude, and airspeed (jinking) to help defeat radar ground tracking. Unlike its predecessors, the C model allows any run-in heading. There is no need to maintain a "yellow brick road" for 30 miles. However, at some point short of the release point (we are now looking at 20-seconds-to-release time frame), you must turn to the needle and start the straight and level final precision phase. Something to remember here is that the TACAN bearing is all that is displayed, no DME is available, and no wind drift correction. In the final phase, you receive either aural tones or controller heading corrections. The tones are sometimes confusing since they step up or down in pitch as the magnitude of the turn changes. The higher the pitch, the greater the turn required. My technique is to make the tones speak to me like a foreign language. I have conditioned myself in that (·--) says "turn right and (-·) says "turn left" in GDBS talk. I have not been able to distinguish pitch steps of one octave per one-half degree error, since my wife says that I only know one note anyway. So, I just think high pitch -- turn 2 degrees, medium pitch -- turn 1 degree, and low pitch -- turn one-half. Yes, I said, one-half degree. In fact, to get the best bomb you must be able to control your headings within one-fourth of a degree, whether on tone or verbal guidance. The way I do that is to place my mode selector knob to NAV COMP and make corrections (roll aug off) referencing the change in numbers in the course selector window on the HSI. After a correction, I concentrate on keeping the bank pointer on the ADI frozen at dead center and wait for the tones to change or the controller to make a correction. This waiting takes two to five seconds and is very important since the computer must now digest your latest correction before it can give you a valid input. The name of the game is patience and small corrections in this phase. Five seconds before you drop you hear your last turn correction or on-course, and go into a release sequence that sounds like tic-bong, tic-bong, tic-bong, tic, tic, naaaa .... Pickle at the start of the naaaa. Another pointer -- don't try any "hairy" corrections in the last few seconds; call off dry, and try again if things went to pot. The TPB-1 and the TLAR (that looks about right) system do not mix! A word to the gib, you are not a passenger in this system. Many ACs will want you to control the throttles in the final phase so he can concentrate on the tones. On most ranges, you'll have to call for the master arm switch, since some part of the run may be off-range; don't forget. You also can assist by listening to the tones and correcting the AC if he misinterprets left and right. (If he does this continually, make labels for his gloves!) However, barring this input, you should keep quiet in the final phase since your voice will distract the AC's concentration. During this phase, you'll have your hands full watching the RHAW indications and clearing for other aircraft, especially the bad guys.

This system is not hard to fly; although it will take some practice and training as did the LORAN when first introduced. The 4444th Operations Squadron from Luke AFB has put together a brief on TPB-1. Wing weapons officers might give them a call if you need this brief. They also are preparing an ISD package for TAC which should be available soon. In addition, the simulator people will be getting into the act by modifying the simulator to accurately depict a real event. Some of you will become more familiar with the world of GDBS when it is added to a Blue/Red Flag scenario. Finally, the hows of the TPB-1B/C integration into our TACS as an Air Support Radar Team (ASRT) will probably show up in the AGOS curriculum.



USAFTAWC and the 4485th Test Squadron are presently engaged in a QOT&E evaluating the C model from the tactical operator's point of view. Operational effectiveness and suitability in a TACS and ECM/Chaff environment are being examined. The objectives are:

a. Determine minimum effective straight-and-level flying time prior to bomb release.

b. Evaluate the TPB-1C effect on the radar warning receiver on board the directed aircraft.

c. Evaluate low-level and look-down capabilities.

d. Evaluate capability to direct non-beacon equipped aircraft.

e. Evaluate repair and maintainability as well as necessary tech data.

A last word of warning to all of you VFR bombing diehards. As an outgrowth (only in concept) of the MSQ and sky spot systems, many old attitudes and experiences have been carried over (some justly and some unjustly) and applied to TPB-1B/C. Expressions such as, "Any straight-and-level bombing above skip altitudes belongs to SAC," and "Blind bombing by the TAF is sacreligious," will have to give way. As you become more familiar with this sytem and its capabilities, its value will be self-evident.

Next month, I'll cover the AN/ARN-101, Pave Tack system, which should hold a little more interest for the VFR bombers in the audience. See you then.

Major Davy M. Bass (M.S., Aeronautical Engineering - Air Weapons Development, AFIT) currently assigned to the 4485 TESTS is a 1965 graduate of the USAFA. His service experience includes an F-4 tour in Germany, a tour at Ubon RTAFB, and a staff tour with Alaskan Air Command. He has flown the F-4, RF-4, and T-33.

SPO CORNER

Hey Lead--I've Lost Both My Generators !!

By Capt Garry S. Mueller
TAC/SEF

This is one of those stories that dwells on the all too familiar topic of knowing your airplane and what it does and does not like. Undoubtedly, a few of my comments will irritate some of the prospective aeronautical engineers running around -- but that's understandable.

The first thing every fledgling learns in pilot training is that time-tested axiom: "Anytime you have trouble sleeping, open your Dash One." Instantaneous results are guaranteed. Evidently there are a bunch of guys running around who have problems going to sleep because it doesn't appear from all the message traffic that a lot of Dash Ones are being read.

The majority of these manuals contain a simple looking thing called an engine operating envelope. Besides the gray shaded and black/white striped areas, there are usually some comments such as:

1. Flight outside this envelope not recommended.

2. Afterburner initiation not recommended in this area.

3. Rapid or abrupt throttle movement, engine acceleration to military or AB power above this line (shaded area) may cause engine stall or flameout and is not recommended.

Although the envelope is based on 1 G, nonmaneuvering flight, it does have some use in predicting what an engine will do when operated (mistreated) in the marginal areas of operation. (Here come the aero engineers with the argument that engines were designed to operate throughout the aircraft envelope and if they don't, they're crummy engines, so why worry about it. No comment.)

Since compressor stalls and flameouts are beginning to become an almost hourly occurrence, let's go back to the basics.No graph can account for the many variables affecting an engine. Of primary concern is fatigue, which is generated mainly by temperature, time, and stress. Fatigue is one of those things that cannot be stopped because the three main ingredients are present whenever an engine is operating. Unfortunately, the effects are cumulative. The rate of onset varies from one engine to another, but always has the same result -- decreased engine effectiveness. Add to fatigue a slightly out-of-trim condition, reduced airflow over the compressor, a few compressor blade nicks, and a ham-fisted throttle jammer (same guy who doesn't always sleep good) and the engine envelope is not as good as the Dash One leads folks to believe. Put the same engine in the shaded area of the envelope and in the golden hands of some S. Canyon trying to do a high AOA, double-inverted, sneaky flick-noogle to get a Fox 2 on a cloud at FL 450 and guess what happens? Now that same S.C. has nothing to do except fall out of the sky while he busily cleans out his flight suit and tries to figure out why he has two generator-out lights glowing in his face in that all-too-quiet air machine.

I'm not advocating being a whiskey delta everytime you strap on an airplane. On the contrary, do what you have to do -- including a high AOA, double-inverted, sneaky flick-noogle if that's what it takes. But let's knock off the dummy things which require safety officers to continually write up incident reports when only a few words are required: "out-of-the envelope."

TAC TIPS

...interest items, mishaps with morals, for the TAC aircrewman

> **Failures are made not by those who dare to fail but by those who fail to dare.**
>
> **Lester B. Pearson**

NEW WEATHER ADVISORY

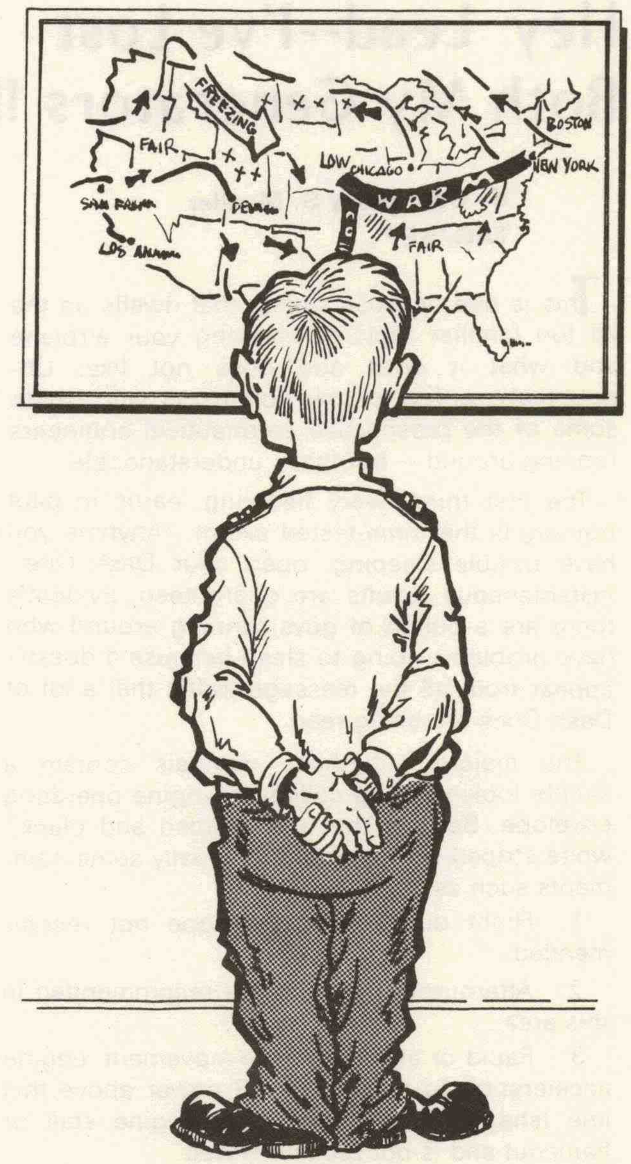
Courtesy 5 WW, Langley AFB, VA

"Everybody talks about it, but nobody does a thing about it ...", the weather? Yep! But low-level wind shear is also an item that's gotten a lot of attention lately without much positive action being taken. The TAC ATTACK's series of articles in the Sep - Nov 76 issues aided greatly in the understanding of this phenomenon. As mentioned in those articles, neither the civilian nor military weather services presently have the capability to detect and measure those elements that cause low-level wind shear. True, and it's still several years away.

Air Weather Service units at TAC bases are commencing a weather advisory program for low-level wind shear. Their emphasis is going to be on (1) collecting wind shear reports, (2) cross-telling via wind shear advisories and teletype transmission of PIREPs, and (3) relating these reports to meteorological conditions. These will be catalogued to aid in improvement of future advisories.

Weather people will be issuing some "forecast" wind shear met-watch advisories, too. They will be based on rules of thumb established by several civilian airlines studies.

The key to the program's success rests with TAC crews, and early reporting of all instances of wind shear. Call them in on pilot-to-metro or report them through air traffic control facilities, but report them! Each event you report will help



us all achieve a fuller understanding of the interrelationship of weather conditions and aircraft handling. Better, your report may save a buddy's skin -- or yours!

HO HUM--ANOTHER UTILITY FAILURE

The F/RF-4 Dash One leads you to believe that a bleed air duct failure will be readily apparent because of the myriad of symptoms. Tain't so, Sherlock.

A PACAF recce bird recently experienced an initially insidious bleed air duct failure.

Fifteen minutes after takeoff, 90 miles from departure base, on an out-and-back, the RF-4's Check Hydraulic Gauges light illuminated. Utility hydraulic pressure was below 1,500 PSI. When the flight turned back towards homeplate, utility pressure went to zero and stayed there. As a descent was started, the left throttle stuck at 88%. The AC had to exert excessive force to retard the throttle. During the descent, the gear, flaps, and hook were lowered IAW the Dash One. Two minutes later, the left engine auto-accelerated to 100%.

It wasn't until the aircraft was within 20 miles of home base that any bleed air duct failure symptoms other than the stuck throttle appeared indicating this wasn't a normal utility failure. Smoke entered the cockpit, several circuit breakers popped, the telelight panel went blank, and the UHF became intermittent. (Sounds a bit more familiar?) About 1 NM on final, PC-2 started dropping. The aircraft completed a successful barrier engagement -- probably none too soon for the crew, I'm sure.

Investigation is still in progress, but it appears the bleed air duct in the number-one engine bay separated just below the number-four fuel cell. From the amount of damage, it appears that another few minutes of flight could have proven disastrous for all concerned.

Don't treat common emergencies as commonplace. The credit for being right is small; the cost of being wrong could be enormous.

RICOCHET ROMANCE

How long has it been since you've heard of a bird getting hit by a ricochet? Probably quite a while. It happened to a USAFE F-4 in December.

The incident aircraft flew one good air-to-mud mission in the morning. The second gunnery sortie started with two strafe passes, both within parameters and restrictions. When the Phantom went into the bombing pattern, the doors to the SUU-21 wouldn't open. Postflight inspection revealed why. A 20 mm projectile was found in the right inboard pylon. It had severed several cables in the pylon rendering the SUU-21 inoperative.

The strafe range was policed daily and plowed periodically. Don't get complacent. All the range work in the world doesn't prevent ricochets -- it only lessens the chance of getting a hole in your jet (or whatever).

LOOK BEFORE YOU LEAP

Confusion and procedural errors nearly resulted in a midair collision recently ...

During takeoff, while staging out of a strange field, an F-15 pilot followed his home field noise abatement procedures. The rapid climb immediately after takeoff brought the F-15 within 300' of a T-38 in the VFR overhead pattern. It might have been closer had the T-38 not taken evasive action.

The IFR supplement for this particular base carried a takeoff restriction to maintain an altitude below that of the VFR pattern until reaching the field boundary. This restriction was also incorporated into local operating procedures. Since F-15s had been operating out of the base that week on DACT missions, confusion existed in the minds of the pilots and tower controllers as to whether the aircraft were in transient or deployed status and were aware of the restrictions. As a result, the normal takeoff advisory issued to transient aircraft during takeoff clearance was omitted. The pilot was unaware of, or forgot, the restriction and we almost lost two aircraft.

Don't let your daily habit patterns become the cause of a mishap. When operating out of a strange field, review their departure procedures closely. It can, and probably will, save a lot of embarrassment and maybe your hide.

PHYZ-BIZ

By Lt Col Harold Andersen
HQ TAC Physiological Training Coordinator

Ask yourself -- ask any number of people, "What was the most important decision of your life?" and I'll bet your experience is about the same as mine. The vast majority will be related to marriage (or love), career choice, or to education. Few, if any, will answer, "My decision to start smoking cigarettes." Yet this latter decision should be the answer given by the 98,000 people who became new 1977 lung cancer patients; or by the 200,000 people who were victims of cigarette-related premature deaths each year in the United States.

There are about 44.5 million smokers (age 21 or older) in the U.S. (or 36% of the total population above age 21) and the number is growing.

THE MOST IMPORTANT DECISION OF YOUR LIFE

Each year an estimated 1.1 million teen-agers are making the decision to start smoking cigarettes. And so the problem continues to grow; in 1925, the U.S. per capita consumption of cigarettes was 1,085 (age 18 or over); in 1970, 4,030; and in 1971, 4,040. Recent estimates put the number of two-pack-a-day smokers at four million, and the chances of such heavy cigarette smokers dying during their prime years are twice as great as the non-smokers. For example:American male smokers, aged 25, two-pack-a-day smokers, 46% will die before age 65; however, of 25-year old non-smokers,only 23% may expect to die before age 65. To put it another way, the life expectancy of a two-pack-a-day smoker, aged 25, is 8.3 years less than a nonsmoker.

In 1964, the U.S. Surgeon General reported unequivocably that: "Cigarette smoking is causally related to lung cancer in men; the magnitude of the effect ... far outweighs all other factors." Early on, the nicotine, tars and resins found in cigarette smoke were incriminated as cancer-causing agents (carcinogens), so research was begun to find ways of reducing their presence in cigarette smoke. The filter approach (plus changes in tobacco types and blends) succeeded in reducing the yield of both nicotine and tars by more than 50% over a 20-year period (1955, average 43 mg tar and 2.8 mg nicotine; 1975, 18 mg tar and 1.2 mg nicotine).

However, tobacco smoke is a very complex substance and, besides the nicotine and tars, there are about a dozen deadly gases in every drag. About 92% of cigarette smoke is gaseous, the most poisonous elements of which are carbon monoxide (CO), hydrogen cyanide (HCN) and oxides of nitrogen (NO, NO_2, N_2O, etc). It has been discovered by laboratory analysis of cigarette smoke that although a cigarette may be low in nicotine and tars, it may have dangerously high levels of the poisonous gases.

Since tobacco smoke is a "combination of ingredients" type of substance, perhaps a brief review of the effects of some of the ingredients on the smoker will contribute to a better understanding of the whole situation. Nicotine is a colorless, soluble, fluid alkaloid; the alkaloid family includes other familiar substances such as caffein, morphine, quinine, strychnine, etc. It is generally thought to be the substance which causes the "addiction" or "habituation" experienced by cigarette smokers. It is a powerful poison which acts upon the adrenal glands and other tissues, raising the level of substances called "catecholamines" (epinephrine, nor-epinephrine) in the blood stream. It increases heart rate and raises blood pressure causing the heart to work harder and require more oxygen. At the same time that the cigarette smoker satisfies his craving for nicotine, he is also loading up with carbon monoxide (CO). As you may remember, from last month, CO is colorless, odorless, tasteless gas which combines quickly with the hemoglobin (Hb) of the red blood cells. Nonsmokers may have anywhere from 0.5% to 2.0% of CO in their blood stream, mostly from external, environmental sources. The body also produces some CO in the course of normal metabolism. The heavy smoker may carry as much as 10% CO-Hb in his circulating blood. Some effects on the body, besides the lowering of blood oxygen level, are damage to the walls of the arteries, causing atherosclerosis (cholesterol deposits on the artery walls) and increased "stickiness" of platelets, a blood constituent involved in blood clotting; it speeds clot formation. Nicotine also promotes this "stickiness" of platelets. All of which may help us to understand why cigarette smokers have more heart attacks and are more likely to die from coronary artery disease than nonsmokers.

Before moving on, let's just dwell for a minute on the combined effects of these two (nicotine and carbon monoxide) and their possible effects on aircrews. It was shown above that nicotine increases the body's demand for oxygen at the same time the CO decreases the amount of oxygen available. That's a bad situation for any consumer, increasing demand with a concurrent decrease in supply. The level of CO-Hb may rise to 20% or more, as has been demonstrated in civilian airline crews forced to wait in line for takeoff. To make matters worse, even cabin pressurization levels of 7,500 - 8,000 feet add a low level of hypoxic hypoxia to the already grim picture. Remember, all these effects are additive. Recognizing this potentially lethal combination, a group of airline pilots recently petitioned the FAA to prohibit any smoking in the cockpits of all commercial flights and to prohibit any smoking by flight crews for 8 hours before takeoff.

Hydrogen cyanide (HCN) and the oxides of nitrogen (especially NO_2) are connected with lung disease such as chronic bronchitis and emphysema, which are known together as "chronic obstructive pulmonary disease" (COPD). The two go hand-in-hand, and it has been found that about 99% of chronic bronchitis sufferers also have emphysema, to some degree. Probably, the main cause of these diseases (plus cancer) is the inability of the lungs and respiratory tract to cleanse itself normally. This task is carried out by two separate mechanisms, both of which can be inactivated by HCN and NO_2.

One mechanism employs cilia, microscopic hair-like structures which line the respiratory passages and beat in coordinate, wave-like rhythm to carry mucous and foreign materials from deep in the lungs to the bronchi and trachea where coughing can expel them. Cigarette smoke quickly paralyzes these ciliated cells and in time they are irreversibly damaged and die. HCN seems to be the main destructive agent in this case, although other elements in cigarette smoke can eventually accomplish the same end result when HCN is removed.

A second-line of defense, so to speak, for the lungs is provided by some specialized cells called macrophages which can migrate around in the lung structure, slipping between cells, to surround foreign materials and deactivate them. They are free to dump their toxic load onto the ciliated escalator, or to move out of the lung area and into the lymphatic system. The toxic gas NO_2 reduces macrophage activity. NO_2 is also a strongly irritating gas, which is thought to be a probable causative agent in emphysema.

It has been noted that many of the new "low tar -- low nicotine" brands of cigarettes actually produce more of the poisonous gases than the old "high tar - high nicotine" brands. This poses a potential danger: If, in his attempt to satisfy his body's demand for nicotine, the smoker of a low nicotine brand draws more deeply and inhales more frequently, then the intake of the poisonous gases will be greatly increased. The fast puffers and deep inhalers are apparently in greater danger of COPD than if they remained with their old high-tar brand.

So much for the horror stories! Now getting back to my original question: "What was the most important decision of your life?" The decision to become a cigarette habitive should be the answer by all smokers. If you are a smoker, it has already changed your life, perhaps imperceptibly, but nevertheless you are a changed person.

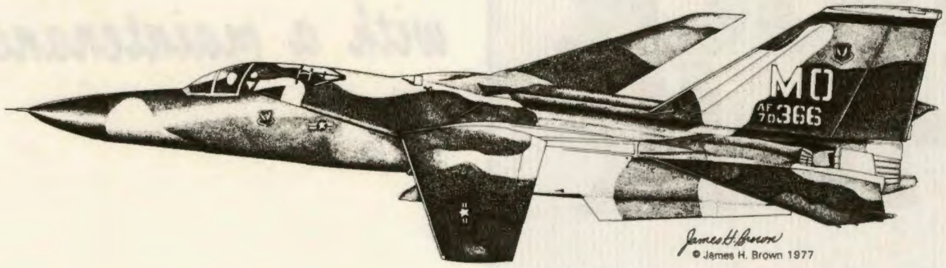
Why do people start smoking? The decision to start is usually made while a high school teen-ager, and without benefit of proper counsel. Most probably start because their friends and peers smoke, and it seems to be the accepted thing to do. If the teen-ager has older brothers and sisters or parents who smoke, the chances are great that he, too, will join the crowd.

It's never too late to stop smoking -- unless you're already torn up by cancer or emphysema. The Surgeon General's report pointed out that, "The risk ... is diminished by discontinuing smoking." Many smokers who continue to smoke, in the face of all the available evidence (and there is a whole helluva lot of it) blithely point out that not all smokers get lung cancer, and they figure they'll be one of those. Well, one of the reasons is that many don't live long enough to develop lung cancer; cigarette smokers' death rates from all causes have been shown to be 57% higher than nonsmokers. Most die of heart disease. That's not such a great alternative in my book.

Which brings us to the "bottom line." Clearly, the decision to smoke is made, in most instances, by immature minds; by unsophisticated, poorly informed juveniles. Once the habit is established and the smoker has become addicted, it becomes easer to rationalize the activity. "I don't smoke enough to hurt me!" or "I can quit anytime I feel that it's bad for me!" Somebody put it in a nutshell when he said, "The only safe cigarette is the one you don't smoke."

Maybe some readers will decide to reevaluate their status as a smoker; review the reasons they had for starting and decide whether they still have the validity they once appeared to have. Nobody will tell you it's easy to stop smoking, but remember -- any accomplishment, great or small, has to begin with one decision, "I'll try!" The life you save will be your own!

F-111 Emergency Situation Training



F-111 Emergency Situation Training

By Capt Marty Steere

SITUATION:

You're leading a flight of two F-111s on an ORI-directed mission. After taking gas from the tanker, you're proceeding at FL 200 to the letdown point for your low-level ingress to the target. You're doing 450 KIAS and the wings are swept to 45 degrees. All of the sudden, number two calls a right break to defeat a missile from an Aggressor who has cleverly gotten to your five o'clock. You rapidly roll right and pull back on the pole in a right slice to defeat the missile and get down where the Aardvark runs best. When you approach 135 degrees of bank, you attempt to roll out -- oops, you move the stick left -- but the aircraft continues to roll to the right at an increasing rate. The rudder pedals shake, and the stall warning horn is blowing. Whatcha gonna do now, Bunky?

OPTIONS:

A. Call the SOF and ask him what to do.

B. Go through the out-of-control recovery procedure.

C. Accomplish the procedures for an unscheduled roll/yaw maneuver.

D. Check the AOA.

DISCUSSION:

Option A seems to be in vogue these days, but you've only got 5,000 feet of altitude to play with before you have to eject. So, let's not waste time with extraneous radio calls. Option B may be correct. The only problem is that if you are not out-of-control and you abruptly put the stick forward, you may aggravate the situation to the point where recovery is impossible. Option C poses the same problem. If you are out-of-control and you don't immediately put the pole forward, you may not be able to recover. As you can see, if you pick the wrong option you'll have to eject and that means losing an aircraft, filling out a lot of forms, and answering a lot of questions from the Mishap Investigation Board, the DO, God, etc. Option D? Right on, Sherlock. The key to the problem is that old Greek named Alpha. Since the post-stall gyration will probably be of a rolling nature, it's difficult to determine whether you've gotten yourself into a departure or into an unscheduled roll/yaw. Therefore, AOA is the primary clue. If your AOA is below 20 degrees, you probably have unscheduled roll/yaw -- above 20 degrees, you've probably departed. If you've departed, the only solution is to get the stick forward to decrease alpha. However, if the airplane is rolling due to a flight control malfunction and the alpha is low (below 20), pushing the stick forward will cause roll coupling and the airplane will wrap up in an increasing roll rate (150° - 200° per sec).

If you think this emergency can't happen to you or that you'd be able to tell the difference between roll coupling and a departure without checking the AOA -- lots of luck. We've lost a couple of F-111s because the jocks mistakenly identified an out-of-control situation for roll coupling and vice-versa. That quick glance at your AOA could prevent a bad day from becoming worse. ➤

chock talk

...incidents and incidentals with a maintenance slant.

AND THIS SWITCH DOES...

Hands-on familiarization training is one of the most effective methods of training personnel in the use of equipment. In the case of aircraft and other complicated machinery, however, it is often best to limit the switch moving to FTD mockups, etc.

An A-10 had just completed a QC Initial Acceptance Inspection and was being utilized for weapons load crew training. During cockpit familiarization training for weapons load personnel, the instructor placed the fire extinguisher toggle switch to the "right" position, firing the squibs and dispensing the right forward and aft fire bottles.

Troubleshooting revealed that a relay in the right "T" handle malfunctioned allowing firing voltage to the squibs even though the "T" handles were in the "off" position. At this unit, future training will involve showing, but not actuating the switches. How about yours?

ALONE, UNARMED AND WITHOUT TECH DATA

After a routine training upload of a GBU-10, the crew went to a classroom for debrief. Following an uneventful debriefing, the number four man in the team returned to the aircraft alone -- without the knowledge of the crew chief. He prepared for the down-load of the GBU-10 without the crew chief present and without using the required checklist. While attempting to remove the swivel links from the arming solenoids, he mistakenly pulled the arming wire which fired the thermal battery of the computer control group. The safety pin in the thermal battery was not installed. Cost -- $800 plus the emergency response of required personnel, crew decertification, extra training, and a lot of headaches for all. The inattention to established procedures isn't worth it!

A LITTLE KNOWLEDGE IS A DANGEROUS THING

During a preflight cockpit check of an F-15, the crew chief noted what he thought was improper routing of the parachute automatic actuator arming cable housing. The oxygen hose guard immediately to the rear of the emergency harness release (EHR) handle is tubular and of approximately the same diameter as the end of the arming cable housing end. Thinking the cable should go through the hose guard, the crew chief disconnected the cable from the EHR handle and attempted to route it through the hose guard. This attempt was unsuccessful because the arming cable end is too large to go through the hose guard. He then attempted to replace the cable in its original location but accidentally pulled the arming cable, causing the relay cartridge to fire.

Instead of calling the egress shop to check out the system, the crew chief attempted to reroute the cable by himself without reference to tech data. His earlier training emphasized the procedures to be followed when an individual notes something wrong with an aircraft system. Unfortunately, while trying to do good work on his bird, he chose to ignore it. Don't let your "knowledge" overload your judgement. If you need help, get it.

TAC TALLY

	TAC DEC	TAC thru DEC 1977	TAC thru DEC 1976	ANG DEC	ANG thru DEC 1977	ANG thru DEC 1976	AFR DEC	AFR thru DEC 1977	AFR thru DEC 1976
MAJOR ACFT. ACCIDENTS ▶	3	28	31	3	15	10	0	1	3
AIRCREW FATALITIES ▶	4	32	17	0	6	5	0	0	1
TOTAL EJECTIONS ▶	2	23	24	3	14	6	0	1	2
SUCCESSFUL EJECTIONS ▶	0	16	18	3	10	6	0	1	1

TAC'S TOP "5" thru DECEMBER

TAC FTR/RECCE	
class A mishap free months	
20	474 TFW
18	56 TFW
15	67 TRW
14	35 TFW
12	347 TFW

TAC GAINED FTR/RECCE		
class A mishap free months		
69	127 TFW	ANG
35	156 TFG	ANG
24	434 TFW	AFRES
24	162 TFTG	ANG
21	131 TFW	ANG

TAC/GAINED Other Units		
class A mishap free months		
125	182 TASG	ANG
105	135 TASG	ANG
94	193 SOG	ANG
86	110 TASG	ANG
81	USAF TAWC	TAC

CLASS A MISHAP COMPARISON RATE 76/77
(BASED ON ACCIDENTS PER 100,000 HOURS FLYING TIME)

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TAC	76	2.9	8.6	9.0	7.3	8.0	8.1	6.9	6.8	7.5	8.1	7.4	7.0
	77	0.0	5.3	5.8	5.4	5.1	5.0	5.6	5.2	5.9	5.6	5.3	5.5
ANG	76	10.5	5.0	6.5	4.8	3.8	3.9	3.4	3.5	3.7	3.9	4.0	4.1
	77	0.0	3.1	1.9	5.7	4.4	5.4	5.4	5.3	5.3	4.8	5.9	6.8
AFRES	76	0.0	0.0	11.3	8.1	6.1	5.0	4.2	7.2	6.4	5.7	5.3	7.3
	77	0.0	0.0	10.1	7.4	5.8	4.7	4.0	3.4	3.0	2.7	2.5	2.3

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CONGRATULATIONS TO THE 23 TFW (FLYING TIGERS).