JULY 1962

TAC ATTACK

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TACTICAL AIR COMMAND

DIRECTION TO PERFECTION

TAC ATTACK

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COVER PHOTO

This month we pay tribute to TAC's hard working C-123 Units.

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"When you take a chance, you trust to luck. When you plan ahead, you make your luck!"

General Disosway on Safety

It seems unbelievable that a reasonable person could read the emergency procedures outlined in the Dash-One and still feel "It couldn't happen to me."

These procedures are, in effect, alternate courses of action. If we memorize them and know when to apply them, we automatically adjust the odds in our favor.

Yet, experience has taught us that a few will not plan to meet contingencies unless forced to do so.

For example, we are required to list an alternate airfield for instrument flight when our destination doesn't meet certain weather minimums. This requirement was laid on many years ago, and was not an arbitrary move. Rather, it was a clear determination by those shrewd enough to profit from hard earned experience and wise enough to realize the priceless value of alternatives.

Thinking along these lines, let's plan every operation in such manner that we can safely complete each mission even though a forecast tailwind of 125 knots turns out to be much less or from the opposite direction. Thus, we leave nothing to chance when we use our heads and always have an out when we fly.

We can renew our determination to do this by recalling the experience of early leaders of aviation. They quickly learned that the less they left to fate, the greater their control over destiny. It naturally evolved that the wisest of these leaders, and the ones who lived longest, flew by plan and not by chance. They planned what they would do IF. They had a plan for living!

Once again we have fictionalized a report of an actual accident. We think you'll find this story interesting, mainly because it illustrates how an excellent investigating board determined why this F84F went . . .

Choppin

THE CAPTAIN WAS spooning sugar into his coffee when the crash phone rang. He dropped the spoon, shoved a chair to one side and stumbled over a waste basket, reaching the instrument just ahead of the major. Small puddles of spilled coffee marked his progress across the room, but these went unnoticed since both the major and the cute redhead at the typewriter were watching the captain's face as he listened.

His expression indicated an accident, so the major was waiting by the door when the captain replaced the phone and spoke, "An 84, Vivian, and it's a major. Better call the board." Halfway thru the door he paused long enough to say, "You can have my coffee."

"With sugar?" Vivian murmured to herself, "I should be so sour!" She pulled a folder from her desk drawer, turned to the tab marked 'board' and reached for the phone.

At the crash scene, the major and the captain were pacing off distances while the crash crew finished foaming down the fire area. The aircraft had hit just short of an irrigation ditch located about a half mile beyond the runway, bounced across it and hit again in a plowed field where it skidded across another ditch and came to a halt in a cotton field. The aircraft had been on fire by the time it halted. Therefore, altho the pilot had opened the canopy and gotten clear of it, he had been burned pretty bad. He was already enroute to the hospital by the time the two safety officers had arrived on the scene.

The captain made a notation on his steno pad and nodded toward an approaching staff car. "Looks like Colonel Ward is about to join our scavenger hunt."

"Yeah," the major replied and glanced at his watch. "He's later than usual. Probably stopped by mobile or the tower."

The captain nodded, "I'd bet he went both places . . . he'll know more than we do."

"Anyway I'll fill him in while you interview some of those people working that cotton patch." The major motioned toward a large group of farm laborers in the adjacent field. "They may be able to give you a little useful info."

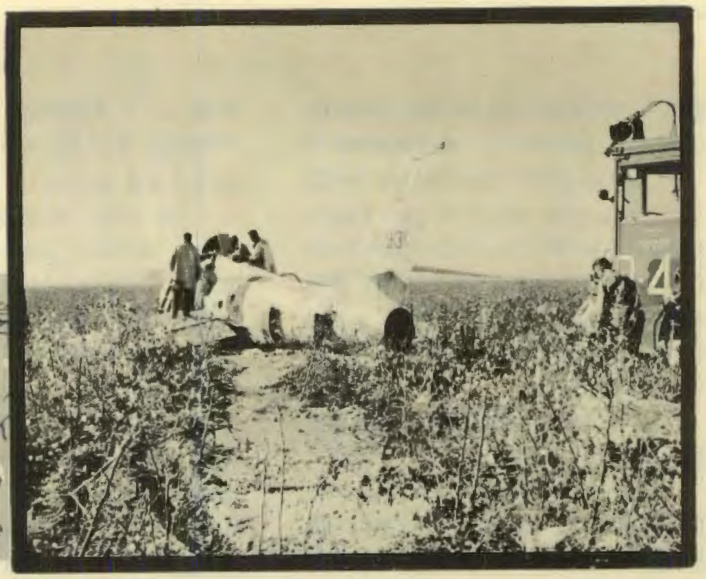
"O.K." The Capt tore some pages out of his steno book and said, "How about sending this to Vivian" She's probably got enough data from Base Ops to make out a pretty good Prelim and this will fill in the holes."

After giving the driver the papers to take to the redhead, the Major turned to Col Ward, "Hope you don't mind losing your wheels, sir. We can give you a lift back soon's we wrap it up here."

"Be my guest, Sammy," the Col grinned, "what have you so far?"

"Not too much, sir. He had the gear handle down, but from the look of the bird, the gear doors opened and that's about all. One of the firemen talked to the pilot when they put him on the ambulance. He said the engine flamed out. However, he's alive and we can verify

Cotton



that more better when we talk to him." He described what they had learned from the impact scars. "He did a pretty good job—came in nose-high and set her down . . . Looks like he might've deliberately bounced it across that first ditch.

"The fire came from the forward fuselage tank near as I can tell. Incidentally, the canopy was partially jammed and wouldn't open all the way. I don't know how he squeezed out with full gear on, but he did."

The Col was silent for a moment, then said, "I dropped by the tower and also checked mobile. They heard him report a flameout to his leader. The leader asked if he was on the ground or in the air and he said he was airborne. The leader called back 'Ignition and Emergency fuel.' but I guess he'd mostly run out of time by then. Capt Smith, on mobile, said he saw him veer right and start losing altitude shortly after lift-off."

They looked over the broken machine, rechecking cockpit configuration until the Capt arrived. "What did you find out, Scott?" the Col asked.

"Not much Sir. The workmen say they heard his engine start coasting down and saw him turn to keep from hitting them. Boy, if he'd ejected or gone straight ahead, he'd have slaughtered 'em."

The Col whistled, "Good thing he was on the ball. Look Scotty, get on your radio and pass on all this stuff to the boss. He's in Base Ops and probably holding onto a hot phone right about now."

"Yes Sir," Scott said as he picked up the mike.

Later that day Major Sammy and Capt Scott came back into the safety office, hot, dusty and just a little tired.

Vivian looked up from her typewriter and said, "You look like you'd been on a 10-mile hike. I'll get cokes." She was back soon. Sitting on one corner of her desk she said, "the flight surgeon said the pilot will be O.K. He gave him enough sedatives to keep you from getting any information for awhile but Capt Green, who's the Ops member of this board, and I went to the hospital and talked to him briefly. Green gave the info to the commander to pass on to headquarters." She checked her shorthand notes, "The pilot said he felt a power loss right after lift-off. He checked RPM and it was falling thru 90 percent. Next, he tried to move the throttle forward and went for the emergency fuel switch. He isn't sure he got the right switch because he didn't have time to look in the cockpit and was busy trying to dodge some people . . . " She looked questioningly at Major Sammy, "What in the world would people be doing off the end of the runway?"

"Farm laborers. He missed 'em, too." The major explained.

"That's about it." She continued. "He told about the aircraft hitting and seeing flames alongside his leg as it bounced thru the air . . . I'll finish transcribing this as soon as I

get a master cut on the mobile control officer's statement."

"Good girl" the major said, "Scotty, you want to put those calls in to MOAMA and SAAMA? Col Ward wants us to pull the engine and give it a TDR right here. We won't have to wait on it then."

"I'm with you, how about the fuel control?"

"Get an expert on it, too. I'll get busy on the fuel samples Sergeant Turner picked up for us. Shucks, no sense in being bashful when all that high priced help is ready, willing and able!"

A few days later Capt Scott rushed into the safety office, winked at Vivian and said, "I'd rather be dead than red in the head!" then flushed and said "morning Sir!" Col Ward untilted his chair from beside the doorway and looked at the younger man and frowned. "I thought we were having a board meeting here at 0700?"

"Yes Sir! We are, but I have a quarter of."

"Oh."

Shortly, Major Sammy walked in with Doc Halbert, the flight surgeon. They both said good morning to the Col. The Doc sat on the corner of Vivian's desk, smiled his best nonprofessional smile, and asked, "How's the safe-slave girl?"

"Safe." she sighed.

"Still can't induce you to work for me. I promise you won't have to do anything but answer the phone . . . "

"And hand out APC's" interrupted Col Ward. "Doc, you better pick out another one. I intend to steal this one myself . . . Sammy, while we're waiting for Green how did we make out on fuel?"

"It was within specs, Sir. They called yesterday afternoon. They ran an engine yesterday using the fuel control. Oh, here's Green."

Two civilians came in followed by Capt Green. After they exchanged good mornings, Green carried on the briefing. He explained that they had checked out the accessory drive shafts which had been found sheared. These were the ones leading to the engine driven fuel pump, to the fuel control and to the angle drive. All were sent to a research lab and found to have been sheared by crash impact.

"Mr. Taber," Green inclined his head toward the taller of the two civilians, "checked the engine."

"Yes," Taber said, "We found that the turbine was free. No discrepancies in the hot section or anywhere else; aside from crash damage that is."

The Col turned toward the shorter civilian and asked, "What did you find on the fuel control?"

"Capt Green and I had it installed on another engine and put it in the test cell. We tried four starts but could only get 24%. It ran properly on the Emergency system."

"Good" the Col said, "looks like we've found our trouble. He must have gotten the wrong switch when he went for emergency."

"Or had already lost the fire, Sir." Capt Scott said.

"Yes, that could have been. Why didn't he get the emergency fuel switch?"

"Time!" Major Sammy said, "We figured from the distance he traveled at an estimated average airspeed of about 180 knots that he didn't have over four seconds to cope with the emergency.

"Who, was the mathematician?"

Major Sammy flushed, "I was, but Vivian checked it."

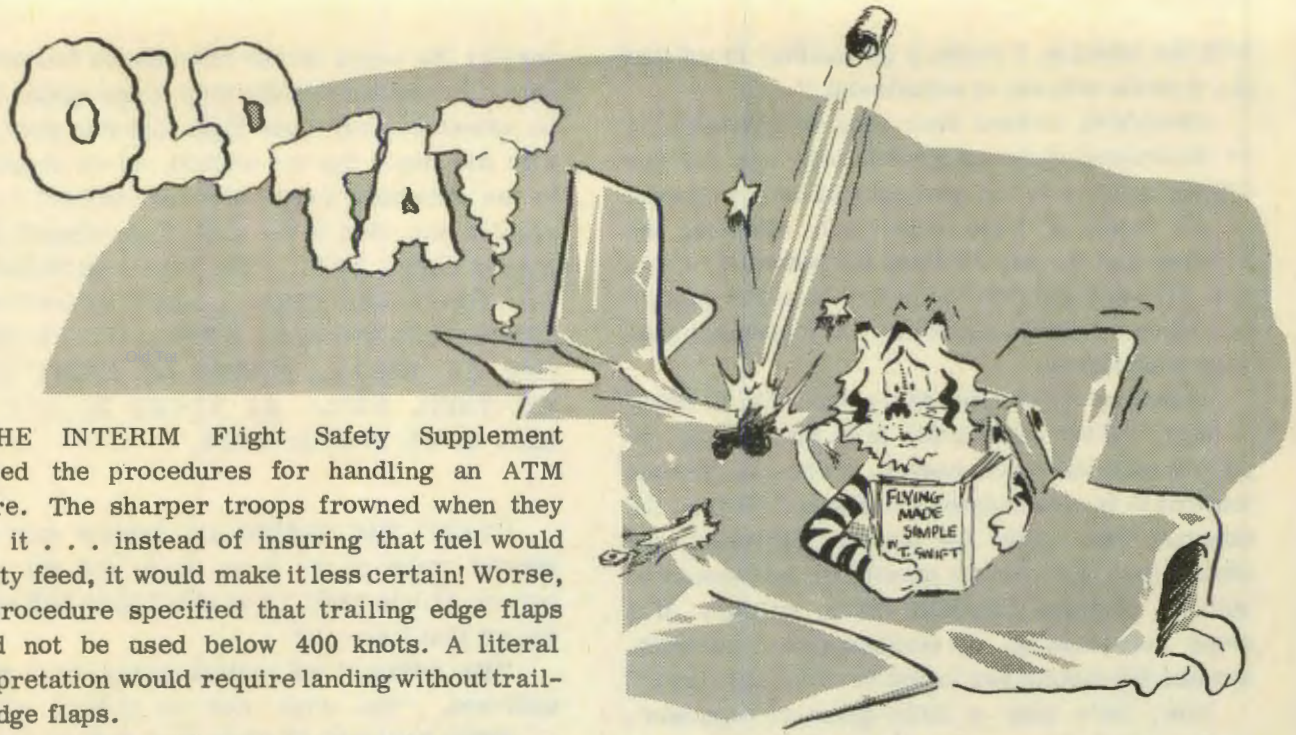
"I'll buy it, then." Col Ward replied. He knew that Vivian had a BS in math and couldn't resist needling Sammy, particularly since the subject had given the major considerable headaches when he went thru the Safety School.

"We'd better get this down in writing and draft up some questions to ask when we hold our formal board meeting," Col Ward mused, "but right now it looks like we'll have materiel failure of the fuel control as primary. Can we get that fuel control to your plant for tear down?" he asked.

The shorter civilian nodded, "I'll take it today."

"Well, other than fixing the regulator I think we should try to get the airstart ignition switch combined with the emergency fuel switch. I think we could use a system like they have on the T-bird. Let's keep this in mind when we make our recommendations."

"Yes Sir" Major Sammy agreed, "and put the switch where it can be reached without making a search."



THE INTERIM Flight Safety Supplement revised the procedures for handling an ATM failure. The sharper troops frowned when they read it . . . instead of insuring that fuel would gravity feed, it would make it less certain! Worse, the procedure specified that trailing edge flaps would not be used below 400 knots. A literal interpretation would require landing without trailing edge flaps.

Sure as your old TAT is sitting here with an itchy headbone one of our more conscientious F-105 troops found hisself in the bleak blue without a working ATM . . . and as sure as we're a scratching our headbone he followed the new procedure to the letter, complete with no flap arrival. He almost took the net, too.

It would be nice if we could simplify flying to the extent that all a pilot had to do was read and memorize a book and follow that book. In fact, this would be so nice that we could easily program the material from that book into a reasonably simple computer . . . and then sit back in a nice safe easy chair and watch the computer fly some of these blessed machines.

Unfortunately, flying isn't quite this simple. It ain't an exact science, either . . . and the computers don't work out too well. They are not adaptable enough and they are not capable of using common sense or judgment. Now, if you'll hang with us for one more moment, we'll direct your beady gaze at a paragraph in the front side of the dash one for EVERY BIRD. It is titled, SOUND JUDGMENT, and in effect tells you that the instructions in the handbook are for a crew inexperienced in the operation of the aircraft. That they are the best possible operating instructions under most circumstances, but are a poor substitute for sound judgment.

Think this over. Think it over carefully and remember it the next time you are tempted to follow a published procedure blindly and literally simply because you'll be "covered" even tho you bend the bird.

Dammit, flying is still pretty much of an art and we have no need to apologize for this fact by trying to turn ourselves into unreasoning human robots!

One word of caution. Usually the handbook has the best procedure and unless you have firm knowledge of the reasons behind a procedure—DO NOT DEVIATE. We have another example, which we got in a briefing.

THE BRIEFING was about half over when the operations officer called on one of the flight commanders to tell the troops about an emergency that had made a recent flight of his a bit more interesting than usual.

"I was flying an F from the front seat. We had the usual load . . . a pair of 335's and a bomb dispenser. Right after lift off we quit accelerating." The Capt paused to let this sink in. "I made a quick check of the pressure ratio. It was normal for military, which made me suspect an AB failure. I pushed the throttle outboard and almost immediately the AB relit . . . so we continued

with the mission. I wrote it up and they found that the throttle was out of adjustment."

Everybody nodded their head sympathetically or murmured their congratulations and the ops officer went on to the next subject on his agenda.

All kinds of high priced help attending the briefing and no one realized the potential of this one. No one caught on to the fact that this captain had taken a terrific chance by not following handbook procedures.

Leave us quote from that good book. In effect it says, "If the afterburner fails after the go, no go distance has been passed, move the throttle inboard to insure nozzles closing and jettison the external load. After the load is jettisoned, you should feel the aircraft accelerate and should be able to continue the take off in military. If it stops accelerating, or continues to decelerate, assume the nozzle has failed to close and abort."

Now, let's play a little game of supposin'.

Supposin' this young lad had failed to get an AB light . . . his next step would have been to come inboard with the throttle. Meanwhile one each F-100F would have returned, gear up, to the runway . . . or would have been hard pressed to clear the barrier while our hero went thru the proper procedure.

We have a couple of photos in our file showing birds that didn't quite clear the net, or went into it at very high speed . . . clearly, losing a set of tanks is a much neater operation.

IT HAPPENED AGAIN . . . and by joe we're beginning to think that someone is out to silence Old TAT one way or another. Yes sir, someone booby-trapped our faithful T-bird again. This time they picked a wet nasty type day. However, despite the water on our bifocals we followed the checklist and spotted the trap. Once again, it was an armament bay door latch that was down flush with the door, but not latched. As we pointed out to the substitute crew chief—we couldn't find the regular one—this is the sort of nonsense that gets people killed. TRUE, THE PILOT IS SUPPOSED TO CHECK THIS ITEM . . . BUT EVENTUALLY SOMEONE IS GOING TO MISS . . . IF THIS SOMEONE IS RUSTY, FLYING AT NIGHT OR IN WEATHER, WE'LL BE LUCKY TO GET THE BIRD DOWN IN ONE PIECE.

"TAT" THE TOUGH old Captain said as he shoved some of the litter aside and sat on one corner of our desk, "I wouldn't have believed it, except that I saw it."

"Me either," we replied trying not to appear confused, "but what are we talking about?"

"This business of some guys being nothing but stick and rudder pilots . . . It was during this special flight. They had three F-105 pilots, a major, a captain and a lieutenant. The major was in charge. During preliminary planning it didn't take long for me to tell that he didn't have the foggiest notion about the fuel consumption characteristics of his bird . . . Oh sure, he knew enough to want to be real close to the airdrome when fuel got to a certain level, but that's about all . . . "

We nodded sympathetically and asked, "Didn't he look it up in the book?"

The old captain snorted something which brought a quick glance from our ever sufferin' secretary and said, "Him? the captain did, but not the major. The captain seemed to be a real conscientious, hard working type . . . which was quite a contrast to his fearless leader. But that's only half the story, they had two practice flights and the real McCoy. I watched 'em take off on all three. On the first, the major popped the bird off and slapped up the gear like we used to do in a '51 back during the war. I thought sure the lieutenant would buy it. He was on the major's wing and pulled his gear at the same time, then settled to a normal wing position. I could just barely see daylight between the bird and its shadow on the runway. It scared hell out of me and everyone else who saw it.

"Next flight, I thought surely the major would be a little less hot... but . . . same performance. This time the lieutenant was smart enough to hold his altitude and it wasn't quite as hairy.

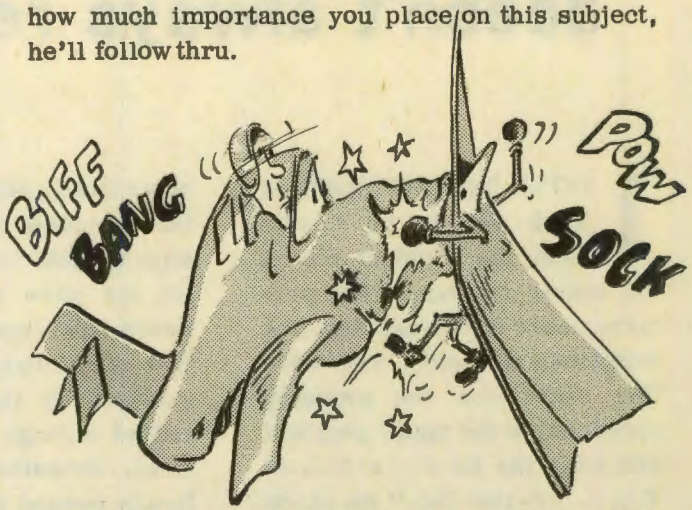
"The major's flying during these missions was much the same way. Individualistic and the devil with everyone else. I could go on, but I think you get the point."

We did. We've run into this type ourself and was surprised to find one still around and in charge of a 5-million buck bird, let alone a 15-million buck flight. The biggest trouble with a character like this is the effect on younger lads like the lieutenant. Many of the younger troops get suckered into imitating them . . . After all, they cut a much more dashing swath than, say, a hard working, quiet, professional like the captain in this trio.

SUMMERTIME IS TIRE trouble time, and TAT didn't have any trouble finding an example of what this kind of trouble means to a century series throttle bender. Fact is the example was what reminded us to give a pitch on this subject. Seems an F-101 pilot from another command found his bird trying to go left shortly after touchdown. Leftist tendencies were induced by a flat tire—as they often are politically—and by the time he realized that he had a problem the situation had gotten out of hand.

The bird left the runway and ran the usual obstacle course thru runway lights, distance markers, concrete slabs, mounds of dirt and large rocks. By the time it finished the course it was likewise . . . both main gear ripped off, fuselage battered and bent—the usual.

He stopcocked both J-57's after the dust settled and never did get around to hanging out the laundry. Had he been a little more alert there is a possibility that he could have kept ahead of events. But, he didn't and he isn't alone. No two tire failures are alike . . . What happens after a tire failure doesn't always hinge on pilot reaction. Sometimes the tire behaves and control is just reasonably difficult. Sometimes the tire goes beserk and even Lindbergh hisself couldn't keep the machine on the pasture. Cure? Maintenance troops can do the mostest by keeping ramps clean and tire pressures on the money. Us pilots can help by giving the critters a real good looking over on preflight and by quizzing the crew chief on tire pressure from time to time. Find out what pressure you should have for the configuration, by looking it up in the dash six. Have the chief actually check the pressure while you're looking over his shoulder. Takes a little time and effort, but once your crew chief learns how much importance you place on this subject, he'll follow thru.



THIS OLD CAT has plenty of curiosity . . . but not as much as a TAC dart hunting F-84F herder we read about. After firing at the dart, this lad decided he'd check it over before his element leader, old Sureshot Smith, had his go at it. Apparently Smitty had a strong tendency to over lead and clip cables making it difficult to score targets, but we digress. Back to our curious lad. He inspected the right side of the dart then dropped back and crossed under to see what he could see on the other side. Silly boy! That dart wasn't about to stand still for anything that foolish . . . it nipped up and down and back and forth and crosswise and slaunchwise. Our hero promptly took "evasive action."

Finally it fell off, kissed the curious one's hog goodbye and dropped out of sight. The hog tried to get even by taking a goodly sized bite out of the playful dart . . . our hero crippled home with a few assorted dents, a bent pitot tube and enough dart on the screens to block off air flow to the engine and cause a substantial power loss. He made it . . . and he did manage to hit the dart after a fashion!

—TAT—

Murphy's Law. .

murphy's law

doesn't always reflect the problem.

"LISTEN TO THIS" said the Tech Sgt as he spread open the accident report for easier reading, "The primary cause of this accident was maintenance factor. The teleflex cable was not properly connected to the upper plug bolt following the completion of T.O.C. 1F-100-784," He shook his head and frowned, "The contributing cause was maintenance supervisory factor in that the inspection of the throttle linkage was not properly performed after completion of the T.O.C." He dropped the report on the desk and said, "It looks to me like it was as much a design deficiency as anything. A fail safe set-up on the fuel control would have saved us an airplane. What do you think?"

The white-haired Master Sgt he had been talking to, adjusted himself to a philosophical position and replied, "It's still the same old story . . . We take the blame and Murphy gets the glory. I read the report, and in all fairness to the design engineers, there are a few things they just can't do much about. Carelessness, laziness and lack of integrity . . . these are abstracts . . .human weaknesses the engineers can't always design around. To prove my point let me show you the Maintenance Discrepancy Record in that accident report." He grabbed up the thick report, riffled through it from back to front, consulted the index and finally opened the report at Tab V. "Here," he said, "see? It's a simple form. I'll bet the human factor experts even had a hand in designing it. Anyway, it fits the needs and has a good layout. Yet, look at block six where somebody entered the date of the work order. He put down the 17th day of the 16th month. A careless error that had no bearing on this accident but obviously an item that couldn't be designed out of the form."

Lighting his pipe he continued, "Another point that stands out on this same form is the INSPECTED BY block. It's signed by a master sergeant. A touchy subject here, but is this a question of integrity? I would rather think not, but the accident seems to prove that the cable wasn't properly inspected. It could have been that the Sgt decided to get the paper work out of the way first, inspect later and was called off the job for a crash project before he could finish . . . an inexcusable procedure but still possible. It's easier to correct these weaknesses through proper planning and discipline than by re-design . . . but we can also re-design our procedures. For a start let's adopt the board recommendation and put the aircraft on a red cross any time the throttle linkage is disturbed. This will require an additional inspection by a supervisor and help to insure against error."

"Gad," said the Sgt who had brought the subject up, "I didn't expect such a sermon, but there's a lot of truth in what you've said. However, in this particular case I'll stick to my guns."

He picked up the accident report, thumbed to the investigation and analysis section and then said, "This was the third flight after the T.O.C. on the throttle linkage. According to the pilot he got an AB light on takeoff and another on his attention pass by the grand-

stand. He throttled back, pulled up and did one roll. It was when he needed more power to climb up and join the formation that he realized he could only get about 80% RPM. He switched to the emergency fuel system and that didn't do any good. After realizing the engine was dying he stopcocked and tried air-starts on both fuel systems. This used all his time and altitude so he ejected. What he didn't realize and wouldn't be expected to know was that when the throttle linkage separates at the upper plug bolt it makes it impossible to increase RPM. He could reduce power, even stopcock, but couldn't get an increase above the lowest point of movement. Now if the linkage had been designed so it would push to increase power instead of pull, maybe even spring loaded toward normal cruise position, the situation would have been much different. At least he would have had enough power to fly. See what I mean?"

"Yep, I savy, but let's read a little further. The investigators found the throttle linkage in the wreckage. The teleflex cable was disconnected. It was obvious it didn't break loose on impact. It was also obvious that the cable had been held in the upper plug bolt by only two spirals. A proper check of the go, no-go hole after the T.O.C. was completed would have shown that it wasn't installed properly. Tests on the linkage by NASA indicated that a two spiral installation would not hold very long. You might say two spirals gave two flights and gave out on the third."

"I agree," he continued, "that a fail safe design is of first importance and in this case I believe it would have saved us an aircraft. But, I'm still convinced that there is no substitute for accurate maintenance and proper inspection."

"We're sure in the same ball park on that," replied the Tech, "so until they design an aircraft that's perfect for the pilot and the maintenance man let's call it a draw."

"Not yet," said the Master Sergeant, "The investigators found a small box end wrench in the aircraft wreckage. It's happened a few times before too. Do you have a design in mind to prevent that?"

"O.K.! O.K.! I'll buy the coffee."

Dig that Hole !

The pilot survived . . . how well do you know your ejection procedures?

Say When

A C-130 WAS FUELED from the pit at an overseas base. Prior to departing the next morning approximately nine gallons of water were drained from each sump. The pilot elected to continue on the mission and made an enroute stop before proceeding to destination. During the last leg of the flight all main tank quantity indicators became inoperative . . . Probably indigestion!

After landing at destination, they checked the fuel tank drains and found mud and more water. A further check revealed engine fuel filters and screens to be about 75% clogged with various types of foreign matter. A cork wrapping paper from a filter tip cigarette (field stripped?) was found in the number two engine low pressure fuel screen. Further, waste was sticking to the sides of the tanks and the bottoms were covered with mud. It was an almost perfect habitat for cat fish. But, we're talking about an accident trying to find a spot to happen instead of a relaxing sport.

Our source of information was incomplete because it left many questions unanswered. For example, we don't know if the sumps were drained into clear containers. Apparently they were drained onto the ramp because one of the numerous cures recommended clear containers be used. We also don't know if the crew chief advised the aircraft commander of the excess amount of water prior to take-off or if he waited until the fuel indicators quit working. If he didn't tell him before take-off, he should have and if he did . . .

In fairness to the crew, our research has failed to find any criteria for a go, no-go on the amount of water drained from fuel sumps. However, we talked to several experienced C-130 people about this. To get a fair sampling of opinion we did not mention this incident nor indicate that anything was wrong other than the lack of guidance on the amount of permissable water.

After they gave us their answer, we asked how much water they'd accept in case they were in a hurry to get home to mama. Not one gave a figure in excess of one pint per sump. They all agreed that any amount over that would justify a fuel inspection then and there, regardless of

how long mama had been waiting.

Corrective action established procedures for draining fuel sumps into clear containers prior to fueling, and again 30 minutes afterwards. The refueling source is also checked prior to use. These procedures stated, and we quote, "Questionable fuel samples will be brought to the attention of the appropriate base authorities. Provided fuel discrepancies continue to exist, an OHR will be immediately filed. In addition an entry will be made of the condition in AF Form 781 A." It also authorized aircraft commanders to adjust schedules to afford the required

30 minute period after refueling.

These efforts are commendable, are aimed at prevention and should finger the source of contaminated fuel. From where we sit the situation isn't completely covered. In other words, there are still some unanswered questions. For instance, supposing the refueling unit passes water, what's gonna happen after the crew enters the watered fuel in the Form 781A? Will the entry put the aircraft on a red cross or red diagonal? Don't look to Par. 1-25 of T.O. 0020A-1 for help, it's vague too. Is the procedure to just drain the sumps until no more water appears and then remove the discrepancy from the form? Should the entire fuel system be purged?

We know, and accept the fact, that some condensation will form in fuel tanks due to temperature changes. But how much is 'some' and how much is too much?

C-130 Standardization-type Flight Engineers from CCTS gave us their ideas. If they find any water present in the first sample from a sump, they try again. If the second sample shows water, they reject and investigate. This is word of mouth . . . nothing in writing on it, so far.

It seems to us that some written, specific guidance could be given to those responsible for checking the aircraft fuel systems.

We're still shaken-up from reading the incident report and still wondering what miracle kept this potential accident from becoming reality. Had this crew taken off immediately after refueling we'd probably still be trying to guess what happened.

TAC TIPS

THE BIG QUESTION.

The primary cause in a recent non-TAC aircraft accident was determined to be "crew factor in that the aircraft was allowed to deviate from published track."

Not "pilot factor," you will note but "crew factor." The board correctly diagnosed that there are others besides the aircraft commander whose duty it is to help keep a multi-engine aircraft on its proper course. In particular, there are two individuals, the copilot and the navigator.

The obvious question is: Why didn't someone on the crew note the aircraft was considerably off course?

One answer hinges on the reaction of the pilot-in-command when a possible error in operation is brought to his attention. Put yourself in the shoes of a copilot or navigator. You tell the boss that you think maybe he's turning the wrong way into the holding pattern. He checks and verifies the accuracy of the direction of turn. He further implies that you, the crew member, are something of an idiot and leaves the impression that he would appreciate not being bothered as he proceeds in the skillful handling of the aircraft.

There are three possible reactions from the would-be helper. He can admit his error and silently vow to speak up anyway the next time he thinks something is out of order. However, he's a human being with certain frailities. He's just as apt to get mad and vow HE'LL never open his mouth again. Or perhaps he'll be absolutely

TAC TIPS

crushed at his abysmal ignorance and the next time he'll be afraid to risk censure and again will not speak.

There is a faint possibility that the copilot or navigator could ask so many questions that the distractions could pose a hazard. This is extremely doubtful to say the least.

We know of no aircraft accidents caused by the pilot being distracted by a crew member's question, while many accidents could have been prevented if someone had opened his mouth to ask the big question.

T-BIRD TALLY

Does SFO training pay off? There may be doubt with some aircraft, but not with the T-33. During 1960, 45 T-birds were landed with dead or ailing engines as compared to 5 bent during SFO practice.

Eight more were brought in dead stick during the first quarter of 1962 and one recovered after a partial power loss. One was abandoned at low key and one clobbered when the pilot undershot with a dead engine at night. During the same period one was lost during practice.

PATHFINDER

Some pre-planning by the Fire Chief at Cannon Air Force Base paid off quite recently. Approximately one week after he had instructed his personnel to apply reflective tape on all the crash gates around the airdrome, an RF-84 engine failed shortly after take-off at night and the aircraft crashed about 1/2 mile beyond the end of the runway. Firefighters responded rapidly and removed the pilot from the flaming cockpit. The reflective tape paid off in their sprint to the downed aircraft.

T-33 OXYGEN HOSE

A T-33 pilot stop-cocked the throttle and observed the engine RPM and TPT decreasing---indicating a normal engine shutdown. Shortly thereafter he noticed that the engine was still running. With the assistance of the crew chief, the pilot held the throttle full off until the engine stopped, then tightened the friction lock. As the pilots deplaned, they saw fire in the tailpipe and engine section. They alerted a crew chief who quickly got in the front cockpit and again held the throttle back, closed the main fuel shut-off and energized the starter to try blowing out the fire. Fire fighters soon arrived and quickly extinguished the blaze. Investigators found that the pilot in the rear cockpit had stowed his oxygen hose around the throttle. When the throttle in the front cockpit was stop-cocked the throttle in the rear cockpit squeezed against the oxygen hose and caused it to creep forward, then fuel entered the burner section and ignited. All T-33 aircraft of the organization are now equipped with holders for stowing the oxygen hose and pilots have been briefed on proper cockpit cleanup procedures.

AERODYNAMICS MADE SIMPLE

The May INTERCEPTOR gives a syllabus of flight for pilots which is quite informative. The issue discusses in simple language and diagrams basic aerodynamics behind the power curve (no pun intended), acceleration, take-off, maneuvering, approach and landing. The ATTACK congratulates Major Harry Tyndale and his staff for bringing out this long overdue study and strongly suggests that TAC aircrews try to locate and study this issue before it becomes impossible to locate.

T-33 GUN BAY DOOR

It was a Functional Test Flight to check a T-33 for vibration. Prior to flight, both the crew chief and pilot completed a proper preflight of the armament bay doors. In a shallow dive at 25,000 feet and 250 knots the left armament bay door

came open about one foot. The pilot extended speed boards and slowed the aircraft to about 140 knots. The door remained closed in this configuration, but when he extended the landing gear the door again opened about a foot. He discovered that he could make the door stay closed by keeping the aircraft in a slight left skid. This worked down to an airspeed of 125 knots. Lower airspeeds were not attempted. He followed T.O. 1T-33A-1 procedures for the emergency, using 140 knots for final approach. The slight left skid was held until touchdown and the door remained closed until the nose wheel was lowered to the runway. He completed the landing roll without further incident.

Investigators found the shaft of one door hook assembly was broken. This allowed the latch lever to vibrate loose, creating enough additional vibration to cause the other latches to unhook. The cause of the hook assembly shaft breaking could not be determined.

An AFTO Form 22 is being submitted recommending a NOTE be added to T.O. 1T-33A-1, Section III, nose compartment doors malfunction, stating that if only one door comes open a skid in the direction of the door may help keep the door closed.

The above was taken from an incident report sent in by Nellis AFB. The recommendation seems sound, but be sure to skid in the right direction . . . wrong rudder could result in complete loss of control.

FILM REPORTS.

Two new films have been distributed to Air Force film libraries and are available for showing. TF 1-5493 demonstrates the use of visual glide slope indicators, and shows actual approaches during low visibility. These indicate how we are constantly trying to make American Aviation as safe as possible. FR 130 is Air Force Flying Safety Report #12. It reviews the high lights in the development of manned aircraft by presenting the various phases from design and mock-up to aircraft refinement. The film shows how military, industry and science work together to incorporate maximum safety, performance and maintainability into today's Air Force aircraft.

EVEN ODDS

If you are careless, you have two chances—one of having an accident and one of not.

If you have an accident, you have two chances—one of getting injured and one of not.

If you get injured, you have two chances—one of dying and one of not. If you die—well, you have two chances!

ON LANDINGS

A Safety Officer reports that his unit has been operating century birds from a 7,300-foot runway for 18 months without putting one in the barrier. He attributes this to treating the runway with a special compound to make the surface resemble rough sandpaper and greatly improve braking action. The unit had three drag chute failures in heavy rain, and in all cases the pilots only used 6,300 feet to get stopped. This is a much shorter distance than the Dash-One indicates. The increase in braking action was also confirmed by the brake decelerometer, S/N 6695-766-3927. Enough compound to cover the 7,300 x 200-foot runway cost just over $20,000, with an added $12,000 for repainting. When it rains, as it does frequently at the station involved, pilots use aerodynamic braking during the initial ground roll. As additional insurance only rib type tires with more than 20% tread are used on all birds.

--Interceptor

Direction to Perfection

NAVIGATING WITH OMNI (not all of us have Tacan yet) or following the old low frequency bird dog can be compared with driving a new 300SL or an old Stutz Bearcat. However, in this case it's not the difference in speed that counts as much as the ease, comfort and reliability.

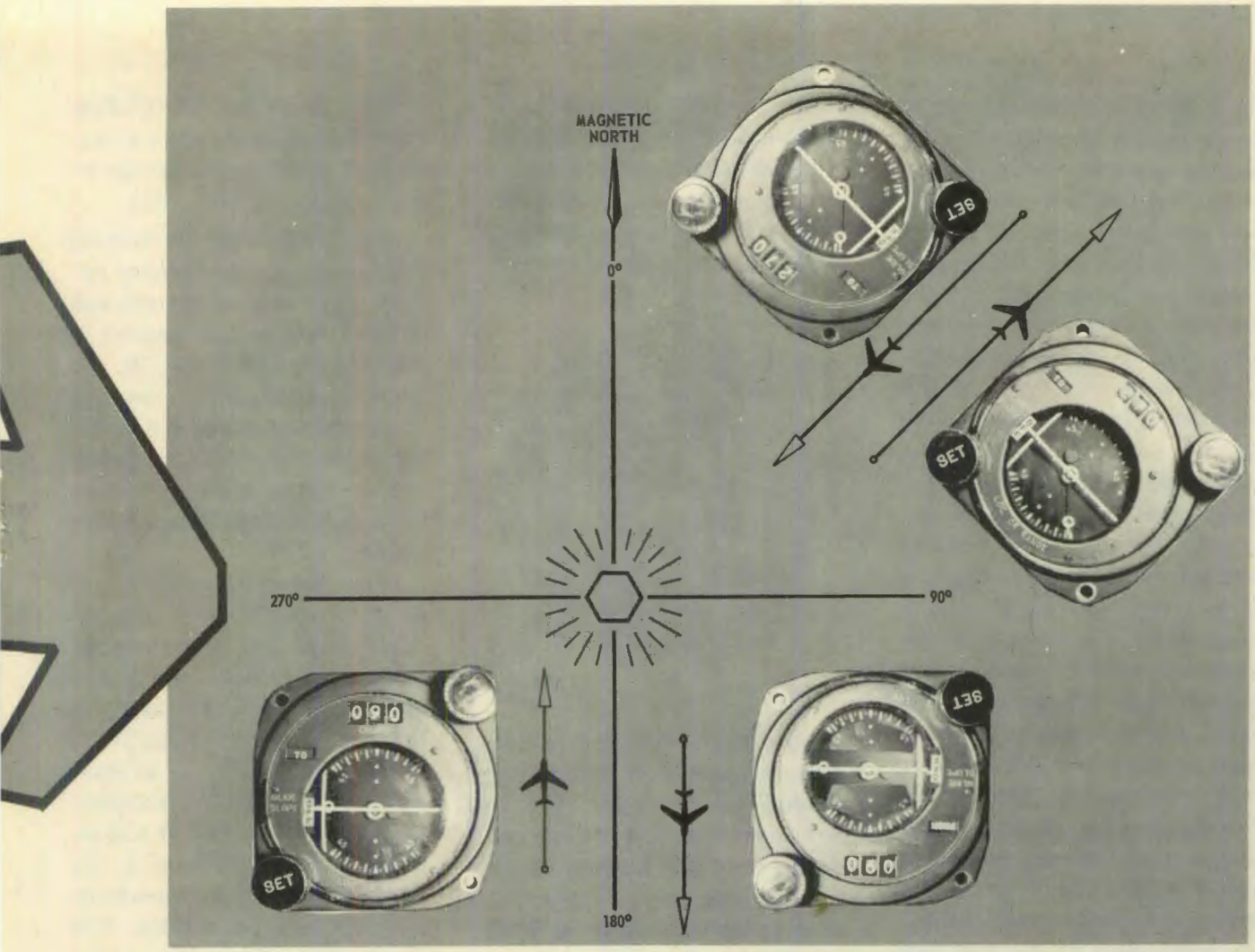
For pilots using Very High Frequency Omnirange Stations for navigation there are only three pieces of equipment to be concerned with. They are the AN/ARN 14 Tuning Head, the ID-249 Course Indicator and the ID-250 Radio Magnetic Indicator. Any Simon can crank in a published frequency, and check to see that he did right by listening to the dots and dashes. He can also, in a round about way, follow a pointing needle until he reaches the station. Therefore, this article will deal almost entirely with the often misunderstood and misused ID-249.

Normally this instrument gives you a visual presentation of all the information you need to navigate. It will give you that info, even with AC power failure, but you must do a little digging to get it. The easiest way to do this is to learn certain basic rules that always apply. With these firmly fixed in mind you can do more tricks with this instrument than a monkey can do on a hundred yards of grapevine.

First you should positively identify the station and make sure it's the one you wish to use. When a station is transmitting an abnormal or erroneous signal, the call letters are not transmitted. Although the signal it is transmitting may be strong enough to make the off flag disappear. Take care! Remember, your ID-249 indication is reliable only when the off flag is not showing and you are getting a clear station identification.

Then you must remember that the TO—FROM window shows you whether the course you've set in the Course Selector Window, if intercepted and flown, will take you to or from the station. Any time you cross the station or another radial from the station perpendicular to your selected course the TO—FROM Indicator will reverse its indication.

Next, remember the Heading Pointer (or do-nut pointer) is connected to the aircraft compass system and the course



selector knob. It shows the angular relationship between the heading you're flying and the course you've set in the ID-249. If the heading you're flying and the one you've selected are within 90 degrees of each other the pointer will be in the top half of the case. It will show whether you are driving toward, parallel to, or away from your selected radial, regardless of which half of the case it's in. It is good for setting up interception angles but will be inoperative if AC power fails.

Now consider the Course Deviation Indicator (CDI or vertical indicator). It shows where your selected course is in relation to your aircraft. It is directional if the heading you're flying is within 90 degrees of the course selected, otherwise it's nondirectional. Remember, it is nondirectional when the do-nut pointer is in the bottom half of the case. That's when you turn away from the vertical indicator to intercept it. However, as you turn away you'll see the do-nut pointer move toward the vertical indicator. The rule for intercepting a selected course with the gyro compass operational, is to always turn the aircraft so the do-nut pointer moves toward the vertical bar. Let's try working a problem.

You're Northeast of the station flying a heading of 045 degrees with 270 degrees selected in the window, the old reliable TO—FROM Indicator will indicate TO and the vertical indicator will be in the left side of the case. The do-nut pointer will be in the bottom half of the case and will point away from the vertical indicator. Observe our illustration.

The statements we've made are true but, why? It's easily explained—you're East of the station so a course of 270 degrees will take you toward it.

Your heading of 045 degrees is more than 90 degrees from the course selected. To be exact it is 135 degrees to the right of it and you can therefore look for the Heading Pointer to be pointing to the 135 degrees relative bearing or 4:30, clock position. But, why is the vertical indicator in the left side of the case when the 270 degree —90 degree radials are obviously to your right? Remember it's non-directional because of the spread between your heading and the course you've selected. If you turn the aircraft to a heading of 225 degrees the vertical indicator remains to the left (selected course is now left), and will remain there as long as you stay in that quadrant with 270 degrees selected in the course selector window. As you turn, the do-nut pointer also turns in the same direction and for the same number of degrees. At completion of the turn you will find that the heading pointer is in the top half of the case and indicates a 45-degree intercept angle to your selected course.

If you happen to think you're lost and have naught but the ID-249 and the old Standby Compass (slave gyro system failure)--don't panic. There's a short way out. Tune and identify an Omni Station. Check the vertical indicator and if it isn't centered with TO on the TO—FROM Indicator, turn the Course Selector Knob toward the indicator until it does center. You'll then find TO in the which-way window and the course you should fly in the Course Selector Window. Turn to that heading using the standby compass. Keep the vertical indicator centered and fuel permitting, you've got it made. To find out approximately how long it will take to reach the station

make a 90-degree turn in either direction and while holding this heading re-center the vertical indicator with the Selector Knob. Note the bearing in the Course Selector Window. As soon as the CDI begins to move off center, change the bearing 10 degrees in the direction that will cause the CDI to deflect opposite to the direction in which it has just moved off center. Continue to fly the heading until the CDI recenters. Recheck the time to find out how many seconds it took to make the 10 degrees bearing change. Divide the number of seconds by ten and you get the number of minutes from the station (no wind considered). Read your course to the station in the Course Selector Window.

Now, if you're thoroughly confused, just keep in mind three salient points. First, when using Omni be sure you are getting a clear accurate identification signal and the Off Flag has disappeared. Otherwise, you can consider the station or your equipment unreliable.

Next remember the Heading Pointer shows the angular relationship between the aircraft heading and course showing in the Selector Window. If the angle is more than 90 degrees in either direction, the Heading Pointer will be in the bottom half of the case. Correct away from the CDI to intercept your course.

For the third point, remember the TO—FROM Indicator tells you whether the course you've set in the Course Selector Window, if intercepted and flown, will take you TO or FROM the station. In other words it solves the ambiguity for only one course at a time.

Last but not least a few words on technique. When holding tracking or making VOR approaches always try to plan ahead and keep the course you're flying (except outbound holding legs) selected in the Course Selector Window. That will keep your CDI directional and eliminate some mental manipulation and possibly fatal errors. Also, if possible, use the CDI as your primary azimuth reference on VOR final approaches. It's much more sensitive than your RMI and will give you a more accurate approach. Add to this the fact that the essential parts of the ID-249 are independent of the aircraft AC power system and you can see the days of the bird dog are numbered.

Chock Talk

TM76A/B CODE MANUALS

Work Unit Code Manuals for the TM76A/B Weapon Systems are presently divided into four sections. Section I is for On Missiles, Section II for Shop Codes on missile components, Section III on AGE, and Section IV - In-Shop on AGE components. A recent change in Code Manual Specifications has made it necessary to rewrite these manuals in two volumes. The first volume (06-1) will contain work unit codes for all airborne equipment and will be used when work is accomplished directly on the missile, regardless of location. It will also be used on airborne components removed from missiles for repair, servicing, testing or calibration in the shop. The second manual will contain work unit codes for all non-airborne equipment and Aerospace Ground Equipment (AGE) and is to be used when work is done directly on non-airborne or AGE equipment regardless of location. This manual will also be used on components that are removed from this equipment for repair, servicing, testing or calibration in the shop.

WRAMA made the re-evaluation, consolidation and incorporation of all changes deemed necessary for the TM76A manual during the week of 21 May 62. At this time all major items and subassemblies were included in the new manuals. Before the manuals are published, the contractor will review the IPB's to ensure that the parts break-outs under these assemblies are complete.

A pre-publication review is scheduled sometime in August with the finalized document scheduled to be in distribution by 3 September 62 with an implemented date of 1 October 62. A similar review on the TM76B is to be conducted sometime in June.

HEAT METER

Chock Talk in the May ATTACK gave some engine trim tips and pointed out that turbine blades stretch as they age during engine operation. It was observed that the higher the RPM and temperature the faster they stretch and that an engine doesn't have to operate very long at or above the higher temperature limits to be damaged considerably. The dangerous part is that an engine can be operated in these high temperature areas and frequently over-temped without it ever being noticed, reported or recorded. This can be an important and critical factor on single engine aircraft because the safety of the pilot and aircraft depends on whether the engine is good for the next mission.

To insure that an engine is good, maintenance personnel perform hot section inspections. But these are costly and time consuming . . . approximately 300 man-hours and 8 days downtime.

What we need then is a simple device to measure and record the amount and duration of over temperatures . . . a time temperature recorder, EGT elapsed timer or similar device.

Several years ago DFSR, Air Force, Navy, DOD, Commercial airlines and engine and air-

frame manufacturers generated considerable interest in the development of airborne analyzers for jet aircraft. It was agreed that the equipment should be automatic, accurate, light and trouble free. A number of airborne recording devices were proposed and several are in various phases of evaluation.

One of the most promising was refined from the highly accurate null balance instruments used to measure EGT and RPM on the Matador and Mace missiles. This system continually indicates the average EGT, records accumulative hot section damage and indicates the temperature spread for an engine. Basically, it consists of an EGT indicator, hot section recorder and an in-flight EGT spread test computer. The EGT indicator has a counter readout that gives the average exhaust gas temperature along with an over temperature warning light and another warning light to indicate excessive temperature spread. A flag shows when the electrical power to the instrument is off.

The hot section recorder gives a digital presentation of accumulated hot section factor units. These units are proportional to the EGT curve supplied by the engine manufacturer and the recorder indicates the length of time the engine has been subjected to certain temperature levels. The end result is an accurate record of the engine's life history. Recorder readings can be directly correlated to turbine blade stretch and extent of damage from normal and abnormal use.

The system has received several airborne tests and was recently ground tested on two engines at OCAMA. The results of these tests were apparently very satisfying. At present, cost of retrofiting the jet fleet will probably be a determining factor in whether or not we will get this equipment, but it certainly does look like this instrument would save us considerable engine maintenance dollars. Even more important, is the obvious value such a system can have to our accident prevention program.

REPEATED SQUAWKS

While waiting for transient maintenance I heard the following conversation over a squawk box:

"Maintenance control calling station eight. Have you worked on that last hydraulic gripe I gave you?"

"Filling it now."

"Well, hold up on it. The pilot just called and said to fill it in the morning as it will all leak out before takeoff if you fill it now."

"Roger."

? ? ?

stick to check lists

CHECK IT!

Checklists are the key to a safe and complete operation with any system . . . be it Scott Carpenter and the Aurora VII, Eddie Ricketyback in his airliner, or Airman Jones building up a tire and wheel assembly down at the tire shop. All tactical wings will be pasting stickers around the flight light, in the ammo area, base shops . . . all over the base . . . to remind you that it is important to use a checklist. So follow the advice on the sticker. Stick to the checklist, it'll support you.

A STATE OF MIND

Maintenance and supervisory personnel should realize that their state of mind has considerable bearing on potential maintenance error accidents.

Each man who services and maintains aircraft must take pride in his work and personally see to it that he does each task correctly, accurately, and completely.

Before such an attitude can be developed, morale must be kept high . . . this is something that must be kept in mind by supervisors at all levels of command.

LITTLE THINGS, BIG POTENTIAL

* Excess fuel spilled around aircraft and equipment.

* Not using the static ground wires.

* F-100 main gear uplock hoses too long—rubbed on the tires when gear was retracted.

* Main gear strut doors too loose on F-100 . . . Inflight air loads caused door to come off.

* Serious discrepancies entered on Form 781 on a red diagonal instead of red cross. Example, LOX system leaking—corrective action was to trouble shoot system and tighten fittings and correction was not signed off by an inspector.

—Nellis Safety Officer

F-100 PROBE PROBLEM

The loss of F-100 refueling probes took a sharp swing upward during January and February of this year. With the exception of 1 probe that was bent, the remaining 13 probe failures were with the early light weight probe support. Most light weight probe support failures were caused by intensive KC-135 refueling during the first quarter. In March, all aircraft equipped with the light weight probe support were restricted from KC-135 refueling. Since this restriction was levied we have only had the one bent probe mentioned above.

SMAMA and NAA have been attempting to beef-up probe mounting on the F-100C and early D wing to allow installation of the late model, heavy weight probe support. The Fix is presently in the final stages of testing and should be coming to the field in the near future.

BASHFUL RAFTS

As far back as 1958, C-130 life rafts have had a definite aversion to air travel, preferring to travel alone without the aircraft. An investigation located the reason. The rafts were swelling at altitude due to residual air trapped inside them and due to CO_2 bottle seepage. WRAMA developed a better evacuation pump and this helped cut the number of losses . . . but didn't stop 'em.

In October of last year we, here in TAC, asked for a strap installation to hold 'em in even tho they swelled up. A prototype of the strap was out by the latter part of that month but the T. O. and kits didn't materialize until the sixth of April, this year. Units have the kits and are installing them as fast as they can. Meanwhile, more improvements are in the mill and the Case of the Leaping Rafts will soon be solved for good.

F-100 CHUTE FAILURES

During the last quarter of calendar 1961, Tactical Air Command flew 18,762 F-100 sorties. Reported drag chute failures for this period were 78, which represents 1 failure for 241 sorties.

There were 18,123 sorties in the first quarter of calendar 1962 with 52 drag chute failures reported. This represents 1 drag chute failure per 349 sorties, and a downward trend in the failure rate. This is undoubtedly the result of emphasis on proper maintenance procedures and because pilots are now required to inspect drag chutes for proper installation.

KB-50 – MELLOW WITH AGE

More and more KB-50's are becoming corroded around the wing flaps, fuel system, electrical wiring, bomb bays and in random areas around fuselage, empennage and wings. According to the report, corrosion is both exfoliation and intergranular . . . and them's the worst kind!

Aggressive corrosion treatment and preventative measures have helped keep the corrosion in check, but this is a continuing problem that will always get worse instead of better. About the only answer, is to find the corrosion early and treat it. If you overlook an area, the bird will spend long hours in the hangar while you fix it.

PREOCCUPATION

By Lt. Col. Joseph G. Manyo

AN AIRPLANE is no place for a man with half a mind. Yet, almost everyone who reads these words has been in the same plane, or at least in the same sky, with half-minded men. Their condition wasn't intentional; it was just that these men were preoccupied. To me, preoccupation is one of the biggest obstacles to successful flying safety and real professionalism.

For years, people like Dale Carnegie have been telling millions how to prosper. One of the keys to this success is complete concentration; and where airplanes and aircrews are involved, concentration isn't just success, it's longevity.

Preoccupation is simply the inability to keep your attention directed where you want it, or where it should be. As an example, a few years age, a two-engine aircraft crashed on landing after experiencing fuel difficulties with one engine. Was the plane lost because of bad fuel pumps, a faulty strainer or a broken line? No, both pilots had become so preoccupied with nursing the sick engine that neither had remembered to lower the landing gear. Mister, that's preoccupation!

We all experience it in different forms every day. How many times have you driven from home to work without remembering anything about the ride? And haven't you walked

from one office to another only to forget the purpose of your trip? Or did you ever read a few pages in a book and suddenly realize you couldn't remember a word? These are the results of preoccupation. Dangerous in an airplane? The answer is obvious.

Preoccupation can be deadly. The man who is worried about debts, family difficulties or disagreements with his boss, really has less than half a mind to use on his duties. In today's airplanes, where many items have to be accomplished quickly and in sequence, half a mind isn't enough. You'd be far better off with a broken arm. Flying today requires everything you've got, every single moment.

At a recent flying safety meeting, a flight surgeon analyzed some of last year's accidents from his viewpoint. He found several where preoccupation, either with airplane problems or personal difficulties, could have been a contributing factor. Between 50 and 80 percent of the problems that flowed through his office had their source in some non-physical area. These people were really sick, but frequently the illness was the indirect product of tension and worry that could be traced to home or job. Then he pointed out a truth known to every commander: the man whose mind is on personal worries isn't very effective doing any job.

Every unit has men incapable of completing special projects on request. It's not a case of lack of ability; they just keep forgetting, can't seem to get started, or keep putting everything off to the last moment only to discover too little time remains. Their attention is plainly elsewhere. On the ground, this is annoying. In the air, it can be fatal.

What's the answer then? The most effective way to guarantee a clear mind is to put personal affairs in order and keep them that way. Obviously this is a lot easier said than done, since sickness, debt and trouble belong to all of us. But when troubles are piling up and you're worried to the point of real distraction, the best course is to stay on the ground. It's almost impossible to make a perfect letdown when your thoughts are home with a sick child or a stack of unpaid bills. And don't think your commander won't understand. Neither he nor his command want to take a chance on a single accident.

But what is a crew member to do when he finds his powers of concentration slipping away? There are two things:

First—he can attack preoccupation from the physical side by keeping his body fit. A good diet, a reasonable amount of sleep, and a moderate amount of exercise are all part of this program.

The second cure for this lack of concentration is based on simple determination. Pick out a couple of things you're going to do perfectly during some maneuver. If you're a pilot, you might choose airspeed and altitude. A navigator can work for LOPs plotted without even slight errors, and a boom operator can try for extra smooth contacts. No matter what your job or what your airplane, you can think of similar items.

I certainly don't mean that you should devote all your attention to these things and exclude everything else. But, by seeking perfection on one or two items, you'll find yourself better able to concentrate your attention where you want it--and keep it there.

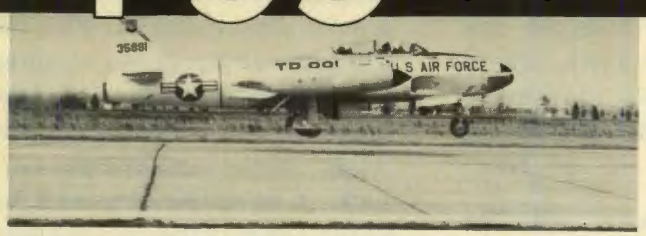
By recognizing preoccupation we've taken the most important step toward avoiding and eliminating it.

If personal affairs are in disorder, then preoccupation is almost sure to follow. Keep your life pretty well organized and control your attention when it begins to wander. This will buy a piece of flying safety insurance that's priceless--a clear and uncluttered mind!

BY CAPT. L. E. DELFOSSE 4500 ABW

T-33 FLIGHT PLANNING

T-33 Flight Planning by Capt LE Delfosse 4500 ABW



THE SHORT METHOD for flight planning presented in Section A-4 of the T-33 dash one is not satisfactory for a typical ZI cross country. It recommends procedures, such as the hot day cruise techniques, which are not compatible with civil air regulations, is inflexible in regard to airspeed, is hard to use when calculating range and fuel remaining and is even worse to use for time enroute and fuel remaining at enroute checkpoints. As a result hardly anyone uses it.

What do T-bird pilots use? A few hardy ones use figure A3-1 for climb and the nautical mile per gallon charts for cruise. The rest use the blue Lockheed Chart, the Maxwell Chart, some other chart that they've picked up along the way, or guesstimate.

One crew recently came into operations real proud because they'd flown a round robin and hit every ETA within a minute and fuel within 5 gallons. Their method was to fly exactly the same route and altitude each time out.

The shortcomings of their system are as obvious as those of the guesstimaters. The Lockheed and Maxwell Charts, even if current, have some shortcomings too. They lack flexibility and are tailored to standard day conditions only.

For quite some time I have been one of the hardy few. I want accurate results that compensate for nonstandard conditions and I like to select my own cruise airspeed.

However, I grew tired of the rigorous exercise in interpolation I had to make before each flight and never had the fortitude to try to use the hard charts for inflight changes. This prompted me to develop a set of charts for myself, using dash one data. My charts do not compromise accuracy, are flexible and easy enough to use while airborne. Run thru a sample problem with me and see for yourself.

Let's plan to start engine with the usual 810 gallons on board. We'll plan to fly at FL 330 on a day when average temperature deviation during climb is forecast to be plus 10°C and temperature at FL 330 is minus 35°C.

We'll enter the equivalent weight correction chart on the CLIMB CHART, to get an equivalent weight correction. At 10°C above standard we will need to use a plus 1500-pound correction factor. Our climb weight is 16,400 pounds, (take off weight of 14,900 plus 1500).

Now we'll enter the TIME TO CLIMB CHART at 33 thousand and intersect our corrected weight of 16,400 to come out with a time to climb of 22 minutes. We have to add 1-1/2 minutes for takeoff and acceleration and get a total time to climb of 23-1/2 minutes. Average airspeed during climb is obtained on the far left. We get 311 knots indicated.

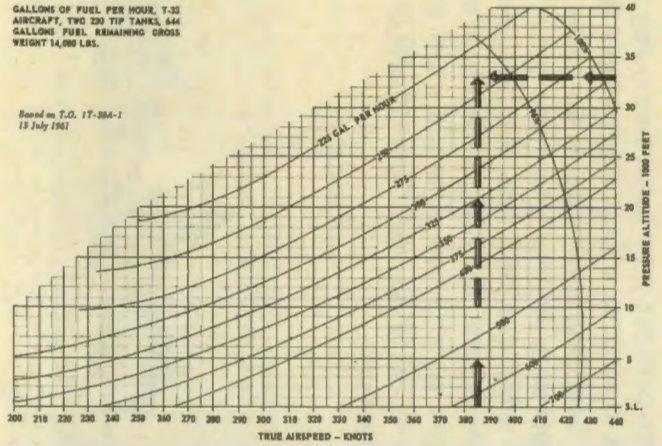
Now let's go back to altitude 33 thousand and enter the FUEL TO CLIMB CHART. Again, we intersect our corrected weight line of 16,400 and come out with about 152 gallons. We add 60 to this to compensate for fuel used during taxi and takeoff and end up with 212 gallons as total fuel required for climb.

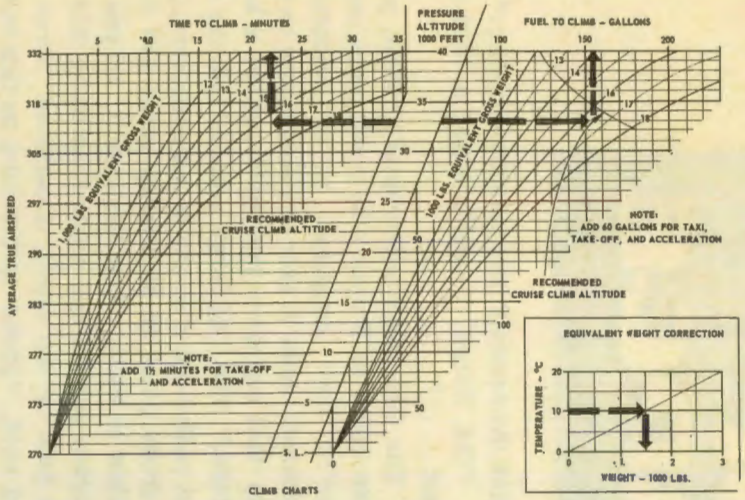
Next we'll enter the IAS/TAS CONVERSION CHART for 14,000 pounds to calculate our true airspeed (or vice versa). We can get the recommended speed by referring to the no wind or 100 K headwind lines . . . But we've always had a hankering to cruise at 385 true. So let's use it.

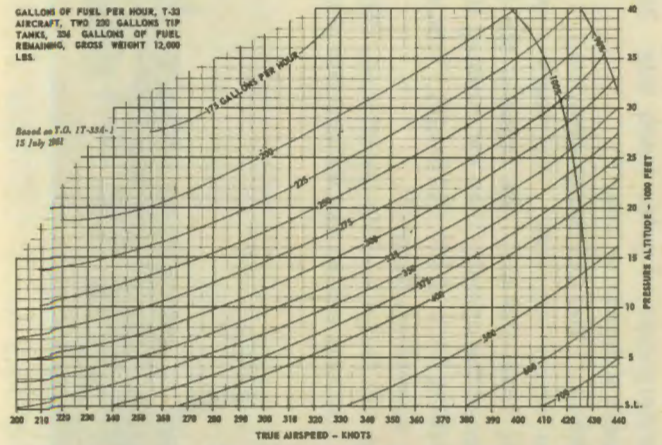
First we have to correct the cruise altitude of 33,000 for the forecast temperature of minus 35°C. We do this with our trusty E6-B computer and find that we have a density altitude of 34,800. We'll enter our IAS/TAS CHART at this altitude, zip across to the 385 TAS line and find we'll have to hold 227 knots IAS. Right now we can crank 227 knots into the ALTITUDE CORRECTION CHART to find out what indicated altitude we must hold to compensate for position error. We get just over 150 feet and would hold 33,150 feet on our imaginary flight.

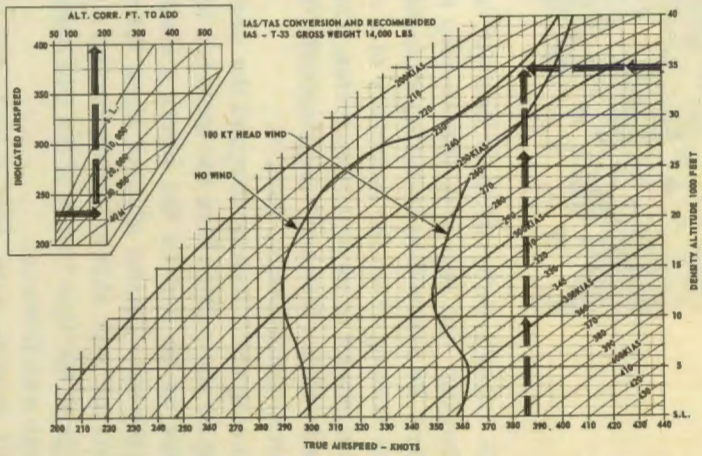
Now we're ready for fuel consumption. We've leveled with an aircraft weight of about 14,000 pounds, so we'll use that chart for our first two or three legs.

We enter it at our preselected TAS of 385 knots and proceed up to 33,000 pressure altitude. Fuel consumption comes out at 240 gallons per hour, and what could be easier than that? All that's left is applying wind correction to our calculated average climb speed and the TAS we selected for cruise.


GALLONS OF FUEL PER HOUR, T-33 AIRCRAFT, TWO 230 TIP TANKS, 644 GALLONS FUEL REMAINING GROSS WEIGHT 14,080 LBS.
Based on T.O. 1T-33A-1 15 July 1961
TRUE AIRSPEED – KNOTS
PRESSURE ALTITUDE – 1000 FEET


TIME TO CLIMB – MINUTES
PRESSURE ALTITUDE 1000 FEET
FUEL TO CLIMB – GALLONS
AVERAGE TRUE AIRSPEED
1,000 LBS. EQUIVALENT GROSS WEIGHT
100 LBS. EQUIVALENT GROSS WEIGHT
RECOMMENDED CRUISE CLIMB ALTITUDE
NOTE: ADD 1½ MINUTES FOR TAKE-OFF AND ACCELERATION
NOTE: ADD 60 GALLONS FOR TAXI, TAKE-OFF, AND ACCELERATION
EQUIVALENT WEIGHT CORRECTION
TEMPERATURE – °C
WEIGHT – 1000 LBS.
CLIMB CHARTS


GALLONS OF FUEL PER HOUR, T-33 AIRCRAFT, TWO 230 GALLONS TIP TANKS, 224 GALLONS OF FUEL REMAINING, GROSS WEIGHT 12,000 LBS.
Based on T.O. 1T-33A-1 15 July 1961
TRUE AIRSPEED – KNOTS
PRESSURE ALTITUDE – 1000 FEET


ALT. CORR. FT. TO ADD
INDICATED AIRSPEED
IAS/TAS CONVERSION AND RECOMMENDED
IAS – T-33 GROSS WEIGHT 14,000 LBS
180 KT HEAD WIND
NO WIND
TRUE AIRSPEED – KNOTS
DENSITY ALTITUDE 1000 FEET

THE HEAVY-SET AIRMAN had his head, a shoulder and one arm thrust deep into the bird. He seemed to be having some difficulty and was tracing down the ancestory of a certain quick disconnect in no uncertain terms. Finally he motioned with his free arm and grumbled, "Gimme the blasted waterpumps, Tom."

"Coming up!" Tommy dropped the line he was working on and rattled thru the tools in a battered box. Just as he located the pliers a shadow fell across the box. Tommy glanced along the shadow to a pair of well shined shoes then up a pair of long legs to the lean frame of the Old Sarge. The Old Sarge was frowning.

"Hi" Tommy said, just a little too quickly. The expression on the Old Sarge's face didn't change. If anything it looked more stern. He looked at the waterpump pliers, than at the piece of hydraulic line Tommy had dropped and finally at the heavy-set airman. Just as he started to speak the heavy-set one called, "Hurry up on them waterpumps, I gotta teach this ding dong disconnect a lesson or two."

"Dooley!" The Old Sarge growled.

The heavy-set man hurriedly extracted himself from the bird. He bumped his head on the edge of the opening then sat rubbing the bump and blinking back at the Old Sarge, "You, ah, need me for somethin', Sarge?"

The Old Sarge tersely questioned, "Haven't I taught you two not to use waterpump pliers on a quick disconnect? You both know better."

"But Sarge, I couldn't get a holt of it by hand . . . "

The Old Sarge interrupted, "When you don't have room to torque it by hand, use a crow foot. You're both supposed to be mechanics. No mechanic uses a pair of waterpumps on a fitting like that anymore than he'd tighten a bolt with pliers." The Old Sarge reached into the tool box and pulled out a couple of screwdrivers. He held a cross point up so Dooley could see its point, "This is badly worn. Replace it. All you'll do is butcher screws and waste time using this thing." He held up the other, a common screw driver, and said, "Dress up the point on this one. While you're at it, replace these files. They are worn out and next to useless. You are working on nearly a million dollar's worth of aircraft, using tools and procedures a shade tree mechanic would frown on. You can't do good work with poor tools in poor condition. No one can. Start taking a little time out to care for your tools, preferably before you start to work on a job. I can't stress this enough. The time you spend caring for tools is nothing compared to the time you waste trying to do precise work with dull bits and files, buggered up screwdrivers, and dirty wrenches. If supply can't fix you up with new files and a new cross point, drop by the office and I'll go with you to give them a lecture."

Birdmen BEWARE

I ASKED the grey haired major about thunderstorm penetrations since I knew he had piloted P-61 Black Widows during one of the early Thunderstorm Projects.

"They'll fool you." He said, tilting back his chair and motioning for me to sit down. "You can punch thru a couple of dozen, even around the freezing level, without getting more than a rough ride. In fact, I've hit rougher clear air turbulence than I got on most of my penetrations. Of course being in a dark cloud with lightening, St Elmo's fire and real heavy rain always makes the turbulence seem worse than it is . . "

"They must not be as bad as most people make 'em out." I replied.

He paused to look out the window at blue sky dotted with Summer cumulus. "People always tend to exaggerate, and most of the bar stories about thunderstorms have undoubtedly improved with age.

"In fact, that was exactly what went thru my mind on one penetration at 15,000 feet. I had gone in expecting to get punched around right bad and was surprised at how mild the trip was. Ten minutes later, on my next penetration thru the same storm, I had what I consider the roughest, most frightening experience of my life. The controls were almost yanked out of my hands and for the next few

minutes that airplane did things I wouldn't have thought possible. It would be impossible to exaggerate the violence of that flight. About the time I became convinced that neither I nor the aircraft could stand anymore, it spit us out the other side into the calm bright sunshine. You asked for my opinion on the best thunderstorm penetration procedure . . . my advice is to stay out of 'em. If you get trapped and have to fly thru one go in relaxed. The odds are you'll have a reasonably dull trip and you'll do a better job of flying if you are relaxed. I suggest being a little lazy. Hold attitude, rely on power setting and attitude for speed control. Pay little attention to the actual airspeed, rate of climb or altitude since all of these gages will be giving you a great deal of false information due to sudden changes in pressure within the storm. Being lazy will reduce the stress on the aircraft. If the storm knocks your left wing up the next bump will kick the right wing up, so if you react too quickly to an attitude change, you'll over control. The same thing holds true for pitch corrections."

I made a tape recording of this conversation almost eight years ago to use in a squadron safety meeting. This was at a time when the average fighter pilot believed his machine to be capable of handling any kind of weather, including thunderstorms. After all, they'd reason, we can get up to 50,000 feet and go over 'em if we have to.

So a lot of us didn't take the grey haired major's advice too seriously. Speaking for myself, I blundered thru several storms relearning what he had learned. Several penetrations at around 25,000 feet were uneventful. One at 35,000 feet resulted in a rather rough ride and considerable hail damage . . . Later I got a job reviewing aircraft accident reports and over the years read about quite a few unsuccessful encounters with these brutes. The more I learn about 'em the more I realize that his attitude was entirely correct and that the only change it needs to bring it in line with the jet age is a caution about trying to 'top the storms.'

Once I fell out of the sky trying to get over a string of 'em with a flight of four. My flight was above 50,000 at the time and the storms were much higher than that. We were lucky and managed to stay in the clear during our recovery. No one got hurt and no one got thru the squall line. We did lose flight integrity and it was a pretty sloppy show.

Since then I've read of others who tried to do this and fell into the storm itself, still at extremely high altitude. Generally, they ended up losing control and punching out.

From this, I've come to the conclusion that a thunderstorm penetration at very high altitude is more hazardous than it is at lower altitudes. The problem is one of control. At very high altitude, the machine just doesn't have a large enough spread between the airspeed it is capable of holding and the stall speed. Overpowered brutes are no better off, since there isn't enough spread between mach one and their stall speed. (If you want to risk a mach one encounter with hail, you are too crazy to be flying.)

If you think you're going to miss all the turbulence by punching thru at 40 plus thousand, guess again. Any build up that goes up past 50,000 feet is going to have plenty of activity at 40,000 or 45,000. Enough to gobble up what little speed reserve you might have.

So the old grey haired major's rules still hold. I'll repeat:

* STAY OUT OF 'EM IF AT ALL POSSIBLE.

* If unable to go around, under or back, then penetrate at an altitude which will provide ample speed for control without resulting in excessive true airspeeds.

* To guard against overcontrol fly attitude and fly relaxed.

* Once again, stay well clear whenever possible, they'll play hail with your aircraft.

Well Done

well done

We can be proud of the excellent safety awards recognition being received by TAC units and personnel.

Early in 1962 two units received USAF Flying Safety Award plaques for outstanding flight safety accomplishments in 1961. The 314th TROOP CARRIER WING and the 170th TACTICAL FIGHTER SQUADRON were the honored units.

Major Paul L. Smith, 839th Air Division Director of Safety, wrote an article called "Recipe for Safety" for the June TAC ATTACK. His article tells how the 314th earned plaques in two succeeding award periods.

Next, one of TAC's reconnaissance pilots, CAPTAIN PAUL R. BAKER, from the 29th Tactical Reconnaissance Squadron, Shaw Air Force Base, South Carolina, was called to the Pentagon where General Frederick H. Smith presented him with the Kolligian Trophy. Captain Baker received the trophy for being the aircrew member in 1961 who most successfully coped with an aircraft emergency during flight. He will hold the trophy for one year then will relinquish it to the 1962 selectee. He was given a replica of the trophy for his personal retention.

Hardly had the excitement from this died away when word came that two TAC people will be featured in the Well Done section of future issues of the Aerospace Safety Magazine. They are CAPTAIN JOHN B. CUTLER from the 401st Tactical Fighter Wing and STAFF SERGEANT DONALD H. GREETAN. Their accomplishments make interesting reading so be sure to watch for a resume of their exploits in Aerospace Safety. Sergeant Greetan was also selected as the Tactical Air Command Maintenance Man of the Month and was featured in the May issue of TAC ATTACK.

Flight Safety hasn't been the only area to receive recognition. USAF Missile Safety plaques were presented to the 4520th COMBAT CREW TRAINING WING and the 354th TACTICAL FIGHTER WING for their outstanding programs in Missile Safety during 1961. The 4520th was recognized especially for maintaining an excellent safety record while assisting in the research and development of air launched missiles. The 354th was recognized for its outstanding safety record which was achieved through excellent maintenance that resulted in a high degree of reliability for their entire missile weapon system.

Ground Safety also scored well, with three units recently receiving awards from the National Safety Council. The 4th TACTICAL FIGHTER WING and the 832d AIR DIVISION each received Awards of Merit. Their excellent ground safety programs resulted in outstanding reductions in personal injuries, fatalities, and vehicle accidents. The 4504th TACTICAL MISSILE WING received the coveted Award of Honor for an outstanding ground safety program that resulted in the greatest reduction in personal injuries, fatalities and accidents of any unit throughout the command.

We hope to see this type of recognition continue in all areas of safety, not particularly for the awards and prestige but for the improved accident prevention and the resultant conservation of equipment and resources that are realized.

With this fine record in 1961 we will have to set our sights considerably higher to make 1962 an even better year. Let's all work together to accomplish this.

recognition

RECOGNITION

MAINTENANCE MAN OF THE MONTH

For his outstanding performance as a member of the egress team, Staff Sergeant Edwin H. Hauschildt of the 479th Tactical Fighter Wing, George AFB, California, has been selected as the Tactical Air Command Maintenance Man of the Month. During a routine inspection of the F-104 ejection system, Sgt Hauschildt suspected that the ballistic rotory actuator was faulty. The item is not normally inspected at Wing level and he met considerable opposition to his belief that a problem existed. He refused to digress from his belief and because of his persistent efforts a detailed inspection was accomplished. During this investigation a bent and sheared pin was found that would make the pilot seat separator fail to operate. An inspection of the remaining 47 F-104's at George AFB revealed that 9 had similar deficiencies and that the majority of the others also required pin replacement. An emergency TOC effecting all USAF F-104's was issued because of Sgt Hauschildt's discovery.

AIRCREW ACHIEVEMENT AWARD

A C-124 crew from the 77th Troop Carrier Squadron, Donaldson Air Force Base, South Carolina, has been selected for the Tactical Air Command Aircrew Achievement Award for the period ending 30 April 1962. Approximately 225 miles south of Jamaica, the number four engine of their C-124 began to backfire and lose power. The pilot feathered the engine and turned the aircraft toward Palisadoes Airport at Kingston, Jamaica. Immediately thereafter, the number three engine lost all power along with oil and torque pressure. The pilot feathered it and restarted number four. The power available from number four did not help keep the aircraft airborne but did help with trim control. Because of the heavy load, the aircraft would not maintain altitude, so the pilot started a slow descent. At 2000 feet the aircraft was still descending so the crew began to jettison cargo. At 1300 feet the pilot could maintain altitude although the aircraft was extremely nose heavy because of the forward location of an 18,000 pound truck. One of the flight engineers started the truck and moved it aft approximately six feet to remedy this condition. One hour and a half after the emergency developed the pilot completed a successful two engine landing at Palisadoes Airport. Capt. D. L. Stanford, Aircraft Commander; Capt F. C. Walker, Co-pilot; 1/Lt P. A. Webb, Jr., Navigator; M/Sgt R. A. Bowerman, Flt. Engineer and M/Sgt W. T. Young Flt. Engineer are commended for the excellent crew coordination and devotion to duty they demonstrated while successfully combating this serious in-flight emergency.

CREW CHIEF OF THE MONTH

Staff Sergeant Paul T. McElvain of the 463d Troop Carrier Wing, Sewart Air Force Base, Tennessee, has been selected as the Tactical Air Command Crew Chief of the Month for his excellent performance as a C-130 Crew Chief. He is an extremely versatile mechanic who performs exceptionally high quality maintenance at all times. He willingly works overtime to insure that his aircraft is in excellent condition and ready for assigned missions. To increase his knowledge of aircraft maintenance, he frequently spends his spare time studying technical publications and visiting specialist shops. Because of his efficiency and ability he was also nominated to receive an award for the excellent manner in which he maintained his aircraft records.

TAC TALLY

A COMPARISON OF TACTICAL AIR COMMAND ORGANIZATIONS

MAY TALLY
ACTIVE UNITS

UNIT	ACDNTS*	INCDTS
831 AD		13
832 AD		14
4 TFW	2	7
108 TFW		4
113 TFW		17
117 TRW		
121 TFW		1
122 TFW	1	2
131 TFW	1	1
401 TFW		6
354 TFW		6
4510 CCTW	4	17
4520 CCTW	2	23
837 AD		16
839 AD		
64 TCW		5
435 TCW		
442 TCW		
464 TCW	1	1
4505 ARW		
1 ACG		

*MAJOR AND MINOR

MAY TALLY
GUARD AND RESERVE

UNIT	MAJOR	MINOR
127 TRW	1	

MAJOR ACCIDENT RATE
1 JAN – 31 MAY

TYPE	1962	1961
ALL	13.1	14.4
F-105	29.1	0
F-104	14.5	65.7
F-101	32.5	13.5
F-100	13.1	15.3
F-86	102.9	25.9
F-84	17.8	72.4
B-66	0	41.8
T-33	3.5	3.0
KB-50	22.1	13.2
C-123	19.7	8.0
C-124	0	0
C-130	0	12.0

ACCIDENT FREE
(MAJOR & MINOR)

JET			
ACTIVE	MONTHS		ANG
474 TFW	14	42	123 TRW
CONVENTIONAL			
ACTIVE			RESERVE
4430 ATG	42	66	434 TCW
314 TCW	34	55	94 TCW


Princess
ANN
SAYS
Know
THUNDERSTORM
PENETRATION
PROCEDURES...
HAZARDS:
HAIL
ICING
TURBULENCE
Hirsch
..but the best procedure
is to AVOID THEM!