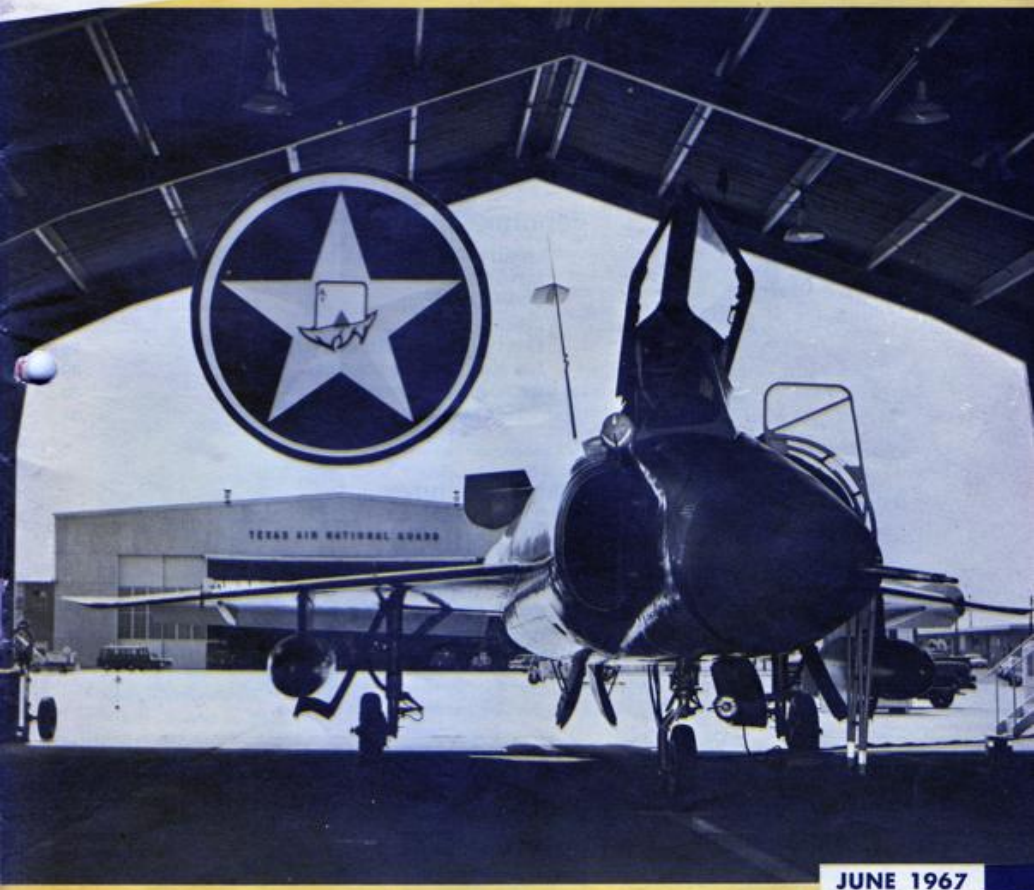
Interceptor



JUNE 1967

ADC's ACE IN THE HOLE . . . see page 16

FOR THE MEN RESPONSIBLE FOR AIR DEFENSE

Interceptor

volume 9
number 6

ADCRP 127-2

spotlight

"About the only exercise some folks take is jumping to conclusions."

departments

special features

Hq ADC Field Printing Plant
Ent AFB, Colorado

OUR COVER

ADC's Ace in the Hole Squadron (ANG), located at Ellington AFB, Houston, Texas, is one of our topnotch F-102 units.

memo

from the CHIEF OF SAFETY

A LITTLE MORE ABOUT PILOT ERROR

COL. OLIVER G. CELLINI

There have been a lot of high level talks and many printed words about pilot error accidents. Our ADC accident analysis people have very aptly categorized all of these accidents into 5 major areas. This excellent study which appeared in the March issue of the magazine listed the results of 45 pilot error accidents that occurred in ADC/ANG units from 1 January 1965 to 1 March of this year. They were 1. Irresponsible acts—4, 2. Technique—6, 3. Didn't know—11, 4. Mistakes or forgot—5, and 5. Pressing—19. The results, or statistics, speak for themselves, and to us as pilots, all too vividly. It gnaws at the professional consciousness of all of us to admit to our failings. I use the word "our" because this is my point. This is what I consider the "little more about Pilot Error."

The condemnation or guilt that follows in the wake of every pilot error accident should justifiably be shared with more than just the men in the cockpit. My reasoning is this: A pilot, any pilot, is not just suddenly created Combat Ready. There are many people, much effort, and a lot of money and time that go into the finished product. If the product is bad, in most instances, it's because someone, somewhere along the production line, fell down on his job. And this fact can be related to each one of the five pilot-error categories.

The pilot who commits the irresponsible act and gets caught is guilty. Guilty of the destruction of an aircraft, possibly of civilian property and lives, and of the resultant grounding or his own death.

But how about the people that produced this pilot and/or this flight? Someone, somewhere along the line failed to instill in the pilot in this instance, the proper attitude towards his job. Each of his supervisors, including the flight commander, operations officer, and commander, has failed in some way in the discharge of his responsibilities. I am not singularly sniping at supervisors or commanders, I have been both, but I think you will agree that somewhere, some vitally important words were omitted from an orientation briefing. Perhaps emphasis of a certain point was lacking during pilot meetings . . . would you believe the pilot in question lacked proper leadership? This is a possibility we cannot overlook.

The most impressive, infamously of course, figure that the statistics pointed out was in the category of "Pressing", the most important single cause factor involved in the pilot error accidents. The "guilt" of these I feel can be shared by every man in the command. Our very by-word has been, and will continue to be—"Get the hack", "Get the MA".

"We" instill this philosophy into "our" troops. We must additionally instill into every pilot in the command to temper the pressure exerted during "pressing" attacks with intelligence and reasoning. *There is no peacetime requirement to obtain a paper "MA" at the risk of an airplane and crew.*

We, as supervisors, can begin to solve this and the other pilot error problems by facing the statistics and sharing the guilt. It's a little more about pilot error that the statistics do not show.

HOT LINE

TURBULENCE REPORTING CRITERIA TABLE. Here is a chart which will help determine what type of turbulence we are flying through and what FAA means when they furnish us turbulence information. The chart was taken from an ATCA staff report.

Intensity		Aircraft Reaction
Light	Turbulence	Turbulence that momentarily causes slight changes in aircraft attitude, altitude or heading. Report as *Light Turbulence.*
	Chop	Turbulence (light bumpiness) that causes slight aircraft fluctuations at rapid intervals without appreciable change in altitude, roll or yaw. Report as *Light Chop.*
Moderate	Turbulence	Turbulence that is similar to Light Turbulence but of greater intensity. Changes in aircraft attitude, altitude or heading occur but the aircraft remains in positive control at all times. Report as *Moderate Turbulence.*
	Chop	Turbulence that is similar to Light Chop but of greater intensity. It causes rapid bumps or jolts without appreciable change in aircraft altitude, roll or yaw. Report as *Moderate Chop.*
Severe		Turbulence that causes large changes in aircraft altitude, attitude, or heading. It may cause large variations in indicated airspeed. Aircraft may be momentarily out of control. Report as *Severe Turbulence.*
Extreme		Turbulence in which the aircraft is violently tossed about and is practically impossible to control. It may cause structural damage. Report as *Extreme Turbulence.*

VISIBILITY REPORTING. The following is quoted from a message from Chief of Staff, Air Force: Reference AFM 55-9 (ERPS) and AFR 60-27. With the implementation of TERPS (Terminal Enroute Reporting Procedures), the most apparent change to the pilot will be the depiction of the landing minima. The new minima format in the pilots' terminal book will include runway visual range (RVR) expressed in feet for straight-in approaches. It is imperative that the visibility reported to pilots correspond in type of measurement to that depicted on the approach plate. Air Weather Service will implement RVR reporting procedures on a base-by-base basis as approach procedures are converted to TERPS criteria. To avoid confusion, base operations personnel responsible for the coordination of approach procedures in accordance with AFR 60-27 must establish the date on which they desire RVR reporting procedures to be locally implemented. Request you establish procedures to insure local weather stations are advised of the publication date of procedures so that RVR reporting may be implemented coincident with procedure publication.

a salute

. . . in recognition of outstanding achievement in accident free operation.

Over 5 Years

★ 456 FIS, Castle

★ 119 Ftr Gp, Hector

Over 3 Years

62 FIS, K. I. Sawyer

112 Ftr Gp, Greater Pitt

132 Ftr Gp, Des Moines

141 Ftr Gp, Spokane

162 Ftr Gp, Tucson

Over 2 Years

✝ 18 FIS, Grand Forks

48 FIS, Langley

87 FIS, Lockbourne

114 Ftr Gp, Sioux Falls

124 Ftr Gp, Boise

148 Ftr Gp, Duluth

120 Ftr Gp, Great Falls

115 Ftr Gp, Truax

149 Ftr Gp, Kelly

414 FIS, Oxnard

444 FIS, Charleston

4600 AB Wg, Peterson

Over 1 Year

13 FIS, Glasgow

27 FIS, Loring

60 FIS, Otis

95 FIS, Dover

125 Ftr Gp, Jacksonville

144 Ftr Gp, Fresno

158 Ftr Gp, Burlington

408 Ftr Gp, Kingsley

539 FIS, McGuire

as of 31 March 1967

"We've had it, Pete!"

This article will serve as a dramatic reminder to all pilots of the hazards associated with landing approaches during severe and violent gusty surface conditions and of the importance of bailout and survival training. It is a vivid first-hand account from an F-101 fighter pilot and his Radar Intercept Officer.

We popped the boards at FL310 and started down. Malmstrom was reporting thunderstorms in the area and a quick refueling stop at Billings would only take about 30 minutes. I told Pete in the back seat to cancel IFR as we passed through 230. Pete was already thinking about our flight plan for the next leg.

Our next call was to Billings Tower for landing instructions. They reported surface winds at 230°, 25 knots gusting to 33, and included a traffic advisory of a civil airliner 10 miles out on final. The only available jet fighter runway was 09/270. The fact that the surface winds were 45 degrees to this runway prompted my remark to Pete that "We'd better be on our toes for this landing," - Pete said, "Rog."

At 13 miles out, the Tower volunteered the information that the winds were now 230° at 35 knots. We were level at traffic altitude when I looked out and noticed a sizable duststorm move across the east end of the field at terrific speed and disappear.

The airliner was touching down shortly thereafter as we could see him through the dust. I considered Runway 220° in my thoughts if the winds remained as reported. Our speed was 350 knots at 5,000 feet, traffic altitude, as we made our break for the 270° runway. The tower reported winds at 230° and 14 knots. We rolled out on downwind, gear and flaps down, when the tower again broadcast the winds "at 170°, 14 knots, squirrelly!" Pete said, "What the hell are squirrelly winds, Colonel?" Well, I didn't know. My next thought was if the winds stayed at 170°, I would carry the approach on through and land on Runway 090.

Our next call was "Golf 34 turning base, gear down and checked!" The tower replied, "Winds are now back to 230 at 12 knots." My mind then somewhat relaxed on the wind effects.

Our 101 was rolled out on final with a slight left wing low. The drift from this point until just prior to or at touchdown was not noticeable, but things started happening awful fast as I started the landing flare. My recollection in the *exactness* of the sequence is rather hazy now.

The bird touched and started a radical, horrendous drift to the right - at the same instant full power was added - the left wing came up completely out of control. We did not know until afterwards that our right wing tip was making a 65-foot furrow with both main gear in the air. I placed the stick as far into the left, forward corner of the cockpit as it would physically move, with full left rudder to try to get the wing down

I told Pete, *"We've had it!"* I couldn't get the wing down, but could see the active alert hangars dead ahead - my thought, however brief in the span of time and events, was the visualization of cart-wheeling into the buildings in a big ball of fire!

Pete's reply - and now that I have the time to think - was in a remarkably calm voice, "Keep her goin', Colonel, keep her goin'!"

The left wing slammed down and I hit both burners. (Later investigation disclosed that a two-inch angle iron fencepost and brace had pierced the bottom left engine compartment, severing the fuel lines and causing a fire. This occurred as the left wing slammed down.) We couldn't tell if both burners lit, and in retrospect this is unusual in the F-101. The bird bounced into the air in a nose-high attitude. We were below and headed straight for the alert hangars. The visual recollection of the old Air Force film of the F-100 doing the now infamous "Sabre Dance" and exploding flashed through my mind. This thought, and a glance at my airspeed which now indicated 155 knots, prompted me to again slam the stick forward! As soon as the nose came down, back on the stick just to miss the ground! I can remember now the repeated thought efforts of "Miss the ground! Miss the ground!"

We cleared the alert hangar and at the same instant, I noticed the left fire warning light. The tower simultaneously transmitted, "Golf 34, you're on fire!" (A later playback of the tapes included the tower's clearance to land on any available runway.)

My decision was to trade fire for altitude, so I left both throttles forward and outboard. We started a slow climb with the thought that if we could just get to single engine speed and altitude, I could then work on the fire problem. At somewhere around 300 to 500 feet, I pulled the left throttle off, looked at the left fire warning light, and saw that it went out and at the same time, with a sort of BLINK, BLINK, the right fire warning light came on!

There was a time when I wondered within myself, when does a pilot know, when does the mind say, now's the time to bail out? I once asked a fighter pilot buddy of mine who had abandoned an F-104, "When did you know it was time to get out?" His reply was "When the time comes, Sam, you'll know it!" I knew it.

I told Pete, "Get out, Pete, get out!" The canopy immediately separated and I turned my head to listen for Pete's seat to go. I heard the explosive charge, let go of the throttle, the stick, and raised both handles. The next thought that flashed through my mind was - the damned seat didn't fire! I glanced down and saw the triggers and remembered, you gotta squeeze the triggers, Sam! This was instantaneously followed by a "real" kick in the seat, followed again by a sensation of tumbling. I remembered to try to beat the automatic seat belt opening mechanism, push the seat away, and pull the "D" ring.

There is no question remaining in my mind that the Survival Training that both Pete and I had received at Perrin and Tyndall respectively was instrumental in our reactions and consequently in our unscathed bail-outs.

During the tumbling which was not vicious, I can recall something slithering across my back - I thought the parachute had streamed. The thought was removed by the reassuring, solid jolt of my chute opening. I looked up to see if the chute was good, and then glanced down at Pete to see if he had a good chute - Thank God, he did. I then looked back to the left as the airplane hit, exploded, and burned in a billowing plume of fire.

I then heard Pete calling, "Colonel, are you OK?" I hollered back, "Yeah, Pete!" Pete had his helmet on and could not hear my reply. I had lost mine in the ejection and could hear Pete plain as day. Two remaining, tiny sore spots on the bottom of my jaw are reminders that my chin strap was fastened.

I looked around again, discarded my oxygen mask that was dangling, and released the Seat Survival kit. I made the mistake of looking down at the ground, saw it rushing up to meet me, and immediately looked back at the horizon (Thanks, Perrin and Tyndall), crossed my arms up on the risers, flexed my legs, and soon as my feet touched, started a roll to the right with my head tucked in. Frankly the impact was kind of a hard jolt from what I had thought I might expect.

I then just kind of relaxed for a couple of seconds on the ground and said thanks to my Maker. The man in the tower who visually followed us down with binoculars, later said, "One of them just laid there and didn't move."

It was me. I then rolled over, unhooked, and stood up.

I turned towards where Pete had landed and saw him charging up the hill towards the burning debris. I hollered, "Where in hell are you goin', Pete?"

Pete then saw me and we headed for each other for reassurances of our mutual wellbeing. Pete had been running towards the crash because he thought I was still in the aircraft.

I don't really remember what we said to each other, but recollect that we were "real glad" about something.

Pete went over to pick up his chute, and I said, "Let somebody else pick it up!" We looked around, saw no roads, and decided to walk the mile and a half back to the airport. ★

YF-12

STATE OF THE ART / *Part II*

The YF-12A is a high altitude Mach 3 plus cruise interceptor built mostly of titanium, a metal stronger than steel but lighter than aluminum. It will also withstand surface temperatures that aluminum cannot.

The fighter is a two - place delta wing, powered by two Pratt & Whitney J-58 axial flow bleed by-pass turbojet engines

BASIC DESCRIPTION

Length	101	feet
Height	18	feet
Wingspan	55	feet
Wing Area	1800	sq ft

The aircraft weighs in the neighborhood of 60 tons, a very "large" fighter with the same "big" performance.

NOTABLE FEATURES

Very thin delta wings.

Twin canted rudders mounted on top of engine nacelles.

A folding ventral fin attached to lower aft fuselage.

Small fixed ventral fins under each nacelle.

Surface controls are elevons and rudders similar to those in our other delta wing fighters.

A pronounced fuselage chine that extends from the pilot's cockpit to the wing leading edge that produces lift and also houses part of the lethal sting of the F-12.

PERFORMANCE

We can only begin to grasp the potential of the airplane and the genius of the design when we talk about its performance. It's spectacular in its envelope. We are talking about a fighter with speed ranges from approximately 175 knots, normal landing weight final approach speeds, to above Mach 3 cruise. On landing the bird crosses the runway threshold at about 160 knots so that it can stop in its normal rollout with *drag chute deployed* and minimum braking.

If we pushed a normal fighter along at these speeds, it would 1, break up, or 2, burn up like a meteor, and "if" it would withstand the temperatures and pressures, the design would most probably lend itself to the landing speeds of a six-inch Navy gun round.

If, however, the drag chute of the F-12 fails on landing, the roll-out becomes something like the "whole, long" runway. Current speed and altitude records are as follows:

Sustained altitude
80,257.86 ft.

15/25 Kilometer Course
2,070.101 MPH

500 Kilometer Course
1,643 MPH

1,000 Kilometer Course
1,688.889 MPH

MISSION

A single F-12 scrambled from a West Coast ADC alert base would easily reach, seek out, and destroy several hostile tracks that vary in altitudes from on the deck to extreme high altitude, over the arctic wastes of central North Amer

ica, and then return to its home base.

Century series fighter jocks can, in the F-12, forget about combat altitude, combat Mach, cruise altitude, and cruise Mach because the bird is a fast-moving platform that readily solves these and many more problems. The days of "RAT Racing" becomes a colloquialism of the past.

WHERE THE CREW LIVES

Pilot and Fire Control Officer occupy a small portion of the sleek, pointed nose, in tandem. The pilot's cockpit is conventional in most respects with stick, rudders, and throttles.

The FCO and pilot are dressed in full pressure suits, similar to our space pilots. The F-12 will require crews to have full pressure suit capabilities, or at least partial pressure suit for altitudes above 50,000 feet.

The FCO depends upon his computerized weapons system. An airborne electronic brain that performs navigation, target detection, and missile launch, including a self-confidence system of analyzing its own ills. It determines its own "go" or "no-go" — a tremendous boon to the maintenance personnel who utilize the built-in fault-isolation system. It additionally suggests alternate courses of action in the event of subsystem malfunction.

The weapons are launched "manually" by the FCO. He additionally talks to the system via a computer keyboard. The training problems envisioned for the FCO with this system will not be a difficult transition.

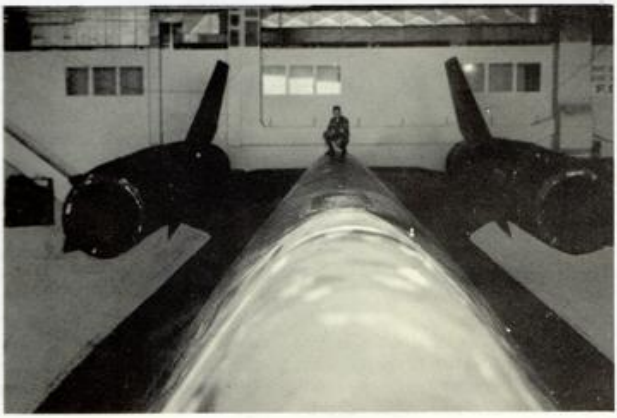
FIRE CONTROL SYSTEM

The aircraft system is the ASG-18/AIM-47A. This is an airborne system designed to perform three basic functions:

"One of the species" - notice the canted rudders, the underside one folded outboard to port.

ADC's Project Chief and his FCO - Col. Vern Henderson and Maj. Sam Ursini.

View looking back from atop fuselage behind FCO cockpit gives some idea of the length and chine.



Col. Joe Rogers in the front pit . . . Maj. Sam Ursini, "Faithful FCO", in back.

CMSgt. Peake and SMSgt. Roberts with maintenance troops showing accessibility of components.

a. Navigation.
b. Target detection.
c. Missile launch.

It utilizes a high-power coherent pulsed doppler radar to detect targets. Search/track augmentation is also provided.

A schuler-tuned stable platform and a digital computer are combined to perform the necessary control and computing functions for autonomous navigation and attack.

Development: The fire control system started way back in 1956 as part of the F-108 development program. The F-108 aircraft was cancelled, but development of the FCS continued. Low power versions of the radar were flight-tested in 1957-58 in a B-25 aircraft. Later on, high power versions were flight-tested in a T-29. An integrated system was flight-tested in the B-58 airplane during the period 1960-1964.

THE PILOT

One of the most impressive things about the bird, to the guys in the cockpits, is that you are sitting comfortably in typical ejection seats travelling in straight and level flight over the ground at better than 2000 MPH.

Another impressive feature of the first F-12 ride is the effect of the drag chute upon landing, the deceleration is somewhat equivalent in reverse to the simultaneous light of both burners in a 101B at sea level on a cold day with less than 3,000 pounds of fuel weight remaining.

The cockpits are roomy and comfortable even with the full pressure suit.

Simple physics dictate a wide turn radius at 2000 MPH, however the turn radius of this bird in the landing pattern is comparable to the F-106. The ease of flying the bird is typical of the stability of the Double Delta. Pilots comment on the ease of landing that is especially effective in crosswind landings.

You can feel the airplane is heavier because it is a larger fighter, but it reacts like most interceptors or fighter aircraft.

THE GEAR

The gear is triple gear — three tires on each main gear and two on the nose. Footprint pressure is less than an F-101.

FUEL

Fuel is not chemical or exotic and burner and engine re-light are accomplished at all speeds and altitudes.

TACTICAL

The Air Force presently has three aircraft at Edwards AFB undergoing the long, hard look by the small ADC contingent headed by Colonel Vernon J. Henderson and his faithful R.O., Major "Sam" Ursini. Colonel Joseph W. Rogers, former world speed record holder is the Ops Officer. The Maintenance Officer is Major Don Donohue. A-E is Major Chuck McCart-

ney. Major Sid McNeil is their Chief of Maintenance and Lt. Colonel Robert Bailie is the exec and Log Plans Officer.

Additionally and most important are the 100 outstanding ADC maintenance troops that keep the big black birds flying. CMSgt Francis Peake and SMSgt Wade Roberts are the "Honchos."

As part of the Tri-Command Test Force located at Edwards AFB the ADC contingent shared in the USAF Outstanding Unit Award.

MAINTENANCE

The maintainability figure that ADC is presently shooting for is approximately 80 man-hours (direct) per flying hour. The current prototype aircraft at Edwards should provide the required studies to achieve the above; as prototypes they do not attain these figures.

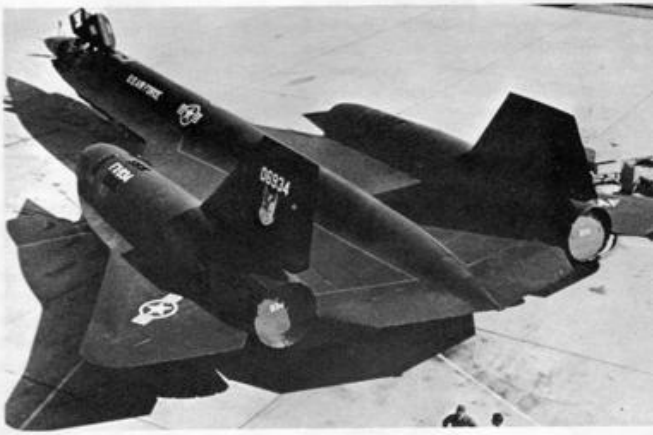
The ADC maintenance people at Edwards schedule their troops to visit other active ADC squadrons in the field periodically and spend from one week to two months at the units to keep abreast of current ADC policies and procedures. They visit units from Maine to California, and provide the current ADC Big Picture to the project.

The maintenance concept will feature extensive field maintenance in some areas, but it will be termed organizational maintenance. A good example is titanium sheet metal that requires special tooling and techniques.

There isn't much more we can say at this point about the world's fastest airplane. The YF-12A is an aircraft with a vitally important mission in the test days ahead, and a more important mission in the defense of our country. ★

CMSgt. Francis Peake, Maintenance Supervisor, shows comparative size of gear and gear wells.

Sam and Col. Joe viewing their packed 200 lbs. worth of drag chute. Their crew chief, TSgt. Hubert is at center.



934 with ADC emblem at Edwards.

inside the tempest

by
FERDINAND C. BATES
Associate Professor of Geophysics and Geophysical Engineering, Saint Louis University

This fresh and stimulating approach to an age-old but important subject was brought to our attention by the Office of Aerospace Sciences of the 4th Weather Wing at ADC Headquarters. Dr Bates was kind enough to grant us permission to reprint his informative article, which originally appeared in the April '67 edition of the Saint Louis University Magazin.

Near the end of the sultry afternoon giant thunderheads appear in the west. In the expectant stillness the first mutterings of thunder can be heard, a sound of wagon wheels on some celestial covered bridge. Suddenly there is motion all about, first in gesticulating tree tops, then in swirls of leaves and dust, and the rising wind feels cool upon the cheek. The first raindrops arrive with the noise of a legion of heavy-footed kittens.

Thus ends the first passage of the symphony of the storm. The rest may follow any of several scores, most of awesome beauty, but some of such macabre horror as to be unbelievable. The thunderstorm is king in the aeolian domain, and, like many kings, dispenses blessings and curses upon his human subjects.

The thunderstorm must also be a laughing king, for in the thousands of years he has cowed and drenched, pelted and electrocuted, torn and shredded men and their property, mankind has not yet learned his secrets. Indeed, man probably now knows as much about the distant planets and the heart of the atom as he does about these nasty neighbors — after one discounts the prolific speculation and garbled lore that has tended to mask the truth of these storms.

The thunderstorm is a machine. This fact is not really new, but one is apt to think of machines as things of metal with well-formed and precisely-functioning parts. The thunderstorm is a machine which converts heat released by condensing water vapor partly into the kinetic energy of the updrafts and downdrafts, the eddies of turbulence, the whirl of the tornado, the gusting surface wind and the modified wind fields in the environment of the storm. Another part of that energy is converted into electrical energy, a tiny part of which goes into thunder. Still another part goes into supporting and retarding the descent of precipitation which forms within its updrafts. Again, all of this is not really new. The new thing is the realization that in the genus, "thunderstorm"

there are sub-species, each a different kind of machine.

It might be interesting to note here the power of the machines we are discussing. The available horsepower (that's the one the salesman quotes when he sells a car) ranges from about one-hundred-forty million horsepower for a benign thunderstorm to fifty-thousand million horsepower for a king-sized severe thunderstorm.

The realization that thunderstorms differ not only in intensity but in their parts and processes has permitted us to make a little progress in recent years, with the exciting prospect of much more just ahead. That realization led us inevitably to ask why two thunderstorms, each with about the same "fuel in its tank", manifest the difference between a prolific rain-making but otherwise benign thunderstorm and one with damaging hail, tornadoes and *airplane-crippling* turbulence associated. We think we now have some of the answers here at Saint Louis University. Bearing in mind that much of what follows yet remains in theory and must be tested, let's shop through King Thunderstorm's showroom for some of the machines he plans to unleash on his human subjects in the 1967 season.

The first model is a "good guy" — the air-mass thunderstorm. This is the most popular model, accounting for better than 90 percent of all thunderstorms. That's probably the reason why meteorologists saw and understood this type of thunderstorm first. It starts out as a cumulus (puff-ball) cloud with small water droplets and an updraft increasing in intensity and depth with time. It grows into a cumulus congestus (towering cumulus) with the size and number of water droplets (and some ice crystals at its top) increasing with time. Then, somewhere up in the cloud, the weight of the water becomes so great that it overcomes the buoyant force driving the updraft, which can be thought of as a chimney of air warmed by the heat released by condensing water vapor. A downdraft begins. It's about this time that the towering cumulus graduates into a thunderstorm. Charge separation has attended the breaking apart, freezing or relative motions of droplets, and the huge voltage differences between cloud regions and the earth break down in lightning discharges, with thunder crashing forth as shock waves from the superheated air columns through which the lightning passes.

This "good guy" thunderstorm dies by literally "choking" on the water in its updraft. In usually less than an hour after its birth, this storm has collapsed into a cloud with downdrafts and decreasing precipitation. In its lifetime it will have produced lots of rain, moderate lightning and thunder, surface winds gusting to no more than fifty miles per hour, and perhaps a little hail. In flying through it, an *experienced pilot* with a *good plane* might have had a few busy minutes, but he really wouldn't have been in dire peril. If it had a tornado associated with it, this "good guy" thunderstorm would probably have been as surprised as anyone.

In regions where there is a large change in wind speed and directions with height, and especially over rough terrain, the first set of "nasty-actor" thunderstorms are encountered. They get that way because their updrafts slope, allowing water products to fall partly out the sides of the updraft. Thus, with the same "fuel in the tank" as one of the "good guy" thunderstorms, these members of—let's call them "The Wild Bunch" since they come in different models—can be several times as intense in their updraft speeds. They can also live much longer, because they will have less water to choke on. Some of the nasty things they do relate more directly to their sloping updrafts than their greater intensity.

One member of the Wild Bunch is the continuously-gusting windstorm. In this model the updraft slopes backward into the wind that blows around the storm in the lower fifteen to twenty thousand feet. The air from this blocked flow, which is rather dry, shears in under the updraft, is cooled by the evaporation of rain falling through it, accelerates downward by being cooled and by precipitation drag, and bursts on the surface as a wind with speeds up to one-hundred twenty-five miles per hour.

Another member of the Wild Bunch is the hailmaker. The key to understanding this prolific ice-making machine lies in finding a path that hailstones may follow that will keep them in the ice-making machine long enough to grow to great size and that will cause them to have concentric laminations of ice of different types. That path

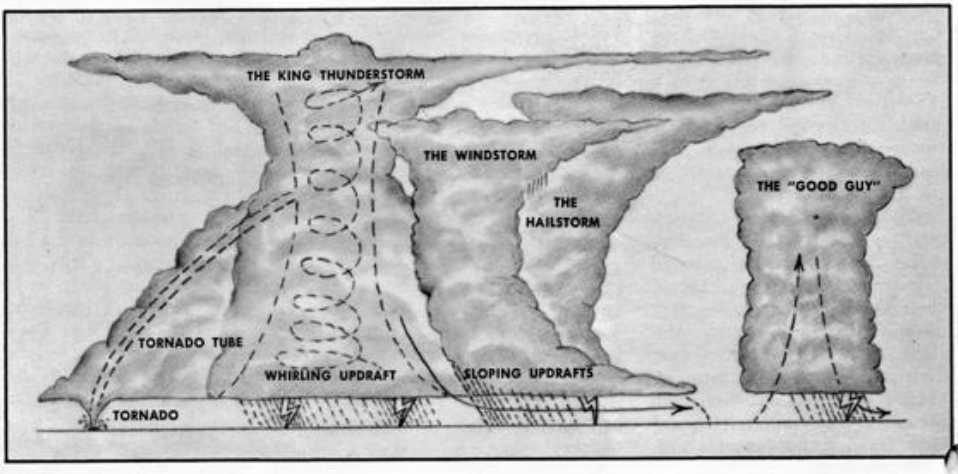
is a bobbing ascent along the upper flank of the updraft which slopes away from the wind blowing around the storm and, of course, in the portion of the updraft which is below freezing. In general, hail can be expected to form, therefore, between fifteen and forty thousand feet.

Thus, we can expect hail from thunderstorms in the Wild Bunch — often almost continuous hail, with stones ranging up to baseball size; strong, gusting surface wind; and turbulence aloft that will give the *best pilot* and *airplane* lots of trouble. With these storms we can also expect vigorous lightning and thunder.

The Rex Tyrannosaurus of all thunderstorms is the one with an erect, rotating updraft. The key to understanding this fellow is that if a thunderstorm (which may originally be one of the Wild Bunch) can live long enough over smooth enough terrain its updraft will develop a vigorous whirl. This won't show much on the outside of the cloud. The updraft can stand essentially erect without the storm choking on its water because the larger droplets are being thrown out by centrifuge action. These storms are huge. They stand to more than fifty thousand feet quite often. The base of their steady updraft may often be fifteen to twenty miles in diameter. Their anvils can stream a hundred miles from their tops and can cover a thousand square miles.

These king thunderstorms are often seen as the principal storm members of squall lines (instability lines). They can live for hours and dominate twenty to thirty miles of such lines. Aside from extreme turbulence aloft, these king thunderstorms do not have most of the nasty phenomena of the Wild Bunch directly associated with them—as befits a "good" gang leader, this president of the atmospheric "crime syndicate." Sporadic large hail, surface wind gusts and the tornado occur, however, in parasitic cloud structures on this thunderstorm's flank—and these parasitic clouds (actually often members of the Wild Bunch aspiring to become king thunderstorms themselves) are there because the king storm helped them to develop.

The reader may have watched the sky during severe thunderstorms and seen puffball cumulus develop, try to stand erect, fail, and shear away in defeat. On the flank of the king thunderstorm, which stands erect and blocks the wind almost as effectively as a mountain, there is a region where puff-ball cumuli can succeed in growing. Here, by favorable aerodynamic-drag interference (an effect which is a little like streamlining the little clouds) such a cloud can develop and grow into a thunderstorm itself. As one such cloud grows immediately on the flank of the king, another often grows on its flank, another on the flank of that one, and so on—so that a line of such clouds in growth will exist, extending usually to the south or southwest from



the king thunderstorm. Thus, these lines of clouds are *not* developing on a cold front, a wedge of cold air driving under them, but simply in a position which is determined by the king thunderstorm and the relative wind.

The foregoing is not simply theoretical c o n j e c t u r e. The writer has, on two occasions, flown under and in the vicinity of such flanking cloud lines and observed and photographed tornadoes over their life cycles. The question, "How do you account for tornadoes occuring in and under t h e s e flanking clouds?" has taken four years to answer — but we are confident, short of one experiment to probe the interior of the flanking cloud line, that we have the answer. Its simplicity is almost as great as the complexity of the devious labyrinth in which King Thunderstorm has the secret buried.

When the growing clouds in the flanking lines have great slope toward the king thunderstorm, one or more of these may have the tops of their updrafts actually come in contact with the intense updraft of the king thunderstorm. They may then become physically connected with that updraft, usually above twenty thousand feet and probably below forty thousand feet. When that happens, because of great pressure reduction at their tops, the central region of their updrafts will draw down into violently rotating tubes. This happens because they will always have some slight rotation of their updrafts in the first place, and a process called "conservation of moment of momentum in a central force field" comes into being. This effect is propagated down the updraft in the flanking cumuli and the tornado, as identified by the visible cloud funnel, comes into being below the base of the cumulus cloud involved.

Actually, the visible funnel appears after an intense vortex has been established to the surface. The point below the flanking cloud where the tornado develops may be as much as twenty miles from the heavy precipitation and lightning of the king thunderstorm! This is beyond the range of audibility of thunder from that storm. Note also that more than one tornado may develop, and that many vortices may be present which never become visible.

Aside from the scientific value of the observation of this tornado mechanism and the validity or non-validity of the mechanics we have just described, the observation of these tornadic vortices on the flank of the king thunderstorm has identified one of the greatest hazards to aviation that can exist in the atmosphere. Beginning with briefing of SAC meteorologists shortly after observing and interpreting this observation, the writer has attempted to reach as many pilots as possible through popular and technical aviation publications and personal briefings to let them know about these claws on the Rex Tyrannosaurus storm.

All of the possible things that can happen in such storms have occurred to jet transports in the past six years. It is absolutely essential that word of this danger reach all airline pilots and that safe flight procedures be adopted to avoid these structures. The safe flight procedure is simple: never fly within twenty miles of an intense thunderstorm — especially one in a squall line. Some airlines already have such rules.

Research on severe thunderstorms and tornadoes continues at Saint Louis University. A project is under way to probe the vortex tube in the cloud with chaff and radar. The objective is to formulate, test, and present a general theory of thunderstorms which will account for all of the observed phenomena and behaviors, and to extend that theory to usefulness in *forecasting* these storms, in increasing *flight safety*, and — eventually — in controlling them. ★

ABOUT THE AUTHOR

Dr. Ferdinand C. Bates holds his Ph.D. in meteorology from Saint Louis University, St. Louis, Mo., where he is presently Associate Professor of Geophysics and Geophysical Engineering. He has been research meteorologist and research forecaster, U.S. Weather Bureau Severe Local Storms (SELS) Center where he was recognized for his contributions by the Department of Commerce. His research has even included the structure and circulation of the atmosphere of Mars!

adc's ac

Feel the difference pride makes!

Before you dismiss that statement as Madison Avenue-manufactured, solely to promote a well-known airline, you need to visit Houston's crack 147th Fighter Group. This is a real proud crowd. And you can feel it. . . .

Not only that, you can *see* it. This group of "part-time civilians" as they refer to themselves, have captured some of the USAF and Air National Guard's most coveted honors, including the USAF Missile Safety Award, ADC Outstanding Operational Ready Unit Award, and The Night Fighter Association Award. This summer, a 147th fighter pilot was selected among the Top 25 Guardsmen in the U.S. Earlier this spring the Group was awarded the USAF Outstanding Unit Award by Lt Gen Herbert Thatcher, Commander of Air Defense Command. The Outstanding Unit Award was doubly significant to the outfit. This was one of the few Guard units nation-wide to receive the honor, and the first time a Texas National Guard unit has ever been selected.

What are these proud Guardsmen like? Are they stereotyped Texans, loud and rowdy, with cowboy boots and ten gallon hats as part of the uniform? Don't you believe it! These men are professionals: pilots, crew chiefs, POL specialists, dispatchers . . . The whole Group is as mission-oriented as any top-notch active duty fighter group in the USAF. In fact, except for the small "Texas" stenciled on the tail of the Group's F-102s, it is completely indistinguishable from a regular Air Force unit. There is a full-time alert commitment, complete with "hot" birds, pilots pulling 12 hour alert tours, and one of the finest alert crew facilities an ADC driver will ever find.

What manner of man belongs to this fighter group? Like most Guard outfits the 147th represents a complete cross-section of society and occupations. Civilian jobs of the pilots range from a medical doctor and several lawyers, to self-employed businessmen, executives, salesmen, airline pilots, a college professor, NASA engineers and scientists, graduate students, and even a couple of oilmen.

Because the unit is essentially a group of civilians performing an Air Force mission, it is imperative that the community be constantly aware of the job being performed by these 800 Guardsmen. Heavy emphasis is directed toward telling the story of the 147th Fighter Group. Col Walter B. (Buck) Staudt and his assistants personally appear before civic groups at least once a week with a program displaying the importance of the Air Defense Command mission, and how it is performed by the Texas Air National Guard. This extensive speaking engagement

e in the hole

schedule is augmented by an annual VIP Tour of the Air Defense Command Headquarters at Colorado Springs, and a briefing at the Cheyenne Mountain complex. Additional identity with the 147th is achieved by the awarding of Honorary Membership in the Group to key Houston civic and business leaders. These community relations activities are particularly important to a National Guard unit, because each man's time is necessarily shared with an employer. As a result of the intensive and continuing "Orientation and Identification" program, excellent cooperation and understanding between the Air National Guard and local employers have been attained.

Because of the wide range of outside activities of Air National Guard personnel, many of the most sophisticated business and scientific methods are employed in the day-to-day operation of the Group. For example, Major David Owen, Executive Assistant, Flight Control Branch of the Manned Spacecraft Center devised a method of programming Annual Pilot Flying Requirements through a computer. IBM cards are punched directly from the ADC Form 76-2, and an updated machine listing is provided weekly showing individual pro-rata requirements and accomplishments. In addition, each machine listing shows the total semi-annual requirements. This system can control approximately 10,000

Their leader . . . Col. "Buck" Staudt, Group Commander.

111th Squadron Commander - Maj. Jerry Killian

Where the wars of peacetime are won or lost . . . "It's gotta be there!"

REPORT DATE 26APR 67 ANNUAL PILOT REQUIREMENTS

PILOTS	INSTR WRITTEN DUE	INSTRUMENT FLIGHT CHECK ELIGBLE	INSTRUMENT FLIGHT CHECK DUE	FLIGHT PHYSICAL ELIGBLE	FLIGHT PHYSICAL DUE	PROFICIENCY/TACTICAL EVALUATION ELIGBLE	PROFICIENCY/TACTICAL EVALUATION WRITTEN DUE	PROFICIENCY/TACTICAL EVALUATION FLIGHT ELIGBLE	PROFICIENCY/TACTICAL EVALUATION FLIGHT DUE	PHYSL TRAINING DUE
STAUDT	03 NOV 68	3 AUG 67	3 NOV 67	3 SEP 67	3 NOV 67	3 JAN 67	3 MAY 67	3 FEB 67	3 MAY 67	23 JAN 70
UDELL	18 MAY 68	18 FEB 67	18 MAY 67	16 MAR 67	16 MAY 67	18 JUL 67	18 NOV 67	18 AUG 67	18 NOV 67	23 MAY 69
DOSS	24 MAY 68	24 FEB 68	24 MAY 68	24 MAR 67	24 MAY 67	24 JUL 67	24 NOV 67	24 AUG 67	24 NOV 67	15 JAN 69
BARNELL	13 NOV 68	13 AUG 67	13 NOV 67	13 SEP 67	13 NOV 67	13 JAN 67	13 MAY 67	13 FEB 67	13 MAY 67	15 JAN 69
BLISSARD	17 NOV 68	17 AUG 67	17 NOV 67	17 SEP 67	17 NOV 67	17 JAN 67	17 MAY 67	17 FEB 67	17 MAY 67	9 JAN 68
WORTHY	22 MAY 68	22 FEB 68	22 MAY 68	22 MAR 67	22 MAY 67	22 JUL 67	22 NOV 67	22 AUG 67	22 NOV 67	23 APR 69
HAUGEN	24 NOV 68	24 AUG 67	24 NOV 67	24 SEP 67	24 NOV 67	24 JAN 67	24 MAY 67	24 FEB 67	24 MAY 67	6 FEB 70
LAIDLEY	26 NOV 68	26 AUG 67	26 NOV 67	26 SEP 67	26 NOV 67	26 JAN 67	26 MAY 67	26 FEB 67	26 MAY 67	5 MAR 69
WALKER	27 NOV 67	27 AUG 67	27 NOV 67	27 SEP 67	27 NOV 67	27 JAN 67	27 MAY 67	27 FEB 67	27 MAY 67	8 JUN 68
HICKS				30 MAR 66	30 MAY 67					15 DEC 69
DAVIS	22 JUN 68	22 MAR 67	22 JUN 67	22 APR 67	22 JUN 67	22 AUG 67	22 DEC 67	22 SEP 67	22 DEC 67	2 FEB 70
NOWLIN				27 OCT 67	27 DEC 67	27 AUG 67	27 DEC 67	27 SEP 67	27 DEC 67	25 APR 69
NATHO	28 DEC 68	28 SEP 67	28 DEC 67	28 OCT 67	28 DEC 67	28 FEB 67	28 JUN 67	28 MAR 67	28 JUN 67	28 JAN 69
HODGES	31 DEC 67	31 SEP 67	31 DEC 67	31 OCT 67	31 DEC 67	28 FEB 67	30 JUN 67	31 MAR 67	31 JUN 67	23 JAN 70
MASLONKA	04 JUL 68	4 APR 68	4 JUL 68	4 MAY 67	4 JUL 67	4 SEP 67	4 JAN 68	4 OCT 67	4 JAN 68	19 JAN 70

MACHINE RUN OF COMPUTERIZED ANNUAL PILOT FLYING REQUIREMENTS

The Personal Equipment section is truly "personal"!!

Flight Line Security

variable training inputs per month. Besides providing instant readouts on both individual and group progress, as well as unfilled requirements, this unique system results in a saving of almost a thousand man-hours yearly over the previous method.

As in all Fighter outfits, everyone has additional duties. For example, the Avionics Officer, production control officer, Chief of Maintenance, and Base Civil Engineer are all combat ready in the F-102. Other mission support pilots crew the Group's T-33s, C-47, and C-54. One of the most important additional duties of all Air Technicians (full-time National Guard employees) is implementation during massload. The 147th Fighter Group's massload is one of its most eye-catching accomplishments. It has been rated "outstanding" on inspection after inspection after inspection, and higher headquarters have frequently recommended that other units visit Ellington to observe the loading operation. In response to this suggestion, observers have come from as far away as Goose Bay, Labrador, and the Pacific Northwest.

It has long been axiomatic that "Guard maintenance is the best." The 147th is no exception. Aircraft, AGE, and missile maintenance are positively superior. The Group OR rate averages 82%, day to day, and even during long exercises, will average 90% or better. Evidence of the exceptional maintenance is the fact that this unit is presently tied for No. 1 of all F-102 units worldwide on the outstanding man-hour report, with an average of 0 TCTO supportable man-hour per aircraft outstanding. The Group's exceptional OJT program has been widely adopted.

Continued schooling of all personnel receives constant emphasis, particularly correspondence and TDY assignments to Squadron Officers School and Command and Staff School. Most of the Group pilots have completed, or are scheduled for the parasail and Life Support

Col. Staudt receiving the USAF Outstanding Unit Award from Gen. Thatcher, Commander of ADC.

"Vector 090 gate climb to 35!"

School. Crosstraining with GCI is constant, and on a first name basis. The "bubble" is located adjacent to the hangar, and the pilots and controllers debrief together in squadron ops following each exercise. This face-to-face debriefing has resulted in mutual understanding of problems of the ground environment and aircrew, resulting in a much better mission. Even though the 747th AC&W is a regular USAF squadron, they are considered honorary "Guardsmen" and participate in all of the Fighter Group's social and military activities.

On paper, it stacks up as a group of well-led, motivated men, thoroughly trained, capable and professional. . . . But there's more to the story than that. Next time you're down Houston way, stop in for a quick visit with the fast guns of the Texas Air National Guard. Because they're southerners, they will extend you lots of hospitality . . . and because they're Texans, they'll quickly tell you about The World's Greatest Fighter Group. ★

A locally manufactured briefing room. "Coolie" labor was obtained from the 111th FIS.

Resharpening the birds talons

One Command

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS FOURTEENTH AIR FORCE (ADC)
GUNTER AIR FORCE BASE, ALABAMA 36114

30 Nov 1966

REPLY TO ATTN OF: 14CSA

SUBJECT: Delayed Ejection Decisions

TO: 31 Air Div
32 Air Div
4756 Air Def Wg
4780 Air Def Wg
4758 Def Sys Eval Sq

(CCR)

1. Not too long ago, one of our operational units experienced a pilot fatality because of late ejection from a crippled F-102. It was apparent that this death fell into that ever-increasing category of unsuccessful ejections resulting from a delayed decision. Under the circumstances the loss of this aircraft was inevitable; the loss of the pilot was not!

2. In re-examining the factors involved in abandoning aircraft, i.e., whether to eject from a disabled aircraft, to stick with the bird while applying emergency procedures in order to effect a "save", or to attempt a dead-stick landing, I find one very important issue that is always prevalent - the "cockpit decision". No one, except the pilot himself, knows what conflicting influences exist at the time of his predicament. Were it reasonable to legislate exact rules upon which a pilot could formulate his decision, I would do so. Unfortunately, such guidance is unrealistic and does not exist.

3. The principal considerations are clearly established in each Pilot's Handbook in that section of the emergency procedures entitled "Ejection vs Flameout Landing". Normally, ejection is the best course of action in the event of a complete engine flameout, or if positive control of the airplane cannot be maintained. If the pilot decides to attempt a forced landing - good; but the decision must be his. If, under the circumstances, there is any question in his mind as to his ability to get the aircraft down safely, ejection is the best course of action.

4. Pilot proficiency in SFO practice, his pilot experience, the availability of a barrier, and a pilot's reasoned confidence all go hand-in-hand with basic requirements for a suitable landing area, clear approaches, daylight VFR conditions and assurance of a satisfactory high or low key position being attained. For some pilots a marginal day in a sick-century series aircraft over Tyndall would be adequate; for others, a clear day with a T-Bird over the salt flats of Edwards may be inadequate.

er's Policy...

5. To this end, I want it emphasized to every jet pilot within the Fourteenth Air Force that "if at any time during the flameout approach, conditions do not appear IDEAL for a successful completion of the landing, ejection should be accomplished". Eject not later than the low key altitude - and certainly not lower than the recommended emergency minimum altitude established in the Pilot's Handbook. The word "ideal" is critical; it means exactly what it says. Remember that at that moment when conditions for a successful emergency landing do not appear ideal, the aircraft becomes valueless and ejection at a safe altitude is the proper and only course of action.

6. This letter reflecting my command policy is to be included in each unit's Aircrew Information File. It is also my desire that every jet pilot once again review ADC Programmed Instruction Text 62-8 entitled "Ejection vs Forced Landing".

Walter B. Putnam

WALTER B. PUTNAM, Maj Gen, USAF
Commander

Cy to: 1 AF
4 AF
10 AF
ADC
3800 ABWg

OPERATIONAL READINESS INSPECTION TEAM

HQ, ADC

THE LEAN CAT

The boys at squadron "X" are pretty happy these days. The ORI team has come and gone and everyone can relax a little — until the next crisis, that is! The big report card came out quite well — seems as though the team was pretty impressed with what they saw, and the Blue Book reflected their findings. Quite a bit different from the last time the squadron tangled with the "owls." The report then wasn't too rosy, because the inspection results were just short of disastrous.

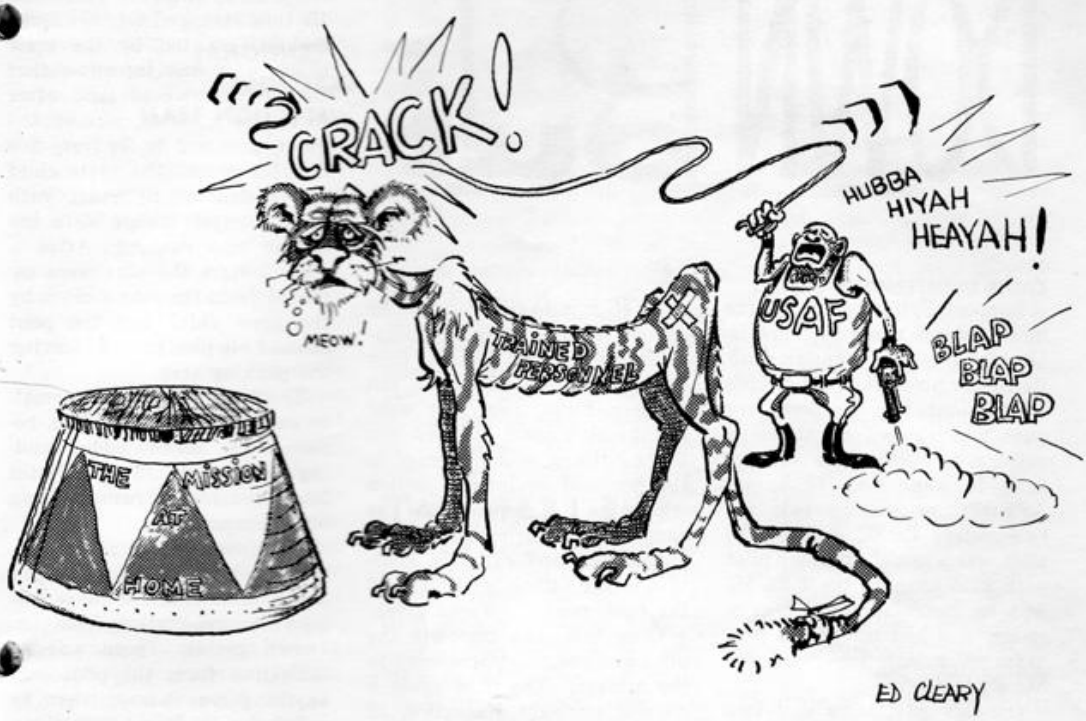
Nobody likes to remember the grim days but maybe there was a lesson to be learned. Someone apparently learned it, from the looks of this year's inspection results at squadron "X."

Last year things just didn't jell. But then the thing in SEA had just drained the squadron of a lot of highly qualified people and who can operate with these young three level and one and one half level airmen? Sure there were supervisors, but just not enough. With all the behind the line people running around it was difficult to tell whether this organization was really a tactical outfit. Grim indeed!

If the situation sounds familiar — it is. We've heard this bit often in the past couple of years, both before and after inspections—unfortunately the heart of the problem often lies in management! Since the ADC ORI Blue Book is concerned with the way the battle is fought as well as its final outcome — many observations are recorded concerning management. As with most subjects, thoughts on management go both ways. Let's talk about the negative side first, then look at the flip side for some counter remarks.

Negative: Our biggest concern is not with people who mismanage, but with people who do not manage at all. Being activists, we often see problems building during an ORI. Still being activists, we jump with joy and use the word outstanding when managers also recognize these problems and initiate corrective action to solve them. SEA did take away many of the old heads, but it also opened the gates of opportunity to those who wanted to push ahead. Some of those who passed through the gates soon learned that there are few instances when things are static. In the days of old, when ADC was a "plump cat," in terms of skill and people, management seemed to take care of itself; not so today.

Positive: One of the brightest spots in management has been the response of three levels to sound direction. In the past few months we've seen these young troops do a tremendous job



LEAN CAT

We've seen them make decisions often previously relegated to supervisory personnel, improvise, and in the end, produce some mighty fine results. The young airmen we've seen rattling wrenches and performing the many other duties upon which successful mission execution depends, have plenty of drive once they are properly motivated. They are molded into a working, fighting force not only by management and motivation, but by the expenditure of supervisory effort. The cry, "We've always done it this way," disappeared. It has taken realistic scheduling, utilization of technical representatives, complete understanding and conscientious application of the OJT program, and augmentation and training of support personnel. All these things, plus knowing when to pat or bat have achieved the results we've seen in the development of young airmen throughout the command.

The improvement in readiness and effectiveness of units we've recently inspected was realized by supervisors recognizing the problem and then acting on it. Retirement on active duty or just plain half effort could not have hacked the program.

The "plump cat" is no more — long live the "lean cat."

BUCK ROGERS, Colonel, USAF
ADC ORI Team Captain

DOWN and out

CAUSE UNDETERMINED (T-33)

Support flying is one of the most difficult missions there is. Usually people of unknown quality fly our aircraft and the types of missions they perform are ones which have no standard pattern to them. This one we have in mind was to be an AFROTC orientation ride for two college ROTC cadets. The pilot was a qualified senior pilot with 2315 hours in the T-33. He was an instructor at a nearby college and had initiated a program of orientation rides for his students.

On this particular day two students were scheduled to each get a 45 minute ride. Upon their arrival at the support operations scheduling section they were given the aircraft tail number. From there they went to the locker room, changed into flight clothing, and proceeded to the personal equipment section where the P.E. people fitted the cadets with helmets, LPU's, parachutes, and rafts. In addition to the fitting, a briefing of the equipment's use was given.

Once this was complete the pilot and one cadet proceeded to the aircraft. The pilot made a normal preflight inspection of the T-33 and then he helped the cadet strap into the rear seat. He then strapped into the front cockpit, assisted by the crew chief, who was informed that the aircraft would land after forty-five minutes, pick-up the other cadet and fly for forty-five minutes more. The crew chief was instructed to assist with the passenger change while the engine was running. After a normal start the pins were removed from the rear cockpit by the crew chief and the pilot showed his pins prior to leaving the parking area.

The flight progressed normally until the pilot requested, received, and acknowledged landing instructions. Two minutes later the aircraft crashed killing both occupants.

The investigation which followed did not reveal a primary cause. Most probable cause was pilot's incapacitation from unknown causes. There was no indication from the pilot that anything was wrong when he called for landing instructions. No attempt was made on the part of the pilot to eject from the aircraft. The ROTC cadet in the rear seat had attempted to eject. It cannot be definitely determined if ejection was before impact or afterwards. The canopy was recovered 100 yards from the cockpit section. It appears the egress system functioned properly.

A check on the medical history of the pilot revealed he was in excellent health. He had no past history of significant diseases. The accident causes will never be known.

LOST PROP (EC-121D)

The majority of the people we talk with from time to time will agree that any aircraft

with two engines is safer than one with only a single engine. They further agree that three engines are better than two and also that any aircraft with four engines is quite reliable. We agree, but here is an instance when, for some people, even four engines aren't completely safe. The aircraft was an EC-121D on an active Air Defense mission. The entire flight was normal up to a point just before landing.

The first indication of any in-flight problem was complete power loss of number three engine approximately one and one half minutes before landing on an ILS approach at home base. A muffled explosion was heard, yellow flames of approximately two seconds duration were observed coming from number three engine, and the flight engineer's BMEP indicator dropped immediately to zero. Prior to engine failure, the manifold pressure was 28" Hg and RPM 2600.

The flight engineer reported to the pilot that number three engine failed. The pilot ordered number three feathered, called for pilot's power and added about 2 inches of manifold pressure. A slight yaw in the aircraft was encountered but was easily controlled by the pilot.

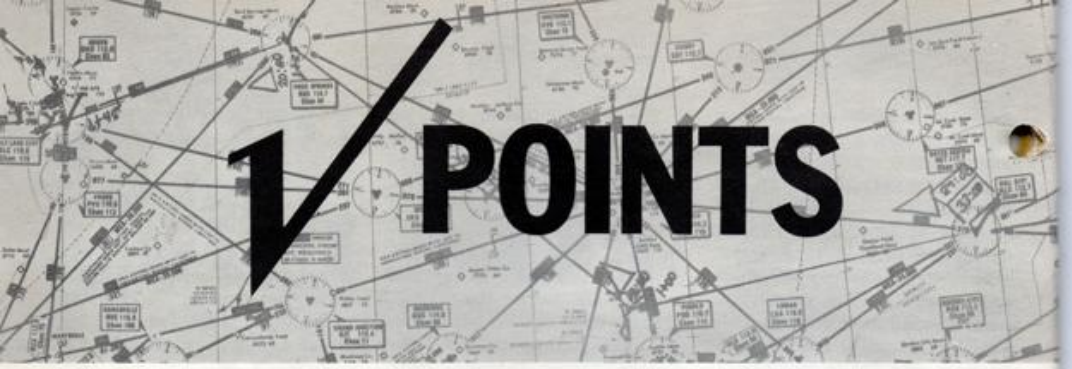
The engine feathering button was depressed as the RPM indicator passed through 1600. The red light in number three feathering button came on and the number three propeller governor high/low pitch position light came on. RPM continued to decrease to zero. There was no vibration. All indications were that the propeller was successfully feathered pending visual vertification.

At the time of indicated engine failure, the off-duty flight engineer proceeded aft to visually scan the engine. Nothing unusual was noted on his initial scan. On his return forward the navigator advised him that the prop was still turning.

A smooth touchdown was made 800 feet down the runway. As the nose wheel was lowered to the runway, a loud noise was heard. At this point the number three propeller left the engine and contacted the right side of the aircraft fuselage, penetrating it in ten places. The propeller inflicted major physical injuries to the navigator's left leg, left side, and left arm.

The propeller penetrated the right side of the aircraft fuselage and severed the electrical wires to the main cabin lights. The aircraft interior was dark except for the illumination from the ditching light and the Mark 13 flare which had been ignited by the propeller as it sliced through the LPU survival vest on the back of one of the seats.

The reason the prop came off was a catastrophic internal failure of the front row power section of the number three engine resulting in instantaneous stoppage of the engine.



√ POINTS

This section of the magazine has been designed for you. Be you a headquarters type at any level, a commander, safety officer, pilot - interceptor, transport, light aircraft - radar intercept officer, mechanic, a civilian in industry, weatherman, doctor, designer, or Indian Chief. This is your corner.

We solicit your ideas, items, notes, photographs, sketches, and pictures. The writing should be less than a paragraph - preferably a sentence or two.

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

DID YOU KNOW THAT

√ The range to the altitude line on an interceptor's radar scope gives the exact terrain clearance. On a dark and cloudy night you should always compare this range with your altimeter to insure against your having misread it prior to starting a descent. It will also uncover that eventuality of the altimeter having been adjusted 10,000 feet in error. (13 FIS)

√ An unusual form of disorientation in flight may be experienced when a pilot sees the lights of two approaching planes which are separating rapidly. This can result in the sensation that a single plane is rapidly approaching on a collision course. Evasive maneuvers to either side could result in a catastrophe. (ADCSG)

√ Caution should be exercised in overflying thunderstorms because of their rapid growth. Vertical growth rates have been observed to exceed 5000 feet per minute and such growth rates may be quite common. One was observed to start in clear skies and in less than ten minutes its top exceeded 40,000 feet; this was near Kansas City in May 1965. (4WW)

√ For each pound of excess fat your "pump" (heart) has over 3 miles of blood vessels through which to pump your blood? It doesn't take a mechanical or hydraulic engineer to figure out the end result. (ADCSG)

√ Thunderstorms often penetrate the tropopause with tops exceeding 50 and even 60 thousand feet. Tops as high as 80 thousand feet are considered possible. (4WW)

Your susceptibility to hypoxia varies from day to day? Illness, fatigue, smoking, alcohol intake, low blood sugar due to inadequate food intake, certain medications, and **poor physical conditioning** increase your chances of developing hypoxia. You, and only you can control most of these factors. (ADCSG)

While flying single-engine turbojet aircraft, landings will not be made from a simulated flameout pattern. Go-around from simulated flameout approaches will be conducted so as not to descend below 200 feet above the terrain. (ADCSA)

The jock of an F-104 was recently quite impressed with the transient service provided by an enroute refueling base. The maintenance was quite outstanding. The intake inspection doors were opened to check the IGVs, the hydraulic bay door was lowered, and accumulators and fluid levels were checked. The windscreen was cleaned. He was lulled into a sense of security that the alert maintenance personnel were familiar with the Starfighter. This mood was quickly dispelled when the pilot checked his landing gear during postflight and found the tip tank pins installed in the liquid springs. The occurrence reemphasized the point to double-check all personnel servicing your aircraft, even if they are well qualified and provide excellent service. (4518 CCTS)

FAT FOLKS FADE FAST AT FORTY? (ADCSG)

A turn of 30° or more from the final approach fix to the runway heading during an instrument approach constitutes a circling approach. **ADC** jet aircraft circling minimums will not be less than 700-foot ceiling and two miles visibility. (ADCSA)

Disorientation in flight from false sensations or illusions caused by the effects of real forces and sensations are frequent causes of aircraft accidents. Only through self-discipline in trusting your instruments will you be able to overcome these illusions. Fatigue, too much partying and stimulants (coffee, nicotine, pep pills, etc.) potentiate the effects of these illusions or false sensations. (ADCSG)

A part of ADMME's research on reliability of aircraft tires, an exceptionally low-price fix has been developed. Based on the ratty-looking rag tires of the F-104 and XB-70 aircraft, this ratty-looking tire should eliminate all problems including shimmy, as the installation would immediately ground the aircraft. (ADMME)

safety officers' FIELD REPORTS

DROP TANKS, F-106B. The drop tanks were inadvertently jettisoned when the landing gear was lowered in the traffic pattern. The pilot stated that he must have accidentally hit the jettison button when he reached to lower the gear. The jettison occurred simultaneously to gear lowering. The pilot was an IP flying chase on another aircraft. His attention was primarily directed at the other aircraft. The drop tank circuit was checked and no discrepancies were found.

VIBRATIONS, T-33A. Vibrations were experienced in flight. The pilot suspected engine vibrations so an expeditious landing was accomplished. The nose wheel well dust cover was found to be loose and it had been flapping against the underside of the fuselage. The engine and tailpipe were checked for security and broken buckets. The engine was ground run and no discrepancy could be found. Vibrations were caused by the loose nose wheel well dust cover.

FUEL CONTROL, T-33A. An engine surge of approximately 1% was noted by the pilot about one hour after takeoff. RPM changes were accompanied by varying fuel pressure and EGT readings. When throttle was retarded to the 70% range, fluctuations increased to about 4%. The gangstart system was activated and all engine instruments stabilized. Operating on the emergency fuel system, the aircraft recovered with no further difficulty. The main fuel control checked bad on post-flight engine runup and was replaced.

FUEL CONTROL, TF-102A. The pilot noticed that only 88% RPM could be obtained with full military power setting at 35,000. Emergency fuel was selected and RPM obtained was 90%. As the aircraft was descended, the RPM increased to a normal setting at 2000 feet (94.5%). Investigation revealed that the inlet pressure line to the fuel control was broken. The line was broken at the connection on the fuel control end of the line. Reason for the broken line could not be determined. The break was most probably due to damage incurred during handling or during maintenance in the engine bay.

BARRIER ENGAGEMENT, F-106A. Tail hook inadvertently extended on takeoff roll. It engaged the approach end BAK-6 barrier and the aircraft was smoothly decelerated to a stop from approximately 50 KIAS. No damage to the aircraft or the barrier, the run out was 1550 feet. The suspected cause of the tail hook extension was maintenance error in that the tail hook was probably not correctly locked after recent tail hook maintenance.

AIRCRAFT YAW, F-106. Pilot noted yaw in afterburner, and nose heavy stick forces on takeoff. Afterburner, trim, and flight control systems were checked and were with T. O. limits. Functional check flight confirmed 1/2 ball displacement in afterburner at 170 KIAS. Use of afterburner did not affect pitch attitude. The afterburner has been changed, the aircraft has been flight checked and released.

OIL DIPSTICK, T-33A. Some smoke was experienced in the cockpit just after takeoff, which cleared up when the cockpit heat was increased. On go-around from a low approach, the smoke was present again with a smell of oil. An immediate landing was made and engine shut down after clearing the runway. The oil dipstick and cap were found against the engine screen. The pilot stated he had not physically checked it for "on and locked." Cause: Pilot error with maintenance factor contributing.

ENGINE SURGES, T-33A. Engine surges were experienced during climbout at 20,000 feet. Most of the climb had been conducted in the weather with no visible rain or icing. The RPM surged 10%, EGT dropped 100°, and fuel pressure fluctuated $\pm$ 10 PSI. The discrepancy could not be duplicated on the ground. The fuel control was changed as a precautionary measure. Suspected cause was icing of the fuel control aneroid. The aneroid was the shielded type.

F-101 YAWING. On initial approach at an X-C base the aircrew experienced severe yaw and roll. Yaw was approximately 15 degrees left and right accompanied by a roll tendency. First impression was that the problem was caused by the external tank. It was jettisoned into an empty field causing no damage. The control problem was not improved. A climb was made and systems were checked. When stability augmentation was put on standby, the yawing stopped. Landing was uneventful. The gyro package was found defective.

THE WAY THE BALL Bounces

ACCIDENT RATE

1 JAN. THRU 30 APR. 1967

	ADC	ANG
Thru Apr 67	5.1	2.5

MAJOR — ALL AIRCRAFT

ON TOP OF THE HEAP

MO	ADC	MO	ADC	MO	ANG
63	456 FIS	34	87 FIS	71	119 Ftr Gp
43	62 FIS	33	444 FIS	51	162 Ftr Gp
36	48 FIS	27	414 Ftr Gp	39	112 Ftr Gp
34	4600 AB Wg	25	18 FIS		132 Ftr Gp
					141 Ftr Gp

ACCIDENT FREE

BOX SCORE

ACCIDENTS FOR Apr	1st AF	4th AF	10th AF	14th AF	4600	ANG
CONV	1					
T-33						
F-100						
F-101						
F TF-102						
F-104				1		
F-106			1			
B-57						
F-89						
EC-121						

MINOR ACCIDENTS THIS PERIOD — 1

CUMULATIVE RATE

1 JAN. THRU 30 APR. 1967

	ADC	ANG
JET	6.1	2.6
CONVENTIONAL	2.4	0

BY AIRCRAFT

T-33	5	0
F-89		0
F-100	93	
F-101	4	
F TF-102	9	5
F-104	37	
F-106	5	
B-57	0	
EC-121	4	

RATE = MAJOR ACCIDENTS PER 100,000 FLYING HOURS

we point with PRIDE

Capt Lawrence A. Wetterhall
4677 DSES • Hill AFB, Utah

Major Roger S. Wilkes
4677 DSES • Hill AFB, Utah

SINGLE ENGINE LANDING (B-57D)

Major Roger S. Wilkes and Captain Lawrence A. Wetterhall departed Hill AFB in a B-57D aircraft on an ECM intercept training flight. Takeoff and climb to altitude were normal, with no problems. While maintaining an altitude of FL 410, both crew members began to smell fumes similar to that of electrical insulation burning. While attempting to isolate the source of the fumes, Major Wilkes noticed #2 engine utility hydraulic pressure was fluctuating and slowly decreasing. As this was the hydraulic system which controls the gear lowering, Major Wilkes lowered the landing gear to preclude the necessity of extending it by means of the emergency system. Captain Wetterhall took over communications and advised Salt Lake Center of the problem, and requested and received clearance back to Hill AFB. To compound the aircraft problem, during the turn, the primary attitude gyro, the J-4 compass, and the TACAN indicators failed. Then shortly after the completion of the turn, the #2 engine fire warning light illuminated. The throttle was immediately retarded and then placed in the cut-off position. The light remained on, so the pull-to-arm knob and the fire extinguisher bottle were activated. The crew double checked the emergency with the checklist and completed all required actions. Within approximately one to two minutes, the fire warning light went out. They contacted the squadron by radio and advised them of the situation. An emergency was declared with Salt Lake Center and a gradual descent was begun enroute to home base.

After aircraft touchdown, the #1 engine was shut down, and the pilot maintained brake pressure during landing roll by actuation of the hand pump.

Investigation disclosed the #2 engine constant speed drive housing had failed and allowed engine oil to escape onto the engine. The oil fire burned through the throttle control linkage to the engine and had shorted out associated electrical control wires, which prevented the fire extinguisher to function.

The teamwork displayed by this crew has earned them the "We Point with Pride" awar

AFTER BURNING

Address your letters to: The Editor, INTERCEPTOR, Box 40, Int AFB 12, Colo., 80912
To be published, your letters must be signed,
but names will be withheld upon request.

ROKAF SAFETY EDUCATION

The Republic of Korea Air Force (ROKAF) depends a great deal upon USAF Safety publications for their education program. The ROKAF has developed an aggressive and effective program over the years. They are considered leaders in this field in the Military Assistance Countries of the Asian/Pacific area.

Not long ago the ROKAF was a small, all-fighter Air Force. Today they are a strong capable air arm with a variety of aircraft. This force consists of the F-5, F86F, F86D, RF-86F, T-33, T-28, 01A, C-54, C-46, and H-19 aircraft. They operate from nine different locations with almost six hundred pilots. In order to provide medical support to the ROK forces in Vietnam, the ROKAF is running a small Military Airlift Command.

Request increase of our allocation of the INTERCEPTOR to seventy-five copies and consolidation of all ROKAF requests for distribution through this headquarters.

Colonel John D. W. Haesler
Commander
6146 AF Advisory Group
APO San Francisco 96276

*We are happy to comply.

ADCPI & AMAIR

A copy of ADCPI 62-1, "Aerodynamics of Sink Rate" has been brought to our attention. The content of this programmed text is basically applicable to jet flight crews in commercial aviation. We would be most appreciative of a copy of this programmed text if it could be made available. In fact, if you could spare more than one copy, we would appreciate two or three copies of the text.

Please advise if there are any proprietary or copyright problems in authorizing American Airlines to use the format and certain portions of the materials in preparing a similar text for commercial aviation.

Thanking you in advance for any assistance you can give us.

D. C. Killian
Manager-Flight Instructor
Training Techniques
American Airlines
Fort Worth, Texas

***Three copies, permission to use, and our best wishes for Safe Flying are on their way.**

HELP FOR THE MARINES

It is requested that the 2nd Marine Aircraft Wing, Ground Safety Office, Cherry Point, North Carolina, be granted permission to republish two articles in the April 1967 issue of INTERCEPTOR.

The articles on "2-Wheel Roulette," page 16, and "Accident Aftermath," page 18, would be of value in aiding in the support of our Ground Safety Program. Our office would like to have these articles republished in the Air Station's paper, "Windsock," and also for use as Student Material for the Wing's Driver Improvement Program.

Captain D. H. Oblinger, USMC
Wing Ground Safety Officer
2 MAW, FMFlant

***It's time we should do something for the Marines.**

F-111 REVISITED

Several years ago I was assigned to do performance work on the interceptor version of the F-111, a task which continued for approximately two years. Early this spring I was reassigned to lead the performance efforts on the F-111 interceptor versions. I have read with great interest your April issue of INTERCEPTOR and was wondering if it would be possible to receive INTERCEPTOR on a regular basis. I feel it would enable me to become more familiar with ADC — its mission and its operating functions.

Please send these issues to me at General Dynamics, Fort Worth, Texas.

E. A. Wadsworth
Senior Flight Mechanics Engineer
General Dynamics
Fort Worth Division

***You're on the list.**

the Cold Hard Facts..

Summation of Summer's Safety Success

- Another summer is upon us with its attendant high temperatures and long takeoff rolls.
- Long takeoff rolls, particularly at aircraft gross weights, shorten tire life and make them more vulnerable to blow outs if you're driving around with well-worn, marginal, or under-inflated tires.
- Maintenance officers should emphasize proper tire inflation to your flight line troops. Pilots, take a close look at your tires during preflight.
- During flight planning, correctly compute your takeoff roll for forecasted runway temperatures and pressure altitude.
- At high elevation bases (4,000 to 6,000 feet above sea level) with high runway temperatures (95° or more), your takeoff distance can be more than 50% greater than takeoff rolls at sea level, depending on what you're flying.
- There is a corresponding slow acceleration and rate of climb after takeoff from a high elevation runway at summer temperatures, so beware of obstacles off the ends of runways.
- Consider your gross weight, runway length, forecast runway temperatures, takeoff ground run distance and obstacles to clear, when ordering fuel from transient maintenance. It is easier to fuel an aircraft than it is to defuel one.
- Summer brings high temperatures — high temperatures bring reduced aircraft performance. BEWARE!

SUMMER'S HERE AGAIN