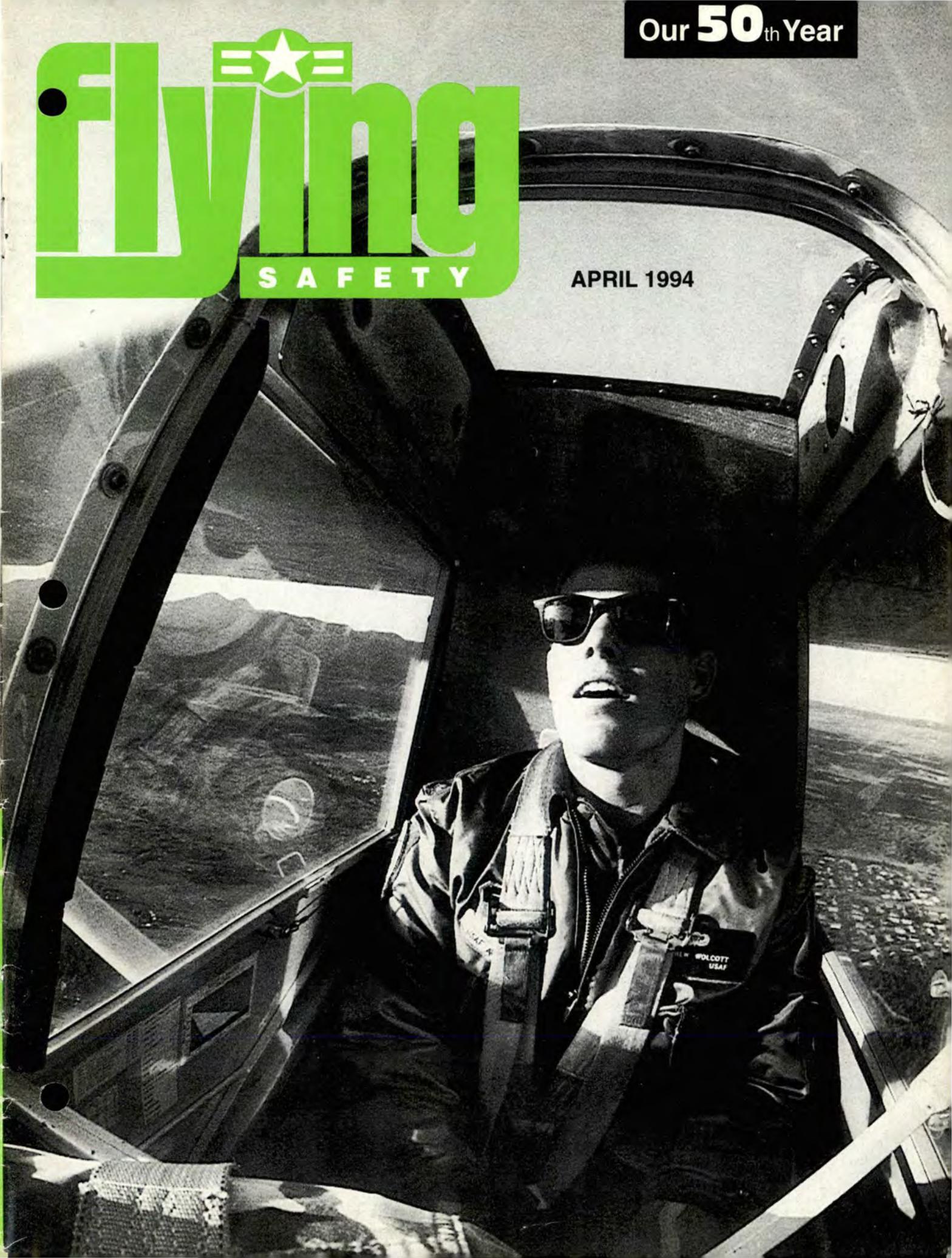


Our **50**<sup>th</sup> Year

# fliving

S A F E T Y

APRIL 1994





# THERE I WAS

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**C1C JESSE HERNANDEZ**  
Cadet Squadron 36  
USAF A

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■ We didn't have the same luxury of a high-powered Twin Otter to take us up for free like we did at the Air Force Academy. At the civilian drop zones, like this one, we had to ride in slow-climbing aircraft and pay for our altitude just like all the other skydivers. So most of the cadet team members had opted for the cheaper, lower levels in order to get multiple jumps in and save money for the night jumps later on.

I was the last load before official sunset, and we decided to get out at 6,000 AGL (approximately 12,000 MSL) to make it down in time for

the night jump brief. Though this was a civilian drop zone, we were using Academy equipment and ran the operations in line with Academy procedures, or as close to those lines as we could get.

It was a cool, Colorado summer night. With not a cloud in the sky and a full moon shining brightly, we knew the visibility would be good without much help from the light sticks we had attached to altimeters and shoes. For most of the junior team members, this was their first night jump which meant they all had to do solo passes as orientation to the new experience. So the first three loads were long and slow with one jumper per pass at the top from 10,500 AGL, just under FL180. My-

self and two other first class men were on the ground planning our first night-relative work dive.

Finally, our turn had come, and my fellow cadets and I moved to the Cessna 206. There was going to be six of us sitting on the floor in the aircraft. As I climbed inside, I heard the pilot telling us he would climb to 5,000 AGL before turning on the oxygen hose connected to the single mask we would have to share, including him.

I felt slightly uncomfortable with this setup. I thought it was primarily because this wasn't the same way we did things at the Academy and not something I was used to. I told myself I didn't need to worry. No one else was.

continued

# FLYING SAFETY

AIR FORCE SPECIAL PUBLICATION 91-1

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### CONTRIBUTIONS

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# THERE I WAS continued

This was the fourth load for the pilot, going all the way to the top and back down using the same oxygen setup. My group was getting out on the first pass.

After reaching exit altitude, we turned in on jump run and prepared to exit the aircraft. One of my partners was closest to the door and elected to take the call for the exit point. None of us cadets knew the area all that well, especially at night. So when he asked me if the spot looked good, I took a glance at the ground, said "Sure, let's go!" and started to climb out, placing all my faith in the pilot, trusting he had us on the proper jump run. Even though I didn't see the ring of lights which was supposed to designate the landing area, I assumed we must be close. This was his drop zone. How could he be wrong, right?

We left the aircraft, and the dive itself was excellent. In the moonlight, we could all see each other and the excitement on our faces. At breakoff altitude, we turned, tracked away, and deployed our chutes.

Not until I got under canopy did I realize how far off we really were. I looked all around below me for the landing area. The only thing I saw was the rural highway which ran 3 miles east of our drop zone. Raising my field of view and looking west, I saw where we were supposed to be landing. My next thought was of power lines, barbed wire fences, and uneven ground — a night jumper's enemies. Luckily, the moon gave a better view of the terrain than should have been expected. I was able to steer myself to a relatively flat field 50 meters from a dry riverbed. Gathering my chute into my arms, I started the search for my compatriots and the long walk back.

How did we get so far off course? Partly, I blame our lack of awareness and knowledge of the area. But another factor, which I think played a considerable role, was hypoxia. Not until I got back to the hangar did someone mention, either before or

during our load, they had heard the pilot on the interphone saying he would make this his last load because he was beginning to feel hypoxic. Why would someone notice something like that and yet continue to operate?

This immediately brought to mind another incident that occurred during the '92 Collegiate Championships down in Arizona. During a round of the four-way relative work competition, a team that was on the back end of a load got out of a King Air. This group had become hypoxic in the air. Still, they got out of the aircraft and performed the dive. Not until 3,000 feet above ground, with less than 15 seconds to impact, did they "wake up," becoming fully aware just in time to deploy their canopies.

The simple fact: The effects of hypoxia are real and dangerous. At the Academy and according to regulation, the aircraft is required to take off with no less than 300 psi indicated on the oxygen gauge. If the ride is to last more than 20 minutes at an altitude above 11,000 MSL or spend any length of time above 13,000 MSL, jumpers are required to be individually connected to the oxygen source and disconnecting no sooner than 30 seconds prior to exit. For any jumps above 18,000, the jumper must have a self-contained source while in free fall. The standards are stressed and strictly adhered to.

Even while operating under strict military standards, the pilot, aircrew member, or jumper must be fully aware of the possibility of becoming hypoxic. Too often people dismiss the symptoms or effects as signs of fatigue. Just because the regulator indicates a flow, the hose is connected, or the ride doesn't seem that long, don't ignore the need for oxygen.

We should listen to our inner voices more often. If there is any doubt or question about something, then don't push it. Bug out of a bad situation, and live to fly or jump another day. Blue Skies! ■

# The



***The 63d Airlift Wing's last flight marked the end of an era at Norton AFB, California.***

In a ceremony on 24 June 1993 with C-141 aircrew, dignitaries, family, and friends attending, the last flight's aircrew prepared to leave.



# Wing's Last Flight



Photos courtesy of 1352d Audiovisual Squadron, Norton AFB, California

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**PEGGY E. HODGE**  
Managing Editor

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■ HQ Air Mobility Command (AMC) and the 63d Airlift Wing (AW) at Norton AFB, California, allowed me to fly with their aircrews on numerous occasions before their deactivation. On 24 June 1993, I flew with the 15th Airlift Squadron on the Wing's historical last flight. This opportunity and other AMC worldwide missions have always proven beneficial to our efforts at keeping the safety story interesting and relevant for our audience.

Last flights are a common occurrence across the country. As we draw down, bases close, and missions change, safety must remain at the forefront of our operations. As I looked back at some of my experiences with the C-141 aircrews, safety was *always* at the forefront of their operations. The 63d Airlift Wing's last flight was no exception — Ed.

## The First Mission

**A Look Back** The first mission I flew with was to Hawaii and the Far East. It is one of my fondest memories, and, thanks to this crew's time, expert ability, and know-how, I learned what crew life was like "on the road." A lot of long flying hours and a lot of hard work go into the completion of each leg of a worldwide mission.

One of the first things I learned about was the necessity of team work — or crew coordination. As I reported then, "It takes a hard-working, dedicated, and well-coordinated crew to bring it all together — safely.

"Each crewmember is responsible for many tasks throughout each leg of a mission. The proper execution of these tasks demands constant vigilance, cross-checking, and sharing of information. The safe accomplishment of a mission is a team effort — every crewmember must be aware of where the aircraft is going and what it is doing. This all adds up to

a requirement for effective crew coordination."

After it was over, I knew I had experienced a lifestyle like no other, and I had flown with some of the best professionals I had ever met. I wanted to go again just as soon as I could. I felt like I now had some idea of why aircrews develop an attachment for their airplanes. No matter the mission, time, or problem, the C-141 enabled the crews to get the job done.

**The Last Flight** The teamwork and the camaraderie I saw on my first flight were also the successful ingredients on this one. The crew's mission was a medical evacuation, and, as always, the professionalism and seriousness for the job was clear.

At the premission brief, Col John D. Hopper, 63 AW Commander and Mission Aircraft Commander (AC), emphasized team work and crew coordination. "A C-141 aircraft involves more than checklists, systems knowledge, and good piloting tech-

*continued*



# The Wing's Last Flight continued



The special ceremonies provided the appropriate sendoff for the final flight's aircrew. Friends and aircrew expressed mixed emotions this day.



nique. It requires clear, concise communication and effective group interaction. Speak up if you see a problem. Regardless of your AC's rank, it is imperative and could avoid serious consequences."

As Col Hopper further explained to me, "Multicrewmember cockpits are designed to ensure needed redundancy. Yet, this system of redundancy has failed in many cases. It has failed because crewmembers have not heeded the warnings of others, or because crewmembers who possessed important information have not passed it on.

## The Many Demands

**A Look Back** AMC crews fly worldwide missions which place many demands on them. These include extreme weather changes which can affect aircrew and aircraft. On every mission I observed, all crewmembers performed their duties with a safety-first attitude — no matter what the demands.

On a mission to Alaska, I had another first-hand opportunity to observe the crews at work. We left sunny, warm Norton AFB and in just a matter of a few hours, flew to the much colder weather of Alaska. The crew was ready as they transitioned to more demanding cold weather operations.

As I reported then, "C-141 crews never know when they take off what equipment or weather demands they may encounter. Their worldwide mission often means a takeoff in warm sunny weather but landing in extreme cold temperatures."

From Alaska, we flew to the Philippines, where it was very hot again, as well as humid. I was impressed with flexibility and professionalism they demonstrated in the performance of their duties.

**The Last Flight** The final flight took the crew from some very hot June weather at Norton to some wet weather at McChord AFB, Washington. And, once again, I was impressed with their flexibility, professional ease, and determination.

No matter what adverse weather we encountered or what aircraft maintenance concern developed, the crew handled it all without jeopardizing passengers or aircraft safety. A professional, safety-first attitude, patience, and complete maintenance practice allowed the mission to be completed. The crew was never pushed beyond its limit.

As Col Hopper emphasized, "you have to know when to 'throttle back.' You can only press so hard to keep your mission on schedule. Being mentally willing to back down is a valuable mishap prevention tool.



The C-141B, dubbed "Spirit of the Inland Empire," was the aircraft designated to fly the last flight. It had been used in the past for many dignitary and other special community flights.

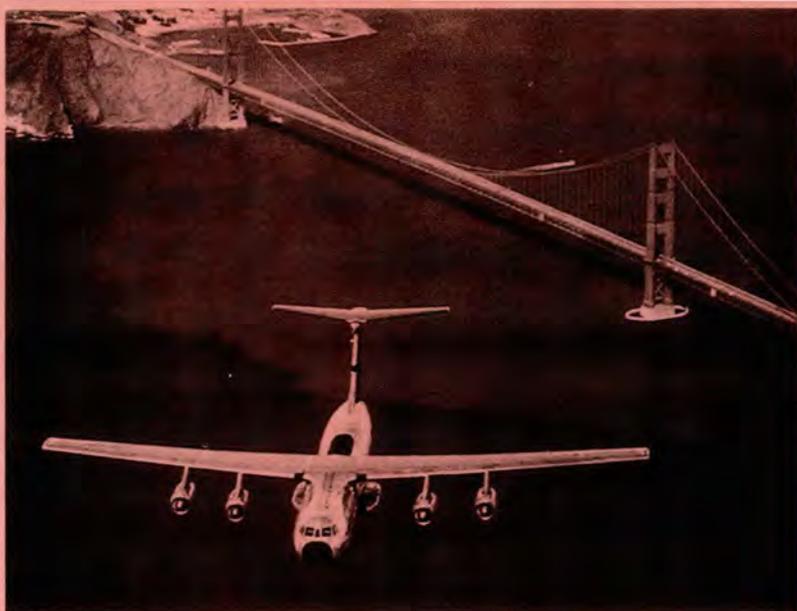
"It is very important to strive for safe, timely mission completion, but for every set of circumstances, you need a mental 'no go' point."

When maintenance problems forced us to stay at Travis AFB, California, it was 104 degrees. The crews took it in their stride and made the best of a bad situation. The following day, all necessary maintenance was completed but never once was their safety or the safe operation of the aircraft compromised.

### Way Down Under

**A Look Back** What I consider to be one of the best times of my life was a 2-week trip to New Zealand to research and write a story on the midwinter airdrop to McMurdo Sound and the South Pole. I flew with the 62d Airlift Wing from McChord AFB, Washington. (The 62 shared this mission with the 63 on alternate years.) This story was another one of professionalism, camaraderie, and fellowship.

The mission complexity and Antarctic winter conditions challenged the parachute riggers, aircraft, and aircrew. A lot of pre-mission planning goes into the preparation for a mission of this scope. It demanded much attention to detail, cross-checking, and checklist discipline. *continued*



### DISTINGUISHED MISSIONS

■ **In April 1957**, a crew transported U.S. Ambassador Charles E. Bohlen and his family from Moscow, Russia, to Rhein Main AB, Germany (en route to his new assignment as U.S. Ambassador to the Philippines). With this mission, the Wing became the first to land a C-124 "Globemaster" in the Soviet capital.

■ **In November 1964**, the Wing flew 15 missions behind the Iron Curtain and provided relief on the flooded areas of Yugoslavia during an outbreak of hepatitis. During that same month, 15 of the Wing's C-124s supported Belgian C-130 paratroop operations to free hostages held by rebel forces in the Congo. The paratroopers' efforts proved successful with the liberation of the hostages.

■ **In April 1967**, the first C-141 took off on its initial cargo airlift mission to Vietnam. During the Vietnam War, the Wing flew around-the-clock missions in support of the U.S. and allied forces engaged in the Southeast Asian theater.

■ **On 12 February 1973**, another 63 MAW first took place when a C-141 landed at Gia Lam Airport, Hanoi, North Vietnam, and picked up the first contingent of American prisoners of war (POW). The Wing eventually transported 387 POWs on 20 flights to Clark AB, the Philippines, during OPERATION HOMECOMING. In the following 3 days, the Wing provided assistance in OPERATION COUNTDOWN — the withdrawal of approximately 5,000 U.S. troops from Vietnam.

■ **On 8 January 1980**, Captain Kathy LaSauce became the first female pilot in Air Force history to command a C-141 when she received her certification by the 63 MAW's Review and Certification Board.

■ **On 19 July 1980**, the Wing received its first C-141B aircraft.

■ **On 22 June 1981**, the Wing accomplished the first-ever C-141B air refueling mission on a flight that delivered fresh produce, mail, and other supplies to the South Pole and McMurdo Sound, Antarctica.

■ **On 21 June 1982**, a 63 MAW C-141B received fuel from the new KC-10 aerial tanker in total darkness and on a similar South Pole mission.

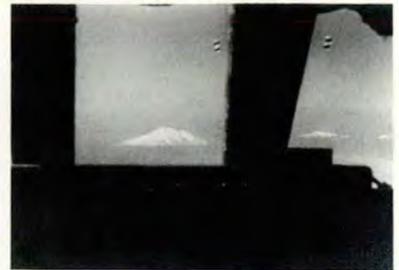
■ **On 20 December 1989**, aircrews and aircraft from the Wing participated in the initial airdrop of troops in the assault on Panama's Torrijos International Airport. During the 3-week contingency, the 63 AW accounted for 72 of the 147 missions flown by aircraft under the Twenty-Second Air Force during OPERATION JUST CAUSE.

**During the August 1990 to January 1991 period**, the Wing flew 1,916 missions and transported nearly 20,960 military personnel and 13,651 tons of equipment to the Persian Gulf region. For its efforts in both OPERATIONS DESERT SHIELD and DESERT STORM, the Wing received its latest Air Force Outstanding Unit Award.

**During the final months of 1992**, the 63 AW began focusing on the March 1994 unit deactivation and closure of Norton AFB, while still maintaining an airlift capability.



The last flight's medical evacuation mission included stops at Travis AFB, California, Eielson AFB, Alaska, and McChord AFB, Washington.



Photos by Peggy Hodge (top group)

## The Wing's Last Flight continued

As I reported then, "Checklist discipline was emphasized. It provided an assurance of continuity and completeness. Time and time again, the checklist was an effective tool in protecting equipment from damage, ensuring a successful drop, and protecting people from injury or death."

This mission proved, as the others, AMC's ongoing capability to resupply forces anywhere in the world, under the most adverse conditions. Good Show!

**The Last Flight** The Wing's last flight demanded the same mission essentials of premission planning,

attention to detail, cross-checking, and checklist discipline.

As all aircraft commanders do on C-141 missions, Col Hopper briefed the mission profile, its demands, and what he expected of the crew. All crewmembers were aware of where the aircraft was going and what it was doing.

When maintenance discovered an engine problem, the crew's attention to every possible detail as to the cause and the extensive cross-checking amongst the engineers and pilots ensured the necessary "fix" to complete the next leg. Each checklist

Hose downs and congratulations are in order as Colonel John D. Hopper, 63d Airlift Wing Commander and Mission Aircraft Commander, complete the last flight.





The last stop for the last time!

Photos by Mr. Ron Samuels

was very carefully reviewed and completed before the mission was continued.

Because of engine problems, we were delayed on more than one occasion, and one leg required an in-flight abort. Because of this crew's professional confidence, attitude, and determination, there appeared to be no anxiety on the part of the crew or any of the passengers.

#### "The 'Es' Have it!"

**A Look Back** All missions demonstrated the importance and necessity of the enlisted crewmember. Throughout the years, many respected Air Force leaders have recognized enlisted crewmembers as the backbone of the Air Force. Their responsibilities are great and their reputation much deserved.

I accompanied a C-141 crew across the Atlantic for the express purpose of watching exactly what they do, and I found the engineer and loadmaster on the C-141 exemplify this much-deserved reputation.

As I reported then, "the loadmaster runs the back of the aircraft. Their responsibilities on the ground and in the air are many. The loadmaster is the first crewmember out to the aircraft. They are responsible for everything and everyone that is a part of the mission's load.

"The engineers are the ones who keep the aircraft ready. Not only do they know how to accomplish this task very well — they know what the aircraft can and can't fly with. They monitor all of the various systems for proper operation. In

addition, they provide the pilots with aircraft performance data which is critical for each phase of flight.

"The engineers report to the pilot on the condition of the aircraft. They also perform the aircraft checklists and fulfill the duties of 'scanner,' determining deficiencies before and after flight which could render the aircraft unsafe."

**The Last Flight** On the last flight, we experienced some serious engine problems, but through the team work and extensive coordination between the engineers, loadmasters, and maintenance — the problem was solved!

The "Es" on all missions worked well as a team. They helped each other out and backed each other up.

#### The End of an Era

When Norton AFB, California, closed last month after 52 years of service to the US military establishment, it was the end of an era. Used to train aircrews and service aircraft during World War II, the base continued as an air depot and ballistic missile refurbishing and storage site throughout the 1950s and 1960s. It served as the home of the 63d Airlift Wing since April 1967.\*

Norton AFB had also been the home for the Air Force Safety Agency since it moved there in 1950 and until its recent relocation to Kirtland AFB, New Mexico, in August 1993. It is with a deep sense of pride and gratitude we say thank you and farewell. ■

\* See "Distinguished Missions"



In August 1993, C-141s lined up on the runway to officially fly away to their new homes. The airplanes were gone!



# Borrowed Headaches

**CMSGT DON A. BENNETT**  
Technical Editor

■ Sometimes, if you want to get the mission off on time, you have to borrow from fellow maintainers, other squadrons, support agencies, civilian aviation facilities (foreign and domestic), or even from sister service components. This kind of "backscratching" has served its purpose well, but sometimes improvising causes serious setbacks.

Most often we resort to borrowing when our backs are to the wall trying to get a high-priority job completed. It could be launching jets, a contingency operation, or because there wasn't time to obtain your own part or fix the broken one. Whatever the case, you must have that special widget now! Rush, rush, hurry! Need it now!

Certainly there are moments when time is of the essence, and we are forced into high gear. But before you throw caution to the wind, it's best to stop, investigate the item or equipment you're going to borrow, and see if it meets the Air Force's specifications for its intended purpose in *your* aircraft!

## Check and Ask Questions

You would be very wise to check the serviceability of your borrowed equipment through visual inspections and equipment forms. Ask the folks you're borrowing from if there are unique operating features. Ask if the equipment was serviced recently. Why ask? Because, for example, a lot of civilian ground support equipment may not have maintenance forms with the unit!

If you are rooting around for some hardware, you need to ask yourself if the O-ring meets the manufacturer's design specifications, such as material composition, high/low pressure parameters, durability, size and shape, etc. Does the Navy power or pneumatic air unit meet or *exceed* your aircraft's systems servicing specifications?

Not all borrowed parts — test or support equipment, tools, even common hardware — serve the same functions we think they do. Or, more importantly, they may not be maintained to meet Air Force standards.

As an example, Ford and Chevrolet automobiles serve the same basic function of providing transportation. However, their engines don't use the same fuel pump, and you can't fix a Chevy using Ford's repair manuals. Likewise, there are distinct differences in the way the Air Force maintains its aircraft compared to our sister services and civilian counterparts.

## A Few Examples

■ An Air Force helicopter maintenance team found out about the negatives of borrowing the hard way. A supervisor borrowed a nitrogen cart from an airport contractor to service his helicopter's landing gear struts. The cart's pressure gauge was out of calibration by 400 psi. This didn't really come to light until *after* the nose landing gear strut blew apart. OUCH!

■ During the Gulf War, a borrowed tool box caused a maintenance delay to a combat support mission. There was serious concern just before launch time because some tools were missing from the

mechanic's tool box. After hours of searching, it was finally discovered the "other mechanic" and his shop had a very loose tool control program, and the tools were missing *before* the tool box was loaned out. A lot of needless worry and lost time could have been prevented if the borrower had pulled a complete tool inventory upon receipt. It would have prevented the late takeoff, too.

■ Gaskets, seals, and O-rings play an important role in any mechanical function. Although they seem to be insignificant in size and function, neglecting proper selection and handling can lead to major mishaps, both ground and flight.

Consider this recent potential for disaster. A fighter lost almost all of its hydraulic systems because a perceived "suitable substitute" seal was used instead of the seal specified by design engineers. Over the years, improper hardware selection such as this has caused partial and total loss of system fluids — and even mishaps!

## Borrowing Mishaps are Preventable

I could also comment about borrowed power units "frying" some of our jets' electrical systems, but I think you get the message. Mishaps caused by borrowing are like most mishaps: *They are preventable!* Do your homework before using your neighbor's equipment or accepting a suitable substitute. When in doubt, don't use it!

Is your aircraft's on-time record important if the aircraft doesn't complete its intended mission or does not return home? ■



# FIRE ON 225!

**CMSGT DON A. BENNETT**  
Technical Editor

"Hello, Airman Jones, this is Sergeant Smith. Sorry for the late-night call. Did I get you out of bed?"

"Hi ya, boss. No, we haven't gone to bed yet. Carole and I were still discussing our plans for the 3-day weekend starting tomorrow. What's up?"

"Maybe nothing, I hope. But something kept bugging me about our work today. Finally I remembered that fuel line we disconnected on the no. 4 engine. You know, the line that was in our way when we helped replace the no. 4 hydraulic return line."

"Yup, I know which line you're talking about. We told hydraulics we would take care of it so he could finish his stuff."

"Well, I already tried to get ahold of Sergeant Elliot, but nobody is answering the shop phone. Guess they're all out on the flight line finishing up so they can close down for the holidays. Anyway, Airman Jones, did you write up the fuel line being disconnected in the forms, because I remembered I didn't."

"No, boss. After we got off the engine you sent me to turn in the tool box while you gave Sergeant Elliot a turnover at the aircraft. I remember we were in a big rush to get out of there."

"Okay. Sorry for troubling you. I'll call Center to see if they can get Elliot to call me here at home. Bye, Jonesy. See you early Monday morning. Don't forget we have a 0500 show for our launch."

"Sure, Sarge, I'll be there. Have a great weekend! Bye."

As the phone rang for the Center, Sgt Smith wished he had slowed down his crew so this kind of problem wouldn't happen. Everybody had been busting butt to get as much done as possible before shift change came in. Maybe, just maybe, they could finish up the work on his jet, and he and his crew wouldn't have to work weekend duty during the holidays. He just hoped his trusty assistant, Sgt Elliot, hadn't run the engines yet for the ops check.

"Aircraft Readiness Center, Sergeant Dish."

"Dish, this is Joe Smith. I need you to do me a favor. Get ahold of Gold Four and ask them to have Sergeant Elliot call me at home. Okay?"

An obviously troubled answer comes back: "I thought you were someone responding to my recall. Listen, I can't

continued

# FIRE ON 225!

continued



*talk to you right now. We have a major fire on 225. Say, isn't aircraft 225 yours?"*

■ Fiction? Yes, this time. Possible? You bet it is! If you were to look through all the mishaps involving maintainers not documenting aircraft forms properly — *or not at all* — you could probably match the above scenario several times over. People in a rush. Get-home-itis!

## Actual Breaches of Forms Discipline

■ A fighter pilot experienced a physiological mishap because maintainers failed to document the disconnection of a pressurization system component. With the help of his flight lead, and while fighting off the effects of hypoxia, the pilot made it safely back to earth. Earlier, his aircraft had undergone a time compliance modification, and the part was

disconnected to facilitate other maintenance (FOM). Because this action wasn't in the forms, nobody made sure the part was reconnected.

■ A bomber suffered some high-speed structural damage to the right wing because a qualified phase inspection maintainer "temporarily" changed a wing sweep system component's configuration. Although the action was briefed during the shift change turnover, it was a FOM action which wasn't documented in the forms. The maintainer safety-wired the component in its up position because the working area around it was cramped.

■ A helicopter sustained damage when an automatic flight control system component was disconnected, *but the wrong position was documented*. Consequently, a supervisor and another maintainer failed to detect the error until, during an operational check, they heard a

loud noise.

■ A tanker nose gear retracted, as advertised, but while it was on the ground — *with the crew chief and pilot under it!* Both were trapped under the aircraft which was partially supported by a fire bottle. Luckily, both of them survived the ordeal!

This is how it happened. Work on the nose gear required a dummy retraction ops check. The writeup was properly documented in the forms but was omitted when the forms were transcribed *in anticipation of the task being completed*. The crew chief failed to inform the aircrew of the ongoing maintenance which included the dummy retraction. Two pilots, however, did talk with hydraulic specialists, but they failed to grasp the scope of the work being performed.

During the aircrew preflight, one of the pilots (with the crew chief accompanying him) removed the nose gear pin. Well, you know what happened next when the gear was dummy retracted by hydraulics specialists. (Side thought: Why would the crew chief allow the pilot to remove the nose gear pin before the hydraulic specialists were finished? Loss of situational awareness?)

As you can tell, there were some communications problems influencing this mishap. A red cross writeup in the forms would have helped communicate the scope of work being performed. The pilot would not have pulled the nose gear pin if an open red cross writeup with a dummy gear retraction due was still in the forms. I'm sure any pilot would prefer "dirty" forms to inaccurate ones.

Strict aircraft forms management and discipline are our last lines of defense in ensuring an aircraft's airworthiness. Never assume the other mechanic or shift will catch the disconnected widget. Verbal shift change turnovers and logbooks have not replaced aircraft or equipment maintenance forms. Never assume someone else on your team will eventually make the forms entry. When in doubt, write it up!

Remember: *Before, during, and after maintenance on any piece of equipment or jet, you've got to check and/or update the forms — ALWAYS!* ■



USAF photos courtesy of TSgt Dennis D. Rogers and DFEV/P, United States Air Force Academy

# Flying, Fighting, and Winning Starts Here

**CAPT BRAD SAILER**  
United States Air Force Academy

■ It is a cold, crisp November morning as more than 40,000 people gather into Falcon Stadium to see Air Force beat Army. The sun is out, the skies are clear, and there is a quiet anticipation as the two football teams prepare to do battle.

Suddenly, the silence is broken as four F-16 Fighting Falcons thunder overhead, the first in a coordinated series of pre-game flyovers. The cadet announcer tells the crowd the lead Falcon is being flown today by Capt Preston Thompson, Air Force Academy Class of '82. Adding to the momentum, Cadet Jon Scheer, Class of '95, roars by in his Competition Flying Team C-150. The Army players then look in awe as B-1s, F-15s, C-141s, and other aircraft deafen the stadium. The stage is set.

Like many Air Force pilots, Pres-

ton and Jon began building the foundations of their professional flying career long before strapping on an operational aircraft. Air Force Academy graduates have flown from the jungles of Vietnam to the deserts of the Middle East and just about everywhere in between, but they all started here.

The Airmanship Program at the United States Air Force Academy forms the bedrock for developing attitudes about flying professionalism, flying leadership, and flying safety. Programs in soaring, parachuting, navigation, and powered flight emphasize those themes and prepare the cadets to become aviation leaders in the Air Force. Their mission is clear: Building Officers. Their motto is simple: "Flying, Fighting, and Winning Starts Here!"

## Grand Central Station

The Academy airfield is a unique

continued



About 50 percent of second year cadets will solo in the Schweizer 2-33.



# Flying, Fighting, and Winning...



Cadet Ellingwood discusses flying techniques with a fellow cadet.

The majority of sailplane sorties at the Academy are flown with cadet IPs as aircraft commanders.



According to ATC senior controller Master Sergeant Mike Thompson, the Air Force Academy airfield is the busiest VFR field in the world.



place. With more than 300,000 events and more than 60,000 sorties per year, it is the Air Force's busiest airfield. Nine different types of aircraft and sailplanes along with extensive parachuting operations share the parallel runways at the foot of the Rockies.

Add to this the fact many of the pilots and jumpers are cadet IPs and solo students, and you might think the Academy airfield is a place where mishaps happen. Not so fast. The Air Force Academy boasts one of the Air Force's most impressive safety records, with no Class A or B mishaps in the last 4 years — a mishap rate of 0.0.\*

How do they do it? Once again, the emphasis here is on developing safe, professional attitudes towards flying. Fundamentals like checklist discipline and clearing are continually stressed. And oh, by the way, did I mention almost every bit of flying at the Academy is VFR? See and avoid?

With such an intense operation, airspace management plays a critical role. Not only does the airspace staff have to contend with extensive local operations, but hundreds of transient aircraft as well. With dozens of parades, football games, funerals, memorial ceremonies, and other events, there is a steady stream of aircraft fly-bys over the cadet area throughout the year.

Coordinating this challenge is complicated by the fact most of the

coordination for timing, holding, and ingress and egress procedures must be done electronically, and not all the participants are rated pilots. Cadet soaring IPs fly sailplane demonstrations, Flying Team cadets pilot the C-150 fly-bys, and cadet members of the Wings of Blue jump into many Academy events.

Cadets learn to operate in a demanding, precise environment in which they develop individual responsibility and teamwork. They watch the airspace management staff develop a systematic detailed plan and then emulate that professionalism as part of the package. What better preparation for a flying career?

## Soaring in Silence

All cadets, regardless of their medical qualification for UPT, fly the Schweizer 2-33 sailplane during

Leadership development is at the heart of the Academy parachuting program.

\*Since the writing of this article, there has been two mishaps. See the Editor's Note on page 17 for further information regarding these.



The 94 ATS instructors keep a close watch on sailplane operations. One of their primary roles is to watch for hazardous wind conditions that can quickly develop.

their second year at the Academy. About 50 percent will solo after 12 rides, with adverse weather being the primary limiting factor.

The program gives all cadets an appreciation for and an understanding of what military flying is all about. It also provides an opportunity for many cadets to develop aviation leadership skills. Selected 2-33 pilots from each class can continue training in the Schweizer 1-26 and ASK-21 advanced sailplanes and earn ratings as soaring IPs. In fact, the majority of sailplane sorties at the Academy are flown with cadet IPs as aircraft commanders.

### Jumping Out of a Perfectly Good Airplane

Character development is at the heart of the parachuting program. The jump program not only provides a unique leadership experi-

*continued*



# Cultivating the Safety Culture

**MAJOR JAMES GRIGSBY**  
Editor

■ Shortly after taking the job as Editor of *Flying Safety* magazine, I had an opportunity to participate in a meeting with all Air Force Safety Agency directors. Our purpose was to identify potential focus and mission statements and agency goals for the future. After some discussion, we decided upon the following focus statement: "Foster an environment where the safety culture is an integral part of Air Force life." While I supported the concept, I couldn't find the words to concisely explain what "the safety culture" was.

In frustration, I put the whole matter aside. Besides, I had enough on my plate trying to get up to speed as editor of *Flying Safety* magazine. Then came an opportunity to visit the Air Force Academy.

During the annual Albuquerque Balloon Festival, my technical editor, CMSgt Don Bennett, got an opportunity to ride in a balloon with a former faculty member of the Air Force Academy staff. One thing led to another, and soon we were on our way to look at the Academy's flying safety program. Their mishap rate was really low for the amount of flying they were doing, and we wanted to see what was making their program such a success.

As guests of Colonel Bud Stokes, 54th Operations Group Commander, we got an opportunity to interview nearly everyone connected to running their flying training program. We also flew with cadet and faculty instructor pilots to get a real taste of the challenges fliers faced there every day.

### The Flying Environment

As Lt Col Randall Nierstheimer, Chief of Safety at the Academy, puts it, just because the Academy flies

what the uninitiated would consider to be recreational aircraft, "the tinker toy mentality is out the window because of the intensity (of the flying program)."

With over 300,000 events (takeoffs, landings, parachute jumps, flybys, etc.) taking place annually within the Academy's 5-x7-mile airspace, the potential for danger is high. But standardized procedures and flying discipline allows powered and unpowered gliders, tow planes, jump planes, parachutists, and aero club aircraft to share the airfield.

Cadet glider instructors routinely instruct other cadets in the pattern. Many of the participants haven't seen their twenty-first birthday. Eighteen months before, those same instructors were civilians. Cadets plan, pre-brief, fly and instruct, and debrief just like crews of other Air Force aircraft do every day. "All of the human factor elements are still there," says 94th Airmanship Training Squadron Operations Officer Major Jeff Dunaway. And for most of the glider flights, he adds "everything happens in 15 minutes."

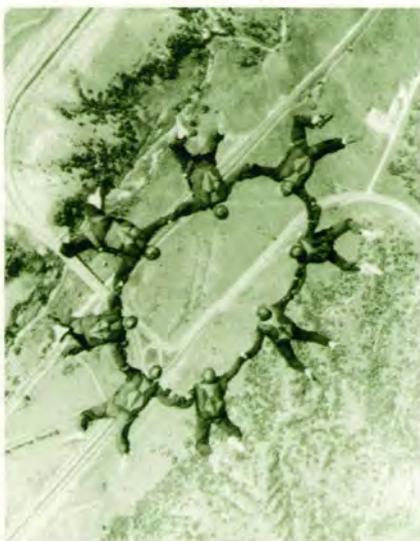
Aircrews and aircraft from all over the Air Force are also asked to come to the Academy and support local events. Each flyby is carefully planned and coordinated and fits into normal aircrew training profiles. Most flyovers are planned as if the crews were performing a tactical strike to maximize aircrew training. When you consider all the activity occurring annually in Academy airspace, as Major Bruce Dopfel, Chief of Current Operations for the 54th Operations Support Squadron (OSS), puts it, "It's the busiest VFR field in the world."

If that isn't enough, local weather conditions compound the problem. The airfield's location at the base of the Colorado mountains makes for very dynamic weather conditions.

*continued*



## Flying, Fighting, and Winning...continued



The Air Force Academy is one of only two DOD programs authorized to award jump wings.

ence for the cadet jumpmasters, but for each student, as well. Closely akin to an "outward bound" program using parachutes, both students and instructors in the program develop a commitment to procedures and discipline and strong confidence in their training and equipment.

Emergency procedures training is especially critical. All students must demonstrate their knowledge and proficiency on the ground before being cleared to jump. Safety is paramount, and the training is rigorous.

The Air Force Academy is one of only two DOD programs authorized to award jump wings and the only program which does it using free-fall jumping. Like soaring, the active duty staff monitors the program and cadet instructors who serve as jumpmasters and members of the competition and demonstration team, The Wings of Blue.

The parachuting program is also conducted on the airfield within a designated drop zone. More than 15,000 parachute jumps are conducted each year. The intense dedication and professionalism of both students and instructors has yielded an incredible mishap-free operation for nearly a decade.

### Where Are We?

All cadets take at least two aviation courses at the Academy. These courses are taught by the 50th Airman Training Squadron, staffed by rated Air Force navigators from numerous weapon systems. Cadets learn aviation fundamentals, flight

planning, and basic navigation skills in a variety of forums. Instruction begins in the classroom, then moves to cockpit trainers, and culminates with flights in the T-37 simulator or T-43A.

Missions are flown out of Peterson AFB and include cross-countries, out-and-backs, and local training routes. Flying leadership opportunities are offered to a select group of upper-class cadets through the Cadet Aviation Instructor Program. Cadet aviation instructors assist in teaching basic aviation classes and

A 50th ATS instructor provides instruction in basic navigation fundamentals in one of two T-43s assigned to the 200th ALS at Peterson AFB, Colorado.



Lieutenant Colonel John Stubblefield on final approach in the UV18 "Twin Otter."



# Cultivating the Safety Culture

continued

instruct cadets in navigation principals aboard the T-43A. To accommodate all cadets, the 50th flies approximately 500 sorties and 1,000 flying hours annually in the T-43A.

## Kick the Tires, Light the Fires

Powered flight is the core of active duty flying, and the Academy provides several programs to develop those skills. The Flight Screening Program is conducted using the T-41 with rated Air Force IPs. All cadets applying for UPT must pass the program which includes a solo flight

continued



Academy cadets and 50th ATS instructors prepare to board a T-43.

The 50th instructors fly approximately 1,000 hours annually in T-43s supporting Air Force Academy cadets.



Most of the instructors we talked to commented on how rapidly the winds could become hazardous, forcing everyone to keep the weather constantly in their cross-check.

All this activity makes for a really intense flying environment. As Commandant of Cadets, Brig Gen Patrick K. Gamble, a former wing commander at Luke AFB, Arizona, explains, "... there's no other airport I've



Brigadier General Patrick K. Gamble, Commandant of Cadets.

flown around in my entire Air Force career that has the challenges or the intensity, and the combination of all the above, than you have right here at the Air Force Academy."

Putting all these factors together, you'd expect the mishap rate to be higher than it is. But it's one of the best in the Air Force. So, you ask, what keeps the risk and the mishap rates down?

## The Air Force Safety Culture

I mentioned earlier I'd sat in on a meeting with Air Force Safety Agency directors. In an interview with Lt Gen Bradley C. Hosmer, Air Force Academy Superintendent, I was reminded of that meeting, and my inability to boil the phrase "the safety culture" down to something easily explained. He said, "... if there's anything that is growing almost as a religion in the Air Force today with quality improve-



Lieutenant General Bradley C. Hosmer, Air Force Academy Superintendent.

ment, (it) is **get it right the first time.**" Those words stuck with me, and after going over my notes some time later, I finally saw a way I could explain what "the safety culture" was.

Simply put: "The safety culture," or more appropriately, "the Air Force Safety Culture," is an environment where *getting it right the first time is the way we should always do business.* Making the safety culture an integral part of Air Force life is a focus we must continuously strive for because it minimizes risks our people and our assets are exposed to. For the Air Force Academy, it's a mindset instilled in all of its present and future officers — it was *the critical element we were looking for.*

## Cultivating the Safety Culture

The Air Force Academy takes very calculated risks. They conduct intensive flying and parachuting activities in a demanding environment because safety, while critical to their operation, isn't paramount. If safety was paramount, they wouldn't be conducting such activities. But, just like the rest of the Air Force, they have a mission which outweighs the risks in-

continued



# Flying, Fighting, and Winning... continued



All cadets applying for UPT must pass the flight screening program conducted by the 557 FTS.

and a check ride. Once again, the IPs stress flying fundamentals such as knowing and adhering to procedures, checklist and air discipline, flight safety, and clearing. Later this year, the Academy is scheduled to transition from the T-41 into the Air Force's new T-3, a more challenging aerobatic flight screening aircraft.

The Air Force Academy also supports a very active Aero Club with

Captain Allen, a 557 IP, completes the 781 after a T-41 sortie.



more than 400 members. Aviation education is alive and well with academic courses offered for FAA Private, Commercial, and Instrument Pilot ratings. More than 80 powered aircraft operate from the Academy airfield.

At the pinnacle of powered flight training at the Academy is the Cadet Competition Flying Team. The Flying Team operates three Cessna 150 aircraft and competes at both regional and national intercollegiate precision flying competitions. These competitions are formally called SAFECONS, for Safety Conferences, to underscore their emphasis on flight safety and aviation education and training.

The Academy Flying Team has won the regional title 4 years in a row and placed second in the nation earlier this year during national competition. Seventy-three schools are members of the National Intercollegiate Flying Association, and the Air Force Academy cadets set the standard for their civilian counterparts both on and off the flight line.

## Leadership by Example

The key to success for the Air Force Academy flight safety program is the commitment of its senior leadership. The Academy's Superintendent, Lt Gen Bradley C. Hosmer, and the Commandant of Cadets, Brig Gen Patrick K. Gamble, both fly the T-41 regularly. Many academic instructors on the faculty

and other officers also fly the T-41, TG-7, and UV-18 as additional duty IPs. They set the highest standards and demand no less from the cadets.

Every other month, the Superintendent hosts an Academy-wide flying safety meeting for all pilots, navigators, and parachutists to focus on safety. With such a mixed bag of aircraft and missions, it is critical to bring all the players together in one forum to learn and communicate with each other.

The Air Force Academy provides vast opportunities for cadets to learn



Quality maintenance and a highly motivated instructor force have been the cornerstones of the 557's success.



by example. In this diverse, dense, complex environment, every bit of the operation must be handled with care and professionalism. The quality of operations here not only ensures a safe and effective flying environment, but it also ingrains those values in the officers produced. Every fly-by, jump, and training sortie flown here adds to that level of experience and creates the foundation for a safe, effective Air Force.

### Behind the Scenes

Obviously, none of this complex operation would get off the ground without a truly superb support staff. Each support area here faces unique challenges, and, without fail, they rise to the occasion. The Academy's civilian contract maintenance keeps eight different types of aircraft flying. Tower, airspace, and airfield management orchestrate the enormous volume of varying speed traffic and maintain a safe ground and airspace environment for the operation. Academy weather has the unenviable mission of dealing with some of the world's least predictable and most demanding weather. Operations would be chaos without these unsung heroes.

### The Bottom Line

When cadets graduate, pin their lieutenant's bars on, and leave to enter pilot or navigator training, or even to pursue nonrated fields, they take with them a set of core values and a due respect for professional flying.

*Know your procedures, know your boldface, use your checklist. Be professional in your approach to flying. Have fun, but do it right, do it smart. Trust in your equipment and training. You can overcome fear, doubt, or any other challenge with this combination of tools. You can make things happen.*

And they do... ■

#### EDITOR'S NOTE

Since this article was written, the Air Force Academy experienced two mishaps. The first, on 28 January 1994, was a Class A ground (contractor) mishap which occurred when a contracted tow plane crashed killing its civilian pilot and cadet passenger.

The second mishap, on 10 March 1994, involved a Cessna T-41 *Mescalero* belonging to AETC which crashed following an engine failure. There were no fatalities in this incident, and the mishap has been reclassified "Class C." — Ed.

## Cultivating the Safety Culture

continued

involved. Forging future Air Force officers is the order of the day.

The blacksmith's name is the Airmanship Program — a program where instructors forge the foundations cadets will need to meet the challenges they will face as future Air Force officers. Here, *getting it right the first time* starts with the examples faculty instructors set for the Cadet Corps.

As Colonel Stokes tells all his new instructors: "I want you to remember what we're here to do, what our mission is — to train and educate cadets to be officers. That's the only reason we're here. We happen to do it in T-43s, TG-7s, 233s, UV-18s, and T-41s. But we're all here to train cadets.

"Because you accepted this assignment and you came here, you're in a glass house. You don't have a choice in the matter. And everything you do, on or off duty, is part of what each one of these young people that we're training to be officers picks up and says 'that's what's expected.'

"And it's especially true in the safety arena. When you make a decision in the cockpit, when you make a decision on the flight line, when you make a decision about how we're going to conduct a mission, that sticks. I know some of the most valuable lessons I learned were as a student pilot watching a second lieutenant IP do

some really stupid things. And I would hate to be remembered for the rest of my career as an IP or IN who showed the wrong way to do things."

Although the Academy's flying safety record is exceptional, faculty instructors are constantly on guard against complacency. Obviously proud of their current mishap record, Col Stokes is always quick to challenge his staff by asking, "What have you done for the safety program today?"

Safety culture principles are constantly instilled in the Cadet Corps through leadership by example. Along with rigorous training, discipline, and adherence to procedures, cadets learn to overcome self-imposed fears. They develop proficiency and confidence. They learn to trust their training and their equipment. They learn to depend on each other. And they learn to manage risk. In that process leadership, tested character, and integrity are born — the essence of a warrior.

*Getting it right the first time* is something everyone at the Academy strives for — from the highest ranking officer to the lowest ranking cadet. It's a culture we need to adopt in all Air Force operations. In this period of "growing smaller," we can't afford to operate any other way.

**Fly safe. Fly smart. ■**

Colonel Bud Stokes, 54th Operations Group Commander.





# Keeping Cool When the Fan

Courtesy *Aviation Safety Reflexions*, Canada  
September 1993

■ History shows pilots frequently have lost control of their aircraft after experiencing an engine failure in the climbout. From 1976 to 1992, 76 mishaps occurred when the engine lost power after takeoff. In 29 cases, the pilot attempted to return to the takeoff area, and the aircraft stalled in the turn and crashed.

A loss of control during a turnback usually translates into a violent impact. In 69 percent of those unsuccessful attempted returns to the takeoff area, the occupants sustained serious or fatal injuries. These occurrences involved single-engine and multiengine airplanes, as well as ultralights. Some examples follow taken from recent mishap investigation reports.

## Single-Engine Airplane Turnback

The pilot of a recently constructed amateur-built aircraft was conducting a series of circuits to become familiar with the aircraft flight characteristics. After takeoff for the second circuit, the aircraft had climbed to approximately 250 feet above ground level (AGL) when the engine stopped. The pilot advised the control tower the aircraft engine lost power and he was going to turn the aircraft back to the airport for an emergency landing.

The aircraft turned about 30 degrees to the left, then stalled. The nose pitched straight down, and the aircraft struck the ground in a near vertical attitude. The pilot received fatal injuries. With 2 hours of flight time on type to his credit, the pilot was not familiar with the flight characteristics of this aircraft, in particu-

lar, the more advanced characteristics such as stall performance.

## Ultralights, Too . . .

Ultralight airplanes seem to be particularly vulnerable to this type of occurrence. From 1983 to 1992, 15 ultralight airplane pilots lost control of their aircraft after the engine failed in the climbout. Five persons lost their lives and three sustained serious injuries in those mishaps. Ultralight airplanes have a low mass and, therefore, little inertia is available when the engine stops producing power. Inertia also depends on speed, and ultralight airplanes have very low climbing speeds, sometimes close to the stalling speed.

Furthermore, ultralight airplanes have a high profile drag coefficient which causes rapid deceleration when propulsive power is removed.



***From 1976 to 1992, Canadian officials report 76 mishaps occurred when the engine lost power after takeoff. In 29 cases, the pilot attempted to return to the takeoff area, and the aircraft stalled in the turn and crashed.***

tioned to turn immediately toward the runway to land if the engine failed after takeoff. The aircraft stalled in the steep turn, and there was insufficient altitude to recover before the aircraft crashed.

**(Report #A90Q0327)**

The pilots' training records and logbooks indicated the pilot and the passenger had received the required instruction and training for a private (ultralight) pilot license. Their flight training included practicing normal and steep turns, slow flight, stalls and spin entry, and recovery techniques, and also included lessons allowing them to experience illusions created by drift.

In one engine failure drill, which was repeatedly demonstrated and practiced, they shut down the engine during the climb to circuit height after the first left turn. The aircraft would be at least 500 feet AGL, approximately 1,000 feet south of the runway. The drill consisted of a left turn and a runway landing in a direction opposite to the takeoff direction, sometimes involving a downwind landing.

The stall speed of the Aerocruiser is approximately 25 mph. As with conventional airplanes, the stall speed depends on the load factor and the angle of bank. For example, if the aircraft makes a 45-degree bank angle turn in level flight, the stall speed could increase to 36 mph, and at a 60-degree bank angle, the stall speed could be as high as 42 mph.

When flying at low altitude in a strong wind, if the aircraft turns from upwind to downwind, the pilot will perceive the increase in ground speed as an increase in indicated speed. If he does not check the

airspeed indicator, he may be inclined to pull back on the elevator control to reduce speed. The resultant decrease in indicated airspeed could cause a stall.

Through continual engine failure training and repeated left turns to the runway, the procedure became a reflex for the pilot. This may explain why he immediately made a left turn when the engine failed. The illusions created by drift may have caused the pilot to reduce his speed in the turn. This would have placed the aircraft at the stall speed in a steep turn, which led to a spin.

**Multiengine Airplane Turnback**

Pilots of multiengine aircraft are not immune to attempting a return to the runway after failure of a powerplant.

On 18 October 1989, a Piper PA23-250 Aztec was on a private flight from Laforge, Quebec, to Alma, Quebec (Report #A89Q0291). After the aircraft lifted off at the midpoint of runway 32, the pilot retracted the landing gear and continued the takeoff on the runway center line. When the aircraft was at about 150 feet AGL, the pilot made a 30-degree right turn. At about 200 feet AGL, the pilot initiated a 30- to 40-degree banked turn to the left and extended the landing gear during the turn. When the aircraft was approaching the center line of runway 14, it made an uncontrolled yaw and roll movement to the left, made a complete turn, and then struck the ground at an angle of about 45 degrees.

The aircraft was substantially damaged, and the right wing was partly destroyed by fire. The six occupants were killed.

A power loss in the left engine appears to have been the only reason

*continued*

# Quits

Combined with a steep noseup attitude during the climb, and often a pitchup moment with power decay because of a high thrust line, all these factors rapidly bring an ultralight airplane into the stall range when the engine fails during the climbout.

On 2 December 1990, a pilot and one passenger (also a pilot) were on a pleasure flight in an Aerocruiser ultralight aircraft. During the climb after takeoff, the engine suddenly stopped. The pilot made a steep left turn, and the aircraft stalled and crashed. A fire broke out after impact, and the aircraft was destroyed. Both occupants were fatally injured.

The TSB determined the engine coolant was likely not sufficiently warmed up prior to takeoff, and this led to the seizure of the piston and engine failure. The pilot was condi-

# Keeping Cool When the Fan Quits continued

for the pilot's decision to return to the Laforge airdrome. In twin-engine aircraft like the Piper Aztec, where both propellers, as seen from the cockpit, turn in a clockwise direction, the left engine is the critical power unit. Therefore, when the left engine is not producing power, the yaw effect on the aircraft is more pronounced. This renders directional control more difficult.

Other factors also make the aircraft more difficult to control when one engine is not operating. The yaw is centered around the aircraft's center of gravity (CG). Consequently, if the CG is aft, as it was when the mishap occurred, the yaw produced by the remaining operational engine requires greater compensation from rudder input.

This yaw is even more pronounced in the Piper Aztec when the landing gear is down because the extended gear shifts the C of G slightly to the rear. Therefore, the minimum speed required to main-

tain control, or  $V_{mc}$ , is increased.

Additionally, in the Piper Aztec, a 5-degree bank to the side of the operational engine allows the aircraft to attain, or be close to, zero sideslip. If this bank is not maintained,  $V_{mc}$  increases by 20 to 30 mph. In this case, the pilot made a 30- to 40-degree banked turn to the left, that is, towards the engine not producing power.

Light twin-engine aircraft lose about 80 percent of excess power available to climb when one engine is inoperative. In the case of the Piper Aztec, 84 percent of the excess power available to climb is lost. Therefore, only 16 percent of excess power is available to achieve a positive rate-of-climb. In this situation, the Piper Aztec can achieve a climb rate of 240 feet per minute (fpm) at a weight of 5,200 pounds. However, the following climb-rate penalties must be taken into account: 350 fpm for the extended landing gear and 250 fpm for the windmilling propeller. These two penalties, which

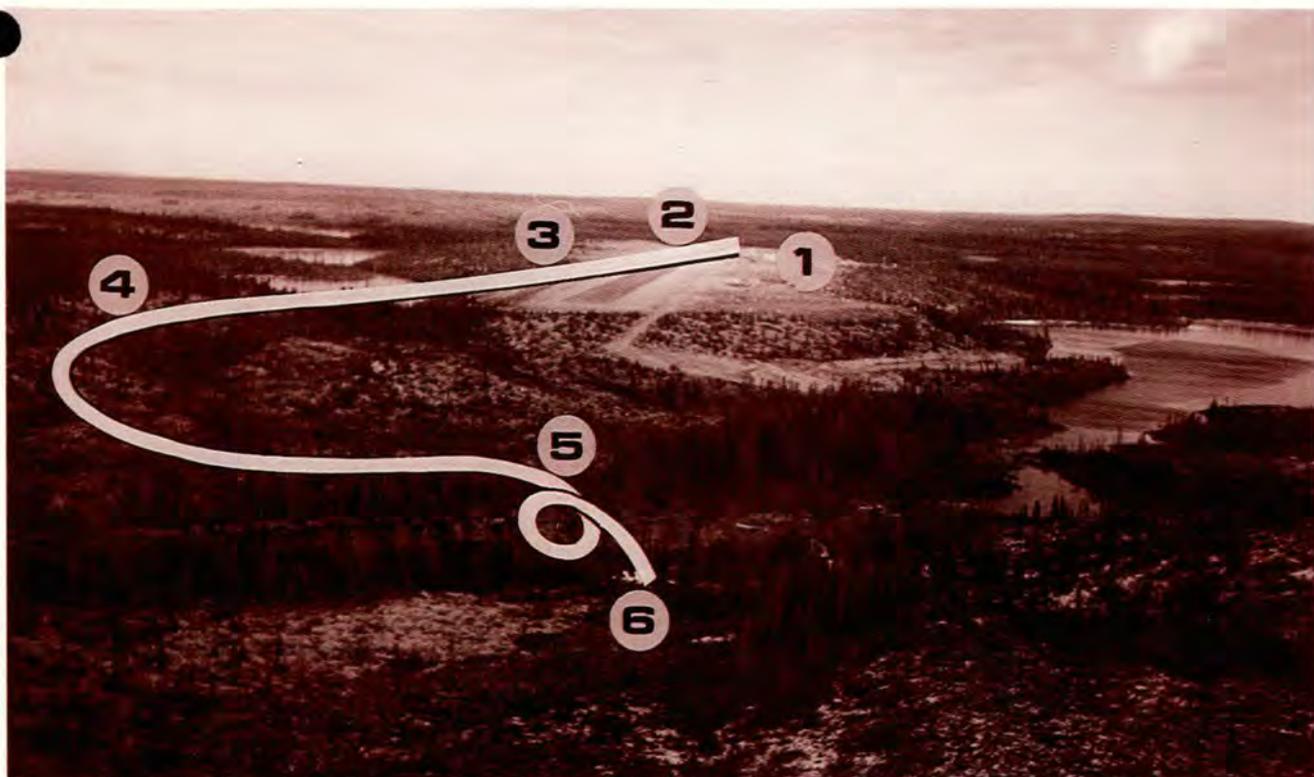
were in effect at the time of the occurrence, total 600 fpm. The probable result was a rate of descent of 360 fpm.

The airspeed indicator was not marked to show the minimum control speed with the critical engine inoperative ( $V_{mc}$ ) or the best rate-of-climb speed with a single engine ( $V_{yse}$ ). The  $V_{mc}$  is usually indicated by a red line and the  $V_{yse}$  by a blue line. Although these indications are required under Federal Aviation Regulation 23, the aircraft had been certified under Civil Aviation Regulation 3, which did not require these indications. For this aircraft,  $V_{mc}$  is 80 mph, and  $V_{yse}$  is 102 mph. The stall speed with landing gear and flaps retracted is 74 mph. With gear and flaps extended, the stall speed is 68 mph.

To obtain optimum performance and achieve the maximum rate-of-climb, it is essential  $V_{yse}$  be achieved and maintained, the operational engine produce maximum power, and the drag created by the

When an engine fails during the climbout, the pilot really has to choose between a rock and a hard place...





The solid line recreates the flight path of a twin-engine aircraft that attempted to return to the airfield after an engine loss. The figures represent: 1. Dispatch trailer, 2. Takeoff, 3. Right turn, 4. Left turn, 5. Uncontrolled turn, and 6. Crash site.

windmilling propeller, extended landing gear, and flaps be eliminated. Other factors which adversely affect performance are high temperatures, turbulence, and altitude. At the time of the occurrence, the temperature was  $-7^{\circ}$  Celsius, and there was little turbulence. The takeoff was made from an altitude of 1,405 feet asl.

The operator's manual for the Piper Aztec recommends either landing the aircraft straight ahead or applying full power on the operational engine, feathering the propeller of the inoperative engine, retracting the landing gear and flaps, and maintaining Vyse.

For an undetermined reason, the pilot did not carry out the emergency procedure for an engine failure on takeoff although he knew the procedure and had applied it on several occasions. He made a left turn towards runway 14 and extended his landing gear. During the left turn, the speed of the aircraft dropped below  $V_{mc}$  which, at that time, must have been about 110 mph. The aircraft then went into an uncontrolled yaw-and-roll movement to the left. Available altitude

was insufficient to allow the pilot to stop this uncontrolled movement.

#### Safety Action

The TSB data base was examined to determine the extent of loss-of-control occurrences subsequent to an engine power loss in twin-engine aircraft similar to the mishap aircraft. Since 1976, there have been 100 mishaps and 43 fatalities involving twin-engine aircraft under 12,500 pounds following an engine power loss. This type of mishap accounted for 12 percent of all light-twin mishaps (827) and 11 percent of all light-twin fatalities (390). Further analysis of the 100 power-loss mishaps revealed, in 17 occurrences (17 percent), the pilot subsequently lost control of the aircraft. These occurrences accounted for 37 of the 43 fatalities.

These statistics revealed two serious trends. First, loss of control subsequent to engine power loss was significant in light-twins (17 percent). Second, the majority of fatalities in light twin-engine power-loss mishaps occurred when control was lost (86 percent). These trends indicate some pilots may lack sufficient

awareness of single-engine procedures, or they require more practice in reacting to a loss of engine power. Therefore, the TSB forwarded an Aviation Safety Advisory to Transport Canada (TC) suggesting that TC reinforce safety awareness campaigns and increase emphasis on single-engine procedures during flight examinations.

Subsequently, TC indicated a new multiengine training handbook would be available late in 1992 to provide emphasis on single-engine procedures. This publication is now available from the Canada Communication Group under the title "Instructor's Guide - Multi Engine Class Rating (TP11575)."

When an engine fails during the climbout, the pilot really has to choose between a rock and a hard place: Straight ahead, the terrain is often covered with trees and ... rocks(!). Behind lies the flat departure runway or lake, but it is a hard place to reach! When a turn-back is attempted, many factors bring the aircraft close to the stall. It takes a lot of determination to resist the temptation to turn back. Would you stay cool when the fan quits? ■



***Get A Grip  
On Safety***



# Lest We Forget...

USAF photos by Major James H. Grigsby and CMSgt Don A. Bennett

**A B-17 simulates being crippled during a reenactment of the Japanese attack on Hawaii on December 7, 1941.**



The CAF maintains the world's largest collection of WW II era flying aircraft.



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**MAJOR JAMES GRIGSBY**  
Editor

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■ The tremendous achievements and sacrifices made by our air forces during World War II left an indelible mark on this Nation's history. Yet tragically, many aviators lost their lives before they ever got to the air war. Only about one in three aircraft lost during World War II was due to combat. As combat and training losses took their toll, commanders came to realize an effective safety program was a force multiplier. In fact, it's from those statistics the present Air Force Safety Agency and *Flying Safety* magazine has its origins. Our first issue was published in December 1944.

Whether lost to an accident, combat mission, or cut up for scrap at the end of the war, few of these great aircraft remain today. Fewer still can fly. Many of those that can fly are associated with the Confederate Air Force.

Headquartered in Midland, Texas, the CAF is an educational organization which seeks to maintain a flying museum of approximately 140 different combat aircraft. The current CAF membership is over 7,000 consisting of 88 units. Using "Lest We Forget" as their creed, the CAF is a living tribute to the memory of the men and women of our great nation who built, serviced, and flew these aircraft. *continued*



## Lest We Forget ...

continued



Air Boss Duane Neifert coordinates the intricacies of an airshow.

Last October, *Flying Safety* magazine got an invitation to attend the CAF's "AIRSHO '93." We thought you might be interested in seeing how safety played a role in their aircraft maintenance and flight operations.

By their very nature, airshows can cause distractions and "momentary lapses in judgment" as operators and spectators gather to remember the "way things were." But CAF flight and ground crews and the CAF headquarters staff (working in close coordination with the Lubbock, Texas, FAA Flight Standards District Office) put on a superb airshow while keeping a close eye on safety. It was an experience we shall not soon forget.

At the heart of the CAF is the desire to allow today's generation the opportunity to experience the majesty of these great warbirds in flight and to learn of the great sacrifices made in the struggle against the Axis powers. For who among us has not heard that the extermination of 6 million people did not happen?

CAF "Colonels" give of their time and go to great expense to rebuild and maintain their aircraft. Many are one of a kind such as FIFI, the last flying B-29. Each is precious; its loss might mean no one would ever see that aircraft type take to the sky again.

While safety is an integral part of their operation, it isn't paramount — or these aircraft wouldn't fly. The

The CAF stages their famous reenactment of the attack on Pearl Harbor which is always a big crowd pleaser.



CAF air and ground crews coordinate flying expertise and visual effects to provide spectators with an unforgettable experience.



FAA Inspector Roger Moore helps in-process CAF pilots. Close coordination between the CAF staff, aircrews, and the FAA was key to the success of 'AIRSHO' 93.

risk of loss is carefully managed so that we might hear the roar of a great warbird passing overhead. As it does, the curtain of time is moved back — we're allowed a peek into the past. Once we've seen, we too shall never forget what these planes and their crews achieved. Thus, the mission of the CAF is fulfilled.

### Checking In

As aircrews and planes arrived at the Midland airport in the days prior to the airshow, they were greeted by the CAF staff. One by one pilots and crews signed in. Old friendships were renewed. Reporters and photographers from around the globe were lining up "shoots" and interviews. In a quiet briefing room away from all this activity, we were allowed to sit in on a T-6 ground school for new CAF pilots, the starting point for many who go on to fly larger CAF aircraft.

Complete with factory-style hanging lamps, frosted glass doors, and battleship gray walls, this room is reminiscent of briefing rooms of aviators past. Instructor Lonnie Edwards, a highly experienced retired airline captain, runs through the T-6's major systems and performance charts. Although most of his students are experienced aviators, Lonnie queries them on the performance characteristics and systems of the T-6 at the end of

the class. A mistake here could lead to the loss of a pilot and an irreplaceable aircraft.

### Airshow Preparation

In the first aircrew inbrief before show, CAF Operations Director John Wilson set the tone for the whole operation. "Does everybody understand the waiver? Fly safe today — you're going to have a great time this weekend. But safety (is) first in our minds."

Heading up the FAA contingent, John Boatright added, "I just want to emphasize the fact that we appreciate you guys being here, and we want to have a good airshow. But please, we've had a good safety record over the last couple of years, (so) let's keep it that way. Everybody keep your head out of the cockpit, pay attention, don't get in a hurry, look out for the various sundry people scurrying around, and just have a good, safe airshow."

Each pilot had to agree to FAA waivers and conditions CAF Operations Director John Wilson had worked out with the FAA months before in order to fly. Additionally, FAA Inspectors Roger Walker and Mike Jordan had to look over each aircraft before it flew as part of the airshow. As Roger Walker put it, "We look for obvious problems. They (CAF aircraft) are getting better and

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FIFI's crew gathers around for a quick crew briefing from Captain Dave Hughes.



FIFI, the last flying B-29, pulls out of the chocks.



## Maintaining Aviation Heritage

CMSGT DON A. BENNETT  
Technical Editor

■ From all walks of life they came — blue collars, white collars, and professionals — to help put together one of the most spectacular and memorable airshows either America or I have ever witnessed. The Confederate Air Force's annual air show is one no American should miss.

They are a special breed of aircraft mechanics who maintain the great air war planes of yesteryear, using today's technology, knowledge, and skills. Although they mostly do dedicated maintenance on their aircraft scattered throughout the country and abroad, combined they are the maintenance arm of the Confederate Air Force (CAF).

They all had a common thread running between them — their love for

maintaining the old war planes of the past. Quality maintenance of the aging, but extremely airworthy, CAF aircraft fleet is their goal. They present themselves as the aircraft mechanic extraordinaires they really are — extremely knowledgeable and fluent in a mumbo jumbo which is a jargon of mixed maintainer, pilot, and aerodynamic engineer experiences.

Maintaining and preserving the few vintage war birds, "flown by all military services in the United States during World War II," offers many challenges. Besides limited spare parts, and sometimes none at all, there is always the fear of flight or ground mishaps preventing another museum piece from gracing the skies. In some cases, such as the B-29 *Superfortress*, Curtiss SB2C *Helldiver*, and Martin B-26 *Marauder*, there is only

one aircraft of its kind still flying in the entire world! Of the approximately eight remaining examples of the Heinkel He-111 bomber, the mainstay of the German Luftwaffe in World War II, the CAF owns the only one in the world which is airworthy and flies regularly.

Maintaining these fragile airborne jewels while on the airshow road also causes some logistical headaches. How many places in the States and overseas can you expect to buy replacement parts for a few rare aircraft over 50 years old?

You should witness the care, attention, and respect the CAF maintainers give these aircraft. Without a doubt, these chosen few are well aware of their tremendous responsibility. They are responsible not only to the CAF but to the entire nation and many foreign countries to keep the grand old ladies and dandies of America's World War II air power history in the public eye and in the skies.

Safe and quality maintenance is an absolute must — a way of life — and the CAF maintainers are champions at this. Safety and quality features are planned and built into all their routine ground and flight operations, especially their airshow flying demonstra-





tion events. They are strictly carried out by all CAF members, regardless of rank, position, or function.

According to the Director of Maintenance, CAF Colonel Doug Jeanes, all CAF aircraft are maintained above the minimum airworthiness standards established by the Federal Aviation Administration (FAA). These standards are upheld by a cadre of seasoned, expert mechanics who hold various FAA-licensed credentials. Most of the main core of crew chiefs of each type aircraft were qualified and worked on that type of aircraft during its active duty service. Because anyone who is a member of the CAF can volunteer to work and/or restore an aircraft, the main core of crew chiefs provides the technical expertise, training, and immediate supervision of the "nonqualified" volunteers.

It's significant to mention these maintainers (also pilots and support personnel) are all volunteers. As such, much of their own money has to cover on-the-road expenses. Yet they're there, turning a quality wrench to ensure one of the objectives of the CAF is met: "To establish an organization having the dedication, enthusiasm, and esprit de corps necessary to operate, maintain, and preserve

these aircraft as symbols of our American military aviation heritage."

For my fellow maintainers on duty today, if you haven't had the opportunity to talk with some of these old ground pounders, you are missing a real treat. After sitting on the ramp under the hot Texas sun, listening to hours of "war stories," I came away with a greater appreciation for the logistical support and "creature comforts" we maintainers enjoy today (if you are to compare with what they had to endure!). It's incredible they could safely maintain aircraft (many seriously damaged) under wartime pace and conditions, in miserable weather, and with an inconsistent logistics support system. They got the job done, and at the same time they gained valuable expertise and knowledge "while in the fire."

Some of the oldtimers, especially



CAF Colonel Ray Ostlie of the 7th Minnesota Wing, were maintainers in the Big War and still turn a wrench today for the CAF. What separates Ray from the rest is he crewed a B-25 *Liberator* in Corsica in its original version. Today he is crewing the same B-25 in its restored version. The aircraft, named "Miss Mitchell," looks and flies like she's ready for a good fight — ready for another combat sortie. And there's not a doubt in my mind Ray would be ready to go too! All the other CAF aircraft had these same characteristics of quality and, most importantly, airworthiness.

The masters-of-their-trade maintainers represent the unsung heroes of the United States air power victories during World War II. And they continue today to be unsung heroes for professionally maintaining the world's largest flying museum and America's living aviation heritage. The nation and many foreign countries owe a great debt of gratitude to the men and women maintainers of the CAF.

I envy these mechanics. As members of the most unusual, prolific air force in the world, these men and women truly love their work, the maintaining of the CAF's "flying museum." I salute ya! Ya did good!! ■

B-24 "Diamond Lil" flies formation with FIFI. This shot was taken from the engineer's window.



Pilot in Command David Hughes concentrates on clearing and flying a stable platform while flying formation with "Diamond Lil."



Observers play an important role in FIFI's crew coordination.

## Lest We Forget ... continued

better every year." To our knowledge, only one CAF aircraft was not able to pass the FAA muster.

### The Show

The premier act in the CAF airshow is the reenactment of the scene from the movie *TORA! TORA! TORA!* where Japanese *Zeros* attack Pearl Harbor. Other air campaigns are also relived providing an unforgettable experience for spectators on the ground. Gasoline explosions set off with dynamite charges add realism to simulated attacks on the ground. The airshow ends with the reenactment of the *Enola Gay* pass over Hiroshima by the last flying B-29, "FIFI," complete with a chest-rattling explosion.

Coordinating all this activity was CAF "Air Boss" Duane Neifert, a retired FAA air traffic controller with over 34 years experience. From the first briefing on how the show was going to work until the last aircraft was safely in its parking spot, the Air Boss was on the scene working with CAF ramp crews and making sure crews stuck to the show plan. According to Duane, with all the different aircraft airborne awaiting their act, his biggest challenge was "having to stop the show for air carrier arrivals coming into Midland."

### Flying on FIFI

On the first afternoon we arrived, I got an opportunity to fly on "FIFI," the last flying B-29. Flying since a 2-year restoration was completed in 1979, FIFI is the last

B-29 able to take to the air out of 39,665 built by Boeing.

Airline Captain David Hughes, pilot-in-command for this flight, went over the takeoff briefing with the crew. Along for the ride was FAA Flight Examiner Mr. Roger Moore.

This would be a photo formation mission with "Diamond Lil," one of the last flying B-24s, and a Navy SB2-C acting as a photo ship. Flight engineer Dan Secker, a former KC-135 navigator, reported we had 3,200 gallons of fuel on board and 55 gallons of oil per engine for a total takeoff gross weight of 97,000 pounds. Each of the six crewmembers does his own walkaround, a tradition among FIFI's crews.

As FIFI's big radial engines came to life amid the smoke and noise, they soon bathed the whole airframe in a comforting vibration. Taxiing the B-29 is no small feat. As Captain Hughes explains, "Nosewheel steering hadn't been invented yet. Neither was antiskid nor prop reversing ... it takes a lot of runway (and uses) differential braking and power for taxiing. It's a challenge." Circumstances many of us would consider an emergency by today's standards.

Getting FIFI into the air is definitely a crew effort. Crew chiefs work closely with the aircrew to make sure FIFI is well prepared for every flight. The three scanner positions in the aft gunner's section of the aircraft provide the forward stations with critical inputs. According



FIFI's maintenance crew carefully tows her to a new parking spot.

Getting to the cockpit from the aft crew compartment requires crawling through a tube over the bomb bay.



The view from FIFI's nose is one no B-29 crewmember can forget.



to Cliff Gaston, one of FIFI's many scanners, "We take care of the whole back of the airplane ... we monitor the flaps, landing gear, engines for fire or flame, oil leaks, fuel pump, whatever."

As you might imagine, the importance of crew coordination and interphone and checklist discipline were just as important to FIFI's crew as they are to today's Air Force aircrews. As Captain Hughes puts it, "The principles of crew resource management are alive and well here."

Amidst the roar of the radial engines, the takeoff was so smooth you could barely tell you were airborne as FIFI took to the sky. After we leveled off, I was invited to the cockpit for an opportunity to take some quick photos. Getting carefully into the "tube," the passageway joining the forward and aft stations in the B-29, I crawled to the cockpit only to pop out not so gracefully on the other end.

By this time, we had been joined by "Diamond Lil" off our right wing. Shooting pictures out of the engineer's open window, I could look out over the rotating props and see the B-24 gracefully maintaining a high right echelon position. From this view, it was not too difficult to imagine yourself as part of a crew on a mission of some great importance somewhere over Europe.

Asking Captain Hughes what it's like to fly FIFI, he said, "When you sit up there (in the cockpit), you have to think (about) what the crews did in World War II and

how they felt ... I think every time I push the power up, thank goodness I'm not going to war, but what a great machine to go to war in. It was the first pressurized aircraft that they had. It (had) the first computerized gun control system. So it was really far advanced for its day."

The flight was brief, only 30 minutes or so, because it's expensive to operate FIFI's big engines. She flies only about 120 hours a year. Captain Hughes put FIFI on the ground as gently as he had gotten the B-29 airborne.

After the props stopped turning, I passed on a heartfelt thanks to the crew and went to join up with CMSgt Bennett. He'd been talking with maintenance crews about what it took to keep these planes in the air. But as I left the ramp, I couldn't help but feel that I was allowed to experience a piece of history few of my generation will ever come to know. ■

- Look for stories on the B-25, Miss Mitchell, and the T-6 "Texan" formation flying in future issues of *Flying Safety*.
- The next CAF Airshow is at Midland, Texas, on 8-9 Oct. 1994.
- To contact the CAF, write:

Confederate Air Force  
Midland International Airport  
P.O. Box 62000  
Midland TX 79711-2000

or phone: (915) 563-1000

# The Reason for Ole Gunfighter's Longevity...●



**ATTENTION  
TO DETAIL**

