

# flwing

S A F E T Y

## Air Refueling

PART II

MARCH 1994





# THERE I WAS

■ On a night low-level mission in an HH-53, using night vision goggles, we were lead in a two-ship formation going in for a classified, covert, high-priority pickup in rough terrain. After going inadvertent Instrument Meteorological Conditions (IMC) twice, we climbed to altitude and started back to the Forward Operating Base (FOB).

Our aircraft commander (AC) then decided to try one more time while our wingman continued to the FOB. We dropped back down to 200 feet

and headed for the pickup point. The weather was bad, and the scanners in the back could barely see the ground using AN/PVS-5s. The pilots had ANVIS-6s and could see better than we could, so they continued.

One-half mile from the landing zone, we again inadvertently entered IMC at 200 feet above the ground (AGL) over rising terrain. We went through 50 feet AGL as the AC pulled in full collective and started a 3,000-FPM rate of climb. But because the terrain was rising at almost the

same rate as we were climbing, it was a full 2 minutes before we were above 100 feet AGL, and we were in the clouds the whole time.

This time, we terminated the pickup and returned to base at minimum safe altitude. We were IMC most of the way to the FOB. Being mission oriented is important, but not if it means taking an aircraft beyond operational limits and converting it to scattered wreckage on a hillside. Believe me, we all learned a valuable lesson that night! ■

# FLYING SAFETY

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**DEPARTMENT OF THE AIR FORCE • THE CHIEF OF SAFETY, USAF**

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# PEOPLE ARE OUR MOST CRITICAL RESOURCE:

A SINGLE DEATH OR INJURY IS ONE TOO MANY...



Brigadier General James L. Cole Jr.  
Chief of Safety, USAF

■ The loss of a single person means the loss of a valued friend and comrade for each of us personally and an increasingly costly loss of combat capability for our entire Air Force. Replacing damaged or destroyed equipment is also becoming more difficult and expensive with each passing year. As our force levels and budgets continue to decline, we can ill afford to lose a single person or a single piece of equipment through carelessness or lack of training and

proficiency. Hence, the 1990's will pose more significant challenges for our Air Force than those faced in years past.

Today's smaller force levels mean experience in many critical areas is also declining. For example, in our pilot force, personnel policy changes and a declining number of flying billets have reduced aircrew experience in all weapon systems. And lower experience levels are not just affecting our aircrews — experience

levels in other operational career fields, such as in aircraft maintenance, are dropping as well.

As experience declines, we must also recognize budgetary constraints are impacting our equipment inventories. According to Air Force Chief of Staff General Merrill A. McPeak, "The Air Force budget has dropped 47 percent in real terms since the peak years of the mid-'80s."<sup>1</sup>

As such, funding available to purchase new aircraft and equipment or to improve existing inventories has been significantly reduced. Spare parts to repair existing aircraft and equipment have also been driven down by congressional mandates. All these pressures add up to an aging fleet of aircraft and equipment inventories for the foreseeable future.

Lower force levels and aging equipment produces challenges we must meet head on. We cannot continue to do more with less. Commanders and supervisors must identify those tasks and missions we can no longer afford to do. We must carefully ensure levels of work are reduced proportionately and in a priority consistent with the Air Force mission. We must pay closer attention to individual training and proficiency standards.

*We must do these things or we risk losing the battle against what has become the primary cause of all Air Force mishaps: human factors.*

While we have made great progress in reducing other types of mishap causes, we have a long way to go before we overcome human factors as a cause. In FY93, approximately half of our flight mishaps involved human factors. We lost 42 lives and \$625 million worth of aircraft. *Over the past 4 years, at least 75 percent of our class A and B mishaps involved human factors.* Not surprisingly, human factors mishaps have been appropriately identified as "the last great nut to crack."<sup>2</sup>

Although our active duty end-strength is down one-third from the mid-'80s<sup>3</sup>, we have seen no decline



in the number of operational tasks. As a result, the tempo of operations for the Air Force as a whole has significantly increased. Operating at a faster pace, commanders and supervisors may press to "move the mission" at all costs.

Some of our people, particularly the aircrew members, may also perceive it is necessary to fly the mission while accepting unwarranted levels of risk as something that "comes with the territory." **This mindset is unacceptable!** It opens the door to a culture where shortcuts and deviating from the established procedures and tech data become acceptable and institutionalized.

Today we place more responsibility on individuals to do a quality job rather than relying on traditional quality control methods to catch their mistakes. Our high operational tempo, coupled with a perceived lowering of task oversight may allow complacency to invade our ranks and produce unwarranted risks.

**We cannot allow individuals in today's Air Force to get the wrong message. There is no difference between "doing the mission" and "doing the mission right."** Any other message will cultivate an environment where human factors mishaps will thrive with costs we can't stand. It will consume and destroy our people and resources to the point of jeopardizing mission success.

The Air Force mission is to "defend the United States through the control and exploitation of air and space." The *Air Force Vision* supports this mission by "building the world's most respected air and space force — global reach and power for America." As we work to embrace and fulfill that vision, we must also create an environment where "Air Force people make the safety culture central and essential to everything we do."

In the words of Lt Gen Bradley Hosmer, Superintendent of the United States Air Force Academy, "If there's anything that's growing al-

most like religion in the Air Force today with quality improvement, **it is getting it right the first time.**"<sup>4</sup> In essence, "the safety culture" I'm talking about is a culture where "getting it right the first time" is **the way** we must conduct business in **everything we do.** We can't have one safety culture for training and still another for the real world. *There must be only one safety culture — the Air Force Safety Culture!*

The Air Force Safety Culture — getting it right the first time — is the foundation we need to support the Air Force mission in consideration of today's fiscal limitations and global responsibilities. It allows us to "provide Air Force people with the means to enhance mission capability by preserving human, natural, and material resources in peace and in war." Better resource conservation is a road we must travel if we are to remain mission capable and proficient in a time when resources are becoming more scarce. If our journey is to be successful, we need a roadmap for success.

Our Air Force safety strategy roadmap to the 21st Century is laid out in the "Safety 2001" plan. But this is not the only guide available for use. We must also capitalize on other non-DOD programs such as the Federal Aviation Administration's "National Plan to Enhance Safety Through Human Factors Improvements." We can then use the best ideas from other programs which are consistent with Air Force interests and goals. For example, we will continue to expand our human factors training program initiatives, such as Crew Resource Management training for our aircrews.

The road to creating the Air Force Safety Culture begins by **engaging the No. 1 safety officer at every unit — the unit commander.** They must relook and rethink their attitudes toward mission accomplishment and day-to-day operating practices. Are their troops getting the mission done by cutting corners or using unauthorized procedures? Have they certified

people to perform critical tasks without providing the training to maintain proficiency?

Commanders and supervisors must get personally involved to create the culture we will need to fly, fight, and win — now and in the 21st Century. They must take every opportunity to demonstrate self-discipline, adherence to tech data, and sound operating procedures. They must demonstrate that "getting it right the first time" is an **individual responsibility** expected of everyone in today's Air Force.

In the Air Force we take risks in the interest of national defense. We have always done so. *Safety isn't paramount — executing the mission has always been, and will always continue to be, our first priority.* What keeps the level of risk to an absolute minimum for our people and our equipment is training, discipline, and integrity.


Over the past few years, you have delivered the lowest mishap rate and the lowest number of mishaps in Air Force history while going through a radical period of change. *Our record has never been better!* Yet, it is imperative we maintain a focus on **the Air Force Safety Culture.** It's an integral part of pride, professionalism, and mission success. If we fail to do so, we will repeat the mistakes of the past at a time when we can more than ever not afford the resultant losses. *For the United States Air Force, a single death or injury will always be one too many.* ■

<sup>1</sup>Air Force News Service. AFNS/IICX, Kelly AFB TX. 29 Jan 94 newswire. Remarks made by General Merrill A. McPeak at the Air Force Day Luncheon, Armed Forces Communications and Electronics Association, Washington, D.C. 10 Jan 1994.

<sup>2</sup>Lieutenant Colonel Willie Harris and Lieutenant Colonel Warren Thomas, Air National Guard Reserve Center. Remarks made in an Air Mobility Command-sponsored conference on Crew Resource Management, Scott AFB IL. 11 Feb 93.

<sup>3</sup>Air Force News Service. AFNS/IICX, Kelly AFB TX. 29 Jan 94 newswire. Remarks made by General Merrill A. McPeak at the Air Force Day Luncheon, Armed Forces Communications and Electronics Association, Washington, D.C. 10 Jan 94.

<sup>4</sup>Lieutenant General Bradley C. Hosmer, Superintendent, United States Air Force Academy. Remarks made in an interview with *Flying Safety* magazine, AFSA/SEDP, at the officer's club, USAFA on 10 Nov 93.



# **Breakaway, Breakaway, BREAKAWAY!**

## **The Bomber Perspective**

**“Breakaways are a common part of air refueling training. You can’t begin air refueling training without first knowing how to obtain separation quickly and safely.”**

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**CAPTAIN BILL STIMPSON**  
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■ For all you Buff pilots out there, when was the last time you performed an actual breakaway? If you’re like most pilots, it was at night in the weather while closing on the tanker. Most likely, it caught you by surprise and created some tense moments. Were you properly prepared for the ensuing breakaway? Why did it occur then? Do weather and nighttime conditions make air refueling more difficult?

The majority of air refueling breakaways take place at night. If you add weather to this scenario, then the likelihood of a breakaway increases dramatically. There are a fair share of breakaways during initial qualification training, but that’s typical. Teaching a pilot to air refuel a B-52 for the first time can be very challenging. An unplanned breakaway is definitely a surprise, but when performed properly, it significantly diffuses a tense situation.

Breakaways are a common part of air refueling training. You can’t be-

gin air refueling without first knowing how to obtain separation quickly and safely. With any type of maneuver, there is a right way and a wrong way. It is up to you to ensure you accomplish and/or teach it correctly.

Let me begin with the precontact position. You have just stabilized, and you start closing on the tanker. Suddenly, you realize your closure is too fast, and despite your best efforts, the aircraft continues to close and the boom operator calls for a breakaway. At this point, three different possibilities could occur. First, you could have a centerline underrun of the tanker. Second, you see the underrun coming, so you try to offset to the left or right, but create a lateral underrun instead. Third, you could safely separate and accomplish a perfect breakaway.

Let me start with what not to do first—centerline underrun. Have you ever read, “Because of the magnitude of interrelated aerodynamic effects, flying two airplanes in close vertical proximity is not safe”? If the centerline of the two aircraft coincide forward of the contact position, the aircraft will tend to fly together. This condition can be caused by ei-



her aircraft. The receiver can under-run the tanker as in this example, or the tanker can "back up" through inappropriate power management.

The venturi effect and the effects of downwash are two primary reasons for this condition. The venturi effect causes a low pressure area between the two aircraft. The funneling of this airflow increases the velocity and decreases the static pressure. This low pressure center draws the two aircraft together.

Downwash is also altered when the aircraft are in close proximity. The tanker will essentially experience ground effect. Induced drag is reduced, downwash is reduced over the tail, and a nose-down pitching moment results. The receiver will experience the opposite effect. Induced drag increases, downwash on the tail increases, and a pitchup moment occurs. So you can see how the centerline underrun in all cases must be avoided.

There is one other item which can add to the danger of underrun and that is the tanker autopilot. The venturi effect created by the two aircraft can affect the static ports of the tanker. This can lead to erroneous

airspeed and altitude indications. If the tanker has the autopilot on, the low pressure at the static ports could be sensed as a climbing indication, and the autopilot might initiate a descent into the lower airplane. All are clearly the end results of poorly executed breakaways.

Now that you know the potential disaster associated with incorrect breakaways, you are probably wondering how to properly perform the breakaway. It begins on mission planning day. Take the time to sit down with your copilot, student, or fellow pilot and thoroughly discuss breakaway procedures. Review the hazards I mentioned above and ensure each crew position understands his actions when the breakaway is called. Discuss the various problems which could surface during the breakaway, such as loss of the interphone or uncommanded pitchup with the air refueling mode of the autopilot. Give the tanker a call. Let them know what type of training you may be doing and what you expect of them. The bottom line: Climb into the jet prepared.

You're behind the tanker and the breakaway is called. First and fore-

most, obtain positive nose-tail separation between the tanker and the receiver. This is accomplished by smoothly bringing the power to idle and sliding down and back what we all know as the 30-degree line. At the same time, the tanker will add power to ensure the separation but will not climb. It is imperative you get good nose-tail separation and you *do not* immediately push the nose of the aircraft down. In that situation, the bomber will continue to move forward, but the tail of the aircraft will come up possibly contacting the tail of the tanker.

The potential of collision increases if the tanker decides to climb since the pitching moment will cause the tail of the tanker to drop. Such a scenario was quite common in the past, more so in other heavy aircraft. In the B-52 community, we continually stress the importance of good nose-tail separation. Little did the crew know that the tail of their aircraft barely missed the tanker while the boom operator watched horrified.

The breakaway does not end with good nose-tail separation, but continues until both aircraft are safely separated and the breakaway is ter-

continued

# Breakaway, Breakaway, Breakaway!

## The Bomber Perspective continued



USAF Photo by SSgt Blake R. Borsic

### B-52 AIR REFUELING WITH JP-8

■ In case you didn't know, the Air Force is currently switching over to JP-8 from JP-4 as the new standard for aviation fuel. Why JP-8? JP-8 is the international standard overseas, and it is less affected by the hazards of combat with a lower susceptibility to fire and explosion. JP-8 has a much lower vapor pressure and significantly higher flashpoint than JP-4, making JP-8 a safer fuel.

There are some associated problems though. Hung starts, as well as torching, may be more frequent during cold weather operations. Also, the freezing point of JP-8 is higher than JP-4, so the OAT needs to be closely monitored when operating at altitude. Overall, the safer ground handling characteristics outweigh the minor operational nuisances.

Castle AFB went through the conversion process with few problems. Initially, fuel tanks leaked as the seals became accustomed to the new fuel. It is hard to determine if this is a seasonal problem or a JP-8 problem since this is the time of year when most fuel leaks occur. Burner pressure was also adjusted on many of the engines.

In the air refueling arena, we found onloading a small amount of JP-4 can contaminate the entire fuel load of JP-8, despite the best efforts by crewmembers to put the fuel in an empty tank. If contamination takes place, it doesn't mean the fuel will not work. It just means you lose the safety properties of the fuel. The vapor pressure of JP-8 rises to that of JP-4, and the flashpoint decreases. It's a good idea to ask your tanker what type of fuel you're getting. Boeing engineers claim some degradation with JP-8 may occur. Keep an eye on your divert fuel as the weather drops, and it won't catch you by surprise.

There are numerous articles discussing the properties of JP-8. One example is Operational Supplement 11S-83 to the B-52 Dash-11. This covers some adverse effects and the limitations currently known about JP-8. More information will follow as the engineering studies are completed. So stay in tune as you convert to JP-8, and share the knowledge you gain with other units. Remember, JP-8 is a much safer fuel and more suitable for our operations. FLY SAFE, FLY SMART. ■

minated. To expedite separation between the tanker and the B-52, consider lowering the landing gear on the bomber. On all unplanned breakaways, someone should be reaching for the gear. Lowering the gear on the B-52 causes a pitching down moment and creates a significant amount of drag. This drag immediately increases the separation between tanker and bomber.

Keep in mind this is not applicable to other heavy aircraft such as air refuelable tankers where the pitching moment is in the upward direction. In most cases, it is the receiver causing the most separation, not the tanker. So don't be afraid to use the drag devices which are appropriate on your aircraft. Once the aircraft are safely separated, you may terminate the breakaway and climb back to the precontact position.

Now you know how to perform a properly executed breakaway, what can you do to prevent one in the first place? You can follow the two basic rules which will, in most circumstances, lead to good air refueling and prevent breakaways. *Make all changes during air refueling slowly. Be predictable.* Remember, if you take your time while closing to the tanker and make all changes slowly, you will be more predictable, and the boom operator will be more comfortable. The end result is a successful air refueling.

I hope this discussion provided you a little insight on how to accomplish a safe breakaway. If correctly accomplished in training, your actions will be second nature when the unplanned breakaway occurs and will afford a safe and successful maneuver. There is no difference between a real breakaway and a practice separation. Your actions should be the same each time. Too often we fail to look at how we do things and perform "the way we've always done it." Take the time now to review your actions during a breakaway. See if improving them will make you a safer flier. ■





# C-5 AIR REFUELING TECHNIQUES

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**CAPTAIN BOB McVEY**  
56 ALS  
Altus AFB, Oklahoma

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■ First off, I would like to congratulate all of you folks who participated in the 30-hour crew duty day, quadruple air refueling, non-stop flight to Mogadishu, Somalia. It was definitely duty above and beyond, and any accolades or awards coming your way are justly and richly deserved. The instructor team here at Altus is extremely gratified and proud of your performance, in particular the quadruple air refueling you all handled so smoothly.

Since being offered the opportunity to write this article, I found myself with a myriad of topics to discuss. I decided to focus on two safety concerns of the C-5 — specifically, emission control (EMCON) 2 procedures and formation integrity. While any discussion may be directed toward the C-5 world in particular, it probably applies to the rest of the air refueling community as well, espe-

cially for KC-135s and KC-10s.

## EMCON 2

The more realistic your training, the better you'll be prepared for the real thing. The Air Force has long held this concept. However, in a training environment, some conservatism is built in when the benefits gained are outweighed by the risks involved. For example, altitudes flown during low-level training are generally higher than might be required on a real-world mission. This is justifiable when you consider the probability of kill of the ground (100 percent)\* versus the probability of kill of the simulated threat (almost 0 percent)\*\*.

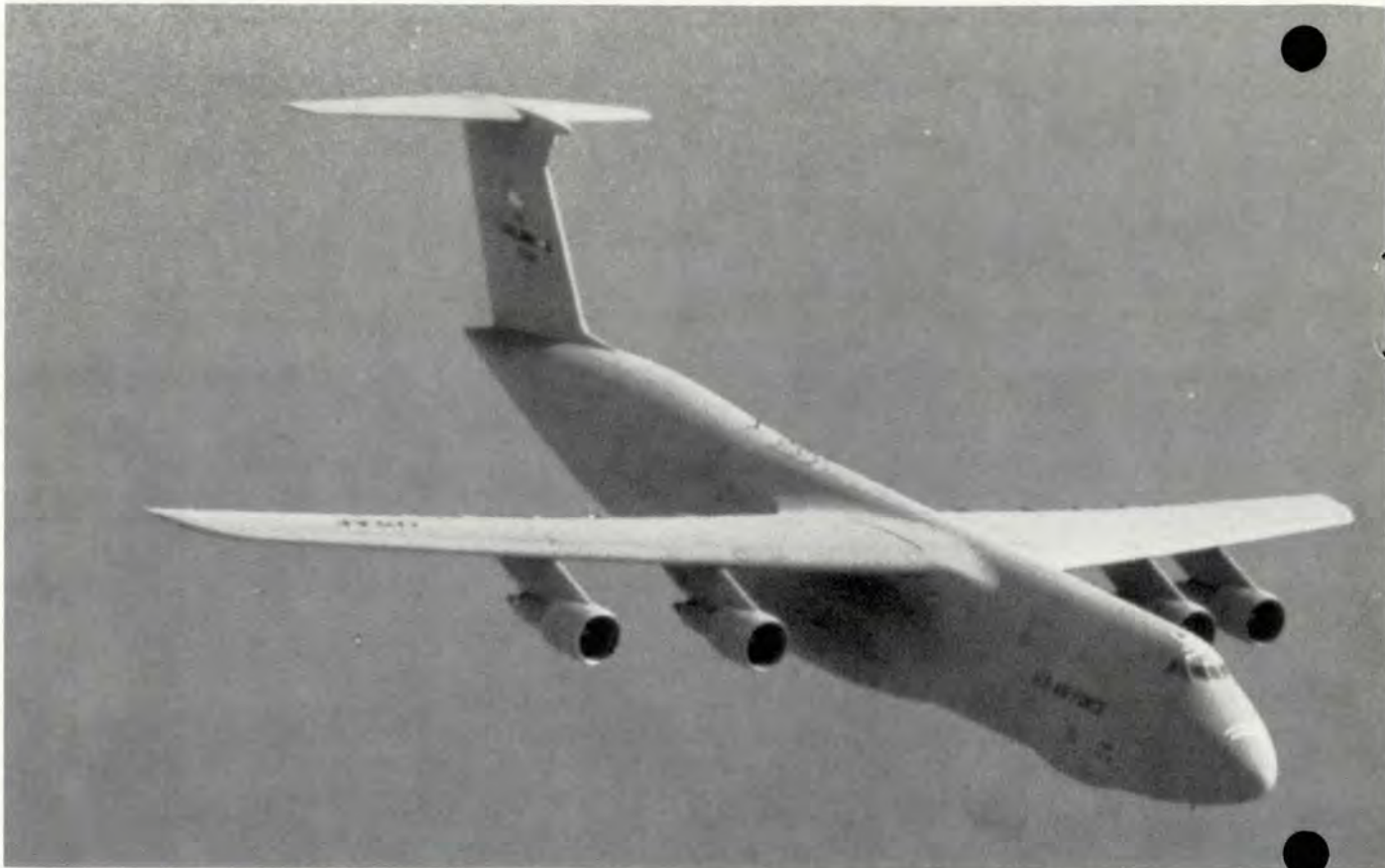
How does EMCON 2 fit into this discussion? We need to be capable of performing EMCON 2 procedures when an operational necessity exists. We, therefore, need to train EMCON 2 procedures if we expect to be successful when called upon, and do it safely. During training, however, there is never a good reason to sacrifice safety for EMCON 2

procedures. As stated in a recent HQ AMC/XOV message, dated 081409Z Oct 93:

The importance of EMCON procedures in a threat environment cannot be overemphasized; however, during training, or whenever the potential of mishap exceeds the danger posed by the threat, aircrews must be especially diligent to adhere to all safety considerations at the expense of strict compliance with EMCON procedures.

The problem we face, then, is how to conduct safe and effective EMCON 2 training. I'm sure most of you would agree that while strict EMCON 2 is the goal, it often degrades into EMCON 1½ or even EMCON 1 before the rendezvous is complete, and not due to a hazardous situation, but rather from a lack of coordination prior to takeoff. This breakdown is understandable. Even when the rendezvous itself is going well, important issues need to be resolved before the first hookup, such as student refueling, sustained versus multiple contacts, all the fuel

*continued*



## C-5 AIR REFUELING TECHNIQUES continued

offloaded, half the fuel offloaded, autopilot on/off, boom limits demo.

So how, then, do we maximize strict, by-the-book EMCON 2 training and still communicate the specific requirements for our mission? I would like to suggest three options.

**1. EMCON 2 with prior coordination** Talk directly with the tanker crew prior to flight to coordinate their and your specific requirements. The rendezvous and contacts can be accomplished with strict adherence to EMCON 2, but you'll know exactly what to expect since you've already talked to each other on the ground.

The difficulty here is actually being able to get in touch with the tanker crew. In most cases, though, you should be able to catch the tanker crew the day prior to mission planning your flight. The call requires minimal extra effort, and it

pays big dividends to both you and the tanker.

**2. EMCON 2 without prior coordination** If you have not talked to the tanker before takeoff, accomplish the first rendezvous and contact strictly EMCON 2. When the offload is complete, the tanker disconnects you, director lights go out, sending you back to precontact. At this time, you can coordinate your subsequent requirements. This, however, might not be what you want for your training or evaluation that day.

**3. EMCON 2 "modified,"** meaning, minimal calls as defined by EMCON 2 plus those additional calls made as necessary to address specific requirements of the tanker and receiver. This is certainly the safe way to get the job done, but it diminishes effective EMCON 2 training (depending on the amount of additional radio communication going on).

Remember, when in doubt, start talking to your tanker, discontinue EMCON 2, and live to train another

day. However, keep in mind someday you'll be called upon to rendezvous, get the gas, all EMCON 2, and you'll want to be prepared. The best way to be prepared is to practice the way you're going to do it for real, but practice smartly and safely. Next time you air refuel, try calling the tanker crew. Tell them what you want, find out what they want, then watch how safely and smoothly EMCON 2 can be accomplished.

### Formation

On a recent operational air refueling, an interesting situation developed I'd like to share with you. It was a standard point parallel rendezvous with a two-ship cell of KC-135s. It was during the day, and the weather was clear.

The rendezvous went normally, and we proceeded to, and began refueling from, the no. 2 tanker first. I was refueling from the right seat and didn't have the lead tanker in sight or even on my mind, for that matter. I was busy getting the gas.

The jumpseat and the navigator,



Photo by Mr Ken Hackman

however, couldn't help but notice the lead tanker was falling back to our 7 o'clock and had drifted in closer to us. This developing situation was brought to my attention.

Initially, I thought to myself, "Please leave me alone. Can't you see I'm busy trying to refuel with this tanker?" My spotters were absolutely right, though. The out-of-position tanker needed to return to the proper formation position.

I challenged the tanker crew about their location, and their answer was, "We're just getting a few pictures." NOT!! I informed them they needed to do this air refueling formation by the book — we didn't want any surprises! The lead tanker graciously returned to the normal formation position and, as a result, there were no surprises.

The point is, Murphy was out there waiting for us to ignore this developing dangerous situation. A breakaway right at the wrong time could have been disastrous.

What's the moral of the story? Formation integrity is paramount,

and all of us are responsible to ensure it remains intact. We need to know the procedures well enough so we can determine where all the cell participants are supposed to be. Then, if someone does fall out of position, we need to let them know.

This needs to be tempered with some common sense and judgment, though. The cell is not frozen in space. There are going to be minor deviations from the "perfect" cell position. In fact, a perfect no. 2 tanker (one who constantly adjusts power and bank to hold the perfect no. 2 tanker position) can make for a miserable day trying to get the gas. If, on the other hand, one of the cell participants gets a little too loose with their loose visual, we need to stop it and fix it before it gets out of hand.

I suggest you include in your air refueling briefing (if you are not already) that extra crewmembers keep an eye on the rest of the cell and inform you of any significant deviations. You can bet I do!

While EMCON 2 and formation

integrity are just two of the many ingredients on the road to safe, effective air refueling, they are, nonetheless, key ingredients along that road. They are issues which can't be ignored, and the alternative could be disastrous.

Today, with the cold war over, strategic deterrence is more the capability to park 500,000 troops in the enemy's backyard than the likelihood of nuclear confrontation, and air refueling will play a huge role in providing this capability. Single, double, triple, and quadruple air refueling may not have been very likely in the past, but we are seeing, and will continue to see, more and more of it in the future.

So, the next time you air refuel, it's not just to punch your currency clock, but rather to sharpen the skills you'll need to provide strategic airlift anytime, anywhere in the world. ■

\*if you hit the ground  
\*\*from an air-to-air collision



# Mister USAF Mishaps, to You!

**CMSGT DON A. BENNETT**  
Technical Editor

■ *Come on, buddy! Hurry up, will ya! I've waited a long time for you. Yes sir, you've always escaped me before, but today's the day your luck finally runs out. You're mine! Ya just better not let me down with a fizzle! I want a BIG BANG! And maybe, just maybe, you could give me some of that funeral stuff, too. There ya go, pal. That's better. Perfect! What a sucker you are! LET'S ROCK AND ROLL — AND GLOW!*

*Uh oh! What's this? No, no, NO!!! Not now! Please, please, please! No goodie two-shoes now! Some other time, but NOT now. You've been beggin' for this for too long. I mean, you were just a heartbeat from death and destruction! I had you!*

Dadgum it! Doesn't happen too often, but I'm foiled again by some hot shot supervisor — one who just HAS to have everything done right — and safely. How borin'. How stupid. How can I have my fun? WHAT'S THIS AIR FORCE COMIN' TO ANYHOW?

Sorry, folks, but I just fume when a plan doesn't go right. Lost my cool. It won't happen again. Doesn't matter, 'cause there ain't too many of ya out there who pays any mind to me anyway.

Who am I? Well, USAF Mishaps. Mister to you though. I'm Mister USAF Mishaps, at your eternal service. King of Hurt-'n-Pain. Master of Destruction. Boss of Loss. My motto: "Grief is my name — death is my game!"

Ya see, I started groomin' this cat back when he was a no-striper, when he thought he was goin' to be an ace aircraft mechanic. (Sure, sure, they all start out thinkin' this, but it doesn't take me long to change their attitudes.)

Yes siree, I've been nurturin' and settin' the guy up for years, and as I look back on it, he was easy to sucker in. All I had to do was make sure he always got weak trainers and poor immediate supervisors. It was simple. They're anywhere there's an inactive, ineffective line of supervision.

At our Annual Interservice Mur-

phy's Law Revision Conference last year, my sister service coconspirators and I were takin' a break and talkin' mayhem and such. Well, the subject came up 'bout who had the best potential for a disaster in the works. Didn't make any difference whether it was a flight, ground, or industrial mishap. One service rep had a shoo-in if his mishap came true.

Then I stood up and told 'bout my man here and the gem of a mishap I had in the works. I shot 'em all down. I was congratulated on turnin' this possible professional into a great potential for disaster. Sure enjoyed the praise! Hated to remind 'em I was only the instigator most of the time. It's really the guy's supervisors and peers who developed him all through the years to full mishap-candidate status.

By the way, for those supervisors who fit into this category, may I take the opportunity to sincerely thank you for your undyin' (no pun intended) support. If I had to do it all by myself without your help, I'd be

## **"Ya see, I started groomin' this cat for a mishap back when he thought he was goin' to be an ace aircraft mechanic..."**

workin' some serious overtime.

My guy easily picked up all his supervisors' bad habits. Made me really proud when he mastered the art of unnecessary risk-takin' in minimum time. And boy howdy! Ya should have heard him talk that doubletalk jargon to cover his tracks when somethin' went wrong with his work. Had quite an extensive collection of excuses, too.

But I guess the most important thing I admired 'bout this guy was how he always blamed his coworkers, friends, and even bosses for his poor performance and mistakes. Why did this excite me? Because this kind of behavior, coupled with the supervisors' inability to stop it, leads to hate and discontent. And if you don't have a clue as to what I'm talkin' about, let me help ya: **POOR MORALE IS HOW I'M ABLE TO RECRUIT MY POOL OF MISHAP POTENTIALS SO EASILY!**

So now ya know my mishap man was fully qualified as "an accident waitin' to happen." Nobody got his attention to help him reevaluate his values — or I should say, lack of values. His poor performance was never taken to task, never disciplined — at least, never to the point where it carried any weight. You can imagine my relief when he was able to make it so far unscarred. Nobody could stop him! Everything was ready. The stage was set for lots of death and destruction.

There was a disaster, all right, only it was for me! Not exactly what I had in mind! Picture this, will ya: an aircraft ready for launch, full of crew and pax, last-minute maintenance, everybody's in a rush, improperly trained mechanic with no integrity, and no tech data! **YEE-HAA! BIG BANG THEORY IN ACTION!**

My man was just a heartbeat from doomsday. But man, oh man, did this guy have an uncanny amount of luck — pure luck — high grade stuff! Ya talk 'bout cats havin' nine lives. Well, this cat had hundreds! Right when he was ripe for the

pickin', he lost situational awareness in front of a new supervisor, Sergeant Leta Do Right, a supervisor with common sense (yuck), integrity (double yuck), and worse yet, the audacity to stop the unsafe act and **MAKE THE GUY GO GET TECH DATA!** Oh, gag me with a spoon!

I just knew one day my guy would give me my due. After all, we both would have earned our monster of a mishap! I was workin' hard to give him every opportunity to take shortcuts in his duties, and he worked equally hard to take them. Had him in my grasp, too, if it weren't for the new creep on the ramp, Leta Do Right!

Sgt Do Right stepped in, smelled disaster, and stopped the show. Can ya believe she released the crew and pax till the repair work was done? Can ya also believe she bought a maintenance delay so safety wasn't compromised? What a nerd! There was supposed to be grief galore! Lots of investigations and finger pointin'. A whopper of a show stopper! And she jumped all over my man's tail!

Kinda feel sorry for my mechanic. Seems Do Right checked a little

more into his trainin' and performance background than past supervisors. She even did a complete factual evaluation of the guy's qualifications. Wasn't a pretty sight — decertifications, downgrades, retrainin', etc. I hear there was a lot of paperwork. Wonder if she got his attention. Wonder if I lost him for good as a mishap potential. Probably, but so what? I have an unlimited source of replacements.

That reminds me. I need to look Sgt Do Right up in my book to see if I've got her as a potential mishap client. It could be I rated her too low on her initial and annual assessments for mishap potential — meanin' she was eaten up with that professional jive, i.e., integrity, pride in workmanship, honesty, etc., etc. Boy, would I enjoy turnin' her attitude around! Just love converts!

Well, ya almost witnessed the mother of all Air Force ground mishaps this year — maybe this decade! What a doozy it would've been had that smarty-pants supervisor not walked up at the moment of truth and broke my dadburned chain of events! Could've even made the headlines. Oh well, got a mess of others in the works. And I've got eternity to wait out these wannabes.

You bet, I'll just have to keep workin' on the thousands of potentials I currently have in various stages of development. Ain't no steep hill for a climber like me. Been around for years, and I'm not likely to disappear anytime soon. After all, isn't it your nature **NOT** to use checklists and tech data, to take shortcuts, to blow off safety precautions, and to shuck off your supervisory and trainer responsibilities? **YOU ARE HUMAN, AREN'T YA?**

Well, this secures my job — unless, of course, a funny thing happens, like a herd of Do Rights comin' to the rescue. But that can't happen, can it?

Not likely, 'cause I **STILL HAVE YOU !!!** ■





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**CAPTAIN RICK WHITE**  
58 TS/ADO  
Luke AFB, Arizona

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■ It's 5 minutes to brief time. Check the lineup card for the proper tanker information on the back. Good, it's all there. Let's see, tanker call sign is Summit 07. Great! It's the Castle guys. This means student boomers tonight. Primary and secondary comm freqs, air-to-air TACAN freqs, air refueling (AR) track, blocks, bingos — good! Everything is covered.

Is this the extent of your preparation for a refueling mission? If it is, you probably tend to have more unexpected "problems" than most, and this is about to be the worst refueling mission of your career — or at least one fraught with problems and lots of time spent answering questions in the air.

Now, think back to that mission and how it started. The weather forecast indicates some high cirrus and building cumulus in the refueling track. The sun sets in about 20 minutes, but you are still hoping for

your "day refueling" square. You get the flight joined prior to entering the weather and are in and out of the weather at the air refueling initial point (ARIP), so you decide to climb above the weather at the top of the block.

"Maddog 1, cleared direct ARIP. Maintain AR-658 block altitude FL200 to FL240 and contact Summit 07 on 391.shhhhhh."

"Albuquerque Center, Maddog 1. Say again freq."

"Maddog 1, stand by. Cleared standard holding at ARIP."

While ABQ Center is busy "checking the rides" for airliners at FL270, you are scrambling for your in-flight guide and lineup card to check the freqs and standard holding pattern. Turning away from the setting sun, the cockpit gets dark, so you fumble for the interior light to read your lineup card. You finally get the attention you deserve from ABQ Center and come up on the correct tanker freq.

"Maddog 1, this is Summit 07. You are cleared down track, maintain FL200. Come up air-to-air

TACAN. You will be refueling with Summit 08 tonight." Oh great, they changed the call sign and didn't tell anyone.

"Summit 08, say position."

"Summit 08 is 20 miles west of Winslow." Yeah, so are 10 other aircraft. I wonder if he can be more specific.

"Summit 08, how about a position from the Drake TACAN." After a few more transmissions, you are able to deduce the tanker does know where he is and which NAVAID the track is based on. A few moments later, you distinguish Summit's position on your radar.

"Maddog 2, 1 has multiple contacts 20 left, 35 miles, 21,000, head aspect ... Summit 08, confirm chicks in tow, Maddog will execute a fighter turn on."

"Maddog, negative; Summit 07 and 08 are working in cell formation tonight. We will execute a point parallel rendezvous."

This ought to be interesting.

"Summit 07, Maddog 1, ARIP inbound. Say flight conditions."

"Summit 07 is currently IMC."



Photo by Mr Ken Hackman

Sure enough, as you approach the limits of your radar, you notice the telltale signs of a tanker which has not checked the weather throughout the entire block. As Summit 07's vertical tail cuts a path through the cloud layer below, you inquire as to the possibility of him coming up to your altitude.

After a few minutes discussing rules, regulations, and "company policies," you finally convince Summit 07 mission completion requires him to be at the top of the block.

As the formation ascends out of the weather, you pick up the tallyho on a strobe and position lights in the distance. You feel, for certain, you have sorted the trailing tanker, and it appears your target designator box is now tracking a black hole and not the strobe.

"Summit 08, Maddog 1. Are your lights on?"

"That's a negative, Maddog 1. We're running blacked out tonight."

Great. Things are going just as briefed — all screwed up! Summit 07 just happens to have his light up full bright with his strobe flashing in

the distance. Well, it is just as well the lights are off. Every time you park yourself in the observation position at night, the tanker's nacelle light blinds you anyway.

### Mission Preparation

A smooth mission involving air refueling starts with more preparation than just looking at the lineup card prior to walking into the brief. I'm not saying the preparation needs to be as detailed as a finely honed first-run attack at a strange range. But, there are some options on every refueling sortie which, if answered prior to the ARIP, make the refueling portion of the mission a lot smoother.

The preparation starts with as much information about the tanker as you can muster. The first thing I like to know is where is the tanker coming from and what *the crew's* training requirements are. If their training requirements are not consistent with the mission I'm trying to achieve, then we need to smooth this out prior to the launch. Student boomers with student pilots are one of those inconsistent training objectives.

Other important aspects of the flight which generally reduce airborne confusion and communications are:

- The tanker's scheduled takeoff time and estimated time en route to the AR track. This will help in all of your timing decisions, whether or not to launch late for the rendezvous, complete your primary mission first and then refuel, or even blow off the refueling portion of the mission altogether.

- The number of tankers working the AR track. Many AR tracks have high and low air refueling blocks. It is not uncommon for both of those blocks to be active at the same time with separate missions conducted in each.

The other half of this equation requires you to know how many tankers are working your AR track. Many flight leads have been surprised to find out they rejoined on the wrong tanker. Or, worse yet, some never knew until the mission debrief.

Now that you know how many, what is the formation? The standard

tanker formations can be found in your specific aircraft air refueling flight manual, TCTO 1-1C—1-XX. Every pilot information file/flight crew information file at the ops desk has one. Generally, you can find these guys in a 20- to 60-degree wedge with 1 nm spacing, the trailing tankers stacked 500 feet higher.

- The next checkpoint is the ops schedule. A quick look at the other flights' control times will give you an indication of how much slop you have to make your own contact time. Usually, the ops clerks behind the desk have the total offload for that day's tanker mission. A quick division will tell how much is available for your flight.

Don't forget to coordinate tail numbers for fuel accounting purposes. The most recent PIF/FCIF concerning fuel accounting dictates the accurate accounting of offloads. If you want to avoid an unintentional dry hookup, have the full eight-digit tail number passed prior to launch, or be prepared to list them off prior to hookup.

Now that you have all the preliminaries, you can set up the brief. I usually find the most recent copy of the weather guesser's worksheet and note the expected AR track weather. Moonrise and illumination are important for the night missions. These give a big hint on whether or not to brush up on lost wingman procedures. (Good thing they're on the slide boards in the briefing room.)

### Mission Specifics

An RTU-style briefing covers the actual mission specifics in excruciatingly painful detail. Although this is not expected or necessary in the operational world, the basic mission profile should not be routinely briefed as "standard." Multi Command Regulation 55-series regulations handle the briefing guide very well, and I don't intend to reprint it here. Some of the items in the briefing guide, however, may require a more indepth explanation.

- **Radio Calls** Discussion of emission control (EMCON) levels and procedures is always important for the new guys not exposed to the terminology or different levels of trans-

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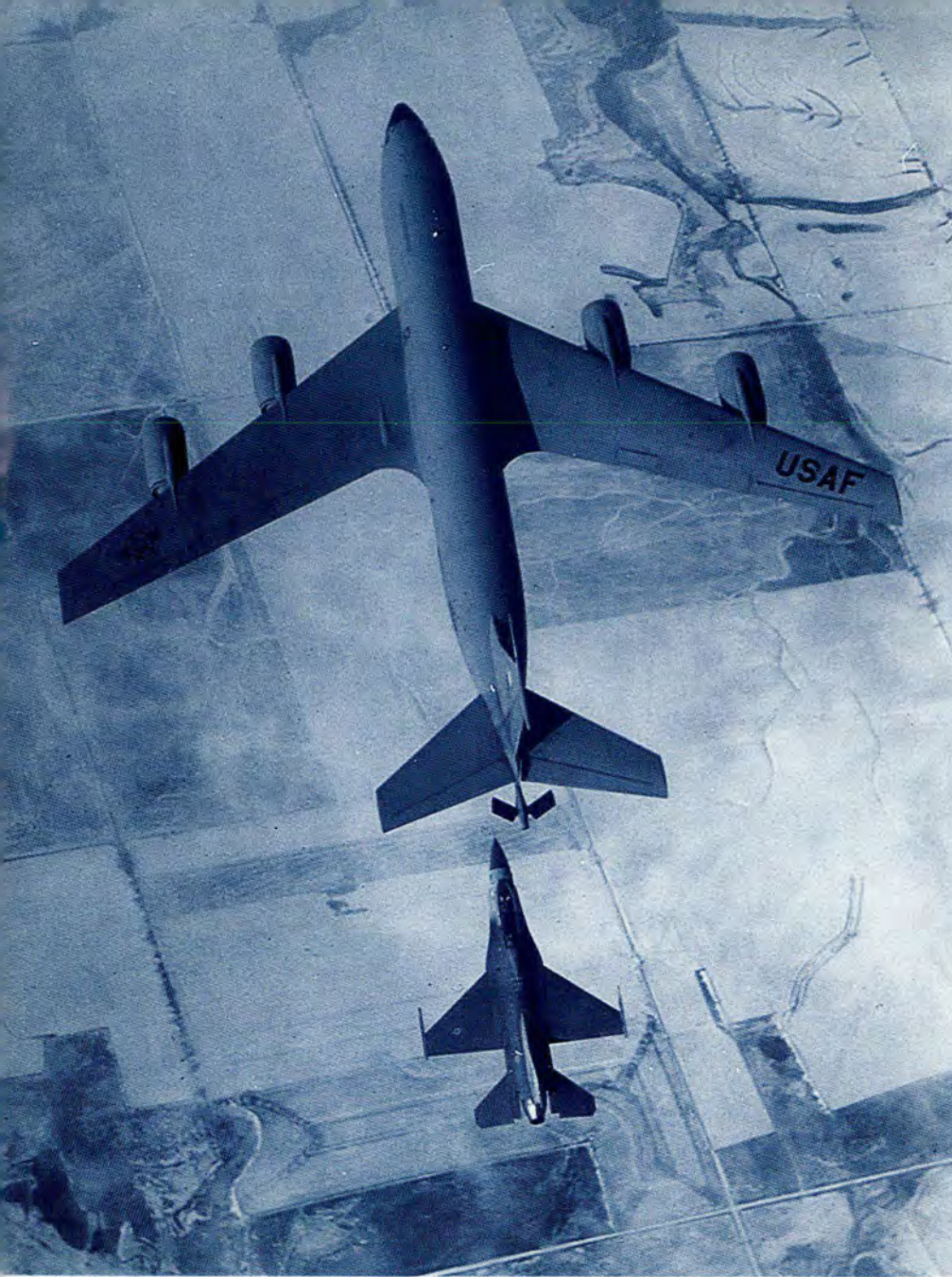


Photo by Mr Ken Hackman

## FIGHTER AIR REFUELING

continued

mission. Those old heads who are set in their ways may even learn a new thing or two. When the squadron is working multiple flights to the tanker, it is nice to know whether or not your check-in frequency is the boom frequency or an administrative frequency talking directly to the crew.

Coordinating your "End AR" request prior to hooking up will en-

sure the maximum amount of time for the tanker crew to work any problems which might occur with your follow-on clearance. When running EMCON 3 or 4, don't forget about the "hot mike" boom interphone option of the KC-10 and most KC-135s. Not only can this reduce chatter, but it also helps avoid embarrassing comments on the common freq.

■ **Observation/Formation** Think about your worst tanker sortie. It probably involved more than one four-ship getting fuel from "your" tanker, a minor mechanical problem (radar, INS, Air-to-Air TACAN, flight lead dropping out), and a lot

of weather. Not having a fully thought-out weather plan, or single tanker plan, for those large-scale employment missions could leave you with more than the desired number of aircraft attempting to occupy the same piece of airspace. A methodical brief from expected situation to the worst fallout plan can alleviate "There I Was" stories.

■ **Refueling** The easiest part of the entire mission is also the most dangerous. Late takeoffs, miscalculated time over targets (TOT), and ATC delays lead to many scratched canopies, punctured panels, and broken booms. Patient and deliberate maneuvering is the key to coming off the boom with only the fuel. Regardless of how late the mission is running, time cannot be made up on the boom. A complete understanding of refueling order and smooth flow positioning, however, can minimize time in the AR track.

Practicing for the worst case can always make things run smoother in less-than-optimum flight conditions. Dropping down from the wing to the precontact position in the weather, at night, out over the North Atlantic, during the winter, has a little higher pucker factor than your basic day training sortie.

The first time you see your wingman drop down to precontact position and lose sight because he pulled too much power and dropped too far back, you should question those instructional techniques which allowed him to even consider the thought of moving about the tanker with such carelessness.

■ **Post Refueling** Fuel checks are in order to make sure the fuel went where you wanted it to and a thorough ops check to ensure the fuel is feeding from the correct tanks. Don't forget — fuel problems are insidious. If you don't catch it now, it will bite you in the busiest part of the mission.

As with any other part of the mission, you can brief the refueling to death, and something will still surprise you. Your ability to make sound decisions in the air during these popup problems is a direct reflection of how much preparation you did and the thought you applied to the planning. ■





# Helicopter and C-130 Air Refueling Techniques

**CAPTAIN JAY STRACK**  
C-130 Stan/Eval IP  
Kirtland AFB, New Mexico

**CAPTAIN JOE BECKER**  
HH-53 CCTSIP  
Kirtland AFB, New Mexico

■ Refueling helicopters with HC-130P/N and MC-130E aircraft is one of the most challenging missions in the Air Force today. Throw in that it can be done at night with or without the aid of night vision goggles, with or without electronic aids, with covert or overt lighting, and the tanker and helicopter crews have their hands full making the transfer of fuel successful. Air Force rescue and special operations rotary-wing assets are not the only receivers who can benefit from in-flight refueling. The Army CH-47D, when modified, also refuels from Air Force tanker-equipped C-130s.

Before 1964, aerial refueling was not thought feasible for helicopters. Innovative thinking and bold action by a handful of Air Force and civilian engineers in the H-3 Systems Project Office at Wright-Patterson

AFB, Ohio, made it a reality. Running against the tide of contemporary thought, Mr James Eastman, Mr Richard Wright, and Major Harry Dunn, an experienced helicopter pilot, thought aerial refueling of the H-3 might be possible.

Working under an Air Rescue Service operational requirement for in-flight refueling, Dunn rigged a fuel probe to the front of a CH-3 in December 1965. He contacted a U.S. Marine Corps aviation unit that agreed to provide a KC-130 tanker with a drogue refueling apparatus. On December 17, 1965, the first successful in-flight hookup was accomplished. Although the first actual transfer of fuel was a year away, Dunn had proven aerial refueling was a valid concept for helicopters.

Following a year of testing and the requisite staff work, the Air Force approved an initial rescue service order for 11 HC-130Hs to be converted for the aerial refueling role. The modifications were made at the Lockheed plant in Marietta, Georgia. Lockheed installed fuel tanks, pumps, and drogues. The first modi-

fied aircraft, redesignated HC-130P, was delivered to the Aerospace Rescue and Recovery Service on November 18, 1966. Rescue crews reported to the 48th Aerospace Rescue Recovery Squadron at Eglin AFB, Florida, to be trained in refueling techniques. It was there, on December 14, 1966, the first in-flight transfer of fuel between an HC-130P and an HH-3E occurred.

Over the years, many changes have been made to improve the aerial refueling process. With the increased use of night vision goggles came the advent of minimum light, communications-out join-ups and refueling. Initially, helicopter crews were required to remove their goggles after accomplishing the join-up and make the plug-in unaided, even though the use of night vision goggles deteriorates natural night vi-

*continued*

<sup>1</sup>Tilford, Earl H., "Search and Rescue in Southeast Asia, 1961-1975": Washington, DC: Office of Air Force History, United States Air Force, 1980.

# Helicopter and C-130 Air Refueling Techniques

continued

sion. Improvements to night vision devices, specifically ANVIS-6 (AN/PVS-6) goggles, led to a request from Special Operations Forces (SOF) to test the feasibility of aided plug-ins.

In 1985, Captains Mike Damron and James "Pappy" Walters, of the 20th Special Operations Squadron, flew the first sanctioned night vision goggle aerial refueling in an HH-53H PAVE LOW helicopter. By late 1986, approval was granted for all SOF crews to refuel using night vision goggles. Rescue crews followed suit a short time later.<sup>2</sup>

In early 1987, SOF again pioneered a major tactical change in helicopter refueling. This time it was the simultaneous refueling of two helicopters by the same HC-130. This maneuver was previously thought to be an emergency procedure.

HC-130s from Eglin's 55th Aerospace Rescue and Recovery Squadron and HH-53Hs from the 20th Special Operations Squadron successfully proved simultaneous refueling could be accomplished while maintaining virtually the same fuel flow as single-ship refueling. These tests were accomplished during the day and at night, using night vision goggles. Once completed, simultaneous refueling was immediately adopted as the standard for multi-ship refueling.

The last major change of the 1980's occurred at about the same time when MC-130E COMBAT TALON 1 aircraft of the 8th Special Operations Squadron were modified for the tanker role. The TALONs provided a deeper combat penetration capability and unprecedented flexibility since they are also receiver capable. In the 1990's, HC-130 COMBAT SHADOW aircraft have begun the receiver modification.

Despite these and other changes during the nearly 30 years helicopters have been refueling in flight, the bottom line has not changed. The intent was, and still is, to place the tanker and the receiver in the same airspace at the same time so they can join up and transfer fuel.

In order to accomplish this, a track is developed. This track consists of an initial point (IP), a control point (CP) 6 nautical miles down track, and an end point (EP). For planning purposes, timing is based on the CP with the helicopter allowed to be early and the tanker allowed to be late.

With the improved navigation gear available today, it is possible to be very close to the intended Air Refueling Control Time (ARCT). This new precision timing has actually



caused some difficulties. As helicopter crews press to reach the CP exactly at the ARCT, they sometimes fly exceptionally fast or slow just prior to the CP. This causes a change in the overtake the tanker is expecting and can actually cause a delay in getting joined up.

To prevent this from happening, the receiver can run their time on target (TOT) to the IP instead of the CP, and then fly the prebriefed speed to the CP. While winds may cause the helicopter to reach the CP a little earlier or later than planned, the chances are, by flying a stable platform for the join-up, the receiver will get on the hose in the least possible time.

This discussion of TOT management is one-half of the answer to the often asked question: Why have an IP?

In addition to aiding in timing for the join-up, thereby reducing the

time required to get both aircraft in a position to transfer fuel, the IP-to-CP leg aids in deconflicting by both time and airspace during the join-up. Without an IP, it would be possible for the receiver to be approaching the track on a heading requiring a 90-degree, or greater, right turn and the tanker to be coming from the opposite direction while attempting to maneuver to the helicopter's right side. This scenario leaves altitude as the only means of deconfliction.

The IP-to-CP run is especially critical for the helicopter to perform because the tanker completes the rendezvous with the assumption the helicopter is traveling from IP to CP. This is important because all the tanker pilot sees at night may be a flashing light with no reference to which way the light is moving.

A rule of thumb is to be on altitude, speed, and a constant heading (preferably headed down track, but at this point a stable heading slightly off-course is better than making last-minute corrections) by the time the tanker is 2 to 3 nautical miles in trail.

From the tanker perspective, the pilot can request position updates from the navigator at quarter-mile intervals during the rendezvous to better judge the closure rate.

Normal air refueling speed is 110 knots. The limits of the refueling system range from near stall speed to 120 knots when the hoses are moving in and out. It has been found that when the H-53 helicopter is holding 110 KIAS, the tanker needs about 115 KIAS just to keep up. This is due to some differences in the pitot static systems. Recommend tanker pilots brief the helicopters to hold 110 KIAS. The tanker pilot then needs to be at a higher speed than 115 KIAS when he goes abeam the helicopter to ensure he takes the lead (130 to 140 KIAS, then slowing to 110 KIAS when abeam works pretty well).

After the tanker has assumed formation lead, it can hold an airspeed above 110 KIAS to increase its stall

<sup>2</sup>Damron, Lt Col Mike. Interview with Capt Becker.

<sup>3</sup>ibid.



Prior to 1987, simultaneous air refueling of two helicopters from an HC-130 was considered an emergency procedure. Today, it's a routine event.

Photos courtesy of 377 SCVP, Kirtland AFB NM.

margin. As the H-3 gets phased out of the inventory, the remaining receivers normally will have little difficulty air refueling at speeds up to 120 KIAS.

As the tanker moves abeam (300 feet above and to the right of the receiver), it is common for the pilot in the right seat of the helicopter (aircraft commander's seat in helos) to look up through the greenhouse to acquire the tanker. If not careful, he can begin an inadvertent climbing right turn as he twists around to see. This is especially true when wearing night vision goggles since there is no peripheral vision available.

A popular technique to combat this tendency is to let the pilot in the left seat fly until the right seater has acquired the tanker. Once this has been done, the helicopter is flown up into the observation position, outboard of the wingtip and slightly above and behind the tanker's horizontal stabilizer. For comm-out refueling, this position is flown a little farther forward and slightly lower than the TO 1-1C-1 definition to al-

low the helicopter crew to see the light signal given by the tanker's loadmaster through the window in the paratroop door.

When cleared onto the hose, the helicopter should be maneuvered in such a way as to allow both pilots to keep the drogue in sight (i.e., square corners). Now the fun begins.

It is not natural to fly a fixed wing aircraft and a helicopter in such close proximity. The helicopter pilots should not be shy about adjusting seat position, pedals, or windshield wipers, especially if in the left seat. The goal is to fly formation off the tanker while disregarding the drogue as it flutters and bounces a mere 5 to 10 feet in front of the probe.

This point is hard to get across to the students experiencing their first in-flight refueling. Even old heads will say when you're over the middle of the ocean, the amount of fuel in your tanks is inversely proportional to the amount of seat cushion you can absorb.

Regardless of climactic conditions,

but especially in turbulence, a good steady precontact position is the key to aerial refueling. The book says 5 to 10 feet. Remember, the probe is about 4 feet beyond the rotors (for the CH-47D, it's actually about a foot inside the tip path), so one only needs to double that distance. As far as we know, Michael Jordan didn't join the Air Force when he retired from the NBA, so if the pilot can't jump from the probe and touch the drogue, the helicopter is too far back.

At night, look for the shadow of the probe to be at about the 5 o'clock position on the drogue. Once a good, close precontact position has been established, it's show time. A nice, level acceleration is looked for (the rotor wash will move the drogue down and right to counter the 5 o'clock aim point) by simultaneously increasing collective and applying forward cyclic — about an inch and a half each should do it. If this doesn't do the trick, reestablish the precontact position and adjust the aim point slightly.

continued

# Helicopter and C-130 Air Refueling Techniques

continued

Don't start jerking the controls around to try to salvage a run-in. At the very least, the crew will be scared, and credence will be given to the belief that air refueling is dangerous. At worst, the blades will either hit the hose or turn the helicopter into a convertible.

The most important point to remember when flying a helicopter during aerial refueling is a good miss is better than a bad contact! After adjusting the aim point and successfully completing the probe-to-drogue coupling, move up and out until the pilot in the right seat is looking down the dump tube at the end of the wing.

Some combinations of sun or moon position, ground lights, and tanker lighting modification can make it difficult, if not impossible, to distinguish the hose-range markings. If the problem is with the tanker, just tell them what to turn up or down, on or off. If it's ground lights, fly a slightly lower-than-normal refueling position to remove them from the field of view. For sun or moon position, one may or may not be able to move around until the tanker is blocking the offensive light source.

The C-130 oscillates about all three axes in the air refueling configuration. The things which will help the tanker crew maintain a steady platform are trim, not chasing oscillations, pressurizing the hose to counteract turbulence, and living with some minor deviations while the helicopter is attempting a hookup.

Trim is your friend. The old saying from undergraduate pilot training still holds true today. Try to trim off the pressures to maintain straight and level flight. It will almost always take some right rudder trim when one is in the refueling configuration. Many students have tried to figure out why their attitude indicator shows straight and level, but their compass card keeps turning left. This is due to the nature of propellers.

The P-factor, based on the turning of the propellers, will attempt to turn the airplane left. You can look up P-factor in your old high school or college physics books to see how it works. The amount of rudder trim required will depend on the airplane, but 5 to 7 degrees is usually a good starting point. This P-factor is constantly working on the airplane but is even more noticeable while in slow flight.

It is important not to chase the airplane's natural oscillation about its three axes. Every input will eventually be reflected at the drogue. The natural sway of the aircraft keeps a pretty stable drogue, but if you chase the oscillations, the helicopter pilots will have their hands full getting hooked up.

Putting fuel into the hose can help dampen some of the drogue movement caused by turbulence. The extra weight might just be enough to stabilize the drogue so the helicopter

can plug in.

Tanker crews should live with minor climbs or descents and slight bank angles while the helicopter is attempting a contact. The helicopter is using the tanker as a reference and probably won't notice you are not quite straight and level. The helicopter pilot is trying to match the tanker's flightpath with some air-speed overtake so the contact can be made. When the loadmaster/scanner reports the helicopter is in precontact, try to live with whatever you've got. After the contact is made, or a miss has occurred, then correct the deviation.

If turns are required while refueling, keep the following in mind. Although the tanker is allowed up to 30 degrees of bank while in the refueling configuration, it is preferable to limit the bank angle to 10 degrees or less while the helicopter is on the hose.

At refueling airspeeds, you have



As with any aspect of flying, a successful aerial refueling begins with good, sensible mission planning, followed by precise execution of that plan.

## ● *A good miss is better than a bad contact.*



an excellent turn radius, even with only 10 degrees of bank. This does two things. One, it lessens the chance of the helicopter falling off the hose due to spatial disorientation. Remember, when the tanker is at 30 degrees of bank and the helicopter is inside the turn, the helicopter would have to be at an even higher bank angle to stay in position. Being hooked up to the hose is no time to practice steep turns!

Two, it makes it much easier for the helicopter to stay in the refueling range (a 20-foot section of the hose). If the helicopter is unable to stay on the hose, or at least in the refueling range, you are not getting the bottom-line job done — **PASSING GAS.**

One exception to the 10-degrees-or-less bank guideline is during night air refueling. The helicopter cannot attempt hookups while in a turn at night. So if the helicopter is not plugged in and a turn is required, expedite things so they can

get plugged back in to the hose. Fifteen degrees of bank should work to lessen the time in the turn without disorienting the receiver.

Once gas is received, the helicopter moves down and over to the disconnect position. Don't forget to set the position lights to flash at 5 seconds prior to coming off the hose in order to alert other receivers. Watch the trim closely during the disconnect to ensure a clean uncoupling. While moving away from the tanker, whether rejoining a formation or proceeding single ship, be sure to avoid the area of greatest wake turbulence directly behind and below the tanker.

Now the actual refueling process has been covered, all planning and safety considerations should be discussed.

As a general rule, plan on a 900-pound-per-minute fuel flow to the helicopter. (This can be increased to almost 1,350 pounds per minute if you feed the helicopter with all pumps and tanks.) It takes about 5 minutes for each receiver to get on and off the hose. Add these times up and you have about the shortest track you would want to use with no racetracks planned. Keep in mind, this is a best-case scenario, and you should probably add a few more miles to the track to avoid a racetrack. If a racetrack will be required, try to let the helicopter get on the hose prior to the turn as previously discussed.

Racetrack-type air refueling tracks provide the helicopter with excellent flexibility if the threat environment allows the tanker to set up near the objective.

For a cross-country mission, the tanker will normally take off about halfway between the helicopter's departure time and the first ARCT. This is predicated on the receivers flying the planned speed and arriving at the track on time. All too often, on nontactical deployments, the helo crews fly faster than planned and then try to get the tankers to rush to make an earlier ARCT. While this may work for subsequent

refueling when the tanker has been airborne for a while, it is difficult to make up time on the first one since the tanker will usually have to push for an early takeoff.

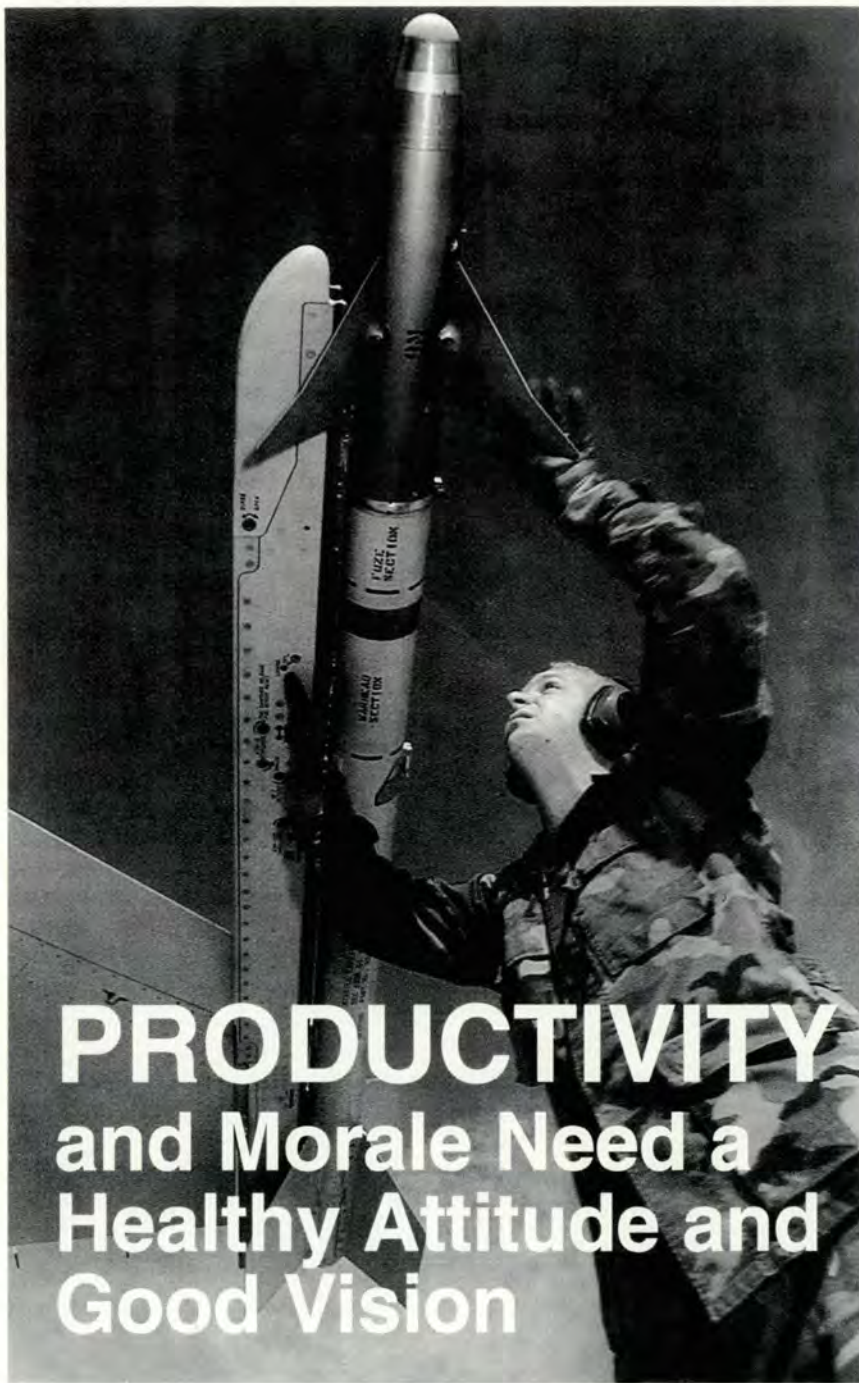
If the helicopter burn rate has been higher than expected, cycle the receivers through the hose to keep everyone above BINGO. A common sin committed by helo crews is to take more gas than planned. Most of the time the tankers can afford this, but in a situation where they can't, it will be the last helo on the hose that pays the price.

The tanker crew will not, and should not, dip into their reserve to service a helicopter except in an emergency. For example, if four receivers are each to get 3,000 pounds on the last refueling of a long over-water leg and for some reason there is only one tanker which gets to the track with only 12,000 pounds to spare, it will pass 12,000 pounds of fuel and then roll up the hose. This means if the first three receivers took on an extra 1,000 pounds "for mom and the kids," the fourth crew is going swimming.

If more fuel is needed than originally planned, it can be requested. If it is not available, the helicopter crews need to determine who in the formation gets the priority and then think about fuel-saving measures such as breaking up the formation, changing altitude or airspeed, etc.

Finally, although they can fly faster, the H-60 presents some new planning concerns. Without auxiliary fuel tanks, the BLACKHAWK carries only approximately 2 hours of fuel. This can limit the assistance the tanker can render in terms of flying away to check on weather conditions or to look for new refueling tracks before returning to the helicopter.

As with any aspect of flying, a successful aerial refueling begins with good, sensible mission planning followed by precise execution of that plan. As long as this is done and helicopter crews continue to live by the adage a good miss is better than a bad contact, the operation will be safe and successful. ■



# PRODUCTIVITY and Morale Need a Healthy Attitude and Good Vision

Photo by SSgt Scott Estes

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**CAPT THOMAS P. AZAR**  
97 AMW/HC  
Altus AFB, Oklahoma

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■ "I feel like a mosquito on that flight line. No one knows or cares what is going on in my life. They say 'people first,' but they just want the jets fixed and flying, even if it takes all night."

Then there are supervisors with

similar concerns. "Will I be here tomorrow? My job might be taken away. Or, if the changes and policies continue to suffocate or control, then I know I'm not fit for the 'new' Air Force, and I'll turn in my papers."

These are some of the statements I have gathered from maintainers on the flight line over the past year. They are from young men and women who want to make a difference but have never learned, or ob-

served, the quality process which builds character, productivity, and self-worth.

Morale and safety begin on the ground, and maintainers are responsible to accomplish a tremendous amount before their aircraft taxis down the hammerhead and cracks the sky. The intensity of the mission, the barrage of mechanical taskings, and the uncertainty of takeoffs and TDYs all weigh heavily on the maintainer.

Couple these with expected and unexpected stressors in one's personal life and you create an intense combination of human factors which could impact morale, productivity, and unit cohesion for better or worse.

## What Causes Declining Morale?

On visits to the flight line and break rooms, many junior airmen state many issues. Among them are too many changes, poor supervision, loss of BAS, no recognition, insufficient training, and not enough time off.

Middle leadership supervisors say the Air Force is not letting people do their jobs. "... They are breathing over your neck and complicating your work with many unnecessary requirements."

Whether these opinions are partially or completely true, the purpose of this article is not to elaborate on the symptoms (which many of us know first hand) or causes (which we find out about too late), but to point out (regardless of one's peers, supervisors, duty location, or mission requirements) a *personal positive vision* is essential for morale and job safety.

Without a vision, maintainers, and the Air Force as a whole, will lack a healthy attitude. Happiness is a choice. Regardless of one's AFSC, job satisfaction comes more from within yourself than from without, and this has a direct impact on job safety.

## Who and What Can Maintain Our Maintainers?

Chaplains spend much of their time visiting troops in their shops, on the flight line, and in their homes. Our role is to be their squadron pas-

tor, counselor, teacher, advocate, and friend. When I visit my squadrons, I observe the dominance of several types of people and more than several types of problems.

There are airmen who, regardless of their supervisor, base mission, or location, are "gifted" in finding numerous issues to complain about. They are your perennial moaners and groaners. They are the ones who always see the thorns and never appreciate the roses. They are takers, not givers. They pride themselves in building negativity rather than positivity.

Where does this attitude come from? It is "taught and caught" from parents, peers, friends, supervisors, and leaders. It also comes from being hurt and never working through the unresolved issues of life in counseling or in a support group. These individuals deal with their stress and pressure from home and work by having an ax to grind. They are always complaining about money, manpower, and the mission.

On the other hand, there are individuals who are consistently peak performers. Nothing dissuades them from feeling good about life. They possess the positive attitude that helps them work excitedly, build up others, and feel proud of their unit and productivity.

Recently, I met with some airmen on swing shift. Several were interested in getting promoted, completing a college degree, helping teenagers, and volunteering as a Big Brother or Big Sister. Those who were married talked about things they did with their children and spouses. Many were studying with their children, taking a greater interest in their spouse, and going to growth groups and chapel programs. They made a conscious effort to improve themselves, family, and friends, all the while trying to enrich the quality of their relationships and products at work.

The first group was not interested in what the positive people were saying. Instead, they complained about all the changes in the Air Force and didn't take time to improve their intellectual and spiritual lives. They were quick to point out who was the bad apple in the unit



Morale and safety begin on the ground. Maintainers are responsible to accomplish a tremendous amount before their aircraft taxis down the hammerhead and cracks the sky.

(never taking time to look in the mirror for the real culprit). They talked about cross-training, getting out, or being reassigned. They dealt with problems by denying or avoiding them.

Unfortunately, this mentality is a coverup for something remaining unresolved and will reappear in other relationships and work stations.

### Recommendations

Leaders and supervisors are responsible for upholding and exemplifying the healthy traits of good leadership and the vision which contributes to a positive attitude. They should speak and act in a positive way about people, missions, and careers. Many are fooled into thinking if they point out the negative and spice it up, they will be more accepted. Nothing is further from the truth.

Leaders make great impressions on their followers. They need to pass on qualities which got them through tough experiences. They can highlight traits within themselves they

drew from. Leaders and supervisors can use history and personal stories to verify the quality values which guided and strengthened them to get where they are.

True, there must be good discipline and adherence to TOs and 35-10. However, more than anything else, the internal aspects of an individual carry greater weight and shape morale and job satisfaction.

It might be profitable for an individual to take some private time, look in the mirror, and ask several questions. "How am I doing? How much do I like myself, my family, and my friends? What makes me valuable? What gives my life its real meaning?"

The answers to these questions form a personal vision or standard of thought and behavior — the building blocks for a positive and healthy attitude among maintainers.

How people see their jobs depends greatly on how they see themselves. For a moment, think about some of your peers or supervisors. How do they dress, talk, and

*continued*

interact? Are the most successful people the ones who complain the most?

### Additional Recommendations

Without a good vision, there can be no proper attitude for living. If a person's vision contains elements of finding deeper answers to the purpose of life, then the attitude will be positive. When you know where you are going, everything else can be seen in its proper perspective.

If your goal is to be the best parent, worker, and friend you can be, you will seriously study the relevant issues. You will know and exemplify the characteristics which keep you sailing smoothly, like optimism, patience, diligence, understanding, forgiveness, and decisiveness. You will be an individual who attracts others to you because you genuinely care about people and life relationships. Your life is set on a

solid foundation within and is not swayed by external changes in the military or world situation. Your consistent, positive attitude will attract others to you and give you the strength to soar through the toughest times.

When you see a problem through the light of your vision, you won't get frustrated, angry, or derelict. If you find yourself in a difficult situation where supervisors do not support you, with your internalized positive vision qualities, you can sail through the rough waters with the right attitude.

### A Success Story

I had the personal experience of working with a young maintainer. We became friends. I introduced him to a tech sergeant who took him under his wing, demonstrated the pride he needed, worked on his punctuality, performance, and mili-

tary bearing. During several counseling sessions, the maintainer learned to unload much of the negative attitudes and behavior he inherited from his early life. He took his PME seriously, enrolled in college, and helped younger airmen. He overcame because he realized, through the example of his supervisor, how much time and energy he had wasted trying to influence and control others with negatives instead of positives. By the end of the year, he was nominated for an award.

The young maintainer grew closer to his wife and children. He even rekindled his relationship with his parents and sisters. Life became meaningful, and his peers realized it. He rechanneled his negative energy into Toastmasters, volunteered at the chapel, and accepted two foster children into his home.

In one of our later counseling sessions, he compared himself with several of his peers. How far had they progressed in the past year? He said, "The apple doesn't fall far from the tree." In fact, those who never unloaded their negativity were overloaded with greater problems at work and at home. The negative, critical, sarcastic, and careless thinking and behavior led to greater problems. Their shops had more absenteeism, safety violations, and delayed or canceled departures, catching the attention of the commander.

### The Value of the Positive

Finally, maintainers need the strong example of leaders whose directives and actions embody the positive values and goals they strive to attain. Individuals need more than head knowledge of vision and attitudes — they need to see it *lived out* in supervisors and commanders. When one experiences positive values and observes healthy behavior in supervisors, it becomes the tested role model to be inherited. This encourages individuals to build up their vision standards and, thus, add to a greater positive attitude throughout the Air Force. ■



When one experiences positive values and observes healthy behavior in supervisors, it becomes the tested role model to be inherited.





Photo by TSgt David R. Adams, USAF O-2B over Pleiku, Vietnam

## You Live With Your Decisions

**MAJOR RICHARD THOMAS, USAF RET**

■ I'd been in country 3 months when the Easter offensive of 1972 wrecked my hopes of getting home soon. I'd done my share of blowing up trees in Cambodia and a few trucks on the trail, but things were winding down. Story was we'd be going home soon. Why'd the bad guys want to fight now?

Suddenly, we were spending our days buying time for fire bases and patrols stuck in places I'd never seen before. I watched the North Vietnamese Army (NVA) walk across the highlands from the Cambodia/Laos border to Dak To and down the highway to Kontum. Where we'd been searching for targets before 2 April 1972, now we had more than we could handle.

I worked with a South Vietnamese Army (ARVN) fire base on a ridge that was part of a line of hills running north and south about 10 miles northwest of Kontum. The US advisor's call sign was Dusty Cyanide. I'd worked with him almost daily

for 5 or 6 days. I put F-4s and A-4s in on the "bad guys" on the opposite side of a ravine from his place, about 100 to 200 meters away. He liked me. They all liked you when you kept the NVA away.

One day, the visibility was way down, so far down I couldn't put fast movers in as close as he needed them. They wouldn't have seen the target clearly enough and might drop on the friendlies. Not to malign the fighter community, but, in general, they didn't bomb too accurately back then.

I told Dusty to get a Vietnamese FAC and some A-1s from Pleiku — the Jupiters. Those boys were good. They flew down very close to the trees, rarely missed, and they'd stay around forever. I never met an F-4 that could stay more than 15 minutes.

"Sorry, Covey, we've got fuel for only two passes."

At any rate, Dusty got his VNAF FAC and fighters. But two fighters got shot down — a major and a 2d lieutenant. The major got picked up. The lieutenant went in with the

airplane.

The NVA probably didn't have anything that could have reached an F-4's release altitude. Maybe the weather wasn't that bad. Maybe I could have figured out a better axis of attack. Maybe the lieutenant could've been back in Pleiku with his family that night. Maybe my fear of a short round falling on the friendlies clouded my judgment in a critical situation. Maybe not.

A couple of days later, when I called Dusty, nobody answered. The Direct Air Support Center later told me they'd had to evacuate the night before. I still don't know if they made it. I wondered if I could have been the difference. I still do. But the name of the game then was you lived with your decisions. It still is. ■

Major Rich Thomas was assigned to the 20th Tactical Air Support Squadron as a Forward Air Controller in 1972. He is a former Combat Crew Training School Instructor Pilot in the B-52, and a former SAC Instrument Flight Course Instructor at Castle AFB CA. Major Thomas retired in 1990 and currently lives in Merced CA.



USAF Photos by SSgt Dean Wagner

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**DET 1, HQ AIR COMBAT  
COMMAND/DOSR  
Offutt AFB, Nebraska**

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■ "Mogas Control, this is Flag 22."  
"Flag 22, this is Mogas Control. Go ahead."  
"Roger. We are en route to AR123. We terminated our low level early due to weather. Request you coordinate a new ARCT time of 1730Z. Over."  
"Copy, standby."  
(Five minutes later)  
"Flag 22, unable your request. There are no times available for the

next two and a half hours."

Sound familiar? Conversations like this one occur on a routine basis. If you have been involved in such a "chat" with Command Post or Scheduling, you know how frustrating it can be. However, unknown to most crewmembers, scheduling an AR track does not just happen.

Just what are those schedulers doing that takes so long? And why can't you get a new time? This article is an attempt to answer these kinds of question — from a MASMS perspective. A what? What's MASMS? Believe me, I had no idea what it was until about 2 years ago.

So, I'd better start at the beginning.

MASMS is the acronym for Military Airspace Management System, operated by Det 1, HQ ACC/DOSR, Offutt AFB, Nebraska. It is a centralized, computerized scheduling and deconfliction system. It first came on line September 1986, developed as a SAC system for deconflicting and scheduling low-level sorties. Since that time, and especially during the past year and a half, MASMS has grown and expanded way beyond its original capabilities.

One of its "mutations" was to incorporate air refueling tracks. MASMS currently has 50 tracks with all directions and 4 anchor areas. Not all AR tracks are on MASMS. Those that are not must be scheduled through the scheduling agency listed in FLIP, AP1B. All AR airspace on MASMS must be scheduled through MASMS. This is where unit schedulers come into the picture. Units having "accounts" with MASMS tie in directly with our computer via modem. Units can log on using DSN (AUTOVON), DDN (Defense Data Network 1-800 SEI VICE), or commercial access. So, how does the scheduler get an AR time?

Remember during the conversation at the beginning of the article, when the crew was waiting patiently for a new time? The scheduling office was busily calling the scheduling agency (non-MASMS track) or logging on to MASMS, attempting to schedule the new ARCT. Since each scheduling agency (airspace owner) has their own procedures for scheduling and tracking utilization, I will approach AR scheduling strictly from a MASMS point of view. Here's how it goes.

After logging on, the scheduler enters the scheduling portion of the system and inputs the date, entry time (IP time), altitude block, and unit in the appropriate fields on the screen. If MASMS finds no other conflicting sorties, the new time is accepted. If a conflict does arise, MASMS denies the requested time and informs the scheduler of the conflict and the unit the conflict occurred with. It's a little more complicated than that, but this is basically what the system does.

I'm sure the next question is, "What constitutes a conflict in MASMS?" MASMS considers safety of flight the primary issue when dealing with any kind of airspace. The criteria we use for scheduling AR tracks comes from FAA Handbook 7610.4, *Special Military Operations*. The specific guidelines depend on the type of AR and rendezvous being accomplished. One thing to remember is all MASMS AR entry times are based on Air Refueling Initial Point (ARIP) times, not Air Refueling Control (ARCT) times.



**Standard AR Tracks (Same Direction) — Point Parallel Rendezvous After Point Parallel (PP/PP) Rendezvous (See the figure)**

A PP/PP can be scheduled as long as there are 40 minutes between both ARIP times. This allows enough time for the first cell to complete the rendezvous and proceed down track before the next tanker arrives at the Air Refueling Control Point (ARCP).

Tankers are allowed to arrive at the ARCP 20 minutes prior to the ARCT and depart down track up to 10 minutes after the ARCT. Potentially, the first cell can depart the ARCP at ARCT + 10, and the next tanker can arrive at the ARCP at ARCT -20. The 40-minute restriction will ensure a 10-minute pad between all aircraft.

**En Route Rendezvous After a Point Parallel (ENR/PP) Rendezvous**

The same time restriction of 40 minutes applies here as with PP/PP. The fact the second tanker could arrive at the ARCP 20 minutes early necessitates the large time pad.

**En Route Rendezvous After an En Route Rendezvous (ENR/ENR)**

A 10-minute time interval is re-

quired between air refuelings conducting en route rendezvous. No delays are authorized as with point parallel. Therefore, 10 minutes will keep all aircraft separated as long as all aircraft adhere to the scheduled timing.

**Point Parallel Rendezvous After an En Route Rendezvous (PP/ENR)**

MASMS allows this combination of ARs with a separation of 30 minutes. The first cell of aircraft is conducting an en route rendezvous, with no delays/orbits allowed. Thirty minutes will ensure a 10-minute pad between the time the first group passes the ARCP, proceeding down track, and the second tanker's arrival at the ARCP.

**Standard AR Tracks (Opposite Direction) (See the figure)**

The separation required for all ARs going in opposite directions is 35 minutes. FAA Handbook 7610.4 requires a mandatory exit time which includes a 10-minute pad plus an additional 25-minute sterile time added as well. For scheduling purposes, the 35 minutes applies to the exit time of the first AR and ARIP of the second. This allows time for the first cell to depart the track

before the second tanker arrives at the ARCP.

Now let's throw a monkey wrench into the works. Both legs of AR tracks having two directions can be scheduled in MASMS by requesting multiple legs. So, how does this affect the time separations required? Quite simply, if attempting to schedule a track which opposes the final leg of the previous AR, the 35-minute restriction applies. However, if attempting to schedule a track going in the same direction as the previous AR, the time restrictions listed earlier for standard AR, same directions apply.

**Air Refueling Anchors**

MASMS treats all anchor areas in much the same manner as Military Operating Areas (MOA), or parcels of airspace. Standard AR tracks are put into the system by latitude and longitude as listed in the AP/1B. Anchors are in MASMS by name only and deconflicted by time and altitude only. Again, FAA Handbook 7610.4 provides the guidelines. Anchor areas require a 10-minute separation between the exit time of the departing tanker and the entry of the next tanker. Times are driven by the tanker since they are normally the first to enter and the last to leave the area.

There is a lot more information we could cover concerning AR scheduling. However, we hope this article has answered some questions and cleared up any misunderstandings. If you have any comments or questions, please feel free to call us at DSN 271-2334. We will be glad to assist in any way possible. ■

**AR Separation Quick Reference Chart**

Type AR	Same Direction Separation	Opposite Direction
En Route after PP	40 min	35 min
En Route after En Route	10 min	35 min
PP after En Route	30 min	5 min
PP after PP	40 min	35 min

# Am I Really Qualified? •



Photo Courtesy of Cannon AFB NM

## ... or am I just Pencil Whippin' along?

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**CMSGT DON A. BENNETT**  
Technical Editor

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■ A recent Class A mishap was caused by a host of maintainers – not just one or two – who did not perform their tasks as “qualified.” The frightening end result: another expensive aircraft lost and Air Force pilots full of doubts about maintainers’ ability to perform quality maintenance. I hope the lessons learned from this mishap were burned into the memory banks of the mishap unit – maintainers and supervisors alike. If not, they can surely expect a repeat!

There were many causes which brought about this mishap. Some involved blatant violations of established maintenance principles. Reading about them is not for the weak-hearted, especially members of the aircraft maintenance community. Involved were

- Mechanic and supervisor complacency,
- Breaches of maintenance discipline, and
- Inadequate maintenance training.

The most disturbing reality is the fact the causes cut across organizational lines, meaning the involvement included more than one shop and more than one squadron. It’s hard to imagine, well into our new quality-enlightened Air Force, we find such extreme examples of unsafe maintenance practices and so many broken good-faith promises.

### What Kind of Training?

I could have written a half-dozen short stories about lessons learned from this mishap, but I chose just one topic: *training*. Why? Because well-trained people are not as likely to perform poor maintenance. Think about it. Highly qualified, knowledgeable, proficient maintainers will probably still turn a quality wrench even if they have, for example, a poor supervisor.

Yeah, I know, it’s possible long-

term exposure to a poor supervisor could eventually break the spirit of a solid, trustworthy mechanic. However, if the mechanics also have an ounce of integrity, they are not likely to fall into bad practices.

What kind of training am I talking about? It really doesn't matter. You name it: on-the-job, qualification, proficiency, technical, ancillary, or cross-utilization – any and all training. For readers who are not aircraft maintainers, you may include your particular training requirements, too. My message applies to all.

Before any of us can apply our job skills, we have to know something about the job, systems, practices, methods, and procedures if we want to perform successfully. We do this through education or training, both of which are critical to the Air Force mission. In either case, there are some shared goals I'd like to highlight.

### Student/Instructor Relationship

First, both of the instructors and students share the responsibility for a successful outcome. One group has to impart knowledge or skill, and the other has to accept this knowledge or skill as their own. If a successful transfer did not take place, then fools part company – the instructors for not ensuring the knowledge or skill was accepted and the students for not ensuring they had it.

The ultimate responsibility, however, the last-line-of-defense responsibility, lies directly on the students! *Whenever being taught or trained, you owe it to yourself and your profession to walk away with the intended skill or knowledge.*

### Supervision's Responsibility in Training

Another important shared goal: Every supervision level has an *inherent* responsibility to ensure all Air Force education and training programs within their scope of operation are effective!

All of you supervisors have been a student many times in your military and civil service careers, so certainly you have been exposed to both good and bad training programs. As such, you know your people have, or will

be, exposed to some substandard training, too. Recent evidence suggests, however, some supervisors aren't aware of poor training standards and programs existing within their organization. Periodic and accurate followups would allow supervisors to assess the effectiveness of unit training efforts.

On the other hand, even with quality training, a student or two walks away without enough knowledge or proficiency to safely do the task at hand. Chalk it up to lack of motivation, slowness to learn, or perhaps personal problems. The bottom line: The student leaves the training event unable to complete the performance of a task safely. And worse yet, this student is listed as "qualified."

There are four ways to detect a loss of proficiency in people.

- Through daily performance observations, a supervisor will be able to determine if the person is not fully qualified.

- When metrics used to measure a process point to an individual problem.

- When evaluations by other agencies, like quality assurance and higher headquarters inspections show a deficiency.

- Individual qualifications are called into question during the course of a mishap investigation.

In most mishaps involving faulty

training, the fourth example is how poor maintenance practices are finally addressed and stopped when the first three ways fail.

### A Costly Class A Lesson

The Class A mentioned in my opening paragraph is an excellent example of a mishap investigation becoming the yardstick which *really* measured the effectiveness of a training program. This mishap, which resulted in the loss of an expensive weapon system, happened because people did not take their training seriously. It also pointed out how different levels of supervision did not know the true worth of their training efforts.

I chose this mishap because of the number of people involved. Many of them *could* have broken the chain of events leading up to it. It appears quite a few individuals slid through the cracks on their qualification training. The maintainers involved were trained, but they did not, or could not, perform their tasks as qualified to keep the mishap from happening.

The mishap involved a catastrophic engine failure which could have been detected months earlier. Maintainers had opportunities to discover the engine problem during the time-specified and special-event inspections.

continued



Although the article addresses an increase of incidents of poor qualification training, fortunately, the vast majority of Air Force maintainers provide solid, effective training.

# Am I Really Qualified?

continued



## “Qualified” Doesn’t Mean “Proficient”

One particular individual was “qualified” to perform the critical inspection required to detect the deteriorating condition. The person had been performing prior inspections on assigned aircraft. It was later determined he had never performed this particular inspection! In fact, when asked to use the equipment necessary to perform the special inspection, he couldn’t!

Others, whose job it was to interpret engine performance data and determine trends, on many occa-

sions failed to accurately read the mishap engine’s trend data. Had they properly analyzed the data, the results would have prompted required special inspections, *the same special inspections other “qualified” maintainers weren’t accomplishing!*

Maintainers also failed to accurately respond to, and diagnose, system monitoring computer codes requiring established actions, including (you guessed it) the special inspection which wasn’t being accomplished by others! For months, this engine literally and loudly screamed it was going to let loose any day!

Photo by SSgt Brad Fallin



Periodic and accurate followups would allow supervisors to assess the effectiveness of unit training efforts.

## Other Mishaps

From the first day we started flying airplanes, there have been mishaps attributed to poor maintenance training. Some have been minor in nature, but others were major events with tragic results.

Due to a series of errors, an air refueler’s nose gear collapsed while on the ground. Here, too, training was a player. The cross-utilization trained (CUT) specialist was qualified to perform aircraft recovery duties but improperly installed the gear pin. Had the pin been installed properly, it would have stopped the mishap chain. After all, isn’t this the safety feature of the gear pins?

Another Class A ground mishap caused the total destruction of an aircraft. Besides maintainer complacency and breaches of maintenance discipline, training played a major role in the mishap development. Imagine, three maintainers (two seven-levels and one five-level), from three different specialties, performing their primary duties, but not following data, and lacking proper systems knowledge. Worse yet, another seven-level had a trainee with him while performing improper maintenance. While troubleshooting a system fault, the supervisor/trainer did not refer to the proper tech data and used an unorthodox method in the troubleshooting.

Talk about a poor role model and trainer! Had the mishap not occurred, which possibly changed his training motives, I’ll bet the student could have gone on to “train” yet another unsafe maintainer.

## Time for Self-Assessment

Now you’ve heard my story. Am I crying wolf, or am I justified? You be the judge. But do me a favor. Before you pass judgment, reflect seriously on your own training and how you train others. Assess whether or not your maintainers can “perform” as qualified.

Ask yourself: “Am I really qualified? ... Or am I pencil whippin’ along? ■



# OPS TOPICS

## What's That Smell?

■ Recently a crew of a C-130H3 experienced a little excitement on depart-

ure leg when two hot cups overheated resulting in a strong burning odor in the cockpit.

es are properly turned off, it's probably not a bad idea to take a look at the hot cups when you walk by them to make sure they haven't been inadvertently turned on. An even better suggestion might be to remove the hot cup from its receptacle if it's not in use.

Either way, better aircrew awareness of hot cup and galley procedures might prevent the next "what's that smell" call over the interphone and an unnecessary mission delay. Of course, strange smells in the cockpit are nothing new to us heavy fliers ... are they? ■



It seems the timer switch for the hot cups has to be positioned past the 5-minute mark in order to get the cup to automatically shut off. Anything between the 0 and 5-minute mark wouldn't shut the system off - and in this case resulted in both hot cups overheating to the point of deforming the cups.

Although the C-130 Dash One doesn't address the importance of making sure hot cup timer switch-



ties immediately involved.


Intending to send only the Air Force jet around, the Tower controller uses the phrase "Aircraft on short final, go around." We'll leave you to draw your own conclusions about the ensuing fur ball that developed as all four aircraft went around at the same time.

The point is, while the importance of using standard terminology and keeping up with aircraft call signs was stressed to the controllers involved, it's important for our aircrews to be "heads up" in the pattern and to clear without eyes AND our ears, especially when at a strange field. ■

## Short Final ... Go Around!

■ Here's the picture. An Air Force fast mover is on a straight-in to a parallel runway at a Navy airfield. Also in the pattern to the same parallel runways are two Navy fighters and a

Navy multiengine slow mover. Somehow the Air Force aircraft's call sign is not passed on to the Tower controller from Approach, and the Tower controller subsequently becomes concerned about the separation of all par-



## WE GOOFED!

In our December 1993 issue, the unit for Major Lynn Oveson and Major David McAuliffe, Well Done Award recipients, was incorrectly printed as the 56th Fighter Wing, at MacDill AFB, Florida. Please accept our apologies. We should have reported their unit as the 155th Reconnaissance Group, Lincoln MAP, Nebraska.

