



# Hangar Digest

VOLUME 6, ISSUE 3

JULY 2006



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## From the Editor:

The first flight of the Lockheed C-5A took place on 30 June 1968. Soon thereafter the test pilots made a visit to Scott AFB, Illinois, to brief those of us who were involved with planning for the arrival of the airplane into the MAC inventory. I was in attendance, as one of the representatives from the Personnel Directorate. I remember to this day that the test pilots compared the handling of the C-5A to that of the C-124. Maybe a stretch, I don't know, but sure a crowd pleaser to those "Old Shaky" pilots who were in the audience! Eventually I would be returning to Dover AFB and I would be a C-5A aircrew member myself. In this issue, with the thanks of the Airman Magazine, we will spend an earlier "Week With the Big One", the C-5A Galaxy.

So far we've had a very positive response to our Lifetime Member Fundraising Campaign. The names of the contributors, consenting to have their names published, will appear in the next issue of the Hangar Digest.

And yes, you've noticed something different. I'm planning a new format and color presentation starting with the January 2007 issue. I'm using this issue and the next to work out the kinks.

Until the October issue when we take a look at the Military Air Transport Service's Pacific Division, have a great summer and thank you for supporting your AMC Museum!

*Harry E. Heist, Editor*

## LOOKING BACK

Two DC-3 aircraft acquired by the Army from Pan American Airlines airlifted gasoline and lubricating oil over the Himalaya Mountains from Dinjan in eastern India to Yunnan-yi in southern China. A total of eight such airplanes carried enough fuel and oil over the "Hump" to refuel and service U.S. B-25 bombers expected to land in China after a secret raid on Tokyo from an aircraft carrier in the Pacific. This marked the beginning of World War II's largest airlift, which delivered Allied supplies from India to China after the Japanese cut the Burma Road.

Date: 8 April 1942

## **From the Director**

Mark your calendar now, the USAF Thunderbirds will be flying here on October 7-8 2006. As always admission will be free and many of the museum's aircraft will be open for tours. Check our web site after June to see more details.

Speaking of our web site if you have not visited it lately you should take a few minutes and surf around it. Our volunteer webmistress Nadine Lester has done a fabulous job of adding features and information to the site. Check out the Modeler's Corner with close-up aircraft photos to help modelers get those perfect details. The photos in this section were taken by one of our volunteers, Mike Boyd. Mike is a master modeler himself so he knows what to photograph so others can create their masterpieces. Also check out the Oral History pages. We are still looking for more current stories but the WW II section has some truly unique histories.

Charlie Tanner, Tom Davis and Bill VanNess are hard at work restoring the C-119. Although we have had the plane since 1991 we have not been allowed to do any work on it until ownership was transferred to the AF Museum System. Late in 2005 we received permission to begin restoration work since the plane was getting to be an eyesore. The most noticeable improvement on the outside is the replacement of the incorrect oversize radome with a correct military nose cap. Although the C-119 will never be beautiful at least now it looks "normal". The real progress is inside where the boys have replaced rotted flooring and started the laborious task of bringing the gutted flight deck back to its flight ready appearance. We have received great Assistance from Brent Hoban of the Great American Group. He and his crew have sold us the first batch of critical parts that will allow us to make the "Boxcar" back into a respectable example of one of our early airlifters.

It's not glamorous but one of the necessary things we have to do is make sure none of our aircraft are blown away by a big wind. We recently started a project to get permanent mooring points put in the ramp for all our aircraft. The C-133 required 8 mooring points with many tons of concrete poured into 4 foot square holes in the ramp with huge mooring rings in the middle. The C-54 was done next and as time and funding permits we are working on the other large aircraft. By next year we hope to have all the planes permanently moored and all the temporary blocks removed.

Next time you visit the museum you will notice what looks like a mini-clone of the main hangar located at the corner of the overflow parking lot. Thanks to some excellent work from the 512<sup>th</sup> Civil Engineering Squadron we are getting our vehicle garage assembled. We were able to purchase a Quonset hut shaped building to store our aircraft tow bars, tug and tractor, but it would have cost too much to hire a construction crew to assemble it. Then the 512<sup>th</sup> stepped up and offered to do it as a training project for the Civil Engineering Squadron. After getting the initial roof and side walls up in a two week surge they will return on "reserve weekends" to finish the end walls. Needless to say we are very grateful for their support!

Every day I see the look on the face of some young person, and often an older "young" person as they walk down the main hallway and get their first look at the planes in the hangar. That's what makes it all worthwhile!!!

*Mike*

## **Cruisin' with the Curator**

Well folks, strap in and hang on! Hangar 789 is ahead so let's park and go inside to see what's happening.

The C-121 crew is holding up inside the plane restoring the cargo and cockpit. After several attempts at various wall linings, a consensus has been reached and the materials have been ordered. Slowly but surely, the aircraft interior is taking shape and will look really nice upon completion. As of press time, we're not sure just how the aircraft will be used when it is moved over to the museum. Initial discussion was to possibly use the plane for a

**(Continued on the following page)**

## **Cruisin' with the Curator (Cont.)**

classroom for school groups. Access and environmental controls may play a hand in the final decision. We're still in a holding pattern with regards to the painting of the aircraft exterior. Several issues still need to be worked out before we can begin. With that in mind, the paint contractor will start work on the C-141A in late May.

The C-124 crew has a lot of the plane scattered around the inside of the hangar, and although to the untrained eye this may look like poor housekeeping, they actually know what goes where. Imagine that! It'll all make sense once the plane is completely reassembled. The hinges for the rudder to vertical stabilizer are still in work with one already temp installed and the other still in the shop being manufactured. Work on that hinge may be placed on the front burner due to a "notice to evict" we recently received. Now don't go getting too worked up, it isn't all that bad. Maintenance has informed us that they need the area where the Shaky is parked for an expansion project, which means that they need us to move the bird from its nest. So, let's take advantage of the news and request maintenance to finish the work still in the shops before we have to move the plane over to the museum. You know, we scratch your back ..... At the very least, we intend to tow the Shaky over to the museum sometime in June and park it next to the C-133. the challenge accompanying the plane's move is bringing the restoration setup with it and make it functional for the crew. There are plans in mind, I just hope I can remember what they are.

Let's head back over to the museum. We'll slow down just a bit at the parking lot of the museum so you can see the progress the roof contractor is making on recovering the hangar roof. They've had challenges that have slowed them a bit but by press time, the job should be complete.

Out on the ramp, one of our "younger" volunteers, Hal Sellars, is at it again washing planes. Late in the spring, Hal comes out and takes hose and soap to some of our planes and gives them a good cleaning. He has already washed the F-101 and F-106 and has his sights set on the C-131. Thank goodness he likes to do this kind of work. We need a few more like him around. I really appreciate the help. His other area of expertise as a museum volunteer involves graphic work and some of his creations can be seen around the museum as well as at off base establishments. Thanks Hal.

Rick Veller, our active duty staff member, has been busy attaching bird proofing to some of the planes. This year seems to be a more active one for nesting and the application of bird proofing should slow down the construction process. More power to you Rick.

That's the short and simple of it folks. Other projects are in the planning and we'll cover those in the next issue. A general thanks to all the volunteers for their support. We can always use more so if you have some free time on your hands, stop by and let me cover them with work gloves! Take care all, I'll see you soon.

Jim

## **Meet Museum Volunteer Charles (Charlie) Tanner**

Charlie, a former member of the KC-97 "Stratofreighter" restoration team and now a member of the C-119 "Boxcar" restoration team, has been with the Museum for three years.

He entered the Air Force in 1957. Following his basic training at Lackland AFB and engine mechanic school at Shepherd AFB, Texas, he was assigned to Dover AFB. During his Dover tour, he served on temporary duty at Chateauroux, France and Kano, Nigeria during the Congo Airlift. He was then transferred to Charleston AFB, South Carolina. His active duty commitment was involuntary extended due to the Cuban Missile Crisis. He spent his entire Air Force career working on the C-124.

When not working on the C-119, Charlie volunteers at the Bay Health Medical Center. He enjoys working out at the Life Styles Fitness Center, attending church, camping and reading. He resides in Magnolia, Delaware with his wife Cathel. They have three children and five grandchildren.



You see a lot of the world when you fly...

## A WEEK WITH THE BIG ONE

Airman Magazine, November 1973 - By: Sgt. Dick Anderson (staff writer)

The lanky master sergeant flashed a smile that knew 20 years experience. Across the snack bar table sat two other “old-timers.” All three wore flight suits bearing the Pelican patch of the 9th Military Airlift Squadron.

MSgt. Joe Fournier’s smile broke into laughter as the three men recounted days gone by. “Those were the days,” beamed Joe. “Flying the old C-133s one leg at a time. If you were bound for 12 bases, you could plan on a 12-day trip. Shorter duty days. A chance to have a beer and relax at night.”

One of his partners, MSgt. Ed Ranger, squinted his eyes in acknowledgement and added, “Yeah, and nobody had even heard of a 24-hour crew day.” The conversation continued as they consumed their flight line lunch of burgers and fries. It was a Sunday afternoon at Tinker AFB near Oklahoma City.

Some six hours earlier, in a pre-mission briefing at Dover AFB, Delaware, Fournier, Ranger and eleven other men had been prepared for a mission that would deliver over 775,000 pounds of cargo to numerous Air Force bases over a 20,000-mile round trip. The men are crew members on the world’s largest aircraft—the C-5 *Galaxy*. The big bird can carry a spare crew, meaning that it can fly a mission twice as long as would otherwise be possible. The *Galaxy* is built to transport the greatest amount of cargo in the shortest amount of time.

The aircraft counts on its size. Six stories high at the tail and almost a football field long, it can carry up to 265,000 pounds of cargo in a wartime emergency. It counts on its systems—for navigation, maintenance, loading and unloading—to get to its destination expeditiously. But this airborne freighter, with all its sophistication, is only as capable as the men who crew it.

That morning, Fournier and Ranger and the other man at the snack bar, TSgt. Bob Morris, had gone over their *Galaxy* with a fine-tooth comb. They are flight engineers. It’s their responsibility to make sure that all mechanical systems are “Go” before takeoff and during flight.

While they were making visual checks, checking maintenance logs and monitoring a new computer called MADAR (Malfunction Detection, Analysis and Recording Subsystem), designed to call out maintenance problems *before* they occur, four other NCOs were busy preparing the cargo for the first leg of the trip.

Aircraft Commander Capt. Thomas Maxwell was busy running between flight operations and the weather counter. There were thunderstorms from the top of Indiana all the way to Tennessee. The navigator, Lt. Col. Harry Heist, felt the thunderstorms were too high an altitude to fly over. They would have to detour south on the trip to Oklahoma, Maxwell agreed.

The flight plan was filed. Heist and a student navigator headed for the aircraft. It would take a half hour to “warm up” the Inertial Navigation System. Captain Maxwell and his first pilot grabbed a quick snack, then boarded the crew bus.

“Tail number 70467,” Maxwell called to the driver, as he pointed toward the aircraft parking spot. “This is a brand new airplane,” he added. And new it was. The C-5 for this mission was the 81st and last *Galaxy* to roll off the Lockheed assembly line at Marietta, Georgia. The first one made its initial flight in 1968 and since that time several changes were made to better the aircraft’s performance. This new aircraft incorporated all of these modifications.

Another aircraft commander, a major, greeted Maxwell as he boarded. The major had the job of launch controller, or “bird watcher” today.

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## A Week with the Big One (Cont.)

Out at the aircraft, seven hours before takeoff time, the bird watcher acts as a coordinator. If the flight engineers find a part that should be replaced, he insures that the maintenance people are out there with the part. He's there to assist the aircraft commander. The size of the job calls for the extra help. The bird watcher informed Captain Maxwell that things were running smoothly. It was time to run through the pre-flight checklist.

Two of the loadmasters remained in the passenger compartment at the rear of the aircraft. The rest of the crew was busy preparing for takeoff in the crew compartment up front. The C-5 is unlike airliners or other cargo planes. To get from the crew compartment to the passenger area, you must descend a ladder into the huge cargo compartment, walk 40 yards toward the rear and climb another ladder.

As the crew strapped in, Maxwell began receiving reports from the flight engineer, navigator, copilot and loadmasters in both the passenger and crew rest areas. Each monitored something. Equipment, computers, instruments and people. No discrepancy that could prevent a safe and successful flight could be overlooked.

All systems were "Go" and 450,000 pounds began to roll as Maxwell taxied the huge machine forward, then turned toward the runway. The *Galaxy* responded with miraculous ease. A total of 28 wheels, four on the nose gear and six on each of the four main gears, were all turning. The aft main gear can change direction, allowing the aircraft to turn completely around on a runway that is only 150 feet wide.

The final check is made on the runway.

"Copilot ready for takeoff."

"Navigator ready for takeoff."

"Engineer ready for takeoff."

"Passenger compartment ready for takeoff."

"Crew compartment ready for takeoff."

"Advancing throttles now," Maxwell acknowledged as his right hand pushed the throttles forward.

As the tachometers rapidly rose to indicate the four jet engines were approaching maximum revolutions per minute, the *Galaxy* gently lunged forward. The roll continued, the speed increasing. Liftoff was next, but suddenly—"reject!" The plane was jamming to a halt. The reverse thrust was fighting the forward motion of the large mass. Crew members and passengers were feeling the force, being pushed forward but restrained by their safety harnesses. Within what seemed to be a second or two, the plane was stopped. Each of the 24 main landing gear wheels has an anti-skid system to prevent wheel lockup—and skidding.

The *Galaxy* headed for the taxi ramp and its parking spot. A faulty airspeed indicator was the reason. Captain Maxwell knew the plane was gaining enough speed for takeoff. The airspeed indicator on the copilot's side was reading properly but the one on Maxwell's panel read low. Instinctively, the aircraft commander called the reject. Airborne, it had the chance of causing a problem—or an accident. A maintenance man from the avionics shop was alerted, the new indicator installed and tested and the crew and aircraft was once again "Ready for takeoff." The decisive action Maxwell took in that split second may have seemed hasty. The old seat-of-the-pants pilots in the World War II flicks would never have blinked an eye at a malfunction as trivial as that. After all, there was another indicator and it was working. Maxwell knew that he had enough speed for liftoff. But, the C-5 is not a seat-of-the-pants airplane. Those airplanes and that kind of flying are gone now, except on the stunt flying circuit.

There would be more maintenance problems during the next six days. In each case, a decision would be made by the aircraft commander, usually after conferring with one of the other crew members. And each decision would be made in the same way, with respect and knowledge of the aircraft and its many systems.

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## A Week with the Big One (Cont.)

Not just knowledge of what you feel and what has happened—knowledge of what you see and what can happen. The latter is what Maxwell instinctively considered when he slowed the plane to a halt. The *Galaxy* began its second takeoff roll and this time it was *liftoff*.

The navigator was right about the thunderstorms being too high and the flight to the south went smoothly. Upon landing at Tinker, the loadmasters and ground crew went into action. SSgt. Chuck Werner knew that a load would be waiting. The airlift command post at Tinker had radioed the information—85,560 pounds of cargo on pallets and rolling stock.

Werner and another loadmaster looked over the cargo on the ground. The weight checked out as did the number of pallets. Before loading, Werner sat down with a piece of paper called a “cargo loading plan view.” It’s a diagram of the cargo compartment of the C-5. He carefully but quickly decided how the pallets should be arranged to have proper weight distribution and so that cargo coming off first would be near the rear.

There was another consideration too. Two of the pallets held containers of dangerous cargo—acid. These pallets had to be placed in one of the four rear positions. If one of the containers began to leak during flight, it would be necessary to throw it out through the aft cargo doors. The loadmaster knew this. His knowledge of the systems and what could happen allowed decisive, but quick, action on his part and soon he was ready to load the aircraft.

A device called a K-loader, a large flatbed on top of ten wheels moved towards the open tail section. The flatbed was hydraulically raised to the same height as the horizontally extended *Galaxy* door. Werner waved him forward until the ramp-door and the bed were touching. Although the load was over 85,000 pounds, it took only a short time to load and secure. Werner knew where each piece was to go and to get it there was a matter of rolling the pallet along the caster track until it was in place. It was still hard work and they were apt to sweat a little, but the know-how made the loading go quickly and efficiently. Werner and the other loadmasters headed for the snack bar where Fournier, Ranger and Morris were just finishing lunch. It had been over six hours since the briefing at Dover and the day was just beginning.

Sergeant Werner handed a slip of paper with the cargo weight and distribution written on it to the flight engineers. It would be needed for computing takeoff and flight data. Sergeant Fournier used the information a few minutes later as the crew, now on board, was pre-fighting again. Fournier knew the amount of fuel, the aircraft weight and the cargo weight. He knew the wind direction and speed. He knew the performance characteristics of the C-5. A few computations and Fournier handed forward to the pilots a white 3x5 paper with the words “Takeoff Data” printed on the top. It told the amount of runway needed to take off and the speed needed for liftoff. It contained other data, too. Its importance was in letting the pilot know what to expect. Crew and plane ready. Maxwell headed for the runway. There weren’t any passengers on this leg. None are allowed when dangerous cargo is aboard.

Airborne, the crew headed west for Travis AFB, California. No cargo was waiting and none was to be off-loaded there. By the time the crew members arrived at the Travis billeting office, their day would have gone sixteen hours. By the time they could refuel at Travis and reach the next stop—Hickam AFB, Hawaii—the crew duty day would have exceeded the 24-hour limit. This day would end at Travis.

A 24-hour augmented crew duty day is not unusual in the C-5. In the past, basic crews were limited to 16-hour days. A basic C-5 crew is also limited to a 16-hour day—from the mission briefing to the time the aircraft is parked at that day’s destination. The basic crew consists of eight—two pilots, one navigator, two flight engineers and three loadmasters. By adding a pilot and navigator to the basic crew, the duty day can be extended to 24 hours. In this augmented crew, each man will work for a while, then be relieved by an alternate. This affords him time to eat, relax or catch some sleep. Sometimes the mission calls for the long day. On this mission, none of the days would be long. But the capability was there had it been needed.

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## A Week with the Big One (Cont.)

Sometimes, the augmented crew may consist of more than ten, as it did on this mission. A student navigator, an extra flight engineer, an extra loadmaster flight evaluator were on board. Another navigator came aboard at Travis. Under the regulations, the student navigator could not be part of the augmented crew. So, the extra navigator from Travis was needed to fly a 24-hour day. Wakeup was early the next morning. It would be a long flight to Hickam.

A flight examiner, MSgt. Warren Hapke, was on board to observe Chuck Werner and another loadmaster, Sgt. Jimmy Moore. Hapke, a stocky man, wears a flight suit adorned by a patch denoting over 10,000 flying hours. He knows his business and he knows the C-5. As Werner and Moore load and unload cargo during the mission, he works along side of them, always observing. Often, he stops to ask what they're doing and why. He asks questions about what could happen under hypothetical circumstances.

On the leg to Hickam, there was little for the loadmasters to do. None of the cargo would be unloaded until Guam. Occasionally, a crewman leafed through a magazine. Others tried to catch some sleep. But for the most part those in the crew compartment talked—about the C-5 and its systems. For these troops, at least for then, tech orders beat out *Playboy* as preferred reading material.

Werner thumbed through the Dash-1 (tech orders and procedures) and marked down answers on a test he had been given by the squadron training office. He receives one of these tests each month. The questions, which usually number 100 or so, deal with safety, loading and unloading, what to do in certain airborne situations, but mostly, with knowing and properly using the aircraft systems. It also contains information about modifications of the systems and what they mean to him, as a loadmaster. Werner looked over at Moore, grinning, and said, "You know, each time I look through the Dash-1 to make sure I've answered these questions right, another question about the systems comes to mind." They constantly test each other's knowledge.

Both Chuck Werner and Jimmy Moore plan to leave the Air Force within the next year. Werner will end eight years service when he heads for a job with the police force in his hometown, Baltimore. Moore has plans for an air conditioning business in Arkansas. But to hear them talk about their present job, you'd never know it. They're strictly professionals.

On the ground at Hickam, Captain Maxwell called for a crew rest. At the pace the C-5 crew sets, there is no time for sightseeing. After a hot shower, dinner and a beer, it's time to turn in.

The third day began early with the prospects of over 20 hours until the next crew rest. Another 14,000 pounds were added to the cargo. Destination: Guam.

Flying over the water can be tricky. Lt. Col. Harry Heist had the experience for it—close to 20 years. For student navigator Maj. Tom Masino, it wasn't so easy. Although a rated navigator for some time, Masino held a desk job for the six years prior to being accepted for C-5 transition training at Altus AFB, Oklahoma. The fundamentals remain the same, but the new nav-aids and systems are a challenge.

Heist, who holds an instructor rating, leaned over Masino seated at the nav-instrument panel and pointed to one of the instrument faces. The reading gave the amount of reserve fuel. He asked Masino to give him the amount of flying time the aircraft will have left at the next destination. Masino came up with the answer. It was a good answer but there's a quicker and simpler way to find it.

The lieutenant colonel moved to the instructor's chair at the right of his student as he began to explain one of "the tricks of the trade" he has learned about using the C-5 systems. Heist wanted to instill confidence in the student. "Look, Tom, the way you arrived at this information is fine. But there's a simpler way. By using the computer..." As he depressed a small yellow square on the board in front of them, seven rectangular windows came alive with numbers. It was the Energy Management Analog Computer (EMAC), designed

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## A Week with the Big One (Cont.)

to continuously calculate fuel and range data. The information is constantly being updated by inputs from other instruments on the board. For navigational accuracy, other computers are capable of accepting and monitoring several reference points along the flight path. Heist warned his student not to become over dependent on this new nav-aid, stating, "This computer can be very effective. But the information is only as accurate as the original information you feed into it."

He feels the same way about the other systems—the inertial Doppler, multi-mode radar, LORAN, attitude and heading reference unit and the bearing-distance-heading indicator. Each of these navigational systems attacks the same problem—getting from point A to point B with ample fuel—in a different way. Each system has its advantages and disadvantages. Heist often uses readings from one nav-aid to check the accuracy of another. He emphasizes the importance of understanding each nav-aid's capabilities, as well as faults.

He doesn't stop there. On each of the night overwater legs, student and instructor stepped to the middle of the flight deck to take a celestial reading from the periscopic sextant. According to Colonel Heist, "The sextant's the oldest nav-aid we have, but it's the most reliable."

The chances of having to rely solely on the sextant, however, are next to none. All five of the other systems would have to break down. Dependability is an advantage, but not the reason for having so many systems. Although the *Galaxy* does most of its flying above 30,000 feet, it is designed for low-level, all-weather flying, too. The multi-mode radar is built for this type of mission. During one leg of the mission, Colonel Heist used the radar to show the outlines of small waterways and the lay of the terrain below, even though it was completely covered by clouds.

The computer showed a navigational error of less than a tenth of a mile when the crew started the final approach to set down at Guam. Ground time here would be 2 hours 45 minutes. With high humidity and 100 degree heat, Werner, Moore and Hapke were glad that only 11,000 pounds were to be offloaded. After a sweaty 12 minutes, the three were headed for the air-conditioned snack bar—and another flight line special of burgers and fries. Refueling was already underway.

The next leg brought special problems and more decisions to be made. A few minutes out over the Pacific, the autopilot went out. Ed Ranger was the first to know. As he monitored more than 40 instruments at the flight engineer's panel in front of him, a steady yellow light caught his attention. The light came from the MADAR panel and warned of a malfunction in the aircraft. Within seconds, a series of numbers and letters was printed out on a tape to Sergeant Ranger's right. He read the code easily. He immediately depressed a series of squares on the panel in front of him. A seven by nine inch screen became a changing black and white blur until the movement stopped and a data card with information about the autopilot appeared. MADAR monitors over 1,000 test points in systems and subsystems and reports any weakness or failure as soon as it's detected. It's more to forecast failures than to report them after the fact.

The loss of the autopilot was not critical. It simply meant the pilot would have to manually fly the whole trip. The crew could only hope there would be a replacement when they arrived at Clark AB in the Philippines. However, there was no autopilot at Clark. One would have to be flown in from Travis. It could be a day or more before the part would arrive. Captain Maxwell could wait or he could push on without it. The problem of flying without the autopilot was the manual piloting. The task itself was not a problem, but regulations confined the augmented crew to a 16-hour day when the aircraft is flown manually. Despite that, Maxwell made his decision: *press on*. The mission of C-5 number 70467 was still on schedule. With a cargo load of 123,000 pounds, it took off for Udorn Royal Thai Air Force Base, Thailand.

Udorn wasn't made for an aircraft this large. The C-130s, one-fourth the size of the C-5, overshadow the other aircraft on the flight line. The single runway seemed impossibly narrow as 70467 neared it on final approach, but Maxwell and first pilot Capt. Dick Zabel knew that the C-5 could land on even less runway.

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## Recommended Reading: Remembering An Unsung Giant

The Douglas C-133 Cargomaster carried heavy and outsized cargo for fifteen years, then was retired and forgotten by all but those who flew or worked on it. Author Cal Taylor tells the complete story of this heavy USAF logistics transport, placing it in its historical, technical, military and human context.

Chapters cover technical information, C-133 employment, support of NASA and the strategic missile force, special missions of all kinds and its deployment during the Vietnam War. More than 330 photos and illustrations show the airplane and its people. The index lists over 970 persons as well as other topics and there is a complete bibliography. There is a 16-page color section and four fold-out sheets containing large Douglas factory drawings and one large C-133 photograph.

This 428 page book is definitely a must-have reference for those who flew and worked on the aircraft, airlift enthusiasts and modelers will appreciate the detail in which it is presented.

The book is available from the Museum's gift shop and can be purchased for \$32.95 including shipping and handling, payable by check, VISA, MasterCard, Discover or American Express.

Please call (302) 677-5992 or email: jay.schmukler@dover.af.mil to place your order.



## Museum Aircraft of the Quarter: Stearman PT-17 "Kaydet"

The "Kaydet" was typical of the biplane primary trainers used during the late 1930s and in World War II. Whereas it was powered by a Continental engine, the same airplane with a Lycoming engine was designated the PT-13 and with a Jacobs engine, the PT-18. A later version which featured a cockpit canopy was designated the PT-27.

Of the more than 10,000 Kaydets ordered for the United States and its Allies, 4,360 of these went to the Army Air Force. Following WWII, the Kaydets were phased out in favor of more modern trainers.

The Museum's PT-17 was donated by Al Johnson, a local aerial crop duster, and was restored using pieces from several aircraft and hand fabricated replica parts. The aircraft was under restoration for two years and was placed on exhibit on 23 February 1996.



## Name the Artifact by: Deborah Sellars

Today, almost everyone has at least one credit card to buy food, clothing, entertainment and all the stuff we just can't do without. The credit card pictured here belongs to a C-5! What can a C-5 buy? See page 11 for the answer.



### Membership Recognition

*The AMC Museum Foundation expresses its gratitude for the generosity of the following who have contributed \$100.00 or more in support of the AMC Museum through new and/or renewed memberships:*

W. Erich Hausner

Maj. Douglas W. Thompson

Daniel Weiss

## “Name the Plane”

The airplane that I asked you to identify in April’s issue of the Hangar Digest is the Airbus Industries “Super Guppy”.

The Super Guppy was acquired by NASA from the European Space Agency (ESA) under an International Space Station barter agreement. Manufactured by Airbus Industries, ESA supplied the aircraft to offset the cost to NASA of carrying ESA experimental equipment to the station as part of two future Space Shuttle flights. The new Super Guppy is the latest version in a long line of Guppy cargo aircraft used by NASA.



Guppy aircraft were used in several past space programs, including Gemini, Apollo and Skylab, to transport spacecraft components. The first Guppy was developed in 1962, designed specifically for NASA operations by Aero Spacelines of California.

An innovative approach to management of the Super Guppy allows the aircraft to be leased from the government for other cargo-carrying operations when it is not being used to ship NASA spacecraft components. The leasing of the aircraft is hoped to offset the cost of operations.

The Super Guppy, designated 377SG-201, has a cargo compartment that is 25 feet tall, 25 feet wide and 111 feet long. It can carry a maximum payload of more than 26 tons. The aircraft has a unique hinged nose that can open more than 200 degrees, allowing large pieces of cargo to be loaded and unloaded from the front.

NASA personnel have outfitted the Super Guppy with a special designed cradle to be used when carrying International Space Station components.

The Super Guppy has been a frequent visitor to Dover AFB. The photo was taken on the base’s south ramp which adjoins the AMC Museum.

Of the readers submitting an entry, all but one identified the aircraft as the Super Guppy. Our randomly selected winner of the “Name the Plane” contest is Steven Daskal of Burke, Virginia and he will receive the book “Remembering an Unsung Giant”. Congratulations!

This time I ask that you identify the airplane depicted below including the manufacturer, mission, design and series (if applicable); i.e., Boeing B-17G. Please send your entry either by letter, e-mail, FAX or post card to any of the addresses listed on the last page. Please do not leave your entry by phone. I will designate each correct answer with a number ID from which I will randomly select one winner. Please send your entry as soon as possible and please include a return address. The winner will receive an aviation related selection from the Museum’s gift shop. Good luck and thank you for your participation!

(Museum staff and volunteers are not eligible)





**The Museum Recognizes its Volunteers at its 5th Annual Volunteer Luncheon**

**Pictured above and in alphabetical order are: Don Adams, Hank Baker, Ed Barnes, Mike Boyd, Carl Butterworth, Dick Caldwell, Jan Caldwell, Jim Campbell, Jack Carpenter, Don Clark, Tom Davis, Don Dell, John Demory, Leo Donnellan, Rich Donovan, Dave Doyle, Jim Fazekas, Aaron Fisher, Gerry Foss, Rich Goldey, Bill Hardie, Harry Heist, Dan Jenkins, Bob Jones, Howard Lewis, Jan Marinucci, Sam Marinucci, Bill Maroon, George McDuffie, Paul Mijal, Dave Miller, Jimmy Nolan, Larry Phillips, Ludwig Possenti, Ed Pratt, Jim Reed, Jon Rehm, Don Rynes, Sandy Sandstrom, Jim Santa-Anna, Ralph Scaramo, Jay Schmukler, Harry Shirey, Tom Spangler, Jeff Spiegelman, Les Stiller, Charlie Tanner, Van Templeton, Bill VanNess, Ron Vautard, Bill Voigt, Dave West, Ken Wiggins, Gene Williams, Kevin Wysopal and Al Yerger. At the luncheon but not shown were: Phil Childress, Harry Hettinger and Chester Smith.**

**Name the Artifact**

The credit card, or Jet Fuel Identaplate, is used by the crew to purchase — you guessed it — fuel for the aircraft at home or off station. This particular card belonged to C-5A ser. #680222 when it was stationed at Dover AFB.

Deborah Sellars

## Around the Bases: Kadena Air Base, Japan

Located fifteen miles north of the city of Naha on the Japanese Island of Okinawa (the largest island in the Ryukyus), Kadena Air Base is the home of the 18th Wing; Commander, Fleet Activities Okinawa, United States Navy; 82nd Reconnaissance Squadron, Air Combat Command; Support Center Pacific, Air Force Material Command and the **733rd Air Mobility Squadron (Air Mobility Command)**.

Kadena's history dates back to just before the April 1945 invasion of Okinawa when a local construction firm completed a small airfield named Yara Hikojo near the village of Kadena.

The airfield, used by Japanese warplanes, was one of the first U.S. 10th Army targets and was captured just hours after American troops stormed the island beaches on 1 April. Americans captured a 5,000-foot strip of badly damaged coral runway. Army engineers quickly made repairs and by nightfall the runway could accept emergency landings. After adding six inches of coral, the airfield was declared operational eight days later. By August 1945, an additional runway was built and the original runway was lengthened and improved to accommodate bombers.

Although original a fighter base, a B-29 organization — the 316th Bombardment Wing — was the first element responsible for base operations. The 316th was preparing to fly combat missions against Japan, however, President Harry Truman announced the end of offensive action against Japan on 15 August 1945 before bombers could take to the skies. The surrender of Okinawa's Japanese forces occurred on 7 September when General Joseph Stilwell accepted their surrender.

The 316th Bombardment Wing remained at Kadena until its deactivation in 1948. An advanced element of the 316th returned to Kadena in June 1950 when the 19th Bomb Group arrived from Anderson AFB, Guam, to fight the Korean War. In August 1950, the 307th Bomb Group arrived from MacDill AFB, Florida, adding to the base's growing bomber force.

When the Korean War ended in 1953, the B-29s departed and in 1954 were replaced with F-86F Sabrejets from the 18th Fighter-Bomber Wing (from Korea). In March 1955, the 313th Air Division was activated at Kadena, replacing the 20th Air Force as the senior U.S. Air Force organization in the Ryukyu Islands.

The 18th Tactical Fighter Wing, as the wing came to be known, exchanged its F-86Fs for the supersonic F-10D Super Sabres in 1957. The wing would convert to the F-105D Thunderchief in 1962. In the early 1970s, the wing exchanged its Thunderchiefs for F-4C/D Phantoms. The latest fighter, the F-15 Eagle, was assigned to the base in 1979.

Then, in 1991, the largest reorganization the base had ever seen took place when many units were realigned, redesignated or deactivated. The 313th Air Division deactivated on 30 September and one day later Kadena combined three wings — the 376th Strategic Wing, 18th Combat Support Wing and the 18th Tactical Fighter Wing — into one, thus incorporating the E-3 Sentry (Airborne Warning and Control System), KC-135 Stratotanker and the F-15s all under one wing — the 18th Wing. Since then, the 33rd Rescue Squadron and its HH-60G helicopters have also realigned under the 18th.

The Air Mobility Command maintains the **733rd Air Mobility Squadron**, a unit of the 715th Air Mobility Operations Group, Hickam AFB, Hawaii, which provides support to transport aircraft operating in the Pacific Theater. Employing more than 300 people, it provides a wide range of services that includes command and control, maintenance, fleet services, cargo and passenger handling operations as well as regularly deploying to forward locations to provide many of these same services.

**(Continued on the following page)**



## **Around the Bases: Kadena Air Base, Japan (Cont.)**

Kadena Air Base is the largest U.S. military installation in the Asia-Pacific region and the 18th Wing is the largest wing in the Air Force. Approximately 7,000 military members are assigned to the wing. The total base population of 23,000, from five major commands includes family members, U.S. civilians, Japanese base employees and contractors. The wing manages \$6 billion in resources, including nearly 80 F-15, KC-135, E-3 and HH-60 aircraft valued at more than \$4 billion. Other equipment and capital assets are valued at approximately \$2 billion. Kadena's presence on Okinawa contributes significantly to the island's economy. The base's annual economic impact is estimated at \$700 million.

Kadena's operations contribute to regional stability. Leaders of both Japan and the United States have repeatedly affirmed that the bilateral security relationship, based on the Treaty of Mutual Cooperation and Security between both countries, remains the cornerstone for achieving common security objectives and for maintaining a stable and prosperous environment for the Asia-Pacific region in the 21st century.

Sources: <http://www.kadena.af.mil>; <http://www.globalsecurity.org>

## **A Week with the Big One (Cont.)**

After touchdown, Maxwell parked the aircraft on a concrete square. With the narrow taxiways, the command post advised that the patch in the middle of the airstrips was the most practical.

Werner and Moore would earn their pay today. The cargo, all 123,000 pounds of it, came off at Udorn. Even for Southeast Asia, the day was unusually hot and humid. The job was done in less than an hour.

The pallets weigh several tons apiece, some as much as 10,000 pounds. Even on the roller system, it takes some muscle to move a pallet that heavy down a 50-yard track. After the offload, the last thing the two loadmasters wanted to see was more cargo. But there it was. Udorn had managed to come up with 25 tons of it, bound for Clark. Again, Werner inspected the cargo and assigned each pallet to one of the 36 pallet positions in the compartment for proper weight distribution.

Later, on board, while the crew on the flight deck prepared for another takeoff, Werner talked about the heat. He recalled another mission—to Managua, Nicaragua—to assist earthquake victims there. "You know, working in the heat like this can be hectic, tiring. I think the hardest I ever worked was on that mission to Managua. But I don't think I've ever gained as much self satisfaction as on that trip. Those people really needed us."

After the trip to Clark and crew rest there, it was on to Yokota AB, Japan, where another 103,000 pounds waited for transportation Stateside. Six days had passed. Places and times seemed to melt together. There was no regular schedule—for eating, for sleeping. There was only one schedule—getting the goods to a destination on time.

The last day was the longest. With cargo secure and a full load of passengers, 73 in all, the aircraft left Yokota for a refueling and maintenance stop at Elmendorf AFB, Alaska, and finally Dover. Chuck Werner was tired when the C-5 landed at Dover. It had been a long week of long days. He looked forward to the next couple of days. He could stay at home and relax. He knew he had more studying to do on the aircraft he crewed. And in another week or so, he'd be flying again. Perhaps another routine mission, like this one. Or perhaps another Managua. He remembered them all. It had been a year of long weeks.

*Editor's Note: This mission took place between the 17th and 25th of June 1973 before C-5 in-flight refueling was a common practice as it is today. We logged 50 hours of flight time.*

*Additional note: Not to be outdone by the US Air Force, Russia developed the Antonov AN-124 that became operational in 1986 which exceeded the dimensions and weight of the C-5. The AN-124 remained the world's largest aircraft until the development of Russia's AN-225 which was put into service in 1989.*

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Nadine Cragg-Lester

NCL Concepts

The Hangar Digest is published quarterly and is dedicated to the preservation of our airlift and tanker heritage. All articles, unless otherwise noted, are written by the editor. All photographs are the courtesy of the Air Mobility Command Museum unless otherwise designated.

I solicit your comments, articles and ideas for future issues. You may contact me by mail: Harry E. Heist c/o The Hangar Digest, P.O. Box 02050, Dover AFB, DE 19902-2050; FAX (302) 677-5940; PH (302)677-5997 and email:

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