



# DR AHEAD



THE AIR FORCE NAVIGATORS OBSERVERS ASSOCIATION NEWSLETTER

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OCTOBER 2022



The Air Force's first operational CV-22 Osprey tilt-rotor aircraft hovers upon arrival at Kirtland Air Force Base, N.M., in March 2006. (U.S. Air Force photo by Staff Sgt. Markus Maier. Photo from Wikimedia Commons.)

## PRESIDENT'S MESSAGE

by Jimmie Hanes, James Connally 66-13

I am writing this in August so the timing for inputs is quite unique. I hope you are coming to Ft Worth; it was good to see you, and at the same time, thanks for coming.

We are still looking at Waco for September 2023, and I would be remiss if I didn't advise the spouses that there is still a lengthy wait time for dining at the Magnolia Table. As the 100-degree temperatures abate here in Texas, we look forward to a cool, relaxing end to summer. May God continue to Bless the USA.

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### NOTAM: DEATHS and CHANGES OF PERSONAL INFORMATION

Report address, cell or land line number, and e-mail changes to: **AFNOA**, 4109 Timberlane, Enid, OK 73703-2825; or to [jfaulkner39@suddenlink.net](mailto:jfaulkner39@suddenlink.net); or call 580-242-0526.

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## AFNOA 2ND VICE PRESIDENT BRETT A. SCHRIEVER

by Brett Schriever, Harlingen 61-10

Here are some highlights from my background. I graduated as distinguished graduate from Navigator Class 61-10 at Harlingen and then attended Electronic Warfare Operator's School at Keesler AFB.

After graduation as an EWO I was sent to Eglin AFB as an EWO test officer in 1962. At Eglin my job was to conduct tests of various radar warning and homing systems to determine their effectiveness, to test electronic countermeasures effectiveness, and to schedule various other requests for use of the passive and active electronic systems at the Eglin test range.

In 1964 I was transferred to Hickam AFB in Hawaii to be a navigator in the C-130 Nose Cone

**Continued on Page 3**

**LOOK FOR THE 2022 AFNOA REUNION REPORT  
IN THE JANUARY 2023 ISSUE OF DR AHEAD**

**TABLE OF CONTENTS**

President's Message, by Jimmie W. Hanes, Jr .....	1
AFNOA 2nd Vice President, by Brett Schriever.....	1
Membership Application Form.....	2
Historian's Report, by Ronald P. Barrett .....	4
The Last Bus from Agana, by Murray Siegel.....	5
Scud Viewing, by Bob Johnson .....	5
A Nightfighter Navigator Recalls Space, by Richard Myers.....	5
Flying is Dangerous, by Giles W. Willis, Jr .....	6
C-133 Mission to Easter Island, by Paul Ogushwitz.....	7
Letters.....	10
Last Flights, by Jim Faulkner.....	11
The <b>AFNOA</b> Board & Operating Committees.....	16

**MEMBERSHIP APPLICATION**  
**AIR FORCE NAVIGATORS OBSERVERS ASSOCIATION**

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Age 80 and over — \$35.00 for life

If you are currently a member, GREAT! Please consider a donation to the operating account. If you are not a current member, please consider joining and giving a donation to the organization. Thank you.

Membership	\$ _____
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**MANUSCRIPTS** are welcomed, especially by e-mail (address: sue.curran@att.net) or by submittal to the editor on data CDs, IBM-compatible formats only please. All submissions must include the address/contact of the contributor; no anonymous material will be printed; however, names will be withheld on request. The editor reserves the right to edit submitted articles for reasons of taste, clarity, legal liability, or length. The comments and views herein represent the views of the editor and are not necessarily those of **AFNOA**, Inc. Deadline for the next issue is 15 November 2022.

**CHANGE OF ADDRESS:** Please report changes of address to: **AFNOA**, Inc., 4109 Timberlane, Enid, OK 73703-2825; jfaulkner39@suddenlink.net; 580-242-0526.

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**Continued from Page 1**

Recovery Squadron. I flew one mission involved in the successful recovery by my aircraft. Recovery missions involved four aircraft and one helicopter, and occurred 3-4 times a year.

I was sent to Ubon RTAFB in Thailand to fly C-130 gunships in 1970. I was trained in the operation of each of the four positions manned by a navigator; table navigator, EWO operator, infrared operator, and low light TV operator. Upon arrival at Ubon, I was assigned the duty as the Stan-Eval Navigator and had to write up the table navigators' procedures and associated tests. In addition, I had to give new navigators their check rides. When the wet season arrived, I was transferred to Saigon at the 7th Air Force Headquarters to support the command briefing team.

In June 1971, I was assigned to Hurlburt Field in northwest Florida where I served as an instructor in C-130 gunships for two years.

In 1973 I was transferred to the Pentagon in the Operations directorate as a staff officer. There I was an emergency support staff officer for any emergency actions around the world that involved air staff support. I was also tasked to implement Air Force-wide a new system to measure the readiness of every unit down to the squadron level. The system was to replace the C-rating system in which each squadron commander was to rate his unit from C-1 through C-4, with C-1 being fully ready to C-4 being not ready. Four components were measured: (1) personnel readiness, i.e., number of pilots combat ready and available vs. number assigned; (2) assigned systems status, i.e., number of aircraft combat ready vs. number assigned; (3) system maintenance status, i.e., qualified staff, and required maintenance equipment and parts status; (4) wartime maintenance and spare parts deployment kits status. The new system measured the same four categories but changed the measurements to percentages from 0% to 100%. This did not significantly change the first three categories but was designed to accurately reflect the fourth category. This was brought about because of a disconnect between the way the squadrons were reporting this status. Units regularly raided these kits to keep planes flying, therefore the Air Staff was continually requesting large amounts for unit war deployment kits. Congress did not understand why the Air Force was continually requesting large amounts of funding for something which should stay reasonably stable. The objective, therefore, was to be able to justify the need for the necessary additional funding using a format that congress could better understand. The system was fully implemented prior to my departure for duty at Headquarters NORAD.

At NORAD my first assignment was as Deputy Director for ADP Resources. I was tasked to assist in an analysis of the security of the NORAD communications systems. The results of the study exposed some weaknesses in several areas. I briefed the results to the AF Communication Services Command. Next, I was assigned to be the chief of the NORAD Systems Center which was responsible for overseeing and managing all the communications for all the sites and systems. This included requests for systems down times, ensuring the real time status of all sites and systems, and responding to system failures and errors, i.e., false warning generated by a bit swap in a message.

I retired in 1981 at the rank of Lieutenant Colonel. After retirement I worked for several government contractors as a senior systems engineer and a program manager. In 1989 a friend of mine and I formed our own company to pursue government contracts. In 1990 after the first Iraqi War, we teamed with a small company to pursue contracts in Kuwait. I and a member of the other company arrived in Kuwait on June 30, 1990. We spent a total of nine months over the next year during which we proposed and entered negotiations to rebuild two destroyed small harbors, rebuild the central city communications links, install a coastal ship tracking radar system and a Kuwait harbor ship tracking system. Unfortunately, we ran out of money before we could complete a negotiated contract and had to abandon the effort. From that point forward we were able to develop multiple small contracts, both commercial and government, which continued well into the twenty-first century. I myself quit the company in 1998 to pursue a doctorate in computer science.

After completing all but the dissertation, I gave up my studies in order to support a son who was a single dad and who had just been commissioned as a second lieutenant in the Air Force, after completing 11 years and 11 months as a nuclear tech in the Navy. That made him the family's fifth-generation officer serving in the United States military. This was when we moved to Oklahoma, first to Oklahoma City then to Enid, OK. I have been serving on the Enid Air Force Association Chapter Board of Directors since 2010, and I have been a member of **AFNOA** since 2014.

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*Editor's Note: Brett's father was General Bernard A. Schriever; Schriever Space Force Base (formerly Schriever Air Force Base), is named after him.*

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**NOTAM: ELECTRONIC ROSTER**

We no longer print and distribute an **AFNOA** roster. Electronic copies are available in Microsoft Excel. E-mail Jim Faulkner at [jfaulkner39@suddenlink.net](mailto:jfaulkner39@suddenlink.net) for a roster.

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**HISTORIAN'S REPORT**

by Ronald P. Barrett, James Connally 63-06

**Some Nuggets of Wisdom from the Historian on Museum Organizational matters:**

- Neither **AFNOA** or I continue to solicit for "collections" of navigational tools. The museums are reducing such displays.
- The National Museum Foundation of the USAF at Wright-Patterson AFB is working hard to obtain funds as HO (history) funding is being reduced.
- The USAF History Office/Pentagon is further working to reduce "field museum" support, so we all need to consider helping there if possible.
- The Mighty Eighth WWII Museum near Savannah, GA, is the only military-aligned museum with a professional "library" staff (Dr. Susan Rice).
- Overall military-museum gate is down and entry fees are becoming a real issue.
- **AFNOA** members possessing unique history knowledge, please get to me ASAP! Email is best (ronaldpbarrett@yahoo.com). The reason is that there is no official museum, (not HO, not NM-USAF, not Smithsonian, not military branch) and not many of the unique flight groups, saving our proud service histories.
- **AFNOA** asks that all who have unique navigator-related articles, books, tech manuals, photos: sign them, note units and dates and get them to me; I will edit and create another thumb drive, as I did the AF Navigators Comprehensive History. Let's get whatever we can collect—before all is gone—as we are going now rather fast into the heavens (I hope) above, chuckle.

**An Interesting Museum: Aviation Unmanned Vehicle Museum founded by Lt Col "Red" Smith (former SPO UAV W-P AFB) at Caddo Mills, TX:**



**DC-130E with attached drone at a western USA test site. Photo from Wikimedia Commons.**

I admit that only in a cursory way do I have any knowledge of this part of our Air Force history, although my 63-06 James Connally 1961 upper classman Nehru Permaul was in the UAV programs as a lieutenant navigator in Vietnam. Nehru later was

assigned to the UAV SPO at W-P AFB (1965/66). I was not personally in and or around the UAVs.

Recently I learned of Lt Col Harold F. Smith and the AUV Programs. The Aviation Unmanned Vehicle Museum (AUVM) is a collection of incredible rare drones and artifacts, and was founded by retired Lt Col Harold ("Red") Smith.

Lt Col Harold F. "Red" Smith and his crews and SPO Office at W-P AFB area B had a significant part of the USAF UAV (now called drones) program. Sorry to say, Lt Col Smith was killed by a drunk driver a few years ago. His son and grandson now head up this unique UAV museum in Caddo Mills, TX, (northeast of Dallas). Go to [www.auvm.net](http://www.auvm.net) for more photos and information. Very interesting.

If you (**AFNOA**) can volunteer and help this really unique museum call Clifford Smith (grandson to Red) at 903-200-1245. It also comes to mind there had to be other Navigators/EWO/WSOs in the back of the DC-130s. We need to document for historical purposes what the navigators' tasks were. Do any of you all know anything about these UAV/drone programs? If so email me at: [ronaldpbarrett@yahoo.com](mailto:ronaldpbarrett@yahoo.com), or 305-797-0745 (for texting). Thanks.

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**BQM-81A target drone at the Aviation Unmanned Vehicle Museum in Caddo Mills, Texas. Photo provided by Clifford Smith, AUVM.**



**AFNOA DONATION LIST**

The following list of Navigators donated \$100 to the AFNOA operating fund. This donation is much appreciated:

James Isaacks (Ellington 44-06)

William Smith (Harlingen 61-01)

Ira Kroese (James Connally 63-04)

Leonard Melcher (Mather 74-18)

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**THE LAST BUS FROM AGANA**

by Murray Siegel, James Connally 65-03

It was the summer of 1968 and I was flying Arc Light B-52 missions, primarily out of Guam. When I was not flying, I had made friends with several civilians who were living in Agana, then the island's capital. One Saturday evening, I was invited to a party in Agana and since I was not flying, I could go. One of my friends drove to Andersen AFB to take me to the party. At the end of the evening, when my friend offered to drive me back, I told him that I would take the Air Force bus to the base, and I caught the last bus that night from Agana to Andersen.

I looked around the bus and noted that I was one of only two white folks on the bus; the remaining passengers were African American, and I was probably the only sober passenger. After the bus pulled out, a number of the black passengers began complaining about how they were treated by the Air Force and a few made statements that it might be a good idea to beat up the white guys on the bus.

There was not much I could do and I became quite frightened. Fortunately, one of the black airmen on the bus knew me from our home base and told the others that I was a captain. I guess assaulting another enlisted man was not too bad, but attacking an officer was not a good idea.

The complaining continued but there were no more threats of violence. When the bus entered the base, I jumped off immediately and walked the rest of the way. This was to be the most harrowing moment in my Arc Light experience, more so than any mission over North Vietnam. Once I calmed down, I began to consider the situation: what if I had been a black man on a late-night bus in the Jim Crow South where the other passengers were rowdy white drunks? I did not report the incident, nor did I ever ride the last bus from Agana again.

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**SCUD VIEWING**

by Bob Johnson, Mather 78-20

During Desert Storm, many of the U.S. military in Riyadh, Saudi Arabia, were housed in an unused Bedouin compound called Eskan Village on the southern outskirts of Riyadh. The compound was made of about 400 single-story, 2,000 sq ft, 3-bedroom, concrete houses with all the amenities. They had inside stairs that went up to a roof patio. Each house had a solid five-foot concrete wall around the roof patio so the families could do things and store stuff on the roof without the neighbors seeing.

When Saddam Hussein started launching Scuds into Saudi Arabia in February '91, sirens would sound in Riyadh to alert everyone to take precautions against ex-

plosive and chemical attacks. The morning after the first Scud launches, there was a mandatory Commander's Call where we were briefed on what was going on with flight schedules. They told us to open and install the real chemical warfare canisters into our gas masks, have our chemical warfare suits ready to put on, etc.

At the end of the briefing, the commander mentioned he had seen a few crews on the roof patios during the previous night's Scud warning and said everyone should stay off the roof. He said he couldn't explain to our friends, spouses, and parents how we were on the roof watching the Scuds come in to hit us! Everyone laughed!

That evening after the Commander's Call, there was another Scud attack on the area. Everybody had their chem suits and masks at the ready...right next to them as they were standing on the roof patios of their houses watching the Scuds! From what I could see, there wasn't a roof without people on it!

And yes, we did see some Scuds coming down and Patriot missiles intercepting them miles away.

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**A NIGHTFIGHTER NAVIGATOR RECALLS...SPACE**

by Richard Myers, James Connally 52-02

Navigate in space? Nearing the end of my AFIT grad school assignment, I saw no chance of working in "space operations," that being the province of NASA. So, my next assignment would be what? No idea. Then, hearing of "SSD" and its possible connection to "space operations" I sought more info by asking everyone. I eventually learned USAF had a Systems Command, with divisions studying new aircraft, radars, ballistic missiles, and an SSD division, which to me suggested a Space Studies Division. Why was there no info about it?

Did SSD Studies include space navigation? No one knew. I called the Air Force Institute of Technology (AFIT), and learned that SSD means Space Systems Division, Los Angeles. It does studies, yes, but also "looks at" space operations. Could they use a good navigator? Answer: yes—if they study navigation. My Electronics MSEE degree might help—maybe. But my request for assignment should be not to AFIT but to Pentagon Personnel. I followed their advice quickly, carefully, expecting to study space navigation.

A navigator in SSD: Late January of 1965, my wife Aileen, our little folks, and I drove to L.A. Space Systems Division put me in an engineering group working on studies and (surprise!) on an actual spacecraft. A rule: "Be discreet about our spacecraft—don't discuss its details outside these offices." SSD had a T-29, fully equipped for navigating, at LAX a few miles north—and our engineering group, for lieutenant up through colonel, included several navigators and pilots. The Group showed interest in my navigation, but even more so that

at OSU I had learned to solve many forms of “impossible” engineering problems by writing “iterative” algorithms (solutions by trial-and-error step) to create “loops” in math-language-programs, which I’d run on OSU’s big IBM computer. So, I went to the Electronics Branch and problems of the spacecraft’s new, on-board, space-navigation computer.

Non-stop navigation: My new leader, Lt Col “W”, MSEE, said, “We’ve launched some. It’s flyable—and we’re improving our bird’s subsystems.” All dozen or more of his engineers seemed busy, but he called two in for introductions, and said the four of us would attend to the computer. He asked how much I already knew about the spacecraft. I shook my head, and he asked how I would imagine it. About that I had ideas—a spacecraft in space (no wings) could not only monitor its subsystems and export them to cockpit or ground-base, but navigate non-stop, its computer storing (from accelerometers) the three-dimensional coordinates of its position vis-à-vis an internal clock. Also, it could accurately handle path and ETA—and a computerized DR Ahead, too. I noticed “W” jotting notes as I spoke. He smiled and said, “It has a clock, yes, but you need a briefing. First, no cockpit—it’s unmanned. Also, our computer has budgets for size, weight, and electric power; so all navigation computations are on the ground. If our staff wants a maneuver, it uses high-speed computers to create sets of commands, then telemeters, packets of commands up to the bird. Bird un-packs them, stores them, watches its clock—and issues each command when clock matches its time-tag. The craft moves at over 17,000 miles per hour, so time-tags are expressed in tiny fractions of a second—don’t ask what size. So, you couldn’t navigate it alone. You’ll navigate in space, but as part of our tech team. Welcome.”

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### **FLYING IS DANGEROUS. OR COMING UP SHORT IN A MUDDY BIRD**

by Giles W. Willis Jr., Ph.D., PE, Ellington 55-08

In the summer of 1954, I was at Ellington AFB in Houston. I was just told that the navigation training had changed and I would be at Ellington for the next year rather than the few months in Texas and the rest of my training in California. At the time I attended, we were one of the first classes in the Primary Basic Observer training program, or PBOC. We had classroom training on various subjects and flight training in the T-29 Convair. This is a short story about my first flight in the T-29. On this flight were new guys like me from my class (55-08). We also had radar trainees from a more advanced class.

The flight was part day and part night. The flight went up north where we had to use DR and map reading to find out our positions. It’s surprising how all the towns look alike from the air. But my view was out the side window overlooking an airplane wing. When we returned

to Ellington, the weather was bad. Map reading was over. I could not see the ground. Ellington was below minimums so we had to land at Houston Hobby (HOU), where they had GCA (Ground Control Approach). This was a big deal for me. I could listen in on the cockpit voice and the GCA operator’s calls as to the distance and direction. So, we would hear the operator say, “Five miles from touchdown,” “On glide path,” “On centerline,” “Maintain current heading and rate of descent.” It felt confident to know that even though we could see nothing outside our windows, someone was watching and bringing us in for a landing. Then we heard, “Approaching two miles from touch down,” and at that moment, boom! We hit the ground. Our landing gear had not been extended. No one, including the pilots, were expecting that we would hit the ground.

The plane bounced back into the air and the pilots added power. We were able to climb out. The ground was still socked in, as I could still see nothing out of our windows. The pilot said, “That’s it! We are going to San Antonio and spend the night.”

When we landed at San Antonio, we got out and looked at the plane. The bottom of the T-29 was covered in mud. The next day the maintenance crew checked over the plane and cleaned it up. We returned to Ellington where the weather was now fine. After landing, several of us drove over to the HOU airport and found where we had hit the ground. It was in a plowed field. Between that spot and the end of the HOU runway was a mass of overhead electrical wires that were directed around the end of the runway. There was no way we could have gotten through this mass of wires, but we did.

Lt Jack Bowman, one of the pilots, told us later what had happened. As it turned out, we had a trainee on our GCA in HOU. We didn’t know that. The weather conditions were such that we should have had a fully trained operator giving us directions. The trainee had set up the GCA incorrectly and he was actually bringing us in to a touchdown point a little over two miles from the end of the runway. They should have had an instructor watching the trainee, but they didn’t. This is but one of many examples that flying is dangerous. That’s why we got the flight pay. This incident has to be put into the unexplained miracle category.

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#### **NOTAM: DR Ahead Distribution**

**AFNOA** members who are current on dues should receive the e-mail copy of **DR Ahead** by the 7th of the published month (January, April, July or October) or the paper copy via USPS by the 25th of the published month. IF NOT RECEIVED, contact Jim Faulkner (jfaulkner39@suddenlink.net) or Errol Hoberman (afnoa.distributor@yahoo.com). Note that e-mail copies may sometimes go into the “spam” or “junk mail” folders so please check them before contacting **AFNOA** representatives.

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**C-133 MISSION TO EASTER ISLAND**

by Paul R. ("Gus") Ogushwitz, Ph.D., Mather 70-21

Easter Island is a volcanic island in the southeast Pacific Ocean. It is located at approximately 27°07'S and 109°22'W. It is roughly due south of Salt Lake City and about 2000 nautical miles west-northwest of Santiago, Chile. Easter Island is one of the most isolated places on the planet. Pitcairn Island, the closest inhabited land, is about 1100 nautical miles west of Easter Island and lacks an airport. Politically, Easter Island is a "special territory" of Chile, while geographically it is the easternmost island in Polynesia.

During December 1970, the 1st Military Airlift Squadron (Dover AFB, Delaware) was tasked with fetching cargo from Easter Island and delivering it to Robins AFB, Georgia. Our loadmaster, (now retired Col) Jack Anderson, recently reminded me that the cargo was classified and the mission was not.

The C-133 was the Air Force's "heavy lifter" cargo aircraft from its first rollout in 1956 to fleet retirement in 1971. By the 1970s, the C-133 fleet had exceeded its airframe life expectancy almost by a factor of two. The fleet was worn out, and maintenance problems were frequent.

For those unfamiliar with the C-133, I recommend a visit to "View The C-133A Flight Deck Overview" in the C-133A article at the Air Force Museum website. The navigator station was back-to-back with the pilot (which means I have flown perhaps a million miles facing backwards). The C-133 navigational equipment was primitive by modern standards. At the top of the panel was the Loran-A scope (APN-9), the radar scope (APN-59), and the radar altimeter (not sure what the designator was). On the bottom left was the Loran-A receiver (APN-70). The nav station was also equipped with pressure altimeter, true airspeed meter, gyrocompass, outside air thermometer, time clock, and auto direction finder (ADF). An instrument panel at the navigator's right shoulder had HF radio controls, along with other controls and fuses that the wise navigator never laid hands on unless specifically ordered to do so by the A/C. Finally, and in my book most importantly, a Kollsman D-1 sextant could be mounted in the ceiling of the cockpit. Notably, the aircraft lacked a drift meter, and we had no on-board Doppler. My Mather classmate, (retired Lt Col) Sam Baker, points out that the C-133 had significantly less nav gear than did the antiquated T-29 aircraft we trained on.

I wonder when the word "ergonomics" was first coined? The Kollsman sextant was mounted in the entryway to the cockpit. The navigator stood on a fold-down platform while taking cel sights. A vital item of crew coordination was to warn everyone not to trip on the platform nor bang their head on the sextant. Another cause for dismay was that damnable ashtray on the

left end of the work table. Most of those ashtrays went missing, which left roughly 3" diameter vertical holes through the left side of the nav stations. With ashtray or without, the left end of the desk was a good place to bruise your left elbow and/or to damage a chart. What were those aircraft designers thinking?

The 1st MAS had conducted a few missions to Easter Island earlier in December, 1970. Happily, the returning aircrews did tell us what goods to bring for trading with the islanders. Sadly, they did not brief us as to navigation, radio communications, or other flight essentials. So each "next navigator" ventured forth on his own totally new adventure.

The crew roster for the Easter Island mission is given in the attached flight order. (The Social Security numbers have been masked out.) There was the usual crew of six—pilot, copilot, navigator, two flight engineers, and loadmaster. There were four additional crew members (ACM)—a medical officer and three maintenance personnel.

Our first aircraft was tail number 62000. We made four abortive flights in that aircraft. On 15 December 1970, there was a problem after takeoff, and we returned to Dover after a half-hour in the air. On 16 December, there were two flights, each lasting less than an hour. These may have been test-flights, although as I recall the full crew complement was on board. We returned to Dover each time. On 17 December, there was one flight lasting five hours. We returned to Dover yet again.

FLIGHT ORDER									
1. Crew members listed below will proceed in aircraft indicated and upon completion of mission will return to proper station. Qualified aircrew members are authorized to perform FCP's at enroute stations where MAC PCF personnel are not available. All crew members cleared for Secret except as indicated. Variations in itinerary authorized. Reserve personnel not on extended active duty, are subject to the provisions of the Uniform Code of Military Justice while performing this duty.									
2. FROM: Dover AFB, Delaware		3. EFFECTIVE ON OR ABOUT 15 December 1970		4. RETURN ON OR ABOUT 16 January 1971					
5. TO: South America		6. AIRCRAFT, SERIAL NUMBER, OR TACTICAL CALL SIGN: C-133A		7. MISSION: Airlift					
8. RETURN TO: Dover AFB, Delaware									
CREW INFORMATION									
CODE	GRADE	NAME	ORGANIZATION (If other than 11)	SSAN	CREW POSITION	CREW QUAL	SCV CLNC		
A	B	C	D	E	F	G	H		
1.	LT COL	JOHN C DYER			AC	AC	TS/BI		
2.	1LT	DANIEL F HAYES			CP	CP	TS/BI		
3.	2LT	PAUL R OGUSHWITZ			N	N	TS/BI		
4.	CAPT	DAVID L KLEIN	1607 Hosp		MT	M/C/MQ	S/MAC		
5.	TSOT	FRANKLIN A VICTORY			FE	IFE	S/MAC		
6.	SSOT	JOHN D LYLE			FE	IFE	S/MAC		
7.	SOT	JACK L ANDERSON			IM	IM	S/MAC		
8.	SSOT	JON D SEDDON	617 OMS		OC	M/C/MQ	S/MAC		
9.	SSOT	CARL A CHASE	136 PMS		OC	M/C/MQ	S/MAC		
10.	TSOT	WILLIAM R N HUNTON	136 PMS		OC	M/C/MQ	S/MAC		
<p>FLY S &amp; F ELY</p> <p>WBS authorized TAW MM 55-1, para 23.3. All crew members allowed 156 lbs of baggage TAW MM 76.1.</p>									
<p>9. REMARKS: (Legend for 9a)</p> <p>Following additional directives applicable to crew members: (1) In Command (+) Crew Equipment Officer (5) Enlisted Aircrew Coordinator.</p>									
10. FOR RESERVE CREW ONLY - PASSENGER QUALIFIED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO									
11. ALL CREW MEMBERS QUALIFIED IAW AFM 22-22 <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO									
12. FUND CITATION: 57Xh922.030 681-65DA 213020 OL 4093h S 528400				13. ORDER NUMBER: M-323		14. DATE OF ORDER: 14 December 1970			
CIC 4 E 165 2130 528400 4073h				15. DISTRIBUTION: (X) 1XN 1926-02					
16. NAV COLLECTION DATA:				17. SIGNATURE ELEMENT OF ORDERS AUTHORIZING OFFICIAL: Michael C. Riffe, Major, USAF Acting Operations Officer					
18. DESIGNATION AND LOCATION OF AUTHORIZING ACTIVITY: 1ST MILITARY AIRLIFT SQUADRON (MAC) Dover Air Force Base, Delaware 19901									

**Flight Orders to "South America." Photo provided by Paul Ogushwitz.**

On 18 December, we departed Dover on board a different aircraft (tail number 40145). The mission proper had begun! That day, we flew to Howard AFB in the Panama Canal Zone. The following day, we flew non-stop from Panama to Los Cerrillos Airport at Santiago, Chile. Chile had been experiencing political unrest for some months. Salvador Allende had become the President of Chile in November, 1970. The streets of Santiago were replete with political banners, posters, and demonstrators. We were ordered to wear civilian clothing while in Chile and on Easter Island. I remember bringing (among other clothing) bell-bottomed trousers and a grotesque polka-dotted purple shirt, which was customary "townie" garb of that era.

We flew to Easter Island on 20 December 1970. We took off at 6:13 a.m. local time. Our daytime flight lasted 8½ hours. During the first hour or two of the flight, we passed north of the Juan Fernandez Archipelago. I recall detecting distant Robinson Crusoe Island on radar. For the next six or seven hours, there were no further radar targets, and aids to navigation were minimal.

By 1970, there were many aids to air navigation in other parts of the planet. However, nav aids remained sparse in the Southeast Pacific. There were few usable radar targets. There were no ocean station vessels. There was no Loran service of any kind. Consolan (also called "Consol") was only available in the Northern Hemisphere, as far as I am aware. The only available radio aid to navigation was ADF (Automatic Direction Finder). We detected ADF for a few hours from Santiago, Chile, and then it was too distant to be reliable. Although we also intermittently detected ADF from Tegucigalpa, Honduras, that station was hundreds of miles to the north, and its signal was wildly unreliable. In essence, ADF radio was only good enough to confirm that we were somewhere in the Southeast Pacific.

Because the C-133 aircraft was not equipped with a drift meter nor with on-board doppler, we were left with just two usable navigational techniques for most of the flight. One technique was a now-obscure method called "pressure differential navigation" or "pressure pattern navigation." Pressure pattern navigation relied on the difference between pressure altimeter readings and radio altimeter readings to obtain course lines (i.e., lines of position parallel to track).

The other technique was celestial navigation. Had the flight been at night, abundant stars in the clear southern summer sky would have made navigation easy. The flight was scheduled for daytime, however, and celestial nav was limited to sun sightings. As usual, no one consulted this lowly second looie as to takeoff time. "Theirs but to do or die."

Normally, sun sightings would not have been a problem. However, we were within a day or two of summer solstice (December is South American summer).

This gave rise to serious challenges. Early in the flight, the sun was near the horizon and almost directly behind us. To get accurate speed lines (i.e., lines of position across track) required very careful observations of solar elevation. Happily, elevation readings were quite reliable, because the sextant was equipped with a two-minute timer-averager, which compensated for small motions of the aircraft during the sighting. So, early in the flight, we knew how far we were from land.

However, as the morning wore on closer and closer to local noon, the sun climbed to within three or four degrees of zenith. The navigational situation changed radically. The sun was abeam the aircraft, so solar sightings were now giving us a course line. Although it was reassuring to have two course lines (one from "pressure" and one from "cel"), what we really needed was a speed line. We needed a speed line to know how far we were from the island and whether we would have enough fuel to get there. In theory, a speed line could be obtained by observation of solar azimuth. However, an azimuth reading was much less precise than an elevation reading because there was no averaging of azimuth. Furthermore, because it was southern midsummer day, the noon sun was almost directly overhead. Under this condition, the diameter of the solar disk became a significant fraction of azimuth angle, which meant less accuracy in azimuth. I faced this navigational problem later in the flight, very far from the continent, and with much less fuel in the tanks.

As time wore on, I became aware of a steadily increasing amount of foot traffic in the cockpit. There was more than the ordinary amount of "glancing-over-shoulders" at my nav station. There was some surreptitious peering at the markings on my chart. There were quite a few remarks along the lines of "How we doin', Nav?"

The simple fact was that, well into the journey, I had two course lines, and they were mutually supporting. They both pointed at where Easter Island was marked on the chart. The only possible catastrophe would have been if Easter Island had been mislocated on the chart. So I was certain we would get there. I did not know exactly when that would be.

In retrospect, we were fortunate that two navigational aids were available, pressure pattern and celestial navigation. Had we had only one nav aid (either one), we would have had to estimate our ground speed largely by dead reckoning. That would have been hairy, considering that we were well beyond the point-of-no-return by the time we made landfall at Easter Island. As it turned out, I was able to squeeze just enough info out of those primitive instruments. When we detected the island on radar about 150 miles out, our (essentially) DR position was dead-nuts accurate after a journey of two thousand nautical miles. So who needs GPS?



**Landfall at Easter Island. Photo provided by Paul Ogushwitz.**

I took photos over the pilot's shoulder while landing at Easter Island. (Note: The photos are adorned with a mossy green patina after being stored in attics for many years.) We made landfall at Cape Roggeveen (above); an extinct volcano named Puakatike is visible in the photo, although its summit is obscured by the aircraft's left-central window frame. We overflowed Cape Roggeveen, then began our downwind leg over the ocean along the north shore of the island. We turned southwest onto base leg while observing a freshwater crater lake called Rano Aroi in the caldera of volcano Terevaka. We continued on base leg, now over the ocean again on the west side of the island. Finally, we turned on final approach and landed at Easter Island Airport.



**Final approach at Hanga Roa. Photo provided by Paul Ogushwitz.**

In this photo, one can see that the airport (the entire island, for that matter) was quite desolate in 1970. There was a single airstrip with just one parking pad for aircraft. There were a few ramshackle houses, one or two shabby official buildings, some dirt roads, and a curious monument at the airfield. By comparison, the latest satellite imagery for Easter Island on Google Earth shows many roads and buildings. The photos on

Google Earth show spiffy tourist hotels, tony people, and paved roads. The airport now bears the imposing title "Mataverí International Airport." So much for "getting away from it all."

The Wikipedia article about Easter Island includes (or used to include) an enchanting photo labeled "Polynesian dancing with feather costumes is on the tourist itinerary." We received no such greeting. The islanders met us in friendship, wearing ordinary clothing. We were all eager to trade. In accordance with the briefings we had received from earlier C-133 crews who had made the trip, we had brought clothing, soap, cigarettes, and other useful items. We traded our stuff for the islanders' skillful wooden carvings of Easter Island figures.



**Monument at Hanga Roa airfield. Photo provided by Paul Ogushwitz.**

Probably it was our pilot, Lt Col Dyer, who wangled us a bus ride to see the famous statues along the west coast of the island. Then we bussed to the northeast part of the island, where the "Statue Factory" is located on the slopes of volcano Rano Raraku. All of the island's world-famous stone statues were quarried and carved at Rano Raraku, centuries ago. We saw one enormous statue, 60 or 70 feet long, still lying on its back in the quarry. That giant statue was left unfinished and was never completely separated from the native rock.



**Crew, left to right: Copilot 1Lt Hayes, Aircraft Commander Lt Col Dyer, and Flight Engineer TSgt Victory. Photo provided by Paul Ogushwitz.**

By the following day, 21 December, the cargo had been loaded onto the aircraft. We took off at 6:09 a.m. local time. It was to be one of the most eventful takeoffs in my USAF experience. Winds were easterly, so takeoff was toward the southeast. The aircraft did not accelerate as expected. We were within a few dozen feet of the end of the runway before we finally achieved minimum takeoff speed. Hearts were in throats. Happily, the southeast end of the runway is at an elevation of about 150 feet above sea level. Lt Col Dyer coaxed the aircraft a few feet into the air, flew us over the bushes and past the cliff, and then descended slowly toward the ocean at takeoff power until we had gathered enough airspeed to make a proper climb. A less-experienced pilot might have tried to force the aircraft upwards, risking a stall. Were it not for Colonel Dyer's skill, we might have ended up in the drink. We probably owe him our lives.



**Easter Island statues and navigator Lt Ogushwitz in mufti. Photo provided by Paul Ogushwitz.**

Compared to navigating toward an island, navigating toward a continent is relatively stress-free. The flight back to Chile was unremarkable. We landed in Santiago after eight hours in the air. The next day, we flew to sunny Lima, Peru, staying two days. I recall we went on a shopping tour and visited a local farmer's market, where I bought a beautiful handmade alpaca poncho. (I later gave the poncho to a young lady, a grad student at Princeton, whom I was wooing at the time.) C-133 crews often found opportunities to go shopping for unusual items at attractive prices in exotic locales.

On 24 December, we flew to the Panama Canal Zone. The local ambient temperature was in the high 80s or low 90s. Although it was very humid and decidedly un-Christmassy, the turkey dinner was just right. We returned to snowy Dover, Delaware, on 25 December. On 26 December, the crew (minus ACMS) flew the aircraft with its cargo down to Robins AFB. Because it was the day after Christmas, no ground personnel were available to assist with off-loading. We "commandeered" some ground equipment. The six of us

off-loaded the aircraft, under direction of the loadmaster. The three officers drove the forklifts, and the flight engineers were responsible for securing straps and so on. It was a textbook example of crew coordination and Yankee ingenuity. We flew back to Dover the next day for crew rest.

Later we learned that ground personnel at Easter Island had underestimated the cargo weight by twenty thousand pounds. Ten tons of excess cargo weight had caused an unexpectedly long and nearly catastrophic takeoff roll.

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## **LETTERS**

To: Editor, **DR Ahead**

26 July 2022

Dear Susan,

Thank you for continuing to publish **DR Ahead**. Being able to read them over the years has revived many fond memories that I obtained while I was in the U.S. Air Force. In the July 2022 Issue, I had fun with the stories about Survival Training at Stead AFB. I personally identified with "Survival School—A Different Story." I believe that I went through some of the earlier classes before it was fully defined (February 1963). In writing this note to you, I decided that it was time to thank the crew that refueled us in the EC-135C. I reread the entire July issue several times, thinking that I was finally losing it; there was no article.

I then pulled up the April 2022 issue and found "Through the Looking Glass." As I reread this article, I noticed that the KC-135 was from McConnell AFB, whereas my memory was that it came from Altus AFB. I then saw that it was written by Dave Schneider, Mather 82-05. This story is nearly 20 years later than mine. I then went through my storage and found my old "Navigator's Log." So here is an earlier version of a similar event:

## **MEMORIES OF BEING REFUELED IN AN EC-135C**

I was assigned to the 34th Air Refueling Squadron at Offutt AFB. Our duties and missions were pretty standard for SAC. We stood alert for a week at a time, as well as training missions, tactical missions supporting fighters en route to training exercises, and month-long "Chrome Dome" missions in Torrejon AB in Spain, flying 2-3 refueling sorties per day. We also flew Looking Glass, right there at Offutt AFB. We flew these missions in the KC-135 A and B. In January 1965, we started flying Looking Glass in the new EC-135C. Not only did it have improved command gear, it had a refueling receptacle in order to receive fuel, and newer more powerful engines (it felt like someone had hung one or two extra on the plane).

During the following month, we used the enhanced refueling feature. Please note that the standard missions were LG-1, LG-2 and LG-3 (taking off at 0000,

0800 and 1600, local time.) On 11 February 1965, we launched LG-1 at 0000 (0600Z). In approximately 10-15 minutes, all communications were established and the general, on board, took over command control. This mission is usually a rather routine mission, flying non-predetermined patterns, and announcing the next leg to Kansas City Air Traffic Control. We had water, hot coffee, and food. The next 6-7 hours were somewhat uneventful. We were then informed that while we were flying, it had snowed 19+ inches. They were having trouble snow plowing the taxi way, much less the runway. Finally, the call was made to scrub the launch of LG-2 and we were instructed to stay airborne and assume LG-2. As the hours dragged on, we were getting tired, but we were warriors and could take it. However, our fuel supply was getting low and they launched a KC-135 from Altus AFB to give us enough fuel. We became the first Looking Glass, on post, to receive a refueling and transitioned into shift LG-2.

The remainder of LG-2 was uneventful, except we had eaten all the food, drank all the coffee, and were starting to run short on water. And yes (this was during the Dark Ages), we were running out of cigarettes. Offutt AFB was finally able to launch LG-3, a little early, and we landed at Barksdale AFB at 1740 (2340Z). While we remained over night, they flew another EC-135C to Barksdale AFB to replace ours as it had sheared a generator shaft. We, on 12 February 1965, launched at 0815 (1215Z) and flew the LG-2 mission. After an uneventful mission, we landed at Offutt AFB at 1635 (2235Z). Again, thank you, KC-135 crew from Altus AFB, who gave us fuel. Thank you **DR Ahead** for sparking old (and fond) memories.

Frederick A. Wassem, James Connally 62-15

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**NOTAM: DR AHEAD BY INTERNET**

Still getting a hard copy of **DR Ahead**? Join the over three hundred members who have elected to receive **DR Ahead** via the internet, thereby helping to ensure the longevity of our association by saving **AFNOA** the postage and printing. Please e-mail to Jim Faulkner at jfaulkner39@suddenlink.net to switch.

\*\*\*\*\*

**NOTAM: EMERGENCY LIST:**

One of our members has told us that if something should happen to him... he has left a listing of people to be contacted. Great planning! Suggest we all consider putting **AFNOA** on that listing.

\*\*\*\*\*

**LAST FLIGHTS**

by Jim Faulkner, James Connally 64-04

Some people reporting MULTIPLE Last Flights were: Dale E. Everson, Harlingen 58-12; John Fradella, James Connally 66-17; and Bill Wilkins, Ellington 52-09.

Please send last flight notices on navigator/observer/bombardier/EWO or combat system officers to AFNOA membership (jfaulkner39@suddenlink.net).

Please keep "Last Flight" families in your prayers. Listed below are the last flights reported this quarter.

**BIG SPRING**

Leopold DDS, Herbert S. San Diego CA 44-04

**CARLSBAD**

Mathews, Norman D. Elizabeth PA 44-46

Stewart Jr., William P. Monroe LA 44-46

Myers, Roger K. Fort Wayne IN 45-12

**CORAL GABLES**

Ahl, William M. San Mateo CA 41-C

Busby, Joe N. Alachua FL 42-04

Gale, Paul R. South Hero VT 43-02

Martineau, Max L. Sun City AZ 43-04

Phillips, Samuel D. Lake Worth FL 43-06

Wayne, George H. Calabasas CA 43-06

Inglisma, Peter K. Melville NY 44-02

Wisser, Eugene P. Verona PA 44-02

Best, Richard H. Flushing MI 44-06

Jannace, Manlio J. Farmington CT 44-06

Kasten, Nelson S. Rockledge FL 44-06

Pipek, Charles G. Westmont IL 44-06

Shwartz, Kalman S. Montgomery AL 44-06

Talley, James C. Knoxville TN 44-06

**DEMING**

Friedman, Joel I. Ventnor City NJ 44-11

Wynne, Richard D. Girard PA 44-13

**ELLINGTON**

Moore, James W. San Antonio TX 41-00

Murphy, Michael J. Millis MA 41-00

Atkins, Francis R. Laguna Woods CA 43-00

Bailey, Edward L. Houston TX 43-00

Blankenheim, Robert S. Green Lake WI 43-00

Handelman, Fred Naples FL 43-00

McCarthy, Daniel F. Tempe AZ 43-00

Connors, Edward B. Richmond Heights MO 43-13

MacLachlan, John D. N. Hollywood CA 43-18

Brill, Ben S. Durham NC 44-01

Telkamp, Edward A. Lindale TX 44-01

Wise, Milton B. Slidell LA 44-01

Mills, James D. Charleston WV 44-02

# **DR AHEAD PAGE 12**

Thompson, Howard E.	Long Beach	CA	44-02	Wilkie, Edward J.	Ocala	FL	44-49
West, Albert C.	Ottawa	IL	44-02	Cantor, Paul G.	Atlantic Beach	NY	44-53
Blackstock, Ray C.	Freeland	WA	44-03	Eckart, Elmer E.	St. Paul	MN	44-53
Brugger, Lee B.	Cypress	CA	44-03	Haskins, Harold C.	Gainesville	FL	44-53
Farris, William P.	Cincinnati	OH	44-03	Hollacher, Edward M.	Honolulu	HI	44-53
Haggland, James L.	Riverside	CA	44-03	Jewell, William L.	Woolwich	ME	44-53
Gordon, Franklyn	Brooklyn	NY	44-04	Olsen, Joseph J.	Vancouver	WA	44-53
Immasche, Robert L.	Houston	TX	44-04	Sessler, Leonhardt H.	Cary	NC	44-53
Kraft, Dr. Robert A.	Hillsborough	CA	44-05	Bezozo, Edward	New York	NY	45-04
Lieto Jr., Joseph J.	Brick	NJ	44-05	Goodwin Jr., Edwin J.	Telford	PA	45-04
Francis, Jack C.	Amory	MS	44-06	Benjamin, Manuel B.	Boca Raton	FL	45-04N
Peterson, Joseph A.	Omaha	NE	44-06	Bennett, John R.	Evansville	IN	45-04N
Walther, Henry R.	San Antonio	TX	44-06	Bogdanski, Walter R.	Middlesex	NJ	45-04N
Brown, George R.	Creamridge	NJ	44-07	Burnham, Charles S.	Alabaster	AL	45-04N
Gaffin, Morton	Peekskill	NY	44-07	Miscia, Henry	Harrisburg	PA	45-04N
Graverok, Robert V.	Bloomington	MN	44-07	Shepley, Warren W.	St. Paul	MN	45-04N
Jensen, Lloyd E.	Mesa	AZ	44-07	Bowman, Dr. Ben Phillip	San Carlos	CA	45-08
Almand, Richard H.	Atlanta	GA	44-08	Bonwit, Barry L.	Pensacola	FL	50-D
Martin, Donald E.	Portland	ME	44-08	Bjorgen, Leonard L.	Grand Prairie	TX	50-E
Napora, Frank S.	Phoenix	AZ	44-08	Burgess, George M.	Falls Church	VA	52-00
Taylor, Arthur C.	Kitty Hawk	NC	44-08	Bond, Louis E.	Fremont	CA	52-01
Dzenowagis, Joseph G.	Okemos	MI	44-09	Walker, William R.	Sugar Land	TX	52-09
Heist, Harold F.	San Diego	CA	44-09	McKay Jr., Hugh D.	Arlington	TX	52-24
Burkhart, Charles J.	Lexington	KY	44-11	Butler, Carroll B.	Shalimar	FL	54-00
Carter, Paul W.	Salisbury	NC	44-11	White, Max E.	Cullman	AL	54-00
Ciappa, Mario J.	Mount Pleasant	SC	44-11	Turner, Miles G.	Plano	TX	56-02
Hahn, Stanley L.	La Jolla	CA	44-11	<b>HARLINGEN</b>			
Irvin, Ralph M.	Beloit	WI	44-11	Roberts, James R.	Norton	VA	53-07
Yazak, Dean D.	Pensacola	FL	44-11	Chabolla, Gilbert A.	Los Banos	CA	53-10
Smith, Richard K.	Florence	OR	44-12	Conti, Alfred J.	Longwood	FL	53-14
Casper, Thomas L.	Martinsburg	WV	44-45	Allen, Fred R.	Auburn	WA	53-19
Cochran, Walter C.	Holiday	FL	44-45	Mertens, Robert E.	Melbourne	FL	53-19
Erdman, George F.	Tallahassee	FL	44-45	Quesenberry, Daniel J.	Winston Salem	NC	53-19
Thomasco, Francis F.	Lancaster	PA	44-45	Mills Jr., Byron E.	San Antonio	TX	54-09
Bennett, James G.	Orlando	FL	44-49	Dawson, Charles F.	Bellevue	WA	54-11
Dowidchuk, Paul J.	Allen	TX	44-49	Roberts III, Arthur	Vacaville	CA	55-16
Fisher, Billy B.	Brentwood	CA	44-49	Barsell Jr., John E.	Pshoa	HI	56-09
Glover, Louis S.	Silver Spring	MD	44-49	Bujak, Stanley S.	Kerrville	TX	56-09
McCoy, George R.	Chicago	IL	44-49	Carney, Robert W.	Palo Heights	IL	56-09
Mood Jr., John B.	Hendersonville	NC	44-49	Daly, Gerald J.	Scottsdale	AZ	56-09
Port, Arnold R.	Cedar Rapids	IA	44-49	Felderman, Arthur L.	Bettendorf	IA	56-09
Sinnefia, Anthony G.	Foster	RI	44-49	Nale Jr., William L.	Forney	TX	56-09
Stratton, David E.	Westfield	NY	44-49	Takano, Robert I.	Honolulu	HI	57-04

Boepple, Wayne T.	Bellevue	NE	57-09	Boomhower, Milton A.	Spring Valley	CA	43-15
Dedo, Richard G.	Hillsborough	CA	58-00	Maloney, John F.	Wauwatosa	WI	43-15
Viana, John	Grand Rapids	MI	58-03	Coles, William J.	Pittsfield	MA	43-16
Erni, Walter A.	Adrian	MI	58-12	Fisher, Lauren A.	Portland	OR	43-16
Mackin, William D.	Ashland	OR	58-12	Hering, Paul A.	Port Charlotte	FL	43-16
Miklos, George A.	Derby	KS	58-12	Kleinrath, Alfred A.	North Hills	CA	43-16
Anderson, Roger L.	Larimore	ND	58-13	O'Donnell, James R.	Houston	TX	43-16
Bowman, Wilfred R.	Bossier City	LA	58-13	Bratlie, Jack R.	Tacoma	WA	44-00
Helms, Andre K.	Williamsburg	VA	58-13	Reavis, Richard L.	Dustin	OK	44-04
Hillgren, Victor D.	Derby	KS	58-13	Johnston, Wilbur E.	Dayton	OH	44-06
Recicar, Steve A.	Ashton	MD	58-13	Grove Jr., William S.	Sandy Springs	GA	44-07
Robben, Vincent D. J.	St. Louis	MO	58-13	Kingsbury, Derrell	Rolling Hills	CA	44-08
Stewart, William H.	Tipp City	OH	58-13	Dickison, Dr. William E.	Fairborn	OH	44-09
Yurkovich, Daniel T.	Austin	TX	58-13	McGinnis, William R.	San Antonio	TX	44-10
Mateer, Thomas D.	Newport	RI	59-02	Moore, Owen E.	Cocoa Beach	FL	44-10
Shaw Jr., Christopher C.	Carlinville	IL	59-08	Roe, Norman E.	Desert Hot Springs	CA	44-12
Stevenson Jr., Bonnie G.	N. Chesterfield	VA	59-15	<b>JAMES CONNALLY</b>			
Tinley Jr., Frank F.	Charleston	SC	59-15	Bedessem, Nicholas E.	Hagerstown	MD	52-04
Staples, Robert M.	Lubbock	TX	59-17	Helf, Joe F.	Kelseyville	CA	52-04
Roberts, Ernest A.	Bay Minette	AL	59-21	Johnson, William R.	Dallas	TX	52-07
Goins, Richard T.	Cypress	CA	60-05	Lindeman, William E.	Colorado Springs	CO	52-07
Weil, Robert B.	Oklahoma City	OK	60-13	Reinking, Robert G.	Santa Rosa	CA	52-07
Warren, Dorman M.	Granbury	TX	60-19	Watkins, James A.	Arlington	TX	52-07
Greenspan, Michael M.	Houston	TX	60-21	Butchin, Samuel B.	Willingboro	NJ	54-05
Wallace, Jack T.	Weslaco	TX	61-01	Cockayne, William A.	Moreno Valley	CA	54-05
Christison, Charles F.	Ridgecrest	CA	61-13	Craner, Robert R.	Washington	DC	54-05
Champion, Laurence L.	Viera	FL	62-12	Dixon, Louie W.	Hazelhurst	MS	54-05
Marcus, Donald R.	Slidell	LA	62-12	Chason, Lloyd R.	Wilmington	NC	58-03
Slaughter, Jackie L.	Montgomery	AL	62-14	Moore Jr., Paul J.	Monroe	LA	59-02
<b>HONDO</b>				Adams III, Jordan E.	Jensen Beach	FL	59-08
Berger Jr., George E.	Brighton	CO	41-00	Moore, Ernest F.	Fairborn	OH	60-15
Keely, Gerald J.	Tacoma	WA	41-00	Crawford, Dale H.	Tucson	AZ	60-16
McGuire, Cecil G.	Mobile	AL	41-00	Kierstead, Glenn E.	Vacaville	CA	62-15
Nystom, Robert W.	Glenview	IL	41-00	Nelson, Gary M.	Plano	TX	62-17
Taylor, Chester W.	Greenville	SC	41-00	Dorr, John K.	Fort Walton Beach	FL	63-06
Homes, William E.	Sun City	AZ	42-16	Eller, Richard A.	Phoenix	AZ	63-16
Shirey, Clair L.	Eagle River	AK	42-16	Pence, Thomas G.	Houston	TX	63-21
Ford, William M.	Westfield	NJ	43-08	Kohlmann, Dennis	Citrus Heights	CA	64-07
Thurston, Truman H.	Hereford	TX	43-08	Walton, George T.	Munsonville	NH	64-08
Cleveland, Carleton A.	Naples	FL	43-09	Callahan, Wayne B.	Abingdon	VA	64-09
Lee, Reese C.	Foley	AL	43-09	Keenum, Billy J.	Lake Charles	LA	64-09
Sanders, Boles M.	Broadview Heights	OH	43-09	Wells, Robert S.	Boerne	TX	65-03
Hull, Howard L.	Newport Coast	CA	43-10	Barron, James M.	York	SC	65-13

# DR AHEAD PAGE 14

Dannheim, Billy E.	San Antonio	TX	65-13	Clark, George H.	Mooresville	IN	43-13
Higgins, Thomas A.	Columbia Falls	MT	65-13	Bolino, August C.	Silver Spring	MD	43-14
Hynes, George K.	New Bern	NC	65-13	Johnston, Kenneth G.	Bakersfield	CA	43-14
Karner, Howard R.	Coeur d'Alene	ID	65-14	Morse, Loren C.	Painted Post	NY	43-14
McCaslin, Patrick D.	Georgetown	TX	65-14	Nally, John P.	Casselberry	FL	43-14
Michaud, Edward J.	Oklahoma City	OK	65-16	Noullet, William C.	Temple Hills	MD	43-14
Blackard, Jean P.	Haileyville	OK	65-18	Classick, James J.	Haddon Heights	NJ	43-15
Ropp, James W.	New Braunfels	TX	65-21	Curtis, Billy R.	Medford	OR	43-15
Coleman, Myron C.	Liberty	IN	66-17	Magee, George J.	Doylestown	PA	43-15
Lyon Jr., Lawrence M.	Cocoa Beach	FL	66-17	Randolph, Steven T.	Woodland Park	CO	43-15
<b>LOWRY</b>				Brooks, Carlton	Springfield	OH	43-16
Burke, Dracos D.	New Iberia	LA	41-03	Burnham, Ruel D.	Tampa	FL	43-16
<b>MATHER</b>				Champagne, Donald L.	Buffalo	NY	43-16
Scanlan, William J.	Rochester	NY	42-08	Miller, Robert H.	Watertown	WI	43-16
Briggs, Travis C.	Dennison	TX	43-05	Wrightsmen, Clarence M.	Derby	KS	43-16
Calenda, Anthoney V.	Elmhurst	NY	43-10	Moore, Charles L.	Naples	FL	44-01
Kraus, Leonard D.	Aliso Viejo	CA	43-16	Mudie, Charles R.	Croydon	PA	44-01
Warner, Walter E.	Arnold	MD	50-00	Beckman, Joseph F.	Cincinnati	OH	44-02
Ablett, Kenneth L.	Chesapeake	VA	52-24	Grace, John N.	Smithfield	VA	44-02
Cline, Richard R.	Richardson	TX	72-00	Zwierlein, Carl	Westlake	OH	44-02
<b>SELMAN</b>				Eisenstock, James E.	South Hadley	MA	44-03
Parham, Hoyle W.	Nashville	TN	42-16	Fidrocki, Henry E.	Milton	MA	44-03
Doolan, Robert H.	Cincinnati	OH	42-17	Gordon, James R.	Lombard	IL	44-03
Self, Robert O.	Redlands	CA	42-17	Johnson, Oliver D.	Winnisboro	LA	44-03
Fox, William H.	Columbus	IN	43-02	Stewart, Dean B.	Johns Island	SC	44-03
Burns, John R.	St Louis	MO	43-03	Weber, Robert R.	Corona Del Mar	CA	44-03
Fedge, William R.	Norwalk	CT	43-03	Zelnicker Jr., Edwin A.	Mobile	AL	44-03
Stapleton, Carl W.	Greenville	SC	43-04	Clark, Everett A.	Bloomfield	CT	44-04
Conrad, Francis B.	New York	NY	43-05	Dooley, Jeremiah R.	Peoria	AZ	44-04
Durow, Alfred A.	Tucson	AZ	43-06	Huston, MGen John W.	Annapolis	MD	44-04
Tschirehart, Wilbur E.	Atlanta	GA	43-06	Muchnik, Jack L.	Media	PA	44-04
Slesinger, Robert L.	Boynton Beach	FL	43-08	Rowland, Donald G.	Woodbridge	CT	44-04
Blanchfield, Edward W.	Hemet	CA	43-09	Benjamin, Alfred D.	Newton	MA	44-05
Cannon Sr., James E.	Monroe	LA	43-09	Hines Jr., Andrew H.	St Petersburg	FL	44-06
Eakin, William P.	Lake Charles	LA	43-09	Pohorilla, Michael J.	Berwyn	PA	44-06
Heller, Stephen M.	San Rafael	CA	43-09	Morris, Daniel M.	Great Neck	NY	44-07
Hintz, Lawrence G.	East Pointe	MI	43-09	Rudy, William J.	Ardsley	NY	44-07
Jones, Harrell R.	Charlotte	NC	43-09	Pischel, Carl S.	Fullerton	CA	44-08
Young, Dan A.	Ocala	FL	43-09	Ansel, Lawrence G.	New Orleans	LA	44-09
Taylor, Robert S.	Mesa	AZ	43-11	Anthony, Thomas P.	Haverhill	MA	44-09
Bennett, George A.	Boise	ID	43-12	Burk, William H.	Bella Vista	AR	44-09
Colon, Flores M.	Burke	VA	43-12	Connor, Joseph E.	Manchester	CT	44-09
Mears, Frank C.	Stockton	NJ	43-12	Craven, James W.	Evansville	TN	44-09

Evans, John A.	Santa Fe	NM	44-09	Thomas, Thomas L.	Wheaton	IL	43-14
Jones, Olie T.	Dayton	OH	44-09	Crowder, Lucien G.	Grand Forks	ND	43-15
Pick, Fred M.	Lakeland	FL	44-09	Weeks, John M.	Batavia	IL	43-15
Caldwell, Charles A.	Amory	MS	44-10	Dowe Jr., Dan O.	Montgomery	AL	43-16
Chakarian, Ara M.	West Milford	NJ	44-10	Bahmeier, Carl E.	Edina	MN	43-17
Firestein, Abraham J. Z.	Hampton	VA	44-10	Nagorski Jr., Carl E.	Erie	PA	43-17
Goldberg, Nathaniel E.	Scarsdale	NY	44-10	O'Brien, Paul D.	Albuquerque	NM	43-17
Harding, Norman C.	Farmers Branch	TX	44-10	Sarfaty, David E.	Washington	DC	43-17
Albrecht, Arthur R.	Sun City	AZ	44-11	Smith, Victor D.	Moraga	CA	43-17
Clemmens, Robert L.	Baltimore	MD	44-11	Grubman, Harold	Fort Lee	NJ	43-18
Portin, John F.	Sea Isle City	NJ	44-11	Maurer, Roy G.	Kansas City	MO	43-18
Cribbs, Richard E.	Tucson	AZ	44-12	Weingand, Paul G.	Satellite Beach	FL	43-18
Singler, Joseph V.	Flemington	NJ	44-12	Feeney, Francis P.	Brighton	MA	44-02
Varnedoe Jr., William W.	Huntsville	AL	44-12	Craig, Robert T.	Fort Pierce	FL	44-03
Moldstad, David F.	Wooster	OH	44-13	O'Donnell, Richard W.	Goodyear	AZ	44-03
Bekius, Joseph J.	Salem	VA	44-14	Walford, Edward T.	Colorado Springs	CO	44-03
Ginder, William M.I.	Royal Oak	MD	44-14	Frankhouser, William L.	Bedford	VA	44-05
Nye, George A.	Bradenton	FL	44-14	Heller, Lowell Q.	Murphysboro	IL	44-09
Wilcox, Glenn	Stratton	ME	44-14	Gudridge, Ernest A.	Fort Myers	FL	44-10
Boyle, James E.	Pinehurst	ID	44-15	Martin, William S.	Bayfield	CO	44-10
Combs, Clarence J.	Louisville	KY	44-15	Kaiser, Charles P.	Princess Anne	MD	44-12
Daiello, Cosimo D.	Fort Pierce	FL	44-15	<b>TURNER</b>			
Onyskin, Alexander J. K.	Huntington	NY	44-15	Bishop, George P.	Mesa	AZ	42-06
Race, Dr. Dale L.	Elyria	OH	44-15	<b>UNKNOWN</b>			
Rumsey, Donald G.	Lenexa	KS	44-15	Butler, Herbert I.	Camp Springs	MD	41-00
Waldmann, Rodney K.	Verona	WI	44-15	Hever, Albert	Arlington Heights	IL	41-00
Clontz, Charles B.	San Antonio	TX	45-03	Bittman, Hammond H.	Los Angeles	CA	42-00
Julian, Paul R.	Montross	VA	45-03	Connelly, Joseph W.	Beavercreek	OH	42-00
Nuss, Robert P.	Issaquah	WA	45-03	Conners, Walter W.	Missouri City	TX	42-00
Bass, Franklin F.	West Lafayette	IN	45-03N	Bodager, Bill W.	Newton Square	PA	43-00
Feather, Byron D.	Bedford	IN	45-03N	Byrum, William H.	Lighthouse Point	FL	43-00
Miller, William A.	St Petersburg	FL	45-03N	Cecil, Charles W.	Tucson	AZ	43-00
Tschannen, Robert A.	Northfield	OH	45-03N	Gould, Alfred A.	Lake Oswego	OR	43-00
Whipple, Burton P.	Arroyo Grande	CA	45-03N	Grassman, Alvin R.	Sarasota	FL	43-00
Andrews, Jack G.	Lake Lure	NC	45-07N	Bostic, Thomas W.	Richardson	TX	44-00
<b>SAN MARCOS</b>				Mabie, Christopher S.	Austin	TX	44-50
Wyks, John R.	Fenwick	DE	42-00	Geren, Robert R.	Fulton	AR	45-00
Meyer, Robert H.	West Islip	NY	43-09	Johnston, Harry R.	Davidson	NC	45-00
Sortomme, Warren D.	Oceanside	CA	43-09	Zastrow, Rev. John A.	Holdrege	NE	45-00
Combs, George F.	Mount Arlington	NJ	43-10	Dorsey Jr., Charles H.	Baltimore	MD	54-00
Schleusener, Dexter E.	Mentor	OH	43-10	Feist, John W.	Maitland	FL	54-00
Velie, John J.	Bloomington	MN	43-12	Cummings, William J.	Tucson	AZ	56-00
Wettig, Carl O.	St Louis	MO	43-12	Malone, John David	Universal City	TX	56-15

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