

Collins Radio and the SAC HF SSB Demonstration Flights

By Rod Blocksome, May 8, 2022

Introduction

In 1955 Collins Radio had developed the necessary ingredients to bring about a revolutionary change in the field of high frequency single sideband communications. Those key ingredients were the Collins Mechanical Filter for excellent selectivity, the Permeably Tuned Oscillator (PTO) for linear tuning accuracy and high frequency stability, and RF feedback techniques for highly linear power amplifiers. The first HF SSB products out of the Collins factory were the 75A-4 Receiver and the KWS-1 1kW Transmitter. They were introduced in March 1955 and advertised for the amateur radio market. But the price was so high that few hams could afford them and soon the community labeled the equipment as “The Gold Dust Twins” because they perceived it took a bag of gold dust to buy them. Collins Radio even offered to sell the equipment with monthly installment payments.

At that time Collins Radio was well staffed with technicians, engineers, administrators, and managers who were licensed amateur radio operators. After all, Arthur Collins, the company's founder and President, was also a longtime ham – W0CXX. So it's very probable that introducing Collins HF SSB into the amateur product line was a carefully calculated marketing strategy to gain maximum exposure with minimum company resource expenditure.

Over the next few months Collins sent a couple of 75A-4 receivers and KWS-1 transmitters to Gen. Curtis LeMay, Commander-in-Chief of the USAF Strategic Air Command (SAC) and Maj. Gen. Francis Griswold, Vice-Commander-in-Chief of SAC. Both were amateur radio enthusiasts holding call signs K0GRL and K0DWC respectively. They were friends of Arthur's and well acquainted with Collins equipment. The new equipment was installed in the Military Affiliate Radio System (MARS) station on Offutt AFB in Nebraska. Arthur Collins personally checked out the equipment on-the-air operation with Generals LeMay and Griswold. This new equipment introduced a new modulation mode called single sideband (SSB) which offered many advantages over the existing amplitude modulation (AM) mode currently in use.

An AM transmitted signal consists of a carrier and two identical sidebands that each carry the information. The transmitter available peak output power is divided with half going to the two sidebands and the remaining half going into the carrier (which contains no information). Single sideband modulation eliminates the carrier and one of the two identical AM sidebands. Thus all of the available transmitter power is devoted to the remaining single sideband. The information is therefore transmitted with 8 times more power using SSB rather than AM for a given transmitter peak output power capability. The revolutionary and highly compact Collins Mechanical Filter allowed only the single sideband to pass through the circuitry and replaced an entire rack of equipment then in use for SSB modulation.

On the receiving end the SSB signal has another 2 to 1 advantage over AM because the occupied bandwidth is only half as wide as AM and therefore only half as much ambient noise on the received information signal.

By March 1956 Collins technicians and engineers were installing the “Gold Dust Twins” aboard a Strategic Air Command (SAC) C-97 transport airplane at the Cedar Rapids Airport. The plane would then begin a series of long flights to evaluate the feasibility of using HF SSB for command and control of the nation’s strategic bomber defenses. This was during the Cold War and it all came about via the friendship and vision of three amateur radio enthusiasts – Arthur Collins, W0CXX; Gen. Curtis LeMay, K0GRL; and Maj. Gen. “Butch” Griswold, K0DWC.

It is a remarkable technology adventure story – especially considering the “radio operators” aboard the C-97 were Arthur Collins and “Butch” Griswold. Here are the details of these flights, compiled from various sources, followed by a summary of the Collins HF SSB legacy with the USAF that was spawned by these early demonstration flights.

The First Flight (Far East Flight)

The first flight took place from March 25 to April 3, 1956. After installation of the equipment at the Collins Hangar at the Cedar Rapids Airport, the plane flew back to Offutt AFB, NE. From there it went to Great Falls, MT, then Fairbanks, AK. Next were stops in Anchorage, AK, Andreanof Island AK, then across the Pacific to Tokyo, Japan. Then on to at Kadena AFB, Okinawa, Guam, Kwajalein, Marshall Islands, Hickam AFB, HI, Travis AFB, CA, and back home to Offutt AFB, NE.

The total flight time was 71 hours covering some 15,000 miles. In addition to Arthur and Butch, aboard was TSgt. Garland C. A. "Willy" Wilson, W5DTA, SAC Radio Operator. In addition to the Collins KWS-1 Transmitter and 75A-4 Receiver, a second Collins 75A-4 Receiver was installed for frequency spotting of other stations calling. The C-97 carried two wire antennas – one 60-feet long and a second 27-feet long. Two Collins 180S-1 antenna tuners were used to match the antenna impedance to 50-ohms for the transmitter. Operations were conducted on frequencies of 7205, 14,297, 21,447, and 28,650 kHz. These were in the US ham bands except 21,447 was an Air Force MARS frequency. During the trip they made over 1000 contacts in 26 countries.



Arthur Collins, Maj. Gen. "Butch" Griswold, and TSgt. "Willy" Wilson at Travis AFB, California



Arthur Collins and "Butch" Griswold operating the Collins KWS-1 and 75A-4
aboard the SAC C-97 Aircraft



This color photo, taken in Guam, was used on the QSL contact confirmation card

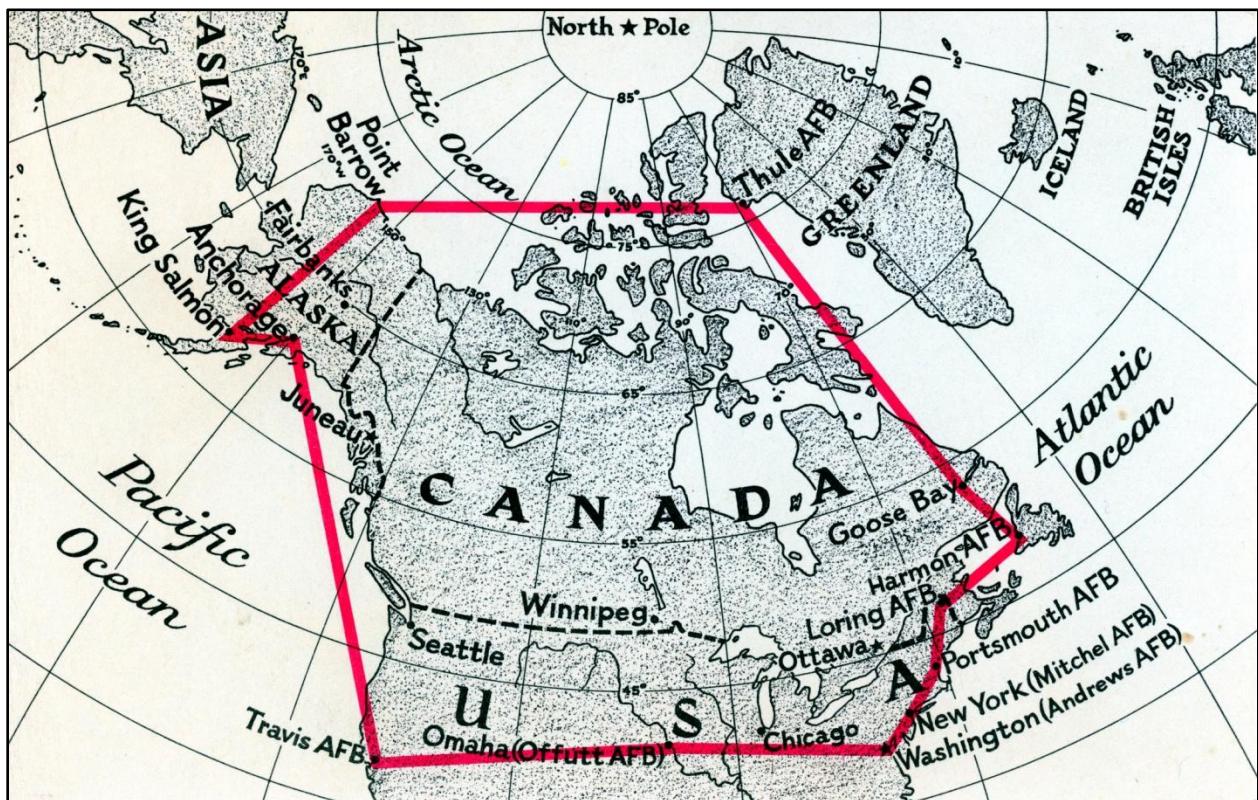
The demo flight was deemed a huge success but more testing was necessary. The SAC bombers and tankers operated frequently at high latitudes from northern Canada and the arctic regions where HF propagation is frequently disturbed or interrupted by the *aurora borealis*. So a second HF SSB demo flight over the Arctic was scheduled two months later.

The Second Flight (North Pole Flight)

Eight weeks later, Collins had re-outfitted the equipment in the C-97 and they are ready for a trip over the North Pole with additional folks on board. The flight left Offutt AFB, NE on June 29 and returned 8-days later on July 7, 1956.

The flight path took them from Offutt AFB, NE, to Andrews AFB, MD, then made stops at Mitchell AFB, NY, Portsmouth AFB, NH, and Loring AFB, ME before heading north into Canada. Next were stops at Harmon AFB, Newfoundland, Canada, Goose Bay AB, Labrador, Canada, and Thule AB, Greenland. While at Thule, they took a side trip in a DC-3 equipped with landing

gear skis. They visited a remote Air Force Installation on the Greenland Ice. From Thule AB they flew over the North Pole and down to Anchorage, AK, then to Travis AFB, CA, and finally back to Offutt AFB, NE.



This map of the trip was part of the QSL card they sent to verify contacts

The total flight time was 42 hours covering 10,000 miles. Personnel aboard this flight were Arthur A. Collins, Maj. General F. H. "Butch" Griswold, Col. John Bestic, Chief of SAC Communications, Lt. Philip Ferrell, Rome Air Development Center, Lt. Col. Joe H. Beler, SAC Communications Officer and later head of field service and support at Collins Radio's Richardson, Texas plant, Leo Meyerson, W0GFQ, President of World Radio Labs, Council Bluffs, Iowa, Melvin B. Grosvenor, Associate Editor of National Geographic Magazine, and Gil¹ Roberts, Staff Photographer National Geographic Magazine.

The demonstration equipment consisted of the usual Collins KWS-1 Transmitter and 75A-4 Receiver but this time a Collins R-390A Receiver was added for spotting. In addition there was a Collins prototype of what became the AN/ARC-58 Airborne HF SSB Transceiver. Also included was a WRL Globe King AM Transmitter, which was used for comparison with SSB, and a tape recorder. They used the same frequencies except for 28,650 kHz. 1200 contacts in 25 countries were made during the trip.

¹ This name likely in error - probably Joseph Baylor Roberts per National Geographic Archives

Leo Meyerson, W0GFQ, founder and president of World Radio Laboratories in Council Bluff, Iowa was aboard this second flight and wrote a detailed description which was published in Electric Radio Magazine:

"In Ray Osterwald's series on the Collins 75A- receivers he mentions that the Air Force did some in-flight testing of SSB equipment back in the '50's. I was very fortunate to have been along on a five-day testing flight back in July of 1956.

General 'Butch' Griswold (K0DWC), who was Strategic Air Command (SAC) [vice-] commander and a very good friend of mine, called me one day and asked if I would like to participate in some in-flight testing of SSB. He said that Art Collins would be going along, as well as some other Collins personnel and other military people.

The gear would consist of a KWS-1 and a 75A-4 for sideband and a Globe King 500 and another receiver (I can't remember what it was, maybe a National) for AM comparisons. Griswold was very familiar with the Globe Kings as I had lent one to him for his personal use. H thought it would be interesting to see how AM stacked up against SSB.

Needless to say I was excited about the trip. It would be good to spend some time with Griswold and also Art Collins (W0CXX) whom I had met but couldn't say I really knew. Art and I became good friends on that trip and remained so until his death. I remember looking over the crew list and seeing myself listed as "antenna specialist". I suppose everyone had to have some sort of expertise listed in order to justify being along.

We took off from SAC headquarters in a lumbering, slow KC-97 aircraft. As soon as we got in the air Art Collins had his gear fired up and was working hams in rapid succession. (I wonder how many of those hams are still around who recall working us on that trip.) He also contacted military bases, particularly those who had been supplied with SSB gear in anticipation of the in-flight tests. Up till then AM was the primary voice mode used by all of the U.S. military. I think he may have worked some of the bases cross-mode as well. We did work some stations on AM with the Globe King but as I recall we used the SSB gear mostly as that was really the whole intent of the trip.

If it hadn't been for a calamitous event I may have had some good Globe SSB equipment along on the trip. Here's the story on that. In 1953 I had a very good engineer by the name of Fred Berry out of Kansas City design a SSB transmitter for me. When he brought the prototype to me, around Christmas of '53, I tried it and thought it worked great. I turned it over to my chief engineer Sam Fidone. Maybe that was a mistake. Sam was adamantly against SSB. He thought it sounded terrible and that it would never gain wide-spread acceptance. Anyway that was the last I ever saw of that transmitter. Sam said it had just "disappeared". Around that time we had our fire – that totally destroyed our building – and it may have been lost there, but I have my doubts about that. I went back to Fred Berry to have him build another one but he said he was involved in another project and couldn't do it. I then approached Wes Schum at Central

Electronics up in Chicago. I suggested that we combine forces in order to develop some good SSB rigs. He said he couldn't leave Chicago, and of course I couldn't leave Council Bluff so that was the end of that. Losing that first prototype transmitter set WRL back considerably in the development of SSB gear.

Our first stop on that trip was at a base in Maine. We then went on to Gander, Newfoundland and then to Goose Bay, Labrador and then on to Thule, Greenland. At that time of year in Greenland the sun never sets and we all had some difficulty getting to sleep at night. Another thing I remember is that one day we flew out on the icecap aboard a DC-3. Incidentally this aircraft was rocket assisted for takeoff. We landed and visited a complete Air Force installation that was in a huge cave carved out of the ice. There seemed to be everything there to take care of the big military staff; even a hospital. It was like an underground city. I had never seen anything like it.



Arthur and Butch on the Greenland icecap with the DC-3 on skis

The next leg of our trip was to Alaska. From there we flew to San Francisco. At San Francisco I left the group and met my family, who had come out for the National ARRL Convention. It was a fun trip."

We learn more details of this second flight from the archives of the Cedar Rapids Gazette for June 24, 1956.

"One project in the Strategic Air Command that has been given top priority during the last year is communications."

"Gen. Curtis LeMay long has believed that an aerial force capable of striking anywhere in the world should have radio equipment that will give him command of the force no matter where it happens to be."

"His vice-commander, Major Gen. Francis Griswold, has spent many days in Cedar Rapids discussing this problem with officials of the Collins Radio Company, and Arthur Collins, head of the Cedar Rapids firm, also has made a number of trips to SAC headquarters in Omaha."

"That labor is beginning to bear fruit."

"Last week Gen. Griswold was sitting in his four-engine personal transport high above the middle of the Pacific ocean. He decided he wanted to talk with a SAC combat commander on a base in England."

"And in a matter of minutes he was doing just that. The conversation was loud and clear on both ends and static free. He later talked to a U. S. installation in Little America and a SAC base back in America."

"The air force recently signed a development contract with Collins for a new communications method that made such calls possible. The method is known as the single sideband technique."

A few days after they returned from this flight, the headline in the Cedar Rapids Gazette for July 10, 1956 read "**Arthur Collins in Flight Over Top of the World**".

"Arthur Collins, president of the Collins Radio Company, flew over the top of the world last week."

"Flying an air force C-97, civilian version of the Boeing Strato-cruiser, Collins flew from Thule air force base in Greenland to Pt. Barrow, Alaska. The flight line was between the magnetic north pole and the geographic pole. It was the personal plane of Major Gen. Francis Griswold, vice-commander of the Strategic Air Command."

"The flight was made to test the effect of polar magnetic fields on the new equipment. The plane was flown from Offutt air force base in Omaha to Thule air force base in Greenland and then over the pole to Alaska."

"Two months ago Collins made a similar flight with Gen. Griswold. That time the flight went to Tokyo and back. Over the middle of the Pacific, Gen. Griswold - using the Collins equipment - talked to a SAC commander at a base in England."

"Reception was reported to be excellent and static free. SAC Commander Curtis LeMay has authorized a project which will enable him to contact SAC planes anywhere in the world from his headquarters in Omaha."

"The new Collins method is known as the single sideband technique."

Then again, five days later, the Cedar Rapids Gazette, ran this story:

"The flight across the top of the world week before last by Arthur Collins and top leaders of the Strategic Air Command was made, of course, for the serious matter of testing new

radio gear. But the flight provided some chuckles for the participants, too. Col. Jack Bestic, who heads communications for SAC, reports their plane constantly was being called by ham radio operators around the world, who had been following the progress of the flight on their receivers."

"On the final leg of the journey as the plane approached Offutt air base in Omaha, Major Gen. Griswold and Mr. Collins decided to hold a contest for the hams."

"Gen. Griswold called to make the GCA approach to Offutt and at the same time announced over the air that he would continue to transmit until his plane touched down. That would be the signal for the hams to call in. The first ham operator to identify himself to the air force plane would be sent a Collins mechanical filter."

"It sounded like a bag of squalling cats," Bestic reported after the flight. "As soon as the general stopped talking hams all over the country were shouting to be heard." Bestic, Collins and Griswold finally decided that an Indianapolis ham was the prize winner."

DATE TIME	STATION CALLED	CALLED BY	HIS FREQ. OR DIAL	HIS SIGNALS RST	MY SIGNALS RST	FREQ. MC.	EMIS- SION TYPE	POWER INPUT WATTS	TIME OF ENDING QSO	OTHER DATA
1960	W9LMX			9	5/9					
	W2ZGM			9						Harold
	W7BA			9						
	WØBLI			9						
	WBHAF			9						
2000	W9IVE/7			9						
	VE4QI			5						Stanley
	W6ITH			9						
2005	W2ZGM			8						
21	WBANS			8						
	W2AI			7						
2100	WBPEC (W8DSC)			9+						
	W9ARK/B			9						
	WØGFK			9+						DOC
	W3WB			9						
	KL7BGA			9						
	K4DDE - WIRCZ (JIT)			9	(Carried on)					
	W2BXA			9						
2200	W4JIT (JIT)			9						
22	WBHAF			9						
	W7BA			9						
2230	W6QF			9						
	W4RLL			7						
	WIRCZ			8						
	- W5ZG			9						
	W2ZGM			9						
	CONTEST	WON	BY							

The station log of those stations calling at touchdown described by Col. Bestic

Additional interesting details of the first and second SSB demo flights can be found in the *Collins Signal Magazine*, Vol. 4, No. 4, Fall 1956 issue on page 6. The Collins Magazines are available on line at www.collinsaerospacemuseum.com.

The Third Flight (Africa and Europe)

A third flight took place October 2 – 12, 1956 again with Arthur and Butch working the radios along with Capt. Walter Browne, Director of MARS. The route was Offutt AFB, NE; Kinley, Bermuda (refuel stop); Loges, Azores (overnight); Sidi Slimane, French Morocco (where the plane was hit by lightning); Wiesbaden, Germany (overnight); London, UK; Thule, Greenland; Sondrestrom, Greenland; Goose Bay, Labrador; and finally back to Offutt AFB, NE. The total flight time was 60 hours and covered 14,000 miles.

The radio installation included the usual Collins KWS-1 Transmitter and 75A-4 Receiver – referred to as station #1. Station #2 consisted of an Eldico SSB-100-MIL 100 Watt Transmitter and a Collins 75A-4 Receiver. Also along were the Collins R-390A Receiver and a Collins AN/ARC-58 Airborne HF SSB transceiver. Apparently Eldico wanted a chance at supplying SAC with HF SSB equipment at this time.

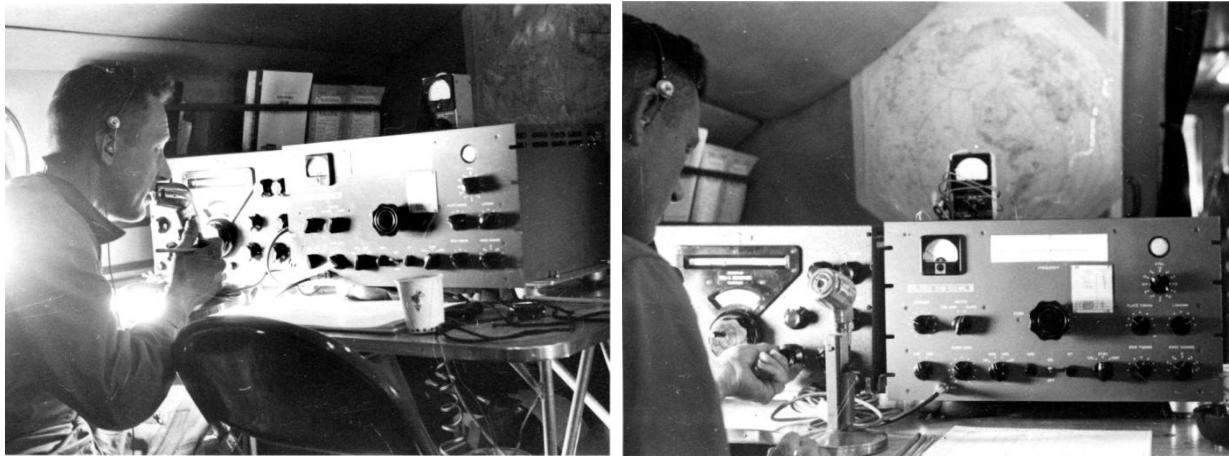


Station #2 (Eldico) on the left; Station #1 (Collins) on the right

The call signs used were W0CXX/M and K0DWC/M on the amateur frequencies and AF0CXX/M and AF0DWC/M on the MARS frequencies of 14,374 and 20,994 kHz. Over 1000 contacts were made in 31 countries on this trip.

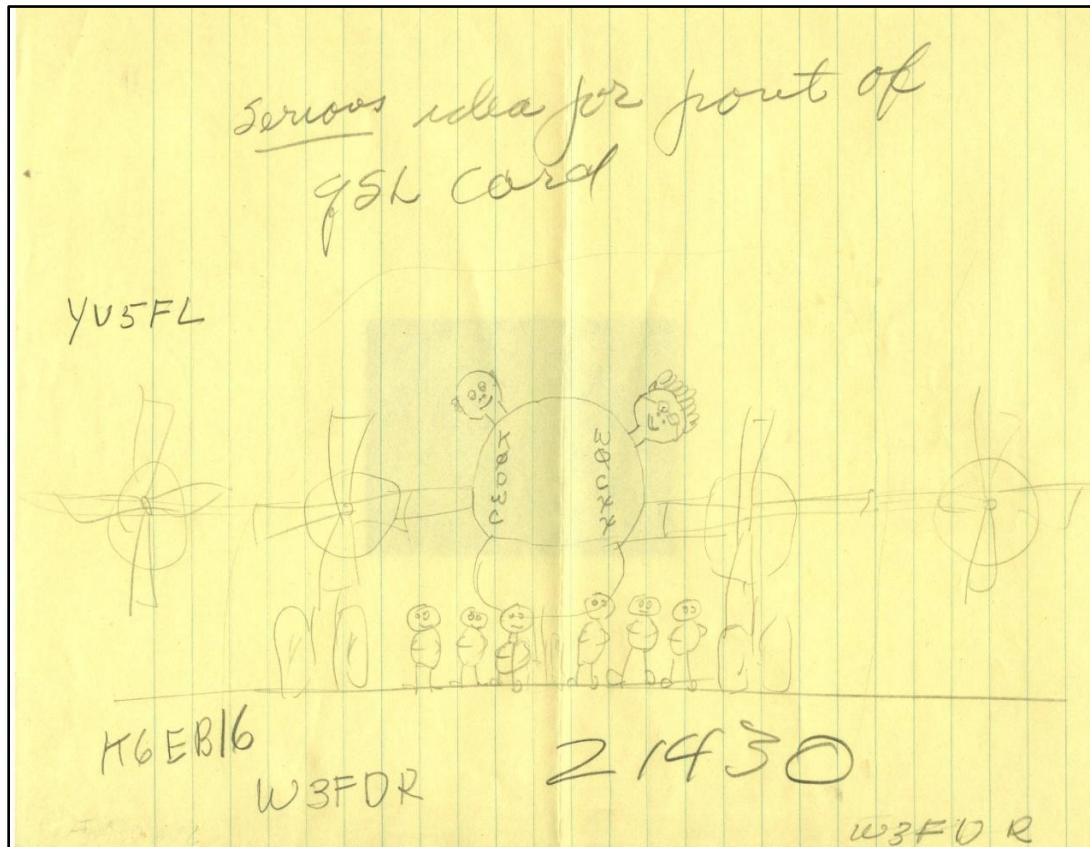


Arthur Collins Operating the 75A-4 Receiver at Station #1 on the Third Demonstration Flight



Don Merten, President of Eldico, Operating his SSB-100-MIL Transmitter
with the Collins 75A-4 Receiver in Station #2 on the Third Demonstration Flight

The following sketch was found in the log books for this flight which became quite interesting years later when the following color slide was discovered. The photo was underexposed and perhaps was the reason it was never used on the QSL card for this flight.



"Serious idea for front of QSL card"



Arthur Collins, W0CXX on the left; Butch Griswold, K0DWC on the right

The Fourth Flight (Domestic Stops)

CQ Magazine reported on a fourth trip in the C-97 on Nov. 4, 1956 in which Maj. Gen. "Butch" Griswold, K0DWC, flew East in his C-97 plane picking up W8DNY, Bob [Westcot], of Detroit, W2KR, Mort [Kahn], W2GG, "Dan" [Dannals] and Don [Merten] K2AAA in New York for a routine flight to Boston, Washington D.C., and return to Omaha. During the stop at Detroit sixteen "side-banders" traveled from distances up to two hundred miles to honor "Butch" at an informal dinner. Through the courtesy of Mickey, W8JYZ we received the picture showing the W-8 gang and the General's party. Incidentally it was also a birthday celebration for Butch.

The Fifth Flight (Europe and Africa)

The fifth SAC SSB demonstration flight took place December 10 – 18, 1956. The route was Offutt AFB, NE; Goose Bay, Labrador, Canada; Paris, France; London, UK; Azores; Bermuda; and Offutt AFB, NE for a total of 12,000 miles. Arthur Collins did not go on this flight as it was apparently Eldico's turn to show what they could do. Aboard were Don Merten, K2AAA, President of Eldico, and Maj. General F. H. "Butch" Griswold, K0DWC, Vice-Commander SAC.

The equipment was a pair of Eldico SSB-100MIL excitors and SSB-1000 linear amplifiers installed in the passenger compartment. However the two Collins 75A-4 Receivers remained. Apparently Eldico did not have a suitable HF SSB receiver available at the time. Nearly 1,300 contacts were made on this flight.

CQ Magazine reported on this planned flight with the following: "On December 10 (1956) General LeMay, K0GRL, will begin a routine inspection flight to Europe and Africa and will take W2KR, W4FB and K2AAA as observers. The plane will be equipped with SSB gear and will operate on the ham bands and also the MARS frequencies."

Then a month later CQ Magazine reported the results of this flight: "W2KR, K2AAA, and W4FB are back home again after a trip with General LeMay, K0GRL. Twenty and fifteen meter SSB stations were operated while en route and hundreds of contacts were made with fifty foreign countries. [Your] Editor handled many phone-patches while the plane was flying over the ocean including one to Arthur Godfrey, K4LIB. The call K2AAA/AM was used on the amateur bands while out over the Ocean and MARS calls and frequencies were utilized while flying over foreign countries."

The Sixth Flight

The exact dates of this flight are unknown but it was said to have taken place a few weeks after Dec. 18, 1956 – Probably in January 1957. The route and other details are also unknown. But Arthur and his friend "Butch" were back on board along with Lt. Col. Joe Beler, (later W5JB). The Collins KWS-1 and 75A-4 equipment were re-installed on the right side of the aircraft.

SSB Communications and Big Game Hunt

The enthusiastic response to Collins HF SSB at SAC is now evident in another flight to Africa. From the pages of CQ Magazine we learn about this trip. "Another A/M expedition is scheduled soon by Arthur Godfrey, K4LIB and Curt LeMay, K0GRL to Africa where they will hunt big game. A fixed SSB station will be set up in the jungle."

Then a month later from the April 1957 issue of CQ Magazine come more details. "Arthur Godfrey's base station is now set up in the bush, and is operating on 10, 20, and 15 with the call sign FQ8LIB. Ozzie, W2HC is the op. Godfrey's DC-3 plane equipped with SSB was to have been used in Africa but due to bad weather over the North Atlantic it was left behind. Arthur K4LIB and Curt LeMay, K0GRL will hunt game for three weeks, and will also work the SB gang from the base station."

Then more on this trip in the May 1957 CQ Magazine: "As previously reported, Arthur Godfrey, K4LIB, accompanied by General LeMay, K0GRL hunted big game in French Equatorial Africa during March. A one kilowatt SB field station using the call K4LIB/FQ8 on 10, 15, and 20 meters was in use. Many of the gang were worked, but the station contacted mostly U.S.A. stations with phone-patch traffic. The operator in charge was Ozzie, W2HC, although Arthur did most of the operating. Cards will be sent."

The Rest of the Story

After these flights HF Single Sideband Communications from Collins Radio had now taken hold among the top leadership at SAC Headquarters as revealed in these news articles. From the pages of CQ Magazine we learn:

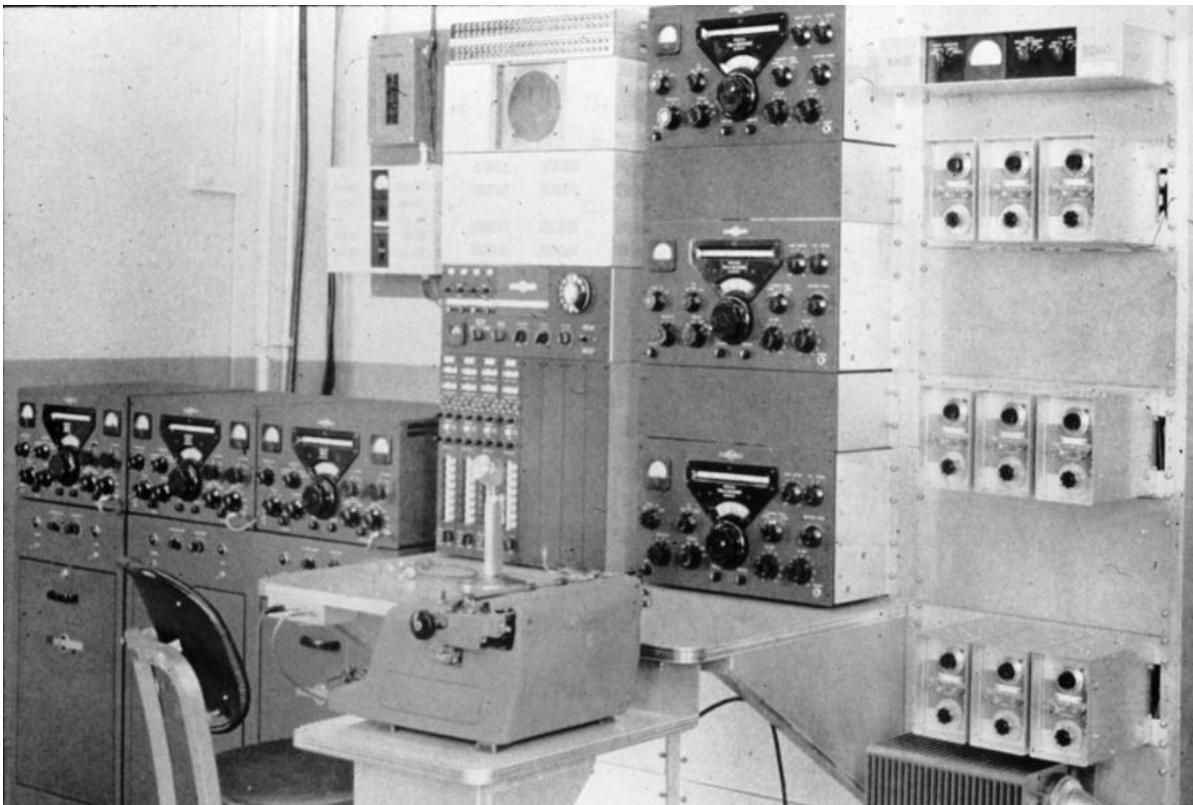
"The recent Single-Side Band Dinner held in New York on March 19th, was a great success Major General "Butch" Griswold, K0DWC was the principal speaker. Other prominent Military Hams were present including Generals Bill Hamlin and Earle Cook of the Signal Corps and Frank Gregory of the USAF, and Captain Blair Jones of the Navy."

"K0GRL, General Curt LeMay, who was recently named Air Force Vice Chief of Staff will move to the Washington area in July. "Butch," K0DWC, who is Vice Commander of the Strategic Air Command, will continue to operate from Offutt AFB."

"General Curt LeMay, was assigned the call K4RFA, and is active from his new QTH at Fort Meyer, VA. We were very happy to see "Butch", K0DWC nominated for his third star. Congratulations, Lt. Gen. Griswold!"

Before the SAC SSB Demonstration Flights of 1956, the Rome Air Development Center had awarded an air-to-ground HF SSB development contract to Collins Radio in 1955. The program was named "**Bird Call**" and later resulted in the AN/ARC-58 Airborne HF SSB Transceiver and other equipment. This was apparently the reason that Lt. Philip Ferrell from the Rome Air Development Center and a prototype of the Collins ARC-58 HF SSB radio were included in the second demo flight. But as a result of the SAC flights using the Collins 75A-4 and KWS-1, Gen. LeMay wanted to implement HF SSB into SAC communications networks sooner than the anticipated availability of the "Bird Call" equipment from Collins Radio.

Collins Radio Company then delivered many KWS-1 and 75A-4 HF SSB stations to SAC bases around the world in a project called "**Big Talk**". At first the equipment was the standard amateur gear then later modifications were made to optimize operations outside the amateur radio bands. The equipment was installed by Collins Field Service Engineers who also trained the on-site Air Force personnel on the operation and maintenance of the equipment.



A SAC “**Big Talk**” Installation of Three KWS-1 Transmitters (left) and 75A-4 Receivers

Communications with SAC aircraft, which only had HF equipment for AM and CW modes, was accomplished by the base stations tuning to the aircraft's AM carrier frequency and thus detecting only one of the two AM sidebands. On the aircraft, the radio operators had to turn on their BFO for CW reception and then carefully tune in the SSB voice signal.

“**Big Talk**” was a quick interim system for SAC while engineers at Collins Radio completed the development of the AN/ARC-58 airborne HF SSB Transceiver and the KWT-6 ground HF SSB Transceiver along with newly invented HF antennas. As this equipment became available from the Collins production lines, it was again shipped to SAC facilities along with experienced Collins Field Service personnel for installation and training. This “**Bird Call**” development project replaced the interim “**Big Talk**” system.

In 1958, SAC initiated project “**Short Order**” to establish four large split-site high power HF SSB stations located at Offutt AFB, NE; Barksdale AFB, LA; Westover AFB, MA; and March AFB, CA. Each station consisted of three sites – a Receiver Site, a Transmitter site, and a Control Site. The equipment was all Collins including new 45,000 Watt 205J-1 power amplifiers. “**Short Order**” became fully operational in March 1960.

In the decades that followed, Collins Radio, then Rockwell Collins continued to upgrade the USAF HF SSB communications systems as newer families of HF SSB equipment were developed. This was accomplished by programs such as “**Giant Talk**” that succeeded “**Short Order**” with Collins KWT-6, KWR-6, 310F-6, 50E-6, 204C-1, and 205J-1 family of HF SSB ground equipment.

Into the 1970’s “**Scope Control**” was the Air Force’s code name for the popularly known “**Priscilla Ellen**” full-duplex, point-to-point communications system. “**Priscilla Ellen**” was a network of eight long-range ground-air-ground high frequency communications stations that augmented existing Air Force Communications Service facilities that provided conventional ground-air-ground traffic and secure teletype communications. Two stations were located in the United States, and the other six at Air Force installations in the Pacific. **Scope Control/Priscilla Ellen** used the Collins URG-I family of HF SSB equipment.

Following “**Scope Control**” came “**Scope Pattern**” which was a communications program of the Sacramento Air Logistics Center. **Scope Pattern** used Collins URG-II equipment which was computer controlled using Collins C-System Computers.

“**Scope Signal**” was a high frequency single sideband (HF/SSB) radio system for the Worldwide Air Force communications network. The “**Scope Signal III**” system was configured as three CONUS HF Stations at McClellan AFB, Andrews AFB and Offutt AFB. **Scope Signal III** used the **Collins HF-80 Family of Equipment**.

The United States Air Force’s high power, high frequency radio system, installed during the 1960s and 1970s, finally became logistically unsupportable. The **Scope Command** program replaced the older HF radios and associated control equipment, used by the **Scope Control**, **Scope Pattern**, and **Scope Signal III** radio systems, with state-of-the-art, commercially available equipment and the latest computerized control techniques.

“**Scope Command**” Used **Collins URG-III equipment (RT-2200 R/T with 1kW and 4kW solid state PAs)**. The system featured Automatic Link Establishment (ALE) and is currently (2022) used today in what is now known as the High Frequency Global Communications System (**HFGCS**)

HFGCS was formerly called the Global High Frequency System or **GHFS**. **GHFS** began on June 1, 1992, and was created out of two earlier HF networks, the “**Giant Talk**” HF network used by the Strategic Air Command (SAC), and the **Global Command and Control System (GCCS)**, used by the rest of the Air Force. **GHFS** became the **HFGCS** network in 2003, on completion of the multi-year equipment upgrade called “**Scope Command**.”

In the late 1970s the USAF upgraded the airborne HF SSB radios with the Collins AN/ARC-190. This program spanned four decades and included virtually every USAF aircraft requiring HF communications.

This was the legacy of Arthur Collins and the Collins Radio Company in the field of HF SSB Communications for the United States Air Force.

Referenced Sources

Collins Column, April 1956, p. 15
Collins Column, August 1956, p. 4
Collins Column, Sept. 1956, p. 10
Collins Column, Nov. 1956, p. 12 & 15
Collins Signal, Fall 1956, p. 6
Collins Signal, Summer 1957, p. 4
"Arthur Collins - Radio Wizard" by Ben W. Stearns, 2002
Electric Radio, April 1993, p.2 & 3
A Pictorial History of Collins Amateur Radio Equipment by Jay H. Miller, 1999
CQ Jan. 1957 p. 84-85
CQ Feb. 1957 p. 81:
CQ Mar. 1957 p. 85
CQ Apr. 1957 p. 70
CQ May 1957 p. 75
Cedar Rapids Gazette, June 24, 1956 p. 13
Cedar Rapids Gazette, July 10, 1956 p. 3
Cedar Rapids Gazette, July 15, 1956, p. 15
Cedar Rapids Gazette, Jan. 17, 1957, front page