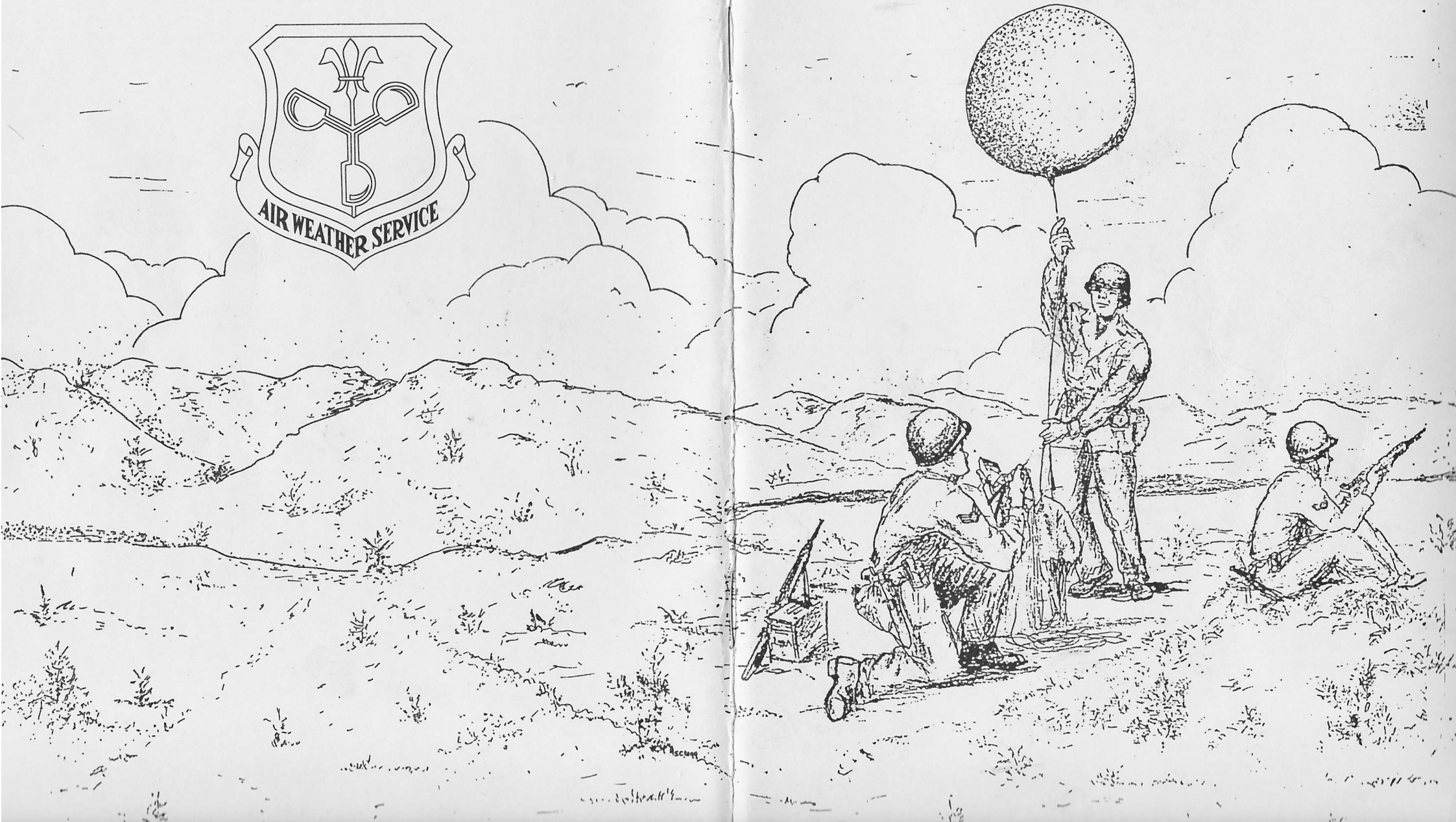


AIR WEATHER SERVICE: A BRIEF HISTORY 1937-1991



**AIR WEATHER SERVICE:
A Brief History, 1937-1991**

ON THE COVER: 20th Weather Squadron radiosonde run while under enemy fire, Korea, 1950.

**Office of AWS History
Special Study
by
William E. Nawyn
Rita M. Markus**

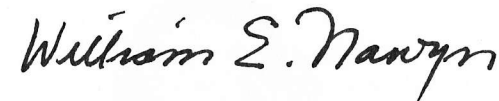
**AIR WEATHER SERVICE
UNITED STATES AIR FORCE
SCOTT AIR FORCE BASE, ILLINOIS
MAY 1991**

PREFACE

This is a particularly appropriate time to publish a history of Air Weather Service. Only a few weeks ago, on 1 April 1991, after spending 45 years as a subordinate organization of the Military Airlift Command, Air Weather Service became a field operating agency reporting directly to the Air Staff. At this point, when Air Weather Service enters a new era in its history, it is well for its members to review where the organization has been and to become more acquainted with the changes, experiences, and achievements in its past. In the process, they will be reminded that Air Weather Service not only confronts change and challenge today, but has faced—and successfully overcome—them time and again during its 54-year history.

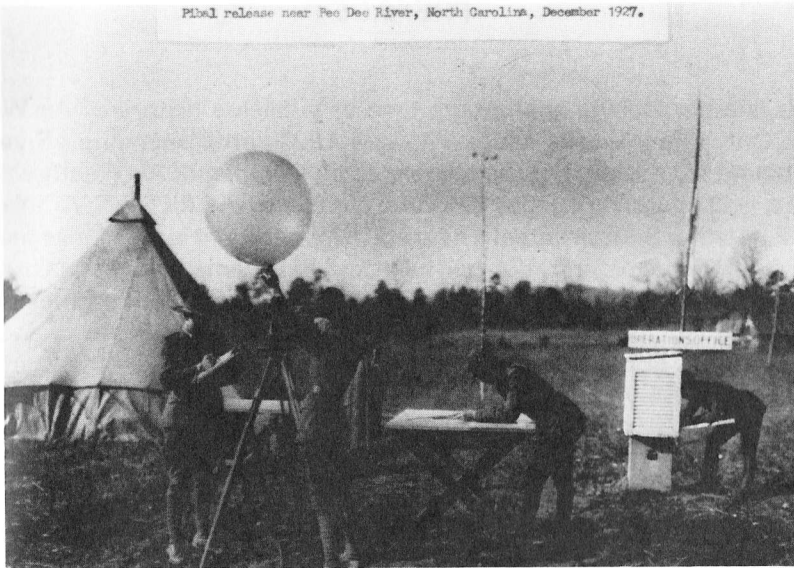
Credit for the fine collection of historical photos that accompanies, and greatly enhances, my historical narrative belongs to Ms. Rita Markus, my editorial assistant. I appreciate the effort she expended in researching the Air Weather Service photo archives, selecting appropriate pictures, and preparing the photo layout.

I hope the brief historical account that follows will not only familiarize the men and women of Air Weather Service with the distinguished history of their organization, but also heighten their pride in its achievements and spur them on to meet the challenges of the future.



WILLIAM E. NAWYN
Air Weather Service Historian
May 1991

Pibal release near Pee Dee River, North Carolina, December 1927.



Pibal release near Pee Dee River, North Carolina, December 1927.



Weathermen of the U.S. Army Signal Corps with the American Expeditionary Forces in France, World War I.



Capt Randolph P. (Pinky) Williams, the Father of AWS.

AIR WEATHER SERVICE:

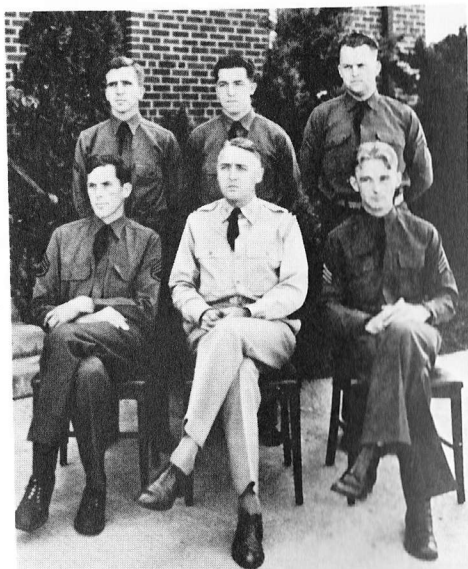
A BRIEF HISTORY, 1937-1991

The organization that was in time to become Air Weather Service (AWS) was born in 1937. Meteorological services to the American military forces, however, predated its birth by more than one hundred years. In 1814, a Physician and Surgeon General of the United States (U.S.) Army directed hospital surgeons to keep a record of the weather. His successor not only continued the practice, but advocated creating a weather observing system. As a result of his recommendation, the Army published a regulation that led in January 1819 to the first recorded weather observations. The only instruments available for assistance in obtaining these observations were a thermometer and wind vane. In 1842 Congress appointed a "Meteorologist to the U.S. Government" and assigned him to the Surgeon General's Office.

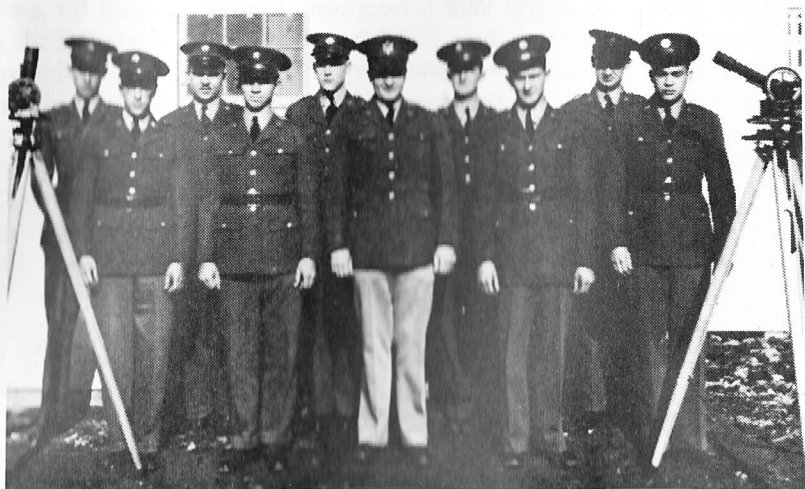
A significant step in the development of military weather services occurred in 1870 when Congress formally instructed the War Department to take meteorological observations at military stations and other locations in the U.S. and to give notice on the northern lakes and seacoasts of approaching storms. The Secretary of War assigned this task to the Army Signal Corps. Over the next 20 years the Signal Corps gradually expanded its weather services, but in 1890 Congress created a U.S. Weather Bureau within the Department of Agriculture and turned over to it all the military weather facilities, equipment, and personnel. As a result, virtually no American military weather service existed from 1891 to 1917.

The U.S. entry into World War I, however, created a need for a military weather service. A request in July 1917 from the Chief Signal Officer of the American Expeditionary Forces in France for weather support led to the creation of a Meteorological Section in the Army Signal Corps. By the end of the war, the Army had trained approximately 500 weathermen, 300 of whom served in France. World War I clearly demonstrated the need for and the potential of a military weather service. Nevertheless, following the war the Signal Corps' weather service quickly declined in size; by 1935, it consisted of only about 160 enlisted weathermen and a half dozen officers. The Army Air Corps was the chief user of the limited weather services provided by this small force.

At this point the fortunes of the military weather service began to take a turn for the better. During 1935 and 1936, the weather officer of the newly-created General Headquarters Air Force, Captain Randolph P. Williams, later recognized as the "Father of the Air Weather Service," produced a number of reports outlining the shortcomings of the military weather service as it then existed. On 1 July 1935 the Chief Signal Officer of the Army called for the expansion of the Signal Corps' Meteorological Section. In the same year a



Capt Don McNeal and staff at Patterson Field forecaster school, 1937, (standing L-R: Maurin, D. Yaeger, C Franz; front row, L-R: Bernheisel, D. McNeal, Hubbard).



First observer class and instructors, Scott Field, November 1939.

committee, charged by the Secretary of War to investigate and report on the performance of the Air Corps in carrying the U.S. mail, recommended the Air Corps operate the weather service in time of war. Additional proposals to improve the weather service came from other sources. In May 1936, the Chief Signal Officer suggested—somewhat reluctantly—that, if the Army could not expand the Meteorological Section of the Signal Corps, it should transfer the Army weather services to the Air Corps.

The various studies, proposals, and debates concerning the future of the weather service led the War Department General Staff in November 1936 to recommend the transfer of the weather service from the Signal Corps to the Air Corps. On 28 January 1937 the Secretary of War directed the Chief of the Air Corps to assume responsibility for the military weather service on 1 July 1937. With the implementation of that directive, 1 July 1937 became the birthdate of Air Weather Service, although it did not receive that name until eleven years later.

The new Air Corps Weather Service consisted of approximately 22 officers and 280 enlisted personnel—180 transferred from the Signal Corps and 100 already on weather duty with the Air Corps. It manned 40 weather stations, five of which were in overseas territories of the U.S. It included both fixed and mobile field units. The transfer order created a Weather Section in the Office of the Chief of the Air Corps to direct Air Corps Weather Service operations. The first head of the Weather Section was First Lieutenant Robert M. Losey. The Weather Section controlled Air Corps Weather Service's fixed field units but General Headquarters Air Force, which directed Air Corps combat operations, managed its mobile units. The appropriate Army commanding officers exercised operational control over the Air Corps Weather Service's five overseas units. The Air Corps organized Air Corps Weather Service units in the U.S. into three geographically divided squadrons under an intermediate organization called the Weather Group. The Signal Corps retained responsibility for the development, procurement, and major maintenance of meteorological and communications equipment.

In late 1939, after World War II broke out in Europe, the Air Corps Weather Service began to experience rapid expansion. By the time the U.S. entered the war in December 1941, it had approximately 2,650 personnel, a vast increase over the 300-man force of July 1937. This explosive growth made recruiting and training weathermen the Weather Service's chief challenge for the period. The Air Corps opened a school for enlisted forecasters at Patterson Field, Ohio, in September 1937, and one for observers at Scott Field, Illinois, in September 1939. It consolidated the two schools at Chanute Field, Illinois, in the spring of 1940. It also sent prospective weather officers to several universities to pursue studies in meteorology. In another act of expansion, the Army Air Corps in November 1940 added a fourth geographically-organized weather squadron in the U.S.



The original AAF Weather Service weather station at a fighter strip on Amchitka. When activated on 27 Jan 1943, enemy forces were 65 miles westward at Kiska Island.



The weather central at Guam, 1945, source of the Hiroshima forecast.

On 20 June 1941 the Army Air Corps became the Army Air Forces (AAF), consisting of an Air Corps and an Air Force Combat Command. The Weather Section remained with the Office of the Chief of the Air Corps as part of its Training and Operations Division and continued to direct fixed weather units. Combat Command, successor to General Headquarters Air Force, supervised Air Corps Weather Service's mobile field units.

World War II brought continued growth to the Air Corps Weather Service, which officially became the AAF Weather Service in July 1942. In the same year General Henry H. Arnold, Commander of the AAF, expanded the Weather Service mission to include support to Army Ground and Service Forces. The AAF Weather Service reached a peak strength of 19,000 men in early 1945. At this time it operated some 900 weather stations. Nearly 700 of these were located overseas in 58 different countries. Weathermen served in all parts of the world from the ice caps of Greenland to the jungles of the Pacific. They set up their stations alongside advanced airstrips; they accompanied the first waves of troops storming ashore on Pacific islands and the Normandy beaches. They served in weather stations on the front lines in the European campaigns. In some remote locations, they were the only military forces present. Members of the AAF Weather Service helped to prepare the critical weather forecasts preceding the D-Day invasion of Europe. They also provided the forecasts that determined the date of the first atomic bomb mission. The war claimed the lives of 68 AAF Weather Service personnel—30 officers and 38 enlisted men.

During the war the AAF Weather Service underwent several confusing, high-level organizational changes. The designation of the highest weather command level at the Air Staff changed in rapid succession during 1942 and 1943 from Weather Section to Weather Directorate (given responsibility for administering both fixed and mobile weather units) to Weather Division. In April 1943, AAF activated a Weather Wing at the Pentagon, which moved to Asheville, North Carolina, a month later. The wing served as a field headquarters with responsibility for managing the nine AAF Weather Service weather squadrons in the North American area (it had a total of 19 squadrons at the time). On 1 July 1945 AAF abolished the Weather Division at the Air Staff, redesignated the Weather Wing at Asheville as the AAF Weather Service, and transferred all functions of the Weather Division and the wing to the new organization. It thus divorced purely Air Staff duties and functions from the Weather Service itself. The Chief, AAF Weather Service, remained in Washington, where he continued to function as staff weather officer to the Commanding General, AAF, while Headquarters, AAF Weather Service, was located at Asheville.

At the end of World War II the U.S. government rapidly demobilized most of the American armed forces. By 30 June 1946, AAF Weather Service had only 4,198 persons left in its ranks. This, however, proved to be the post-war low. By the end of 1948, manning had recovered to 8,300.



Hydrogen manufacturing Unit, 10th Weather Squadron, Liangshon, China, 1945. Aluminum chips and HCL acid were used to make hydrogen in lieu of helium for upper air balloons. These products were lighter to transport over CBI hump. (L-R: Sgt Elmore Frost, station chief, Sgt Mullins, observer, Lt Brabham, Assist BWO, Chinese Nationalist soldier).



Weathermen provide weather support to the Army, World War II.

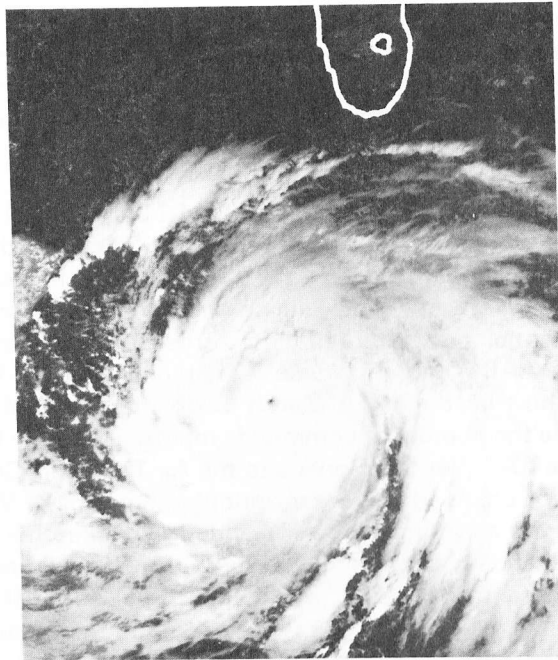
In the three years following World War II, Headquarters AAF Weather Service moved three times. In January 1946, it moved from Asheville to Langley Field, Virginia. Five months later it relocated to Gravelly Point, Virginia, near Washington D.C. A move across the Potomac River to Andrews Air Force Base (AFB), Maryland, followed on 1 December 1948.

Under the terms of the AAF reorganization of 1 July 1945, the AAF Weather Service became a worldwide command reporting directly to the Commanding General, AAF. This arrangement gave recognition to the fact that satisfactory weather service seemed to demand a single functional manager and a separate, centralized organizational structure that cut across the domains of independent commanders. The AAF Weather Service's existence as an Air Force command was, however, short lived. On 13 March 1946, the Air Staff, in a measure designed to reduce the number of commands reporting directly to Headquarters AAF, assigned the AAF Weather Service to the Air Transport Command (ATC). At the same time it changed the organization's name to Air Weather Service (AWS). Although the assignment to ATC ended AAF Weather Service's short tenure as an independent command, the new affiliation did not result in any significant changes to its basic worldwide organizational structure and relationships.

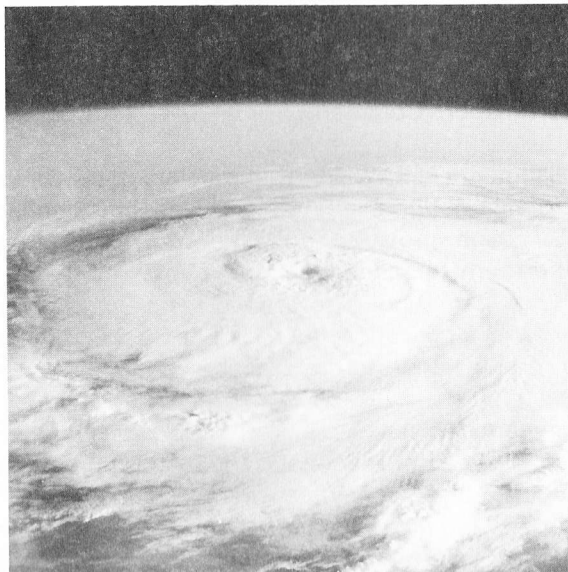
In July 1947, Congress adopted the National Security Act, which created a Department of Defense with Army, Navy, and Air Force sub-departments and a U.S. Air Force as a separate military service distinct from the U.S. Army. AWS, of course, became part of the new Air Force. However, under the terms of a subsequent agreement between the Army and the Air Force on 15 September 1947, AWS continued to provide meteorological services to the Army. On 1 June 1948, AWS, along with three other specialized services, became part of the Military Air Transport Service (MATs) formed by combining ATC with elements of the Naval Air Transport Command.

The accomplishments of AWS in the immediate post-war years included the rehabilitation of foreign national weather services, introduction of a system of weather centrals which provided a daily analysis of weather conditions throughout the northern hemisphere, improvement of weather analysis and forecasting methods, and support to atomic tests. In 1948, it issued its first tornado warning. AWS's operational network coverage in these years included surface, upper air, radar, and storm detection data.

The post-war years also saw AWS gaining an aerial weather reconnaissance capability. AAF aerial weather reconnaissance operations began during World War II. On 16 August 1942 AAF established its first weather reconnaissance squadron, equipping it with nine B-25s. The following summer the B-25s started flying the North Atlantic ferry route to Great Britain ahead of tactical aircraft transiting the ocean. In November 1943, AAF began "weather scout" missions over Europe, using P-51 aircraft. The weather scouts flew to primary and



Hurricane Gilbert, 9-18 September 1988. The strongest hurricane in the Atlantic to be penetrated by aircraft.



Hurricane Elena, August 1985, in the Gulf of Mexico, as seen by the crew of the Space Shuttle.

secondary bomber targets, determined winds, cloud cover, and cloud height, and then radioed the information back to the appropriate bomber strike force. The weather scouts soon proved their worth.

In the spring of 1944, Headquarters AAF assigned four B-25 aircraft and crews to the AAF Weather Service's Weather Wing for the purpose of conducting hurricane reconnaissance. Their primary mission was to provide weather reports from storm areas and to determine the intensity, location, and extent of the disturbance. The first official, authorized flight into a hurricane took place 10 September 1944 on a reconnaissance mission out of Puerto Rico northward over the western Atlantic. The first actual aerial hurricane penetration had occurred several weeks earlier during an unauthorized flight from Texas over the Gulf of Mexico on 23 July 1944. During the remainder of 1944 and 1945, many other hurricane reconnaissance missions followed. Meanwhile, B-17s soon replaced the B-25s.

The AAF Weather Service officially received the aerial weather reconnaissance mission in March 1946, at the time it became part of ATC. When ATC gained the AAF Weather Service, it also received four weather reconnaissance squadrons for further assignment to Air Weather Service. In August 1946, the Air Staff ruled that all weather reconnaissance groups and squadrons should be assigned to AWS. During the same year AWS began to



RADIOACTIVITY. Two airmen transporting a "pig", a lead container for hot samples, to shipping containers on the trailer at far right. The samples were taken from the B-57 shown in the background which just returned from penetration of an atomic cloud on March 28th, 1957, to gather samples for AEC studies, Operation Plumbbob.

receive B-29 aircraft to replace the B-17s it inherited. By the end of 1948, AWS had a weather reconnaissance force consisting of one group and five squadrons equipped with 91 aircraft, mostly RB-29s, and manned by 454 officers and 2,265 enlisted men. The reconnaissance fleet not only conducted routine weather reconnaissance in the Pacific, Arctic, north Atlantic, and Caribbean areas, but also measured radioactivity in the atmosphere, collected airborne nuclear debris during nuclear testing in the Pacific and the U.S., detected and tracked typhoons in the Pacific, and continued to fly hurricane reconnaissance in the western Atlantic-Gulf of Mexico-Caribbean region.

Of all the operational events AWS supported in the late forties, none was more challenging or more significant than the Berlin Airlift of 1948 and 1949. Weather, which was often adverse, was one of the greatest problems affecting the airlift. Low clouds, fog, freezing rain, turbulence, and ice all frequently hampered airlift operations. The airlift required exact ceiling and visibility forecasts for daily operations and special climatological studies and forecasts for operational planning purposes. Logistical aspects of the airlift operation—for example, maintaining a smooth flow of supplies from on-load to airlift bases—also required weather support. AWS met the challenge by concentrating its most experienced weathermen at air bases involved with the airlift and introducing new techniques such as holding telephone conferences of airlift forecasters to discuss the weather situation and arrive at a composite forecast for the airlift area.



A cloud sample, just removed from a B-57 Martin Canberra and inserted in shipping "pig", is monitored by AFC Thomas O. Summers, 1211th Test Squadron (sampling) in connection with Operation Plumbbob. Other leaden "pigs" on truck are to be loaded. Note the protective gloves and rod used to work the monitor control.



Weathermen at work.





20th Weather Squadron observers at a forward airstrip in Korea in mid-1950. (L-R: PFC Doyle E. Naves, Cpl James T. Williams, Cpl Joseph J. Banky, and Cpl John K. Purphy).



Army Support.

Following the invasion of South Korea by Communist North Korea on 25 June 1950 and the immediate decision by President Truman to come to the aid of the South Koreans with American military forces, AWS personnel again entered combat. On 27 June the first AWS detachment arrived in South Korea and almost immediately began generating weather reports. During the next three years AWS provided extensive weather support to United Nations air and ground forces. In the process it introduced "pinpoint" forecasting for bombing targets. It also successfully used, for the first time in combat, the principle of a weather central connected by radio to subordinate forecasting stations. Forecasts, made more difficult because the enemy controlled the areas to the west of South Korea, at first were not too accurate, but they gradually improved.

On 26 June 1950, less than 24 hours after the North Koreans crossed the 38th Parallel into South Korea, AWS conducted its first weather reconnaissance flight over Korea. From then on through 8 June 1952, AWS weather reconnaissance forces flew daily missions over the peninsula. During this period the 512th Reconnaissance Squadron (redesignated the 56th Weather Reconnaissance Squadron in February 1951) logged approximately 750 missions from its base at Yokota, Japan.

AWS strength during the Korean War rose from approximately 8,800 on 30 June 1950, to a peak of nearly 12,000 by mid-1952. Thereafter, manning again began to decline. The war claimed the lives of five AWS officers and one enlisted man.

In 1952, in recognition of a growing need for specialized support, AWS reorganized its units located in the U.S. from a geographical to a functional basis. In other words, instead of having its weather units serving particular geographical regions, AWS aligned them according to the customers they supported. Thus, it established weather groups to support the Strategic Air, Tactical Air, Air Defense, Air Research and Development, Air Training, and Air Materiel Commands. In another important organizational change, AWS in 1957 closed the U.S. Air Force Weather Central at Suitland, Maryland, (a suburb of Washington D.C.), which traced its origins to the Weather Research Center established in 1941 at Bolling Field, D.C., and combined its functions and resources with those of the Strategic Air Command's Global Weather Center established at Offutt AFB in 1949. The new consolidated organization received the name of Global Weather Central. A significant location change occurred in 1958 when the Air Force moved Headquarters AWS from Andrews AFB to Scott AFB.

Throughout its history AWS has constantly sought to expand, improve, and modernize its support services. In the fifties AWS began to develop and place increasing emphasis upon centralized forecasting. In 1958, AWS inaugurated centralized terminal forecasting from the newly-created Kansas City Centralized Forecasting Facility. By 1960, AWS not only operated a worldwide weather



Using an AN/TMQ-22 in support of the Army.



With guns ready, three combat weathermen move through the jungle toward the weather site. They carry enough equipment and supplies to operate a mobile weather station and survive adequately for about 30 days.

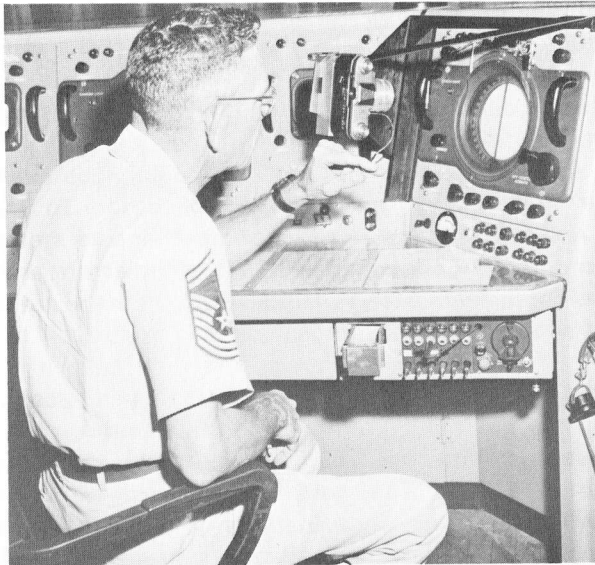
central at Global Weather Central, but also a European weather central at High Wycombe, United Kingdom, and a Pacific weather central at Fuchu, Japan.

During the same decade AWS also made significant attempts to upgrade its Army support operations. In 1952, AWS initiated a joint project with the Office of the Chief of Army Field Forces to study AWS services available for Army support and the organizational arrangements necessary to implement these services. AWS received the first formal, comprehensive statement of Army weather requirements in 1956, which helped it to implement an effective Army support program. Three years later, in 1959, AWS, upon the authority of MATS, activated its first two weather squadrons dedicated exclusively to Army support.

AWS initiated several other new and improved types of services during the fifties and early sixties in addition to those already mentioned. In 1951 it began to issue severe weather warnings. The following year it started operating three Automatic Weather Stations in far northern regions of North America, one in Greenland and two on Alaskan islands. In the same year it inaugurated a program lasting several years to establish runway representative observing sites at air bases throughout the world. In 1960, AWS began to use weather satellites, the very first of which was launched by the U.S. in that year, to acquire additional and more accurate weather data to use in preparing weather products for its customers. Two years later AWS issued its first solar forecasts.



Rocketsonde.



CMSgt Lester Robinson at CPS-9 Weather Radar in Base Weather Station, Patrick AFB FL.



Transmissometer indicator/recorder.

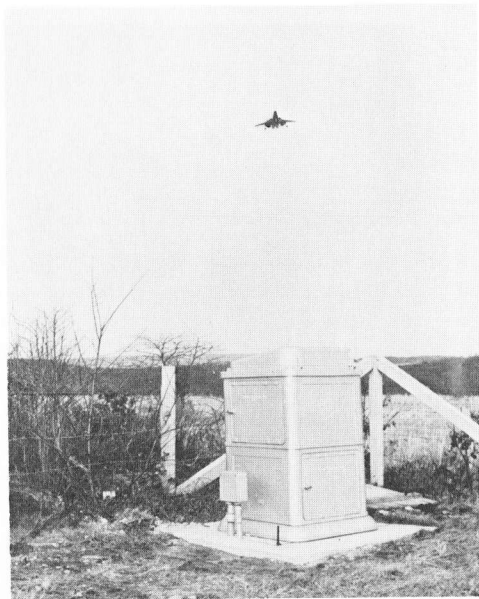
In this period AWS also brought on line a number of new equipment systems, some representing totally new technology and others improved versions of earlier equipment. These included the first radars specifically designed for meteorological use (AN/CPS-9) in 1954; transmissometers (AN/GMQ-10) and surface wind sets (AN/GMQ-11), also in 1954; temperature-humidity measuring sets (AN/TMQ-11) in 1956; rotating beam ceilometers (AN/GMQ-13) in 1959; and rocketsondes in 1962. In 1957, Global Weather Central started using computers to process weather data. AWS introduced the Weather Observing and Forecasting System in 1954, its first attempt to integrate all existing meteorological equipment, techniques, and display and communications facilities into one overall system.

These years also saw AWS weather reconnaissance squadrons receiving new aircraft. In 1955, WB-50s began to replace the old obsolete B-29s. AWS began flying WB-47s in 1958, WB-57s in 1961, WC-130s in 1962, and WC-135s in 1965. By 1965, WB-47s and WB-57s constituted the bulk of the AWS reconnaissance fleet.

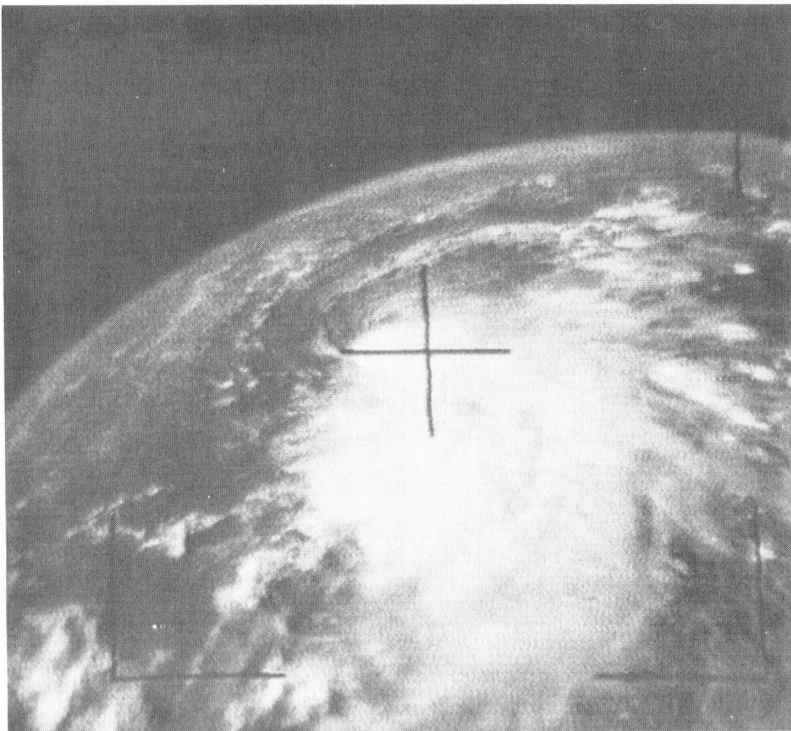
Throughout the years between the end of the Korean War in 1953 and the beginning of large-scale American military involvement in Vietnam in 1965, the AWS manning level remained relatively stable, staying within the 10,500 to 12,500 range. In 1956, the Air Force created a separate weather career field with three advancement ladders—equipment, observing, and forecasting. This



AN/GMQ-11 wind sensing equipment being checked for orientation by a weather maintenance man at Elmendorf AFB AK.



AN/GMQ-13 Rotating Beam Ceilometer Detector.



Tiros VIII photo of Typhoon Cora over the Philippines, 9 July 1964.



Det 7, 30WS, "The Soc Trang Tigers," 1963, RVN.

action, which, among other things, provided AWS enlisted personnel with much better opportunities for promotion, potentially as high as warrant officer, and had a positive effect on AWS personnel retention.

The AWS presence in South Vietnam began in December 1961 with the deployment of a single weather forecaster to Saigon to provide weather briefings to an RF-101 reconnaissance operation. Before the year was out, AWS had ordered a cadre of 23 weathermen to Vietnam for "temporary duty." In May 1962, AWS organized a provisional weather squadron to support military operations in Vietnam; in October this became the 30th Weather Squadron. Thus began an AWS buildup in Southeast Asia that reached its peak six years later. Although overall AWS strength did not increase in this period, expanded U.S. participation during 1965 in the war in Vietnam led to increased manpower requirements for AWS in Southeast Asia at a rate faster than AWS could fill them. From July 1965 through June 1966, authorizations for the 30th Weather Squadron rose from 238 to 560. At the beginning of 1968, AWS had approximately 600 persons in Southeast Asia organized into one group (1st), three squadrons (5th, 10th, and 30th), 26 detachments, six operating locations, and eight cadre weather teams. AWS personnel served in Thailand as well as South Vietnam. Headquarters 1st Weather Group was located at Tan Son Nhut Air Base near Saigon. The 5th Weather Squadron provided support to Army forces and the 30th Weather Squadron to Air Force units in South Vietnam. The 10th Weather Squadron supported Air Force elements stationed in Thailand.

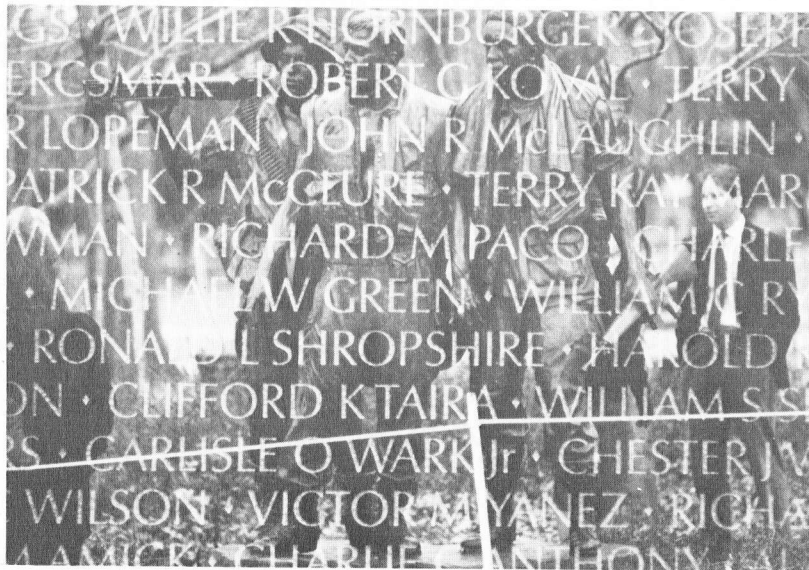
For AWS weathermen, the war in Southeast Asia was one of technological contrasts. Scientific sophistication permitted a weather detachment in Saigon to receive pictures from an earth-orbiting meteorological satellite, TIROS VIII, beginning in January 1964. At the same time combat weather teams, operating with the Army, had to be wary of primitive contrivances such as concealed pits lined with sharpened, poison-tipped bamboo splints.

By 1966, American aircraft were flying 13,000 combat sorties monthly. In response, from July through December 1966 alone, AWS issued no less than 29,488 target forecasts in support of the operations. Because experience in Southeast Asia dictated closer combat weather support to Army forces, AWS extended its services down to the brigade level instead of only to the division level as it had heretofore. One AWS unit commander summed up the AWS task in Southeast Asia as "find[ing] out where the weather-sensitive decisions are being made, then concentrating support there." AWS weather support prompted General William C. Westmoreland, then the American commander in South Vietnam, to remark in 1967 that no other U.S. military commander had ever had the advantages of the outstanding weather support he had at his disposal.

AWS weather reconnaissance forces also played a role in the Southeast Asia conflict. Beginning in August 1965, AWS WB-47s flew weather scout sorties from Guam to refueling areas in support of Strategic Air Command missions over



Vietnam Memorial statue depicts three veterans and faces the granite wall. It was dedicated 11 November 1984.



Vietnam Memorial wall, made of black polished granite, bears the names of those who gave their lives in that conflict.

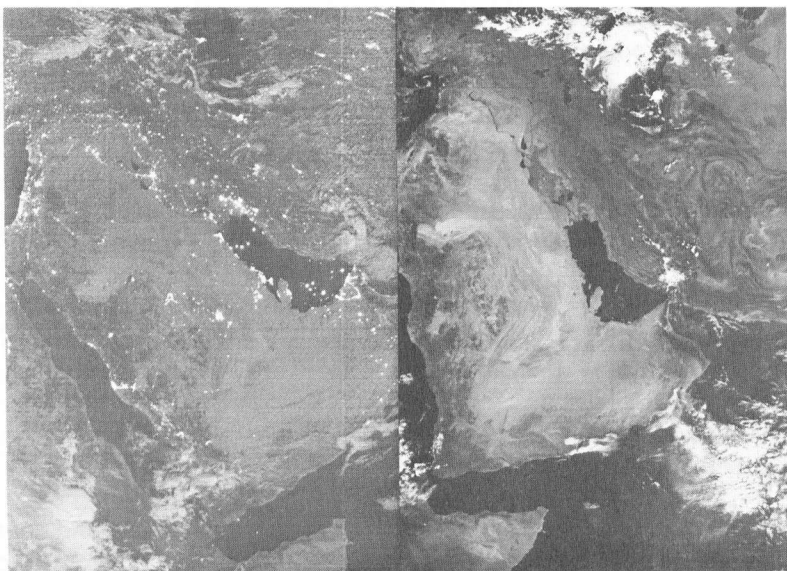
Vietnam. These ended in the fall of 1969 when, at Air Force direction, AWS terminated WB-47 operations. Meanwhile, in March 1967, AWS began WC-130 flights over Vietnam from Udorn, Thailand. By the time these flights ended in January 1971, the WC-130s had flown 1,435 combat support missions.

During the period of U.S. disengagement from Vietnam that began in 1969, AWS underwent a drawdown in Southeast Asia that was even more rapid than its buildup. The last AWS unit in South Vietnam was inactivated on 3 March 1973. The last squadron in Southeast Asia, the 10th, based in Thailand, deactivated on 30 September 1975; the last AWS unit of any kind in Southeast Asia, the 1st Weather Wing's Detachment 30, also in Thailand, officially deactivated on 7 June 1976. The last AWS person assigned to the Southeast Asia theater left Thailand on 21 May 1976, fourteen and one-half years after the first arrived in South Vietnam on 21 December 1961. Four AWS enlisted men were killed in action during the Vietnam conflict.

While the U.S. wound down its presence in Southeast Asia and continuing into the immediate post-Vietnam years, AWS experienced a major force reduction driven to a large extent by the austere post-Vietnam military budget climate. The drawdown began in 1969 when AWS decreased by 757 spaces. For the next several years AWS manning continued to decline. During 1972 alone, AWS was reduced by 2,315 manpower authorizations (and several of its major units were deactivated—two wings, one group, and five squadrons). Manning, which stood at 11,624 on 31 December 1968, dropped to 6,402 by the end of 1977, its lowest point since the end of the post-World War II demobilization in 1946. The drawdown finally ended in 1978, as for the first year in nearly a decade, manning held essentially steady.

AWS aerial weather reconnaissance operations diminished following the cessation of WC-130 missions over Vietnam in January 1971 and ended completely in 1975. AWS adopted a "selective reconnaissance program" in 1971 which greatly reduced the number of reconnaissance missions that it flew. In 1974, the Air Force retired the last of AWS's WB-57s and restricted its few WC-135 aircraft to air sampling missions. The following year it terminated aerial photomapping by AWS RC-130s. On 1 September 1975 the Air Staff transferred the entire AWS weather reconnaissance fleet, now reduced to 19 WC-130s and seven WC-135s, to Military Airlift Command's (MAC's) Aerospace Rescue and Recovery Service, thus ending almost 30 years of AWS ownership and operation of weather reconnaissance aircraft. The Air Staff did not, however, terminate AWS's aerial tropical storm reconnaissance mission, which AWS henceforth carried out by means of AWS aerial reconnaissance weather officers flying aboard weather reconnaissance aircraft assigned to the Aerospace Rescue and Recovery Service.

On 1 October 1977 the Air Staff removed the weather equipment maintenance function—a function essential to AWS for the performance of its



Using the DMSP, AWS forecasters can easily ascertain important weather data from any area. These photos of the Middle East, taken in Support of Operation Desert Shield, show a DMSP image taken during the evening of Aug 30, 1990. LEFT: In this image, both city lights and gas being burned off during oil production, appear as bright areas in and throughout the Persian Gulf Region. RIGHT: This DMSP image taken a few hours later during the morning of Aug 31 shows cloud formations and other weather features. AWS uses satellite images like these to provide vital weather information to U.S. military activities.



Air Force Global Weather Central.

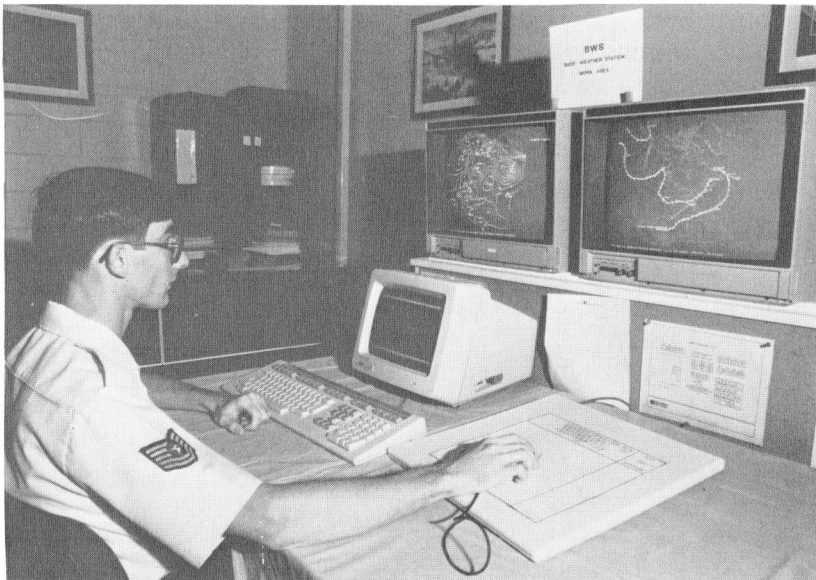
mission—from AWS and gave it, along with 875 manpower authorizations, to the Air Force Communications Service. Ever since its founding in November 1938, the Air Force Communications Service had been providing AWS with communications support; it now received another large and vital AWS support area.

The Vietnam and post-Vietnam eras saw AWS continue to initiate new services and modernize its equipment. It also promoted and utilized systems and technology developed by other organizations which would assist it in carrying out its mission. The Air Force launched its first Defense Meteorological Satellite Program satellite in 1965, providing AWS with a valuable new source of weather data. About the same time AWS began to expand and upgrade its space environmental support activities, especially its solar observing and forecasting. In 1965, it inaugurated a Solar Observing and Forecasting Network consisting of four solar observatories. The following year it established a Solar Forecast Center at Ent AFB, Colorado, and put together the world's first magnetometer network. AWS started operating new solar optical (AN/FMQ-7) and radio (AN/FRR-95) telescopes at its solar observatories in 1975 and 1978, respectively. In 1979, AWS took over operation of the Air Force Geophysical Laboratory's world-wide polarimeter network.

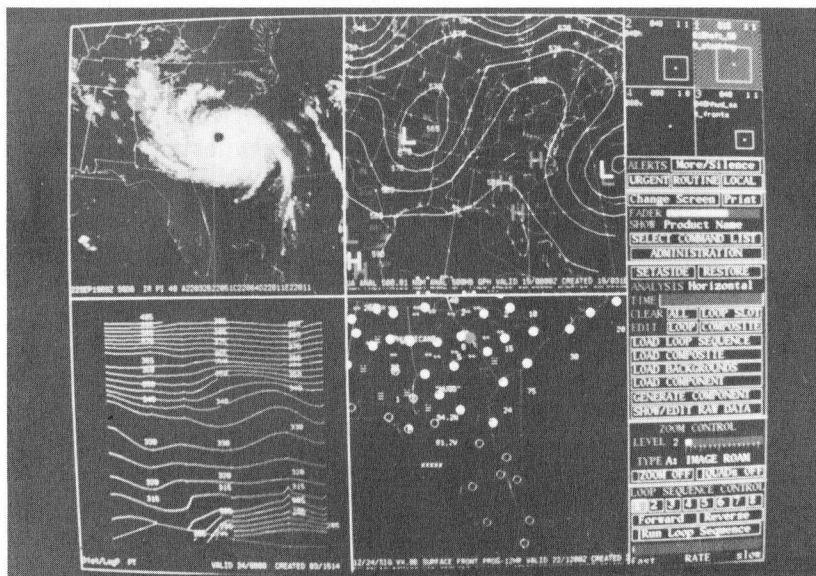
During these years AWS also fostered or introduced several new or upgraded computer and weather communications systems. In 1965, AWS implemented a high speed (4,500 words per minute) Automated Weather Network linking AWS's two overseas weather centrals with the Global Weather Central—which officially became Air Force Global Weather Central (AFGWC) in 1966—at Offutt AFB. In 1969, it began operating a new Automated Digital Weather Switch at Carswell AFB, Texas, for the Automated Weather Network. Periodically, AWS upgraded computer systems at AFGWC, the world's largest operational weather analysis and forecasting facility, and at the U.S. Air Force Environmental Technical Applications Center (formerly the Climatic Center), which moved from Washington, D.C., to Scott AFB in 1975. The first segment of an upgraded weather communications system for the continental U.S., the Meteorological Data System, became operational in 1976.

AWS launched a Centralized Terminal Forecast Program in 1971 under which AFGWC issued terminal aerodrome forecasts for all AWS units in the U.S. Seven years later, however, with the realization of the contribution made by base weather stations to local forecasting, AWS returned responsibility for issuing terminal aerodrome forecasts for less than 24 hours to base weather stations, limited duty stations excepted. In 1982, it completely ended the program.

The post-Vietnam period saw AWS continuing to provide the U.S. Army with the best weather support possible, given the limited manpower at its disposal. In 1979, AWS reconfirmed its commitment to furnish direct observing, forecasting, and staff weather officer support to each tactical Army echelon



TSgt Robert J. Born at the controls of the AWDS system.



AWDS capabilities.

down through divisions, separate brigades, and armored cavalry regiments. In the same year, the National Guard Bureau, at the request of AWS, reassigned 29 Air National Guard weather flights from support to Air National Guard flight operations to support of Army Reserve and Guard forces.

Modernization became the dominant theme for AWS in the eighties. It pursued a major, across-the-board effort to modernize the way it performed its work by utilizing the latest technology available—technology unheard of only a decade or two earlier. As a part of that undertaking it sought to implement new techniques and acquire entirely new meteorological equipment systems and capabilities based on the new technology. At the same time it also initiated programs to replace obsolete existing equipment systems still employing fifties and sixties technology with updated versions incorporating current technology.

The three top priority AWS procurement initiatives of the decade were the Automated Weather Distribution System (AWDS), Next Generation Weather Radar (NEXRAD), and Battlefield Weather Observation and Forecast System (BWOFS) programs. AWDS would bring weather operations facilities, particularly base weather stations, out of the age of manual operations into the era of automation by utilizing state of the art computer, display and communications technology to gather, process, and disseminate weather data. The NEXRAD program was a joint undertaking of the National Weather Service, AWS, and the Federal Aviation Administration to replace existing, unreliable weather radars with new, highly automated Doppler weather radars that would vastly improve severe weather forecasting. The BWOFS program consisted of two parts: the Pre-Strike Surveillance Reconnaissance System (PRESSURS) and Electro-optical Tactical Decision Aids (EOTDAs). PRESSURS would make it possible to obtain weather data from behind enemy lines by using sensors aboard meteorological satellites and unmanned air vehicles. EOTDAs were essentially predictions of the performance of electro-optical precision-guided weapons and target acquisitions systems based on both weather and non-weather data. AWS's goal was to automate the production of EOTDAs for both theater decision makers and aircrews.

The AWDS, NEXRAD, and EOTDA programs made significant progress during the eighties. PRESSURS, however, faltered. The NEXRAD contractor delivered the first prototype hardware in October 1988. The Air Force awarded a full production contract for the radar in January 1990. The AWDS program received a production go-ahead in April 1990. In June 1990, the AWDS contractor installed the first AWDS at McGuire AFB, New Jersey. It became operational on 14 December and was officially accepted by AWS on 29 January 1991. Meanwhile, AWS, in concert with Air Force Systems Command and other major commands, was able to substantially advance the EOTDA part of BWOFS. The first computer-generated EOTDA, developed by the Air Force Geophysics Laboratory, reached the field in November 1986; improved versions followed in May 1989 and December 1990. By the end of the decade, AWS was achieving



NEXRAD.



AWS current officer in space, Major Carol Belt.

some success in integrating EOTDAs into the command and control communications networks of the tactical air forces. AWS, however, halted PRESSURS development at the end of 1988 as the result of a Department of Defense decision to eliminate all full scale funding for the program through the 1993 fiscal year.

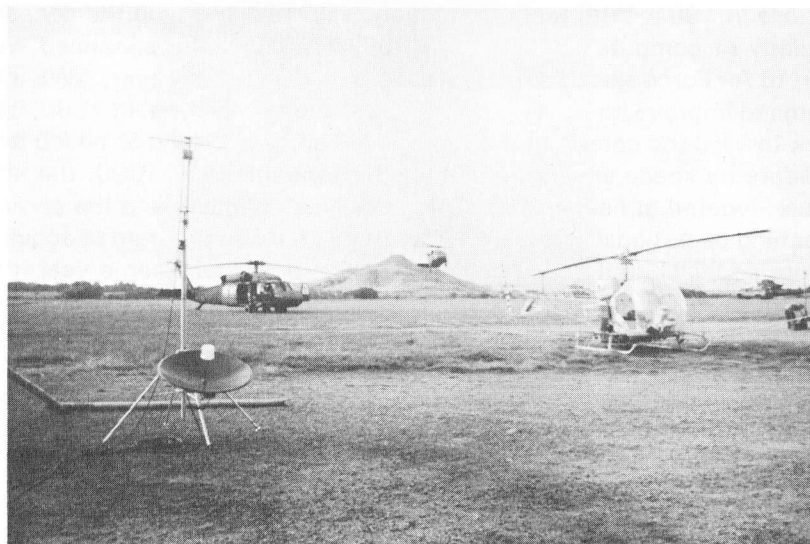
AWS also launched a number of other equipment acquisition and upgrade initiatives during the decade. Among them were programs to modernize AFGWC operations. In 1985, it purchased new mainframe computer systems and a Cray supercomputer for AFGWC. It also acquired for AFGWC an automated Satellite Data Handling System (SDHS) linking together an interactive weather graphics and imagery system with a high speed data handling system. SDHS achieved full operational capability in 1986. In addition, in cooperation with Air Force Communications Command, AWS procured a communications front end processor, nearing full operational capability by the end of 1990, which combined all AFGWC communications functions into one automated data processing system. AWS also set in motion programs to upgrade equipment at the six solar observing sites of its Solar Electro-Optical Network (successor to the Solar Observing and Forecasting Network) and to obtain and install nineteen digital ionospheric sounders at strategic locations throughout the world as replacements for outdated analog sounders. Further, it began, and in some cases completed, several programs to procure new, small, fixed and transportable meteorological and communications systems and aggressively sought to have additional weather sensors installed on meteorological satellites.

Additionally, the eighties saw AWS introducing new and better weather support services. It inaugurated weather support to NASA's space shuttle operations in 1981. With the introduction of EOTDAs early in the decade, and particularly of computer EOTDAs in 1986, it significantly enhanced weather support to Air Force electro-optical weapons systems. Moreover, AWS initiated programs to improve its space environmental support system. In 1983, it began to work toward the construction of a Space Forecast Center at which it would consolidate its space environmental support activities. By 1990, the physical structure, located at Falcon AFB, Colorado, was complete and the center was approaching operational status. In 1985, AWS started a program to acquire new and more sophisticated space environmental models. The same year it began an attempt to secure manifesting for a weather officer on a space shuttle mission. This effort had still not succeeded as of early 1991, due largely to schedule problems caused by a two-year hiatus in space shuttle flights. During the eighties AWS also expanded and enhanced its Army support. In 1988, for example, it agreed to provide weather effects support to Army electro-optical systems, including, for the first time, EOTDA support. In addition, AWS increased its support to both Air Force and Army special operations forces.

AWS provided weather support to several U.S. contingency operations during the eighties. These included URGENT FURY, the invasion of the Caribbean



TSgt Jim Roy taking tactical observations with GMQ-33 and TMQ-34 TACMET during JUST CAUSE.



The WRASSE antenna deployed at a forward location during JUST CAUSE.

island of Grenada in October 1983 to restore order and democracy; ELDORADO CANYON, the air strike against Libya in April 1986 to discourage Libyan-sponsored international terrorism; and JUST CAUSE, the military intervention in Panama in December 1989 to reestablish a democratic government.

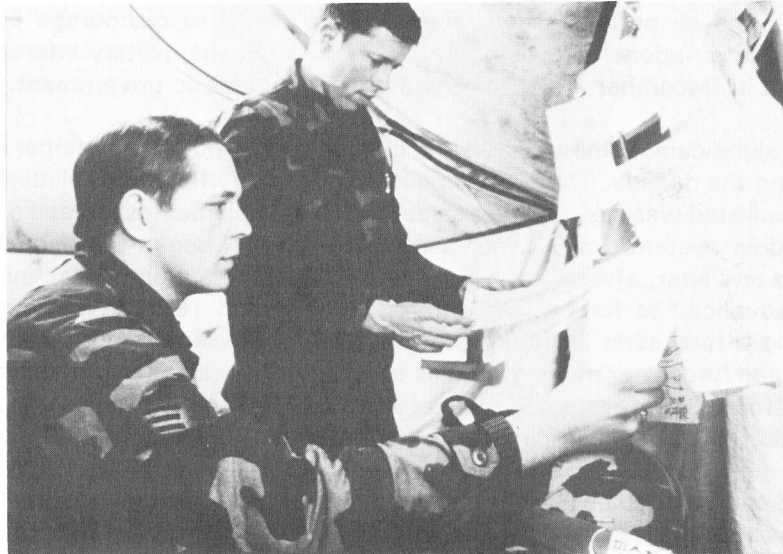
Two significant, somewhat related, changes occurred in the weather career field during the decade. The first came in April 1981, when AWS eliminated a separate enlisted weather observer career field and implemented instead a single career ladder system under which weather personnel began their careers as observers and later, after returning to school to take the weather technician's course, advanced to forecasters. From 1983 through 1986, AWS gradually introduced a forecaster assistant program whereby selected individuals took observer and forecaster training courses back to back. Graduates of the program became "forecaster assistants" who, after on the job and other types of training in the field, could advance directly to fully certified forecasters.

AWS continued to be closely involved with aerial reconnaissance issues and operations after the loss of its weather reconnaissance aircraft in 1975. By 1986 the Air Force was convinced that advances in meteorological satellite weather sensor technology made weather reconnaissance flights by aircraft obsolete. It therefore proposed the termination of aerial weather reconnaissance. Congress, however, concerned about protecting U.S. coastal areas—especially the east and south coasts—against hurricanes, mandated the Air Force to continue WC-130 weather reconnaissance flights over the western Atlantic-Caribbean-Gulf of Mexico and eastern Pacific areas, although it did permit the Air Force to terminate aerial weather reconnaissance in the western Pacific region in October 1987.

Following four years of discussion among the Air Force, Congress, and other government agencies over the future of aerial weather reconnaissance, the Air Staff, in accordance with Congressional direction, in October 1990 transferred the limited remaining aerial weather reconnaissance mission from MAC's Air Rescue Service to the Air Force Reserve, effective June 1991.

As the last decade of the 20th Century dawned, it appeared AWS was entering another period during which it would diminish in size. The surprising collapse of the Communist regimes of eastern Europe and end of the Cold War in 1989 as well as pressure to reduce the Federal budget deficit made a general reduction in U.S. military forces likely during the next few years.

The nineties had barely begun when AWS faced a sudden and unanticipated challenge: conducting the largest overseas deployment of AWS personnel since the height of the Southeast Asia conflict in 1968. In early August 1990, AWS began its support of Operation DESERT SHIELD, the massive deployment of American and other United Nations forces to Saudi Arabia to counter a threat from Iraq following its invasion and annexation of Kuwait. DESERT SHIELD



Weathermen deployed to Desert Shield/Desert Storm.



Weathermen deployed to Desert Shield/Desert Storm.

became DESERT STORM on 16 January 1991 as the United Nations coalition commenced offensive operations aimed at driving Iraqi forces out of Kuwait. Its objective accomplished, the coalition ceased combat operations on 27 February. AWS deployment to DESERT SHIELD/STORM in support of U.S. Air Force and Army forces reached a peak of approximately 450 persons in February. Redeployment began shortly after the end of hostilities.

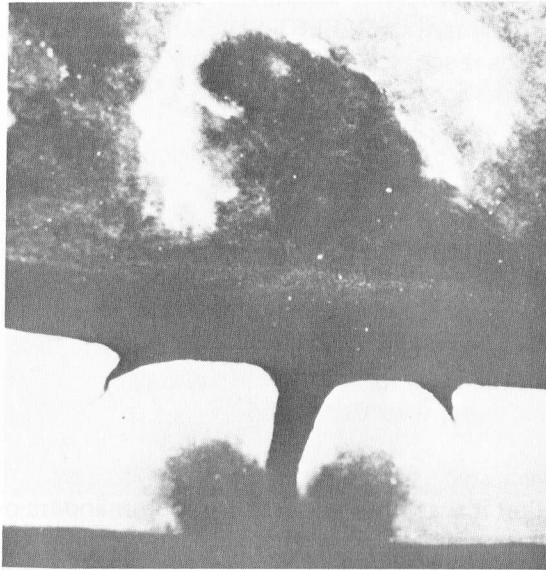
A new era in AWS history began on 1 April 1991 when the Air Force terminated AWS's 45 year status as a subordinate organization of MAC and its predecessors and made it a field operating agency reporting directly to the Air Staff through a Directorate of Weather newly created in the Office of the Deputy Chief of Staff for Plans and Operations. The Air Force action restored AWS to a position similar to that which it possessed prior to becoming part of ATC in 1946. Under the new set up, the Directorate of Weather has responsibility for policies, plans, and resources for environmental support services while the focus of AWS is on operational weather support.

As another major step in the reorganization of AWS, the Air Staff announced on 17 May 1991 that it was giving operational commanders ownership of their supporting weather resources no later than 1 December 1991. Among other things, this meant the deactivation of the six numbered AWS weather wings. However, neither this restructure nor the other organizational changes altered AWS's basic mission.

Undoubtedly a major challenge AWS will confront in the decade of the nineties is to field the many new meteorological and communications systems resulting from the programs it initiated and pursued in the eighties. Integrating the new technology into operational procedures will drastically transform the way in which AWS carries out its mission.

Accommodating to the new organizational arrangements, contending with austere budgets, and performing its mission with fewer people, will pose additional challenges for AWS during the decade ahead. Based on its history, AWS will be equal to all of the challenges awaiting it.

WEATHER PHENOMENA



First Tornado photographed occurred in Miner County, South Dakota, on August 28, 1884. The tornado moved in a southerly direction and remained in sight for more than two hours.



Lightning strikes across the sky at Rhein Main AB, Germany.

WEATHER PHENOMENA



Tornado.



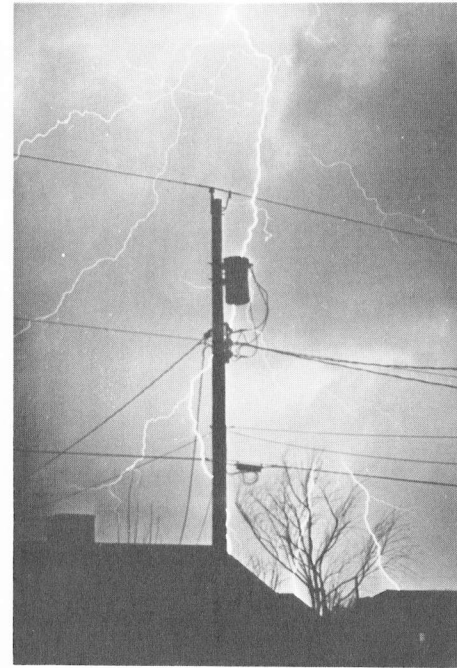
Hail.

WEATHER PHENOMENA

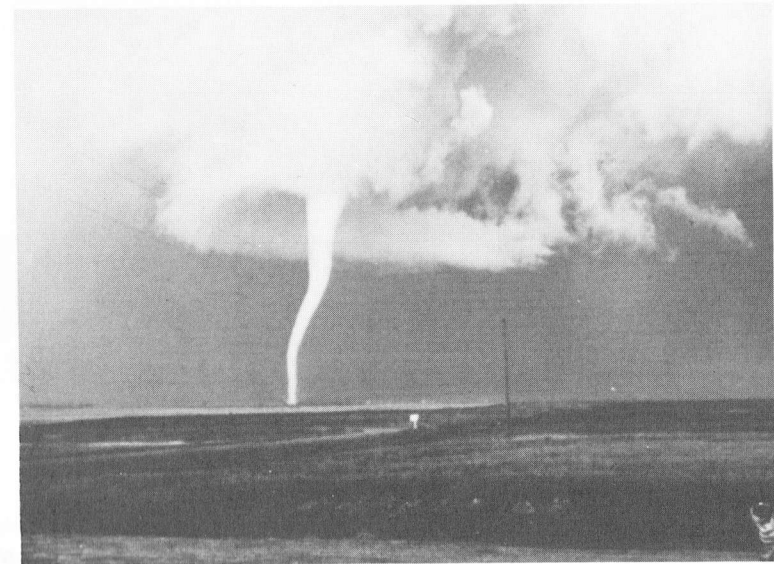


Lightning.

WEATHER PHENOMENA



Lightning.



Tornado.

WEATHER PHENOMENA



Hole in the sky. This unusual cloud phenomena was photographed February 23, 1968, at 11:30 a.m. over Vandenberg AFB, California. Rawinsonde indicated cloud layers at approximately 26,000 feet. Calculated diameter of the hole was six miles. Weathermen from the 6th Weather Wing offered several theories on the cause of the odd cloud formation, but reached no positive conclusions.

WEATHER EFFECTS

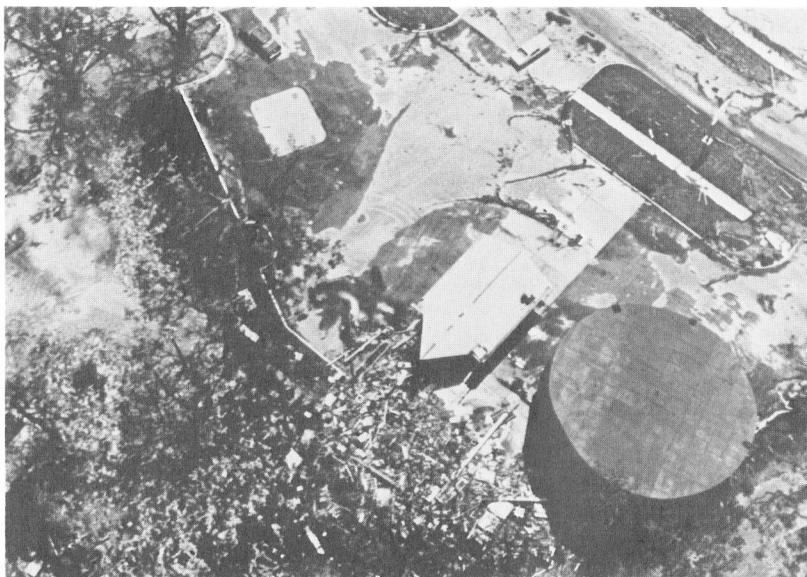


Flooded Operations building at Camp Casey, Korea, in September 1984.



Roof partially blown off of the Arts and Craft Center, Andrews AFB, 1 Aug 83, by a microburst.

WEATHER EFFECTS

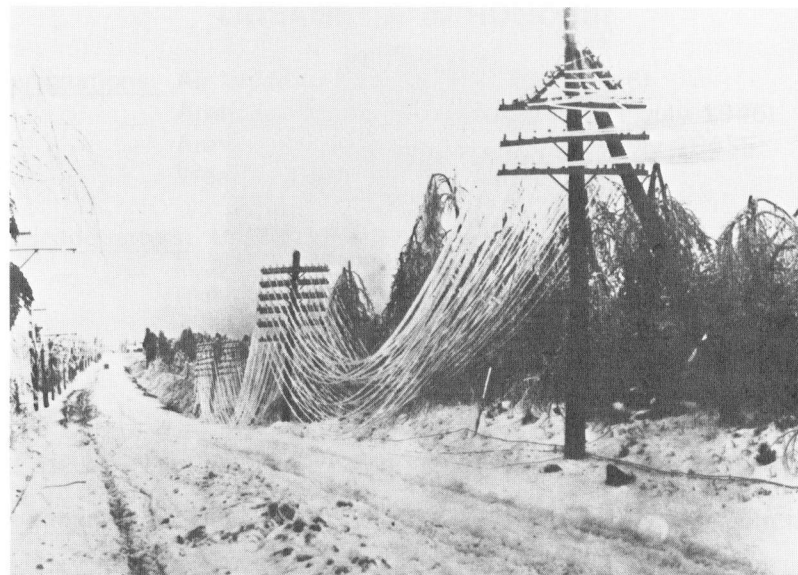


Aftermath of a tornado that hit Altus AFB, Oklahoma, destroying 12 buildings, damaging forty-nine others, and extensively damaging two C-5 aircraft.

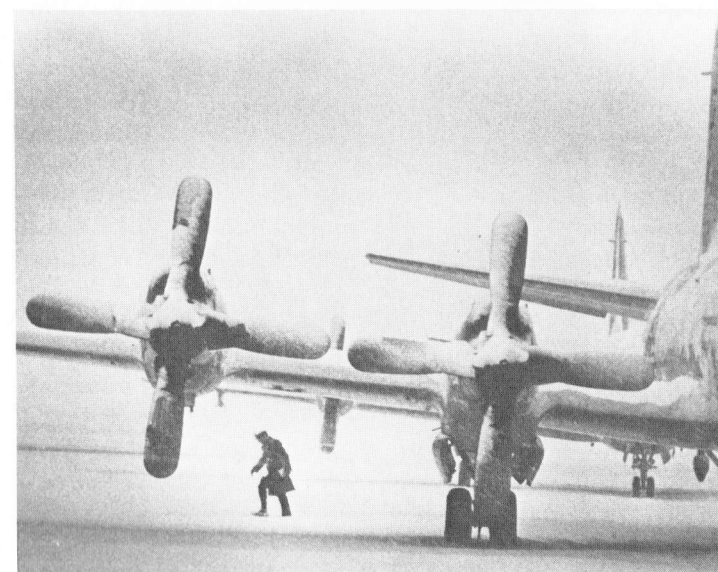


Aftermath of a tornado.

WEATHER EFFECTS

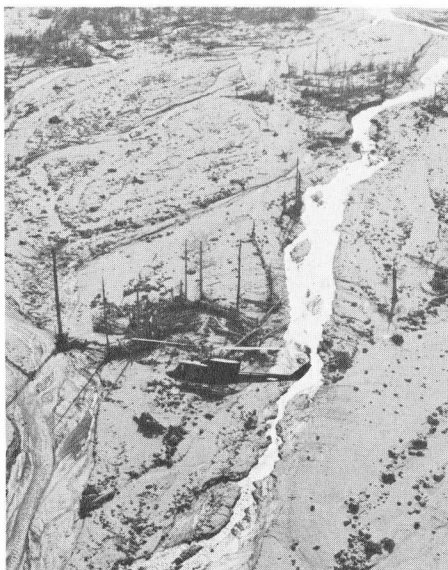
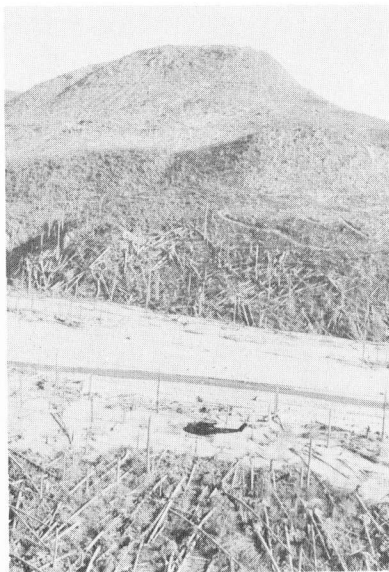


Winter weather poses many problems.



Heavy icing conditions on aircraft.

WEATHER EFFECTS



Mt St Helen, Portland Oregon, July 1980.

APPENDIX 1

LINEAGE* AND HONORS

Unit Designations: Air Weather Service (13 March 1946)
Army Air Forces Weather Service (1 July 1945)
Army Air Forces Weather Wing (6 July 1943)
Weather Wing (14 April 1943)

Higher Headquarters: United States Air Force (1 April 1990)
Military Airlift Command (1 January 1966)
Military Air Transport Service (1 June 1948)
Air Transport Command (13 March 1946)
Headquarters Army Air Forces (6 July 1943)
Flight Control Command (14 April 1943)

Commanders: See Appendix II for a complete listing of commanders.

Vice Commanders: See Appendix III for a complete listing of vice commanders.

Assigned Units (Active/wing level): Location is last active site; date in parenthesis is date assigned to AWS.

- 1st Weather Wing, Hickam AFB, Hawaii, (8 February 1954).
- 2d Weather Wing, Kapaun Barracks, Germany, (8 February 1954).
- 3d Weather Wing, Offutt AFB, Nebraska, (8 October 1956).
- 4th Weather Wing, Peterson AFB, Colorado, (8 August 1959; activation: 1 October 1983).
- 5th Weather Wing, Langley AFB, Virginia, (8 October 1965).
- 7th Weather Wing, Scott AFB, Illinois, (8 October 1965).
- Air Force Global Weather Central, Offutt AFB, Nebraska, (8 July 1969).

Assigned Units (Inactive): Location is last active site; date in parenthesis is date assigned to AWS followed by inactivation date.

- 6th Weather Wing, Andrews AFB, Maryland, (8 October 1965; 1 August 1975).
- 43d Weather Wing [AFCON], Tokyo, Japan, (20 September 1945; 3 June 1948).
- 43d Air Weather Wing [MAJCON], (1 June 1948; redesignated 2043d Air Weather Wing, Tokyo, Japan, 1 October 1948, redesignated 2143d Air Weather Wing, 1 January 1949; discontinued 8 February 1954).
- 59th Weather Wing [AFCON], Wiesbaden, Germany, (23 November 1945; 3 October 1947).
- 59th Weather Wing [MAJCON], Tinker AFB, Oklahoma, (1 June 1948; redesignated 2059th Air Weather Wing, 1 October 1948; discontinued 1 June 1952).
- 2058th Air Weather Wing, Furstenfeldbruck AB, Germany, (12 October 1951; discontinued 8 February 1954).

Continental Weather Wing, Tinker Field, Oklahoma, (1 October 1945, discontinued 3 June 1948)

Stations: Scott AFB Illinois (23 June 1958)
Andrews AFB, Maryland (1 December 1948)
Gravelly Point, Virginia (14 June 1946)
Langley Field, Virginia (7 January 1946)
Asheville, North Carolina (3 May 1943)
Washington D.C. (13 April 1943)

Awards and Decorations:
AFOEA, 1 May 1986 - 30 April 1988, by DAF SO GB-644, 20 Sep 1988.
AFOEA, 1 May 1984 - 30 April 1986, by DAF SO GB-030, 23 Oct 1986.
Service Streamer, American Theater, World War II, 7 Dec 1941-1 March 1946.

Emblem: The original Air Weather Service emblem was a distinctive, disc-shaped badge approved on 8 September 1942. Significance: Performance of Air Weather Service day and night was indicated by the light blue (left inside) and black (right inside) coloring on the disc. The white anemometer cups, bordered in golden yellow, are the principal instruments used in weather forecasting and are symbolic of the performance. The golden yellow fleur-de-lis represents participation of the weather service (American Expeditionary Forces) in France during World War I. MOTTO: COELUM AD PROELIUM ELIGE translates from the Latin as "CHOOSE THE WEATHER FOR ACTION."

The Air Weather Service Shield emblem was approved for use on Air Weather Service headquarters, group, and wing flags with the appropriate unit designation in the scroll on 24 July 1952. On 31 January 1961 the shield emblem was approved for all uses. Two weeks later, on 13 February, the old disc emblems and motto were retired. The significance was updated in 1963 to read: First participation in combat by a U.S. Army Weather Service took place in France during World War I and is commemorated in the Air Weather Service emblem by the golden yellow fleur-de-lis. Performance of weather duties both day and night is indicated on the gold-bordered shield by light blue, to the viewer's left, and black backgrounds, which divide the shield vertically. Three white (gold trimmed) anemometer cups representing the continual collection of weather data serve to identify the around-the-clock, around-the-world functions of the U. S. Air Force Air Weather Service, then a technical service of the Military Air Transport Service (later Military Airlift Command). The emblem was not changed upon Air Weather Service's reassignment directly under the U.S. Air Force.

*OFFICIAL LINEAGE of Air Weather Service begins with the constitution of the Weather Wing on 13 April 1943. Earlier designations referred to in the narrative are part of AWS's historical background.

APPENDIX II

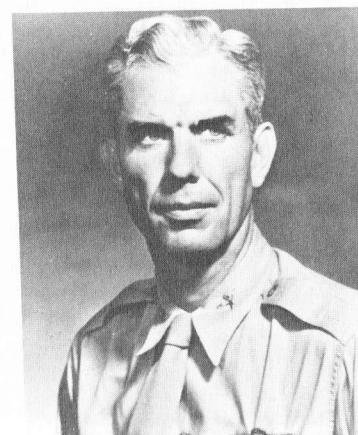
AWS COMMANDERS



1 July 1937
Capt Robert M. Losey



18 January 1940
Maj Arthur F. Merewether



8 January 1942
Col Don Z. Zimmerman



9 March 1943
13 November 1958
Maj Gen Harold H. Bassett

APPENDIX II
AWS COMMANDERS



*10 January 1945
Brig Gen Donald N. Yates*



*1 August 1950
Maj Gen William O. Senter*



*23 April 1954
Maj Gen Thomas S. Moorman, Jr.*



*28 March 1958
1 November 1959
Brig Gen Norman L. Peterson*

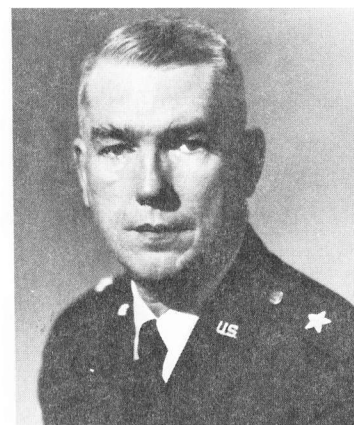
APPENDIX II
AWS COMMANDERS



*18 March 1963
Brig Gen Roy W. Nelson, Jr.*



*6 October 1965
Maj Gen Russell K. Pierce, Jr.*



*27 July 1970
Brig Gen William H. Best, Jr.*



*30 July 1973
Brig Gen Thomas A. Aldrich*

APPENDIX II
AWS COMMANDERS



15 February 1974
Brig Gen John W. Collens III



6 August 1975
Brig Gen Berry W. Rowe



17 August 1978
Brig Gen Albert J. Kaehn, Jr.



30 July 1982
Brig Gen George E. Chapman

APPENDIX II
AWS COMMANDERS



1 July 1988
Brig Gen John J. Kelly



21 March 1991
Col George L. Frederick

NOTE: Rank is highest held while AWS Commander.

APPENDIX III

AWS VICE COMMANDERS

Date Tenure Began

25 Jul 49
 9 Aug 51
 23 Apr 54
 28 Mar 58
 13 Nov 58
 1 Nov 59
 30 Jul 60
 May 63
 1 Aug 67
 6 Feb 70
 27 Jul 70
 1 Jun 71
 14 May 73
 1 Aug 74
 18 Jul 75
 6 Aug 75
 31 Jul 78
 3 Jul 81
 1 May 83
 15 Apr 86
 4 Aug 87
 Jun 88
 30 Jun 90
 21 Mar 91

AWS Vice Commanders

Colonel William O. Senter
 Colonel Thomas S. Moorman
 Colonel Norman L. Peterson
 Colonel James T. Seaver, Jr.
 BGen Norman L. Peterson
 Colonel James T. Seaver, Jr.
 Colonel Roy W. Nelson, Jr.
 Colonel William S. Barney
 Colonel Ralph G. Suggs
 BGen William H. Best, Jr.
 Colonel Thomas A. Aldrich
 Colonel John W. Collens
 Colonel Thomas D. Potter
 Colonel Edwin E. Carmell
 Colonel Berry W. Rowe
 Colonel Alfred C. Molla, Jr.
 Colonel Salvatore R. LeMole
 Colonel Thomas L. Harris
 Colonel Norman F. Rauscher
 Colonel James A. Young
 Colonel John J. Kelly
 Colonel Gary S. Zeigler
 Colonel George L. Frederick Jr.
 Colonel Gene J. Pfeffer

APPENDIX IV

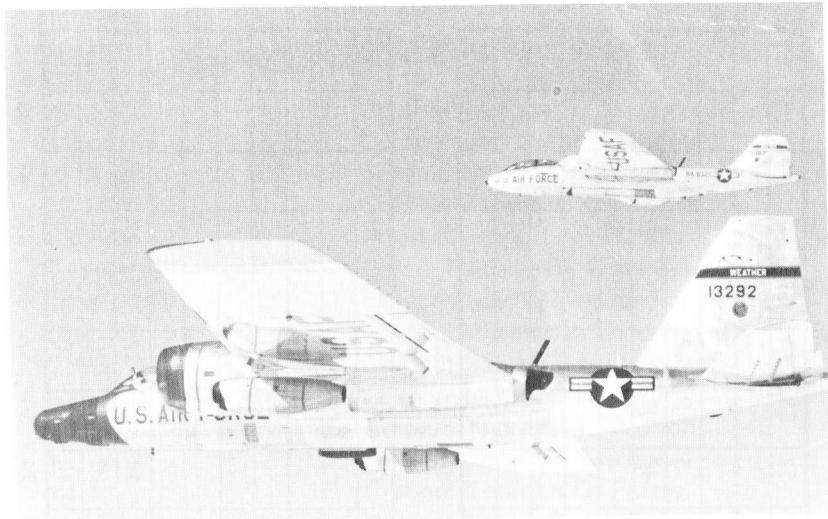
AWS AIRCRAFT INVENTORY, 1943-1975
 Weather Reconnaissance Aircraft

	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
B-25	6	15	15	4	2												
B-24		16	22														
B-17		6	22	18	12	10	4	4	3	3	2	2	2				
WB-29				25	39	67	52	60	59	46	67	80	71	39	2		
WB-50													16	59	66	66	69
WB-47																	
WC-130																	
WB-57																	
WC-135																	
TOTALS	6	36	59	47	53	77	56	64	62	49	69	82	89	98	68	66	69

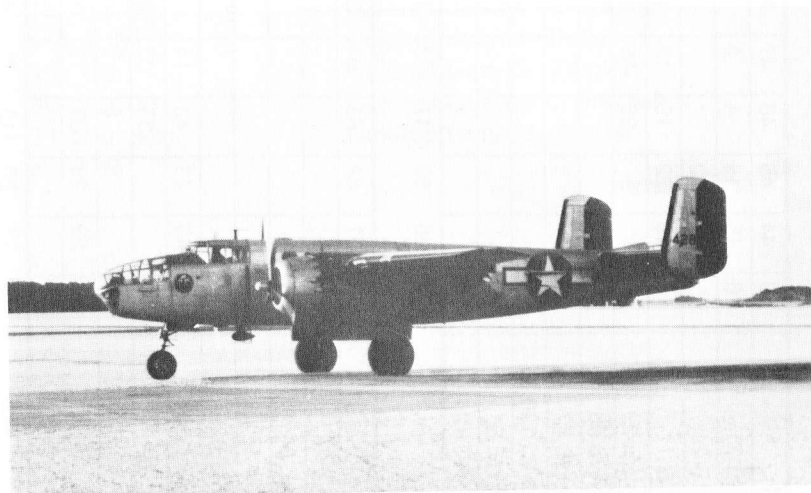
	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
B-25																	
B-24																	
B-17																	
WB-29																	
WB-50	46	43	43	43	14	12	9										
WB-47				33	33	32	32	25	24	24							
WC-130			5	5	5	11	9	12	14	14	23	22	28	27	26	23	
WB-57			28	38	32	19	26	18	22	26	26	25	25	14	13		
WC-135						8	10	10	10	10	10	10	10	8	8	7	
TOTALS	46	71	86	113	71	89	89	65	70	74	59	57	63	49	47	30	

1975 figures as of 31 August.

APPENDIX V
AWS AIRCRAFT

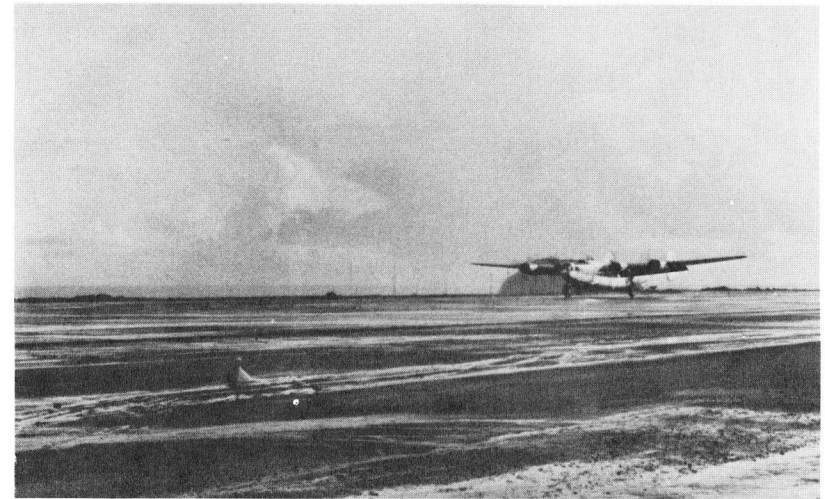


TOP: RB-57C **BOTTOM: RB-57F**

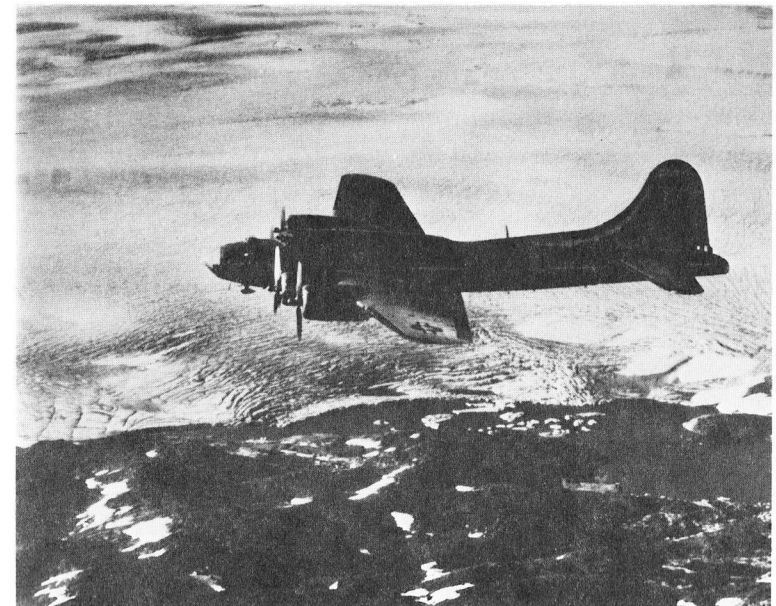


B-25

APPENDIX V
AWS AIRCRAFT

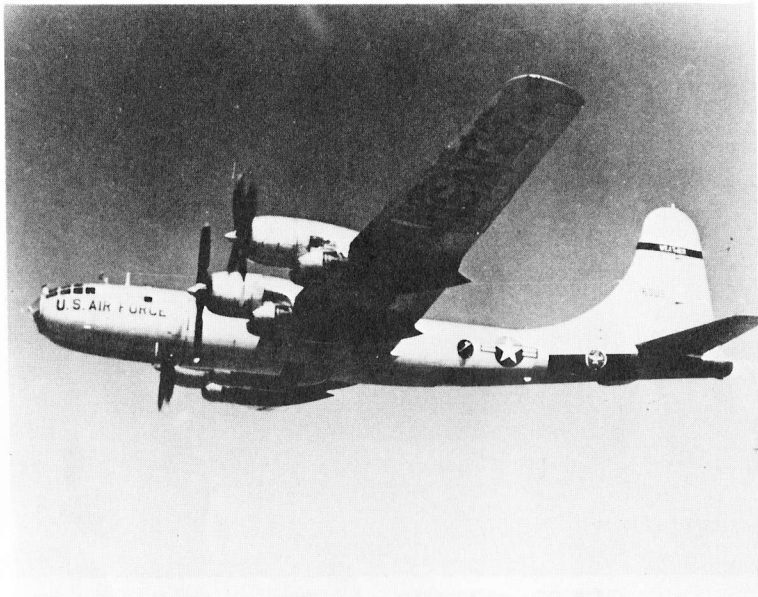


B-24



B-17 over Greenland Ice Cap, 1945.

APPENDIX V
AWS AIRCRAFT

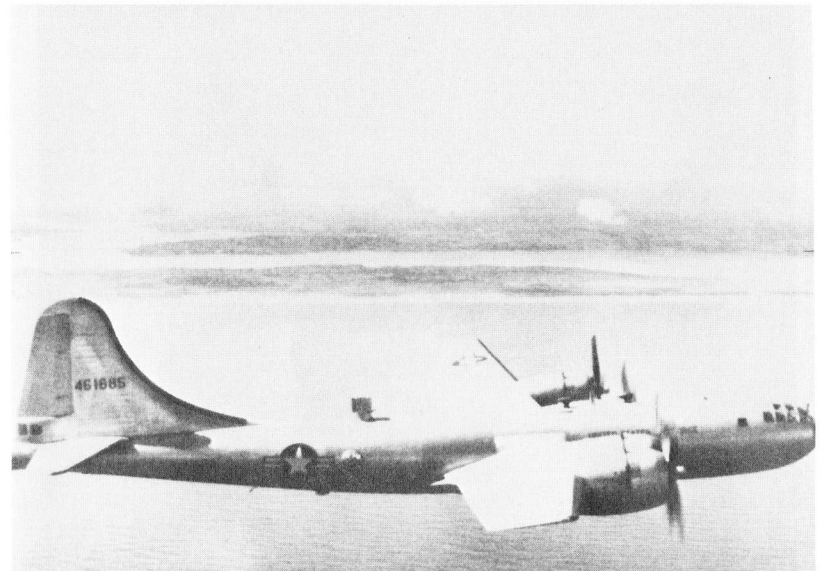


WB-50

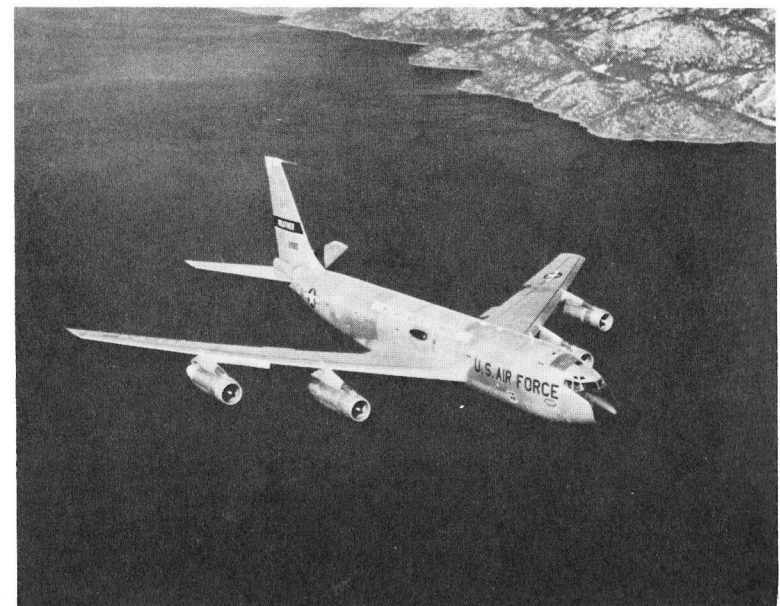


WC-130B

APPENDIX V
AWS AIRCRAFT



WB-29

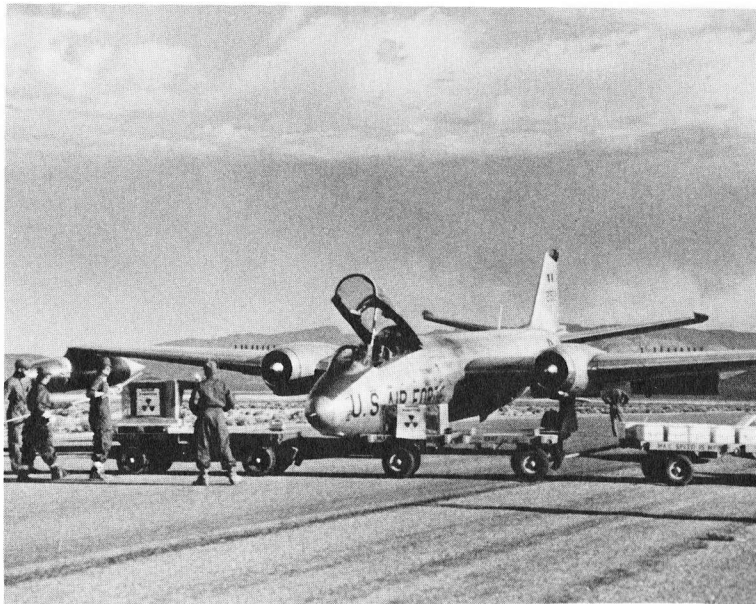


WC-135

APPENDIX V
AWS AIRCRAFT



WB-47



Martin B-57 medium jet bomber used for cloud sampling in the 1957 nuclear tests.