Above left: Oil drums were used to catch rainwater, and also flattened for siding, Na Khang.

Above right: Vietnamese house near Pleiku AB, RVN.

Below: Open morning market at Vientiane, Laos.

Air Weather Service personnel were involved in humanitarian efforts also.

Right, SSgt Wilbur F. Bready of Det 6, 30th Weather Squadron and a Montagnard tribesman with a crossbow. The detachment sold Montagnard artifacts. SSgt Bready was the civic actions team leader. He acted as go-between for the hamlet chief and the Army to provide identification and access rights to the rice paddies for the Montagnards.

Personnel of most AWS units helped build, repair, and otherwise support schools, orphanages, centers for refugees, and for the blind. They also contributed to scholarships for the education of the children of the area.

Left, an orphanage in Vietnam supported by the members of Det 15, 30th Weather Squadron.

Right, Major John B. Walls, commander of Det 15, 30th Weather Squadron, distributing hospital gowns to the children of Udorn hospital.
Another aspect of AWS support to theater operations involved the pictured weather reconnaissance aircraft. Each was used at one time or another for scout or pathfinder weather reconnaissance in support of the many fighter deployments to and from Southeast Asia. Two months after its B-52s actively entered the war in June 1965, the Strategic Air Command (SAC) asked AWS to perform weather scout reconnaissance of air-refueling areas during Operation Arc Light bombing missions from Guam to Southeast Asia. The first such mission was flown with an AWS WB-47E from Clark Air Base in the Philippines, on 7 August. Dedicated Arc Light weather scout reconnaissance was flown continuously with the WB-47Es from then until 1969 at an average rate of nearly two sorties per day, and thereafter on an as-needed basis by AWS' WC-130S, and WC-135Bs. In 1966, air-refueling area and weather scout reconnaissance also commenced in support of SR-71 deployments.

Above, C-130. Below, racks attached to the planes for the silver-iodide flares used in the rain-making efforts. Rain-making was conducted in Laos, North Vietnam, and sections of South Vietnam, with mixed results.
Andersen AFB, Guam, was as much a part of the Vietnam war as Pleiku or Bien Hoa. Supported by 1st Weather Wing's Detachment 2, this key SAC installation was a springboard for B-52 strikes. Det 2 weather reports, prepared before every launch of a B-52, provided SAC crews with up-to-the-minute wind, visibility and temperature conditions throughout the entire air corridor from Guam to Southeast Asia.

The B-52s carried 51 conventional "iron" bombs in bomb bays and clusters under the wings.

Above, SAC B-52 Stratofortress waiting to be loaded with 750-pound bombs in foreground at Andersen AFB in late 1966.

Left, returning, and below, a B-52 alert at Guam.

Military Airlift Command Support

Eagle Thrust, December 1967.

Seven weathermen at Ft. Campbell, Kentucky, 7th Weather Wing observers, forecasters, and briefers, functioned as part of the MAC airlift control element during the largest airlift on record of a combat-ready force into a war zone. It was named "Eagle Thrust" in honor of the 101st Airborne "Screaming Eagles" Division.

Top photo, 101st troops loading on a C-141 at Ft. Campbell, and left, offloading at Bien Hoa, RVN.

Below, Eagle Thrust cargo at Tan Son Nhut, RVN.

Air Weather support to MAC included computer flight plans to crews worldwide. Those came from Suitland, Maryland, (Det 44, 7th Weather Wing) during the early part of the war, and from Air Force Global Weather Central (AFGWC), Offutt AFB, Nebraska, after August 1970.

An unusual support AWS provided MAC was cold fog dissipation at Elmendorf AFB, Alaska, an important base for MAC C-141 traffic between the United States and Southeast Asia. The Alaskan Air Command requested AWS initiate a fog dissipation system there because operations at the base were frequently hampered by supercooled fog, particularly in December and January. The mission was officially assigned to AWS.

During the first season (Nov 67-Feb 68) WC-130s were used to drop crushed dry ice in fog-seeding operations. Thirty-seven seeding missions were flown, resulting in 91 recoveries and 94 departures which otherwise would have been delayed or diverted. The majority were MAC C-141s. The fog dissipation operations continued the following winters, with similar results, the method changing to ground-based propane seeding during the 1972-1973 season.

Elmendorf AFB, left, before, and below, sixty minutes after fog dissipation operation, using dry ice, during the 1967-1968 season.
Combat Support

1966 - 1972

Following the Tonkin Gulf episodes, and the subsequent rapid influx of United States military personnel into Southeast Asia, AWS expanded its theater organizational structure and augmented the manning to handle the increased workload. In the first six months of 1966, for example, theater weathermen issued 29,488 target forecasts—compared to 6,174 issued in the same period a year earlier.

Thus in mid-1966, the 1st Weather Group was activated at Tan Son Nhut under the 1st Weather Wing. Subordinate to it were three weather squadrons. From Udorn Air Base the 10th Weather Squadron supported Air Force units in Thailand. The 30th Weather Squadron remained at Tan Son Nhut and supported Seventh Air Force units in the Republic of Vietnam. Lastly, the 5th Weather Squadron, activated at Tan Son Nhut and moved to Long Binh Army Installation in July, rendered meteorological service to various elements of the United States Army, Vietnam, (USARV). That basic organizational structure remained intact until nearly the end of the conflict. At the group's peak manning, over 700 of AWS' 10,000 weathermen were assigned to various theater units, with 200 of them devoted to Army support.

One very busy unit, organized in Saigon as Detachment 14, 30th Weather Squadron, was reassigned to the 1st Weather Group upon its activation in 1966, and designated the Southeast Asia Tactical Forecast Center (SEATFC). In early 1967 it was redesignated the Southeast Asia Joint Operations Center (SEA WECEN) and in August moved to the Seventh Air Force compound at Tan Son Nhut. It was later redesignated the Southeast Asia Weather Center (SEAWECEN).

Its mission was varied and included support to the USMACV, Seventh Air Force and various Army and Navy units. Among the support requirements were daily pictorial weather summaries, seven day outlooks, a weekly stand-up briefing to the USMACV commander, target forecasts for all in-country and out-of-country air activities, winds along the coast, river stages, sea conditions, and forecasts for specific Navy and Army operations. The unit was one of the most complete weather-support organizations ever developed for an operational theater.
Proposed target in North Vietnam is located by Major Ray B. Coffman, commander of Detachment 14, 30th Weather Squadron, at Saigon. A most important product of the detachment were the detailed target forecasts prepared for the use of Air Force and Navy pilots who daily carried the war to North Vietnam. One of these special forecasts was prepared for every mission flown. (1965)

Below, Captain Dennis P. Woodruff, forecaster and commander of OL 3, Detachment 32, 5th Weather Squadron, Dong Tam, briefing commanding general, 9th Infantry Division, and his staff.

Personalized staff weather officer support was a service AWS rendered to the key personnel at various echelons of command at both Army and Air Force units in Vietnam. Referring to such service, and the overall weather support provided his command, General Westmoreland remarked in early 1967 that "no other U.S. military commander ever had the advantages of the outstanding weather support" he had at his disposal.
Detachment 36, 30th Weather Squadron, Tuy Hoa Airfield, RVN. Upper left, weather observing site under tower cab; upper right, checking the TMQ-11 Transmitter; below, going over final details for an upcoming weather briefing are 2nd Lt. John C. Stevenson and Capt. Clarence M. Duff, detachment commander. The 30th Weather Squadron detachment gave more than 11,600 briefings in its first year of operation, Nov 1966 - 1967.

Headquarters, Seventh Air Force, Tan Son Nhat, RVN, with commanders of Air Weather Service, Seventh Air Force and 1st Weather Wing, left to right, Brigadier General William H. Best, Jr, General John D. Lavelle, and Colonel Newhouse, on 14 September 1971, during AWS commander's tour of AWS units.

Upon General Best's return, he remarked that he thought General Lavelle was the most weather-conscious Seventh Air Force commander in the war, and that there was a slow but steady and significant improvement in the use of weather information over there.
Detachment 18, 1st Weather Group, provided operational weather support for Commando Vault combat missions, flown by C-130 aircrews of Detachment 2, 234th Air Division at Cam Ranh Bay, RVN. The objective of each Commando Vault mission was to drop a 15,000-pound bomb to create a landing zone for Army helicopters. The missions were radar-controlled, with the bomb extracted from the rear of the aircraft by parachute. A second parachute would open to stabilize the falling bomb. A long probe on the nose of the bomb insured that detonation would occur several feet above the ground, directing the full force of the explosion against the jungle foliage without leaving a crater.

Figures 1 through 8 show a typical sequence of events from the extraction of the bomb by parachute to the final landing zone produced from a successful Commando Vault exercise. Within five minutes after the explosion, the area was safe and helicopters could land.
Weather support was provided to the types of aircraft pictured, which were used in Southeast Asia.

- A-37
- F-100s
- F-105
- RF-101
- C-130
- C-47
- SR-71
At Cam Ranh Bay, Detachment 18, 30th Weather Squadron—A2C Jerry L. Lard records an observation in the representative observing site, and A2C Duane W. Timm checks precipitation gauge.
Lt Robert E. Dettling, a weather forecaster assigned to the 30th Weather Squadron's Detachment 3 at Bien Hoa Air Base, receiving a pilot report (PIREP) in 1965 of weather conditions from Lt N. K. Luyen of the Vietnamese Air Force.

Lt Dettling said, "There is always so much moisture in the air here that the smallest disturbance will cause clouds. This is why pilot reports are so important."

AWS' 30th Weather Squadron, the Vietnamese Air Force Weather Division, and the Royal Thai Meteorological Service cooperated in a combined operation covering all of Southeast Asia.

Bien Hoa's weathermen based their forecasts on information supplied by a large weather center in Saigon, special III ARVN Corps reporting points, pilot reports, and their own visual observations.
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AIC Raymond J. Braun regulates flow of hydrogen into a weather balloon at Da Nang AB, RVN. Studying the operation is Ngo T. Phat, a civilian rawinsonde operator of the Vietnamese weather service.

Transmitting a weather observation over a single sideband radio to a Vietnam outpost is TSgt Ralph E. Smith, 30th Weather Squadron, while Maj. William Waggy, Jr., staff weather officer, listens.

At Bình Thủy AB, SSgt Norman D. Berghuis checks weather reports from other bases being received over the teletype.

At Binh Thuy AB, SSgt Norman D. Berghuis checks weather reports from other bases being received over the teletype.

In the very active Mekong Delta area, this was a double-duty detachment which manned a gun position near the weather station as part of the base defense.

Above, Soo Trang's chief forecaster, TSgt Leonard Davis, briefing Army pilot 1/Lt Kennard F. Hill, prior to his departure on a resupply mission to a remote hamlet in the Mekong River Delta.

Weathermen in 1963, at left, supporting the 2d Air Division, and below, in 1965, supporting the U.S. Army 121st Aviation Company.
“Looking North” -­ is A1C Ronald D. Marquardt, clad in flak vest, M-16 rifle ready, standing guard in 1968 near sandbagged weather instrument shelter at Dong Ha AB, some six miles south of Demilitarized Zone (DMZ) in RVN. Detachment 9, 30th Weather Squadron, operated an observing location there.

A1C Norman Bowers and SSgt Arthur Brooks track a gas filled balloon to learn speed and direction of winds, for Detachment 9.

Lt Colonel James H. Gillard, the commander of the 30th Weather Squadron's Detachment 5, and TSgt Charles J. Hoffman, at Tan Son Nhut in April 1966, checking the console of the first weather radar--AN/CPS-9--installed by the Air Force in the Republic of Vietnam. The AN/CPS-9 was a long-range, storm-detection radar capable of providing accurate, three-dimensional information for tracking and plotting rain and storm clouds within a 250-mile radius. Its antenna rotated atop a 70-foot high tower.

The following page contains photographs of a radar tower under construction at Qui Nhon, where an Army helicopter lifted the radar equipment to the platform.

The AN/CPS-9 radar unit, worth $122,000 was eventually replaced by the smaller AN/FPS-103 radar worth $22,000, with a range of 125 miles. The FPS-103, less sophisticated, was easier to maintain.
Building the Qui Nhon tower with a helicopter assist.

The WTR-1 radar mock-up built from spare parts. There were seven sets in the Air Force inventory. This was the eighth set. It was fully operational and could be deployed.

Below: WTR-1 operational at Phu Cat base weather station.

SSgt Frederic O'Brien teaching WTR-1 radar theory in classroom. (1967)
The rains brought discomfort for the weathermen too. Above 2/Lt Robert C. Richey at An Khe, and right, at Vinh Long, TSgt Lawrence L. Young measures the water in the base weather station. The flooding was the result of poor drainage and a heavy rain.

Equipment maintenance was continuous.
There was a sophisticated weather-observing tool of space-age vintage that proved invaluable to the weathermen in Southeast Asia—the meteorological satellite. In January 1964 the weather forecast center at Tan Son Nhut received its first pictures from the Television and Infra-red Observing Satellite (TIROS VIII). While helpful, pictures from TIROS and the follow-on Nimbus satellites were generally of poor quality and not timely enough to meet purely tactical military requirements.

In 1965 a readout site was established at Tan Son Nhut, designated Site VI, that provided pictures of comparatively higher quality from the Air Force's Data Acquisition and Processing Program (DAPP) weather satellite. DAPP was redesignated as the Defense Meteorological Satellite Program (DMSP) in the early 1970s.

In Washington, D.C., the national command authorities were kept advised of the weather in Southeast Asia with the help of satellite photographs handcarried to the White House.
General William W. Momyer, Seventh Air Force commander, when interviewed by Mr. John Hart, Columbia Broadcasting System news correspondent, on 4 May 1967, said, "this weather [satellite] picture is probably the greatest innovation of the war."

In his book, *Air Power in Three Wars*, General Momyer wrote, "When satellite pictures were available...they became the primary source of determining the cloud condition in the target area. Without them and with only the traditional forecast, many missions would not have been launched. The satellite picture allowed us to launch a mission with a reasonable probability that favorable cloud conditions would prevail at the time the strike forces arrived...Thus, the satellite picture was a major advancement in providing the commander with real-time information about the weather his forces would probably encounter."

It was the DAPP pictures General Momyer referred to primarily. They became priceless aids to both the weathermen and the decision-makers in numerous tactical situations during the conflict—including the Son Tay POW raid and the reopening of Khe Sanh.

River flooding was of particular importance to the Army in Southeast Asia. Early morning low angle weather satellite views enabled glints off rivers and lakes to be enhanced on the photos if no cloud cover was present. This photo is an example of glinting off lakes, the Mekong, Kram Nui, Lam Chi rivers, and offshore ocean areas south of SEA.

A DAPP picture of Southeast Asia read out at Site VI at 0530Z, 1 February 1971, with Khe Sanh pinpointed. That day a combined effort by United States and South Vietnamese forces was underway to reopen Khe Sanh. DAPP pictures were instrumental in providing weather forecasts for the massive air support effort. As indicated therein, DAPP photos were declassified on 8 December 1972.
5th Weather Squadron

Air Weather Service's principal mission in Southeast Asia after the Tonkin Gulf incidents was providing weather support for both air and ground operations. Soon after the sizeable influx of Army forces into the Republic of Vietnam in 1965, weather observer teams began deploying forward with combat brigades and battalions on "clear-and-secure" or "search-and-destroy" operations. During the first six months of 1966 Army units engaged in over 350 battalion-sized operations with code names like "Masher," "Jim Bowie," and "Birmingham." For their "exceptionally fine weather support" during Operation Attleboro, which commenced in September 1966, the deputy commanding general of the 1st Infantry Division, in an unusual display of gratitude, personally awarded the Bronze Star Medal to each of the eighteen weathermen from the AWS unit supporting it, and one weather observer serving with it on temporary duty from another 1st Weather Wing unit.

At Detachment 32, 5th Weather Squadron, Long Binh, in 1968, are, left to right: Capt Daniel R. Gornell, detachment commander, Col Ralph C. Suggs, AWS vice commander, Col Joseph M. Bird, 1st Weather Wing vice commander, Col C. John Lotse, 1st Weather Group vice commander, and Lt Col William E. Cummins, II, 5th Weather Squadron commander. Capt Gornell, staff weather officer to USARV's II Field Force, discussed the operations of his seventy-man detachment. In addition to II Field Force headquarters, this unit supported an airmobile division, three infantry divisions, and the 11th Armored Cavalry Regiment.
As part of Colonel Suggs' visit to 5th Weather Squadron units, his party toured a mock Viet Cong village behind USAFR headquarters. Captured Russian 37mm antiaircraft gun, 122mm rocket, 140mm rocket launcher, and a Chicom 12.7mm machine gun employed by the North Vietnamese and Viet Cong were displayed.

Above, Army CH-47 "Chinooks" at An Khe. Below, AIC Hallet Allen slings a psychrometer outside a tent used as Detachment 24's representative observing site at An Khe. The tent was also his home.
Army Chinook helicopter lifting large CPS-9 weather radar antenna from tower near the Tan Son Nhut flight line. It was replaced with smaller AN/FPD-13 radar.

Below: Sgt Paul Levasseur makes a final adjustment prior to installing a component of the FPS-103 radar at Detachment 7, 6th Weather Squadron, at Soc Trang. (1969)

1/Lt Dean Forseth, commander of Detachment 7, with Army WO Robert Lewis, whose UH-1B helicopter was serviced and rearmed for return to the mission area.

Detachment 11 of the 5th Weather Squadron was also located in the Mekong Delta, at Vinh Long. In the spring of 1967, the detachment, commanded by Capt John L. Conley, gave more than weather support. The 9th ARVDF Division, supported by the 13th Aviation Brigade, engaged two Viet Cong battalions in Vinh Long Province. The captain and three of his weathermen, T/Sgt Ken Bates, AIC William Roche, and AIC Nicky Underwood, volunteered as extra help in the ammunition supply point.

For ten hours they helped assemble high explosive rockets and carried them to the helicopters. They also assisted in evacuating casualties from the helicopters to the dispensary.
AIC John W. Lewis, a weather equipment repairman with Operating Location 3, 6th Weather Squadron, Dong Tam, hooks up a ground trap to a lightning rod on the weather station's wind recorder. Lewis was responsible for maintaining all the location's weather equipment at the 9th Infantry Division headquarters, and a field mobile unit at Tan An.

Weather observers at 9th Infantry Division headquarters, Dong Tam, RVN, ready pilot balloon for launching.

Right: Sgt Bo N.S. Tunestam transmits weather information to a U.S. Army O-1 Bird Dog pilot landing at Dong Tam airstrip.

Sgt Tunestam, weather observer at Dong Tam, taking an observation from the tower.
At Vung Tau, RVN, Det 8, 6th Weather Squadron, provided observations and forecasts to meet operational requirements of several types of Vung Tau-based aircraft: the CH-47 Chinook and UH-1B Iroquois helicopters, the OV-1 Mohawk surveillance aircraft, and CV-2 Caribou transports.

Mohawk

Iroquois

Caribou


Precipitation studies by Det 8 were used by Army engineers for planning construction projects. One such study was used in a base drainage project and another, which included wind and temperature data, aided in a base expansion program.
An Army jeep became a mobile office for AWS weathermen taking observations and relaying them by radio in support of the 1st Cavalry Division in 1969.

As a brigade commander with the 1st Cavalry Division put it: "We fight three things, the enemy, the terrain and the weather, and the 5th Weather Squadron provides us with the answers about the weather."

Above left, Capt Thomas E. Taylor, commander, Operating Location 2, Det 31, 5th Weather Squadron, supporting the 1st Cavalry Division. Right, Air Force Sgt Michael Connell checks hourly weather log, while Sgt Bernard Bresee relays data to unit headquarters, at Phuoc Vinh, 1st Cavalry Division base camp. Below, reading the sling psychrometer and passing the humidity back to the base camp in support of the 1st Cavalry.
Preparing a weather chart for use in twice-a-day briefings to the commanding general, 1st Cavalry Division, in 1969, is TSgt John R. Fitz, of an operating location of the 5th Weather Squadron, at Phuoc Vinh, RVN.

At the same base Sgt Stanley Dzula stands atop a mobile weather station near the flight line to tighten the guide wires supporting wind measuring gear, as the sun disappears behind a cloud.

Sgt Michael Connell, combat weather team chief of an operating location of the 5th Weather Squadron, at Phuoc Vinh. When asked how it felt, being stationed with the 1st Cavalry in Vietnam, he was quoted as saying, "We get a very deep sense of satisfaction working with the 'Cav,' because it is a division noted for its success against the enemy, and the information we obtain and pass on plays a vital role in the planning of each operation."
With the 1st Cavalry Division's 2d Brigade at Phuoc Vinh in September 1970, Sgt Ralph T. Wilson, a weather observer with the 5th Weather Squadron's Operating Location B twirls a sling psychrometer, left, and examines his rain gauge, right. In the background are Viet Cong weapons captured by the brigade.

Also supporting the 1st Cavalry is a 5th Weather Squadron observer, reading an aneroid barometer by candlelight and preparing an official surface weather observation.

“Our men wear the patches of the Army units we support,” Lt Colonel William E. Cummins II, 5th Weather Squadron commander and U.S. Army Republic of Vietnam staff weather officer said. “We live with them, eat with them, and if there's some trouble we fight with them.”

There was either a one, two or three-man weather observing team per Army brigade in Vietnam. The teams usually worked near Army air fields, either in a control tower or one of their specially-made weather vanes.