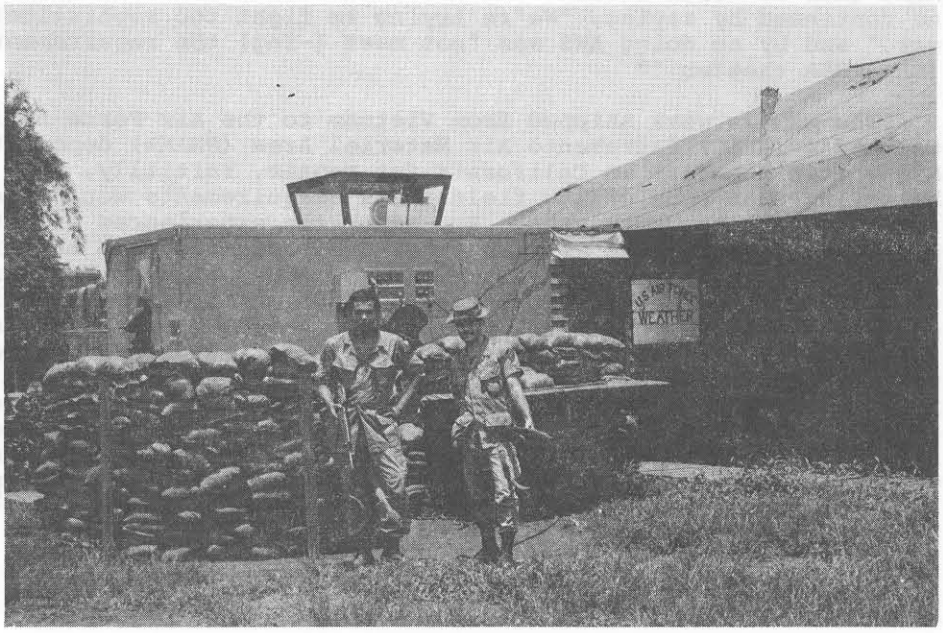
## CHAPTER 5 - EQUIPMENT AND MAINTENANCE

By the late Sixties and early Seventies, after years of frustrating and disappointing experiences, AWS officials came to refer to the Air Force' meteorological equipment research, development and acquisition process as the "Hallelujah Trail." History taught that, on the average, it took ten years from the time a requirement was originally expressed until the piece of gear finally found its way to the field--and of the wars the United States was involved in, only Vietnam lasted that long. Even then many projects fell by the wayside and expired, victims of delays inherent in the process, together with perpetual admonitions by the Air Staff to rejustify the original need. Some were overtaken by events; some collapsed under the weight of spiraling costs; and some were "pie-in-the-sky," beyond the state-of-the art, or were strangled by design alterations and modifications AWS insisted on while the embryo was yet in the womb. Of those that survived the acquisition process to emerge as prototypes, some could not withstand testing--e.g., the EROWS system discussed below. And finally, some that went into production, to AWS' chagrin, simply failed to fill the bill in the field--witness the AN/MMQ-2, the AN/TMQ-25, and the AN/TMQ-22 discussed below. Each administration in AWS knew that the "Hallelujah Trail" was simply unresponsive to AWS' needs; yet there was no alternative, and invariably one administration would optimistically begin the trek down it in quest of the golden chalice only to have to pass on the bittersweet pill of delay--perhaps denial--to an administration twice, sometimes three or four times, removed.

Particularly exasperating for AWS was its unenviable track record with tactical meteorological equipment acquired in the 1960s and 1970s. "In the equipment area, the objective is simple, rugged, and lightweight packages to support the field army," remarked the AWS commander, Brigadier General Best, while addressing the second Army weather support conference in January 1971; "experience in Southeast Asia was a good lesson in the results of over-sophistication."[1] He was referring to the Air Force's--AWS'--responsibility under the joint regulation to provide, install, and maintain fixed and tactical meteorological equipment needed by AWS units supporting the Army. Indeed, as discussed earlier, the tactical observing equipment AWS acquired for use in Vietnam was over sophisticated and too difficult to fix in the field.

### AN/MMQ-2

The AN/MMQ-2 Manual Meteorological Station proved to be a classic white elephant, and support to the Army in Vietnam reportedly suffered because of it. Designed and procured based on lessons from AWS' experiences in the Korean War, the costly meteorological van--some $55,000 per copy[2]--was rushed by AWS into service in Vietnam in 1966 before provisions for spare parts were made, and before technical orders and specifications were available. Most of the fifty-eight vans produced were issued to the 5th Weather Squadron units supporting




*In top photo, AN/MMQ-2 meteorological van being moved by an Army CH-54 "Flying Crane," from Tan Son Nhut, and in the lower photo, the van in place at Long Giao AI, RVN, 1968. (USAF Photos)*

the Army and, before long, they were pleading with AWS to remove them. A mobile tactical van in theory, the MMQ-2 proved to be immobile and "un"-tactical. The shelter suffered from corrosion; hydraulic seals ruptured; external power sources it needed to function were either unavailable or unstable; its weather sensors and ancillary equipment had high failure rates; and spare parts and maintenance people who knew how to keep it operating were both in short supply. "As a result," the 1st Weather Wing reported in 1970, "weather support to ground combat forces was degraded, the ability of . . . forecasters to assist close air support operations was significantly inhibited, and the effectiveness of the weather reporting network was seriously impaired."[3] With a deep sense of embarrassment, AWS decided in October 1969 to remove the MMQ-2s from the theater and replace them with World War II AN/PMQ-1 observing sets that were rugged, easy to deploy and install, and reliable. Although spare parts were hard to get, the PMQ-1's durability and simplicity made it more trustworthy than the sophisticated MMQ-2, and the accuracy of the data obtained with it was quite suitable for tactical operations.

The problems with the AN/MMQ-2 and over-sophisticated tactical meteorological gear in Southeast Asia was addressed rather colorfully by the AWS vice commander, Colonel Ralph G. Suggs, during an interview in July 1970. "We do not have tactical weather equipment that is worth a damn!" he had said. When asked to elaborate, he continued by saying, "We're trying to fight too sophisticated a war," and by so doing AWS was "not meet [-ing] the requirements of [the] SEA theater."[4]

The MMQ-2s were shipped from Vietnam to the Air Force Logistics Command's (AFLC) Sacramento Air Materiel Area (SMAMA) depot (the MMQ-2 item manager) in California for repair, initially, AWS believing that some of its field units' requirements would justify retaining about twenty vans. But after the experiences with the MMQ-2s in Vietnam, the weather wings and squadrons--and the Air National Guard weather flights--informed AWS that the vans were unsuitable for their tactical needs. Thus, after the tactical equipment (the AN/TMQ-14 ceilometer, the AN/TMQ-15 wind set, and the AN/TMQ-20 temperature-dewpoint set, were the major components) were removed, most of the vans themselves--the shelters--were returned by AWS to SMAMA and AFLC for disposition. By the close of 1978, only one shelter remained in use (as a temporary observing site with the 2d Weather Wing at Sembach Air Base, Germany), and, with the exception of the AN/TMQ-15, AWS had less than a dozen items of major tactical equipment from the MMQ-2s in service.[5]

AWS' experiences with the AN/TMQ-25 tactical ceilometer in Southeast Asia was a replay of the AN/MMQ-2's case. It was five years between the time AWS formally stated a need for the MMQ-2 and its initial appearance in Vietnam; it lacked four months of taking that long with the TMQ-25. Even then, if one considered AWS' past track record with acquiring new meteorological equipment, the normal "response" time had been cut in half.[6]

By late 1966, the 1st Weather Group faced the problem of providing observing support to tactical airlift elements periodically hauling troops and supplies into forward bases in Vietnam. The forward landing strips usually lacked standard flight service facilities and, since weather was often a menace, a weather observing service was needed. Therefore, small weather observing teams were deployed to furnish basic observations to airlift control teams guiding aircraft into and out of forward strips. Weather teams usually deployed with their AN/PMQ-4 portable observing kits, their M-16 rifles and sidearms, basic field equipment, and some C-rations. The first such weather team was deployed on 26 December 1966 aboard an AC-130 into Vi Thanh, Republic of Vietnam, in support of an operation that included the first large-scale paratroop drop conducted in that country in two years.[7]

Three months later, Seventh Air Force formally expressed (SEAOR--Southeast Asia Operational Requirement--95) an immediate need for a tactical cloud-height measuring device for use by AWS' weather teams at forward airstrips devoid of normal power sources. The SEAOR was drafted by AWS personnel. In February 1969, the Air Force awarded a contract to General Time Corporation, of Rolling Meadows, Illinois, for twenty-five AN/TMQ-25 tactical ceilometers--estimated costs having risen in 1968 from $127,500 to $290,000, or $11,600 per unit. Category I, II, and III testing of four sets was completed by December 1970, AWS declaring the AN/TMQ-25 "suitable for its intended function."[8] Although United States forces were withdrawing from Vietnam by then, the 1st Weather Wing expressed a need for the TMQ-25 in theater. AWS advised it to requisition six--the balance to be used by AWS units supporting the Army elsewhere. The first AN/TMQ-25s were installed with 5th Weather Squadron units in Vietnam in November 1971. They soon proved unsuitable for tactical operations. In March 1972, the 1st Weather Wing informed AWS that the TMQ-25s in Vietnam "have not made a single reliable ceiling measurement . . . [during] approximately 25 instances ceiling measurements were attempted with known ceilings of less than 3,000 feet." After discussing the set's deficiencies, the wing summarized it all by noting that "problems with the TMQ-25 do not focus on the maintenance, rather the problem seems to be a design deficiency of the equipment in its present environment."[9] The 5th Weather Squadron commander, Lieutenant Colonel Thomas A. Studer, labeled the TMQ-25's performance as "disappointing," adding that it was "too sophisticated for use at anything but established airfields and bare bases," which was unfortunate because "a better way to measure ceilings is greatly needed."[10] Studer's report was followed a month later--in June 1972--by one from the 1st Weather Group's operations officer who wrote that the TMQ-25 was "ineffective as a simple and reliable piece of tactical weather equipment," and that it reflected a "serious deficiency in the system for developing tactical weather equipment" because "field testing of a prototype model should have identified the deficiencies, prior to acceptance."[11]

Until 1977, when AWS decided it no longer could justify their retention, the AN/TMQ-25s were kept in service. During 1975, at AWS' request, the 2d and 5th Weather Wings reviewed their needs for the TMQ-25s. The 16th Weather Squadron informed the 5th Weather Wing that a cloud-height sensor was needed at corps, divisions, and brigades, "but the TMQ-25 does not meet the criteria for operating in a tactical environment."[12] Most of its units had turned their TMQ-25s in two years beforehand,[13] but the squadron notified the 5th Weather Wing that, if AWS insisted on keeping the TMQ-25s in service, it be limited to two per corps and one per division. Although its 5th Weather Squadron had difficulties with the TMQ-25 similar to those experienced by the 16th Weather Squadron, the 5th Weather Wing characterized them as merely "minor logistical difficulties" that could be overcome. The 5th Weather Wing had a need for a covert set to measure cloud ceilings, and the TMQ-25 was the only piece of tactical gear that afforded that capability. It alleged that the TMQ-25 functioned satisfactorily "within the specifications for which it was built," and that "in many instances, the problems seem to arise from lack of familiarization with the applicable T.O. [Technical Order]."[14] The 2d Weather Wing wanted no part of the TMQ-25. Among a host of shortcomings (i.e., too costly, too sophisticated, too bulky to parachute with or transport in available Army vehicles, etc.), its most serious drawback for them was that it would not work in cold weather. The 2d Weather Wing had no TMQ-25s, and did not want any--unless it could be modified to work in cold weather. The wing then could use fourteen, although not for brigade or drop zone support.[15] Therefore, in January 1977, AWS once again had to go to AFLC's Sacramento Air Logistics Center and ask that a piece of so-called "tactical" weather equipment--the AN/TMQ-25--be removed from its inventory because it had no valid use for it.[16]

AN/TMQ-22

Yet another piece of relatively new tactical gear with a turbulent history in AWS was the AN/TMQ-22 tactical meteorological measuring set.

A formal request for a battery-powered, tactical meteorological set for taking limited observations was originally expressed in SOR (Statement of Requirements) 175 of 13 January 1959,* and was subsequently resubstantiated by the Tactical Air Command's ROC (Required Operational Capability) 31-69 of 28 May 1969.

The need for such gear became particularly urgent in the mid-1960s as the Army deployed large numbers of troops to Vietnam. AWS had to survey its units worldwide to corral enough of the venerable AN/PMQ-1 and AN/PMQ-4 manual meteorological stations to meet the needs of war. Meanwhile, as an interim measure, it also obtained forty United States Forestry Service Fire Weather Observing Kits for use in Southeast Asia, at a cost of $119 apiece.[17]

A prototype, hand-held, tactical meteorological set with the nomenclature AN/TMQ-16 was developed and tested in the mid-1960s, but did not go into production because it could not meet the military

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*A blanket document for Project 433L, the "Weather Observing and Forecasting System," launched in August 1954.

specifications. Prototypes of the Army's AN/TMQ-22 and the Air Force's AN/TMQ-23, manufactured by the same company, were developed and tested in 1969. Neither set passed. After consulting with the Army, the Air Force--AWS--decided in 1969 to forego further development of the TMQ-23 and, once the Army corrected the deficiencies, purchase the TMQ-22s. They would replace the AN/PMQ-1s and AN/PMQ-4s, which were developed and purchased under a one-time contract, and for which spare parts had been depleted.[18]

The AN/TMQ-22s had been under development by the Army's Atmospheric Sciences Laboratory at Fort Monmouth. Agents from that facility, and from the Department of the Army staff, including Mrs. Frances Whedon, attended a technical exchange conference at the Air Force Academy in mid-July 1969. AWS representatives in attendance, led by the AWS vice commander, Colonel Suggs, were told by them that if AWS and the Air Force wanted to purchase the TMQ-22s in fiscal 1970, and could come up with the funds, the Army could contract for and deliver them by early 1971. Working feverishly through the Air Staff's assistant for weather (AF/PRW), AWS was able to see that the necessary funds were transferred from the Air Force Cambridge Research Laboratories (AFCRL) to the Army and, on 22 March 1970, it was announced at AWS that the Air Force would purchase 130 AN/TMQ-22s at a cost of $400,000. It was a joint buy with the Army, which had its own uses for the TMQ-22s it bought. The TMQ-22 was described by AWS as an "off-the-shelf" item, small, rugged, and battery powered, which could be carried into the field by one person. AWS expected the TMQ-22s to be in its inventory by May 1971.[19]

However, AWS learned in early September 1970 that, due to a "misunderstanding" between the Department of the Army staff and the Army's Atmospheric Sciences Laboratory, the TMQ-22 contract would not be let until January 1971, and that delivery of production models would take another fourteen to twenty-four months, depending upon the contractor's expertise. The Army expected to release formal request for proposals--bids--to the industry for the TMQ-22s in early October 1970.[20]

The news chafed the AWS commander, Brigadier General Best. "I cannot buy that," he stated emphatically. After recalling the Army's promises, he noted that AWS might have to buy the AN/TMQ-23 instead in order to get it in the field earlier. Whatever, he was intent on making an issue of the TMQ-22 with the Army. "We were lied to," he continued, and

> I think we've got to make an issue of it. If this [sort of] thing is allowed to continue . . . the Army can tie us up. . . . If the Army has something good, we'll buy it. We did this to get CRL [Air Force Cambridge Research Laboratories] off their ass. We are not chained to, or obligated to, CRL-researched products.

Best's assistant deputy for operations, Colonel Edwin E. Carmell, agreed that the slippage was unfortunate, but advised the general that, if AWS made an issue of it, "we could win the battle and lose the war as far as Army weather support. With egg on our face, we've got to go the TMQ-22 route." Another reason the colonel cited for sticking with the TMQ-22 was that it would cost about half what the TMQ-23 would. But Best would not be dissuaded. "If we don't make an issue of it the Army will think we're patsies," the general continued; "they hooked us for $400,000, then slipped the delivery eighteen months, and we don't even make a peep!" AWS had to take a stand, he said, fully aware that it would put "certain" Army people in a tight spot. In referring to the TMQ-22 problems, he and his staff again

pointed the finger of suspicion at Mrs. Frances Whedon, Best labeling her a "chokepoint" in Army-AWS relations.[21]

Two weeks later, on 16 September 1970, in response to General Best's wishes to make an issue of the TMQ-22,[22] his staff assured him that a letter was being drafted for his signature registering AWS' displeasure with the delay. "I just can't believe we are going to have to accept an eighteen-month delay," the AWS commander said, and he directed his people to urge the Air Staff's assistant for weather (AF/PRW) to "rattle the trees" in the Army.[23] A week later, while attending another technical exchange conference, at Annapolis, Maryland, Best "rattled trees" himself, informing his staff upon his return that he had talked to an Atmospheric Sciences Laboratory official and "I gave him hell on the TMQ-22s." "What have we done on rattling the cage on the TMQ-22s?" he pressed his staff.[24]

Insofar as speeding up the acquisition of the AN/TMQ-22s was concerned, General Best realized that the matter was out of AWS' hands and that little could be done. He remained frustrated, however. Soon after the TMQ-22 contract was let in early 1971, he bet his chief of staff that the contractor would not have the production models ready by August 1972 as promised. He won the bet, but did not collect because both he and his chief of staff had long since retired from the Air Force when AWS received its first TMQ-22s--in the summer of 1975!

A formal request for proposals--bids--on the AN/TMQ-22 was released by the Army to industry on 15 September 1970, and on 8 February 1971 a contract was awarded to Air Flow Incorporated, of Glastonbury, Connecticut, to produce 130 of the sets for the Air Force.[25] Shortly afterward, because the money was no longer needed by the Army, the Air Force recouped $190,000 of the $400,000 it had transferred to the Army for the TMQ-22s.[26]

Initially, the first production model AN/TMQ-22s were scheduled for delivery in August 1972, but the date slipped to July 1973. The initial operational test and evaluation phase was completed in September 1972. But delivery of production models was slipped first to October 1973, and then to February 1974, due to the incorporation of engineering change proposals--design changes--asked for by AWS. An extra printed circuit board was incorporated, as well as the capability to use conventional 110-volt alternating current circuits as an external power source. An AWS request in 1973 to purchase sixty-five additional TMQ-22s was rejected by the Air Staff. The first production article TMQ-22 was accepted by the Army on 3 April 1974, and the production sets were shipped by the contractor at the rate of about fifteen per week soon thereafter. The first six production set TMQ-22s arrived at AFLC's Sacramento Air Logistics Center--the Air Force item manager for the TMQ-22--on 11 November 1974. However, in agreement with AWS' wishes, the Sacramento Air Logistics Center would not distribute the TMQ-22s to AWS field units until up-to-date technical orders could accompany them. The date of publication of the AN/TMQ-22 technical order was 1 May 1975, and in July 1975 the Sacramento Air Logistics Center began shipping the TMQ-22s and technical orders to AWS units. Approximately half of the 130 TMQ-22s had been shipped by September 1975; all were in the field by year's end.[27] Estimates of the cost to the Air Force for each of the original 130 AN/TMQ-22s ranged from $1,300 to $3,500.[28*]

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*One AWS authority, Mr. Max M. James--Ground Systems Engineering Div (AWS/LGLG), Dir of Meteorological Systems Engineering, DCS Logistics, HQ AWS--was of the opinion that the AN/TMQ-22s cost close to

The fact that it took over sixteen years from the time the requirement was originally expressed until the first AN/TMQ-22s became available to its field units was a bitter experience for AWS to digest; but the situation became intolerable when reports began filtering through from the field units in the late summer of 1975 that the TMQ-22s would not work! Among other problems it would not work in the frozen climes of places like Alaska or Germany; the case it was carried in was not waterproof; its zinc-carbon batteries had short lives; the barometer did not maintain calibration well; its wind sensor was defective; it gave incorrect temperature and dew-point readings; and it was difficult to obtain spare parts due to the difference in the Army and Air Force supply systems. In regard to the latter shortcoming, the 5th Weather Wing felt that "we are not getting the necessary support for the TMQ-22s from higher headquarters"--AWS.[29]

The instructions to the field from AWS headquarters in 1976 were terse: make the AN/TMQ-22 work because it was the only new piece of tactical equipment AWS would get. "What you've got is what you'll get, fellows," Brigadier General Rowe, the AWS commander, laconically told his wing commanders in early November 1976; "we may have to go to war with it."[30] Rowe had been the TMQ-22 program monitor on the Air Staff (AF/PRW) during the original purchase. In fact, AWS was considering purchasing up to seventy-five more TMQ-22s (by late 1976 the Sacramento Air Logistics Center had made a "follow-on" buy of twenty-eight TMQ-22s) but, based on poor field performance, decided to rewrite the technical orders and modify the sets it had. A meeting was held at Fort Monmouth in mid-November 1976 with Army representatives who agreed to incorporate the modifications AWS wanted before buying more TMQ-22s--but there was no "get well" date. In the meantime, AWS repeatedly sent instructions to the field on how to overcome the TMQ-22's problems, including a training plan in early 1976 and a special brochure a year later on how to operate, maintain, and obtain spare parts for the sets. In summarizing the situation in early 1977, the logistics staff agency at AWS headquarters reported that the TMQ-22[31]

> has been praised, maligned, misused, and abused. Almost all parts are physically available to support the set. Those who have had trouble are the ones who ignored the training plan, knew little about operation or maintenance, and were unable to order parts because of unfamiliarity with procedures. . . . However, . . . the TMQ-22 seems to be on its way to becoming an operational inventory item.

The report may have been prematurely optimistic. During a look at the 7th Weather Squadron in May 1977, the MAC Inspector General found that the squadron lacked enough operable AN/TMQ-22s to support USAREUR in war. The reliable, battle-tested, and cheaper belt weather kit was recommended as an authorized replacement

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*(Cont) $3,077 each--or $400,000 for 130 sets. He noted that, while the Air Force may have recouped $190,000 of the $400,000 it had transferred to the Army in 1970, it spent nearly that much to acquire such supplementary items for the TMQ-22s as spare maintenance parts--as opposed to spare parts kits that were part of the basic TMQ-22 contract--and technical publications, etc. (Telephone conversation by author with James on 5Oct78.)

A document AWS published in 1978 (AWS Pamphlet 105-53 *Weather: Air Weather Service Meteorological Sensors and Related Equipment*, 30Sep78, p. 1-60) put the cost of a single TMQ-22 at $3,500.

for the unreliable and costly TMQ-22. The Inspector General further recommended that AWS review its need for the TMQ-22 and, if cheaper but sufficient tactical meteorological equipment was available, halt further purchases of the TMQ-22.[32] AWS directed Detachment 75 of the 5th Weather Wing's 3d Weather Squadron at Eglin AFB's Hurlburt Field to compare the quality of data obtained from the TMQ-22, the AN/PMQ-1, and the belt weather kit. The results demonstrated that data obtained with the belt weather kit was "relatively accurate" and its reliability was as good or better than the PMQ-1 or TMQ-22.[33] It was therefore recommended within AWS headquarters that the TMQ-22 *not* be modified. And to further muddy the water for the field units, AWS published a directive on tactical weather support on 31 August 1977 which designated the TMQ-22 as the "primary piece of tactical observing equipment"--although the PMQ-1, AN/PMQ-4, and the belt weather kit were authorized as back ups.[34]

In November 1977, the Sacramento Air Logistics Center issued a purchase request to the Army to procure thirty-one additional AN/TMQ-22s to fill back orders and the unfulfilled authorizations of AWS units. AWS asked that the modifications it proposed a year earlier be incorporated into the additional sets, as well as those already in the inventory. The Army agreed to AWS' proposal. Among other changes, the new sets would have improved barometers, better battery case accessibility, more power, longer cables, and be waterproof. By the close of 1978 the Army still had not issued a call for competitive bids for the thirty-one TMQ-22s, or the modification kits, and forecasts were that AWS would not receive them for another two and one-half years.[35] In the meantime, AWS continued to urge its field units to replace the troublesome zinc-carbon flashlight batteries in the sets on hand with alkaline-manganese batteries that performed better in low temperatures.[36]

## Belt Weather Kit

In the meantime also, based on the Hurlburt Field tests in 1977, AWS decided to procure 189 of the belt weather kits, a figure changed later to 250. Consisting of a wind meter, compass, rain gauge, sling psychrometer, and miniature psychrometric and pressure reduction calculators, all in a heavy-duty case, the belt weather kit, patterned after a "fire weather kit" tested in Vietnam in the 1960s, was to be used as a back-up to the AN/TMQ-22s.

A contract for 250 belt weather kits was awarded in September 1978 to the Western Fire Equipment Company, Brisbane, California.[37] The company delivered the prototype to AWS for evaluation on 2 January 1979,[38] and the balance of the order on 27 April 1979. AWS then shipped the kits to field units on 1 May 1979, with instructions to requisition from their host supply offices an altimeter barometer to go with them, manufactured by the Taylor Instrument Company of Asheville, North Carolina.[39] The kits cost $126.05 each, while the altimeter barometers cost $94 apiece.

## AN/TPS-41

In early 1969, the Army formally stated a requirement for a mobile or tactical weather radar. In conjunction with Fairchild Hiller (later Fairchild Industries), it developed a prototype, X-band

(3.2 centimeter wavelength), mobile weather radar with a 240 kilometer range, designated the AN/TPS-41. Engineering tests of the prototype were completed by the Army at Fort Huachuca in July 1970, after which it was moved to Fort Sill where a joint service test with the Air Force was completed in April 1971. Then a review of the program, scheduled by the Army's Atmospheric Sciences Laboratory for November 1971, was slipped indefinitely pending a re-evaluation by the Army of its need for a tactical weather radar. The Army was not overly enthusiastic about underwriting the entire cost of putting the TPS-41 into production.[40]

It was aware, however, that the Air Force might help defray the cost of producing the AN/TPS-41. On 21 April 1969, the Tactical Air Command (TAC) formally established a requirement for a tactical weather radar to complement the Tactical Weather System, which was designed to support tactical air forces during operations from so-called "bare bases."[41] In an effort to keep costs reasonable, it was decided to take advantage of the spadework the Army had done with the TPS-41. At an Army weather support conference in April 1970 it was informally agreed that the Army would procure and maintain TPS-41s for corps and division support, while Air Force (AWS) personnel would operate them; for "bare base" support, the Air Force would pro-procure, operate, and maintain the TPS-41s.[42] Once the joint service test of the TPS-41 prototype was successfully completed, it was felt that a contract could be let by February 1973, and that the first production model could be in operation by June 1975.

However, before proceeding with a contract, the Air Staff wanted to review the need for an X-band tactical weather radar as opposed to C-band (5.4 centimeter wavelength) radars. For AWS, the wavelength question was a key issue. Even though it would be larger and cost more, a C-band radar was favored by AWS because X-band radars had greater attenuation difficulties. The Army insisted on the less-sophisticated X-band radars for support of its units. In the fall of 1971, at AWS' instigation, Fairchild furnished estimates to, one, convert the Army's prototype TPS-41 to C-band configuration and, two, produce and test an entirely new C-band prototype. Both estimates were considered excessive.[43] Still, on 24 September 1971, AWS recommended to the 5th Weather Wing, whose primary mission was support of TAC, that the TPS-41 wavelength be changed from 3.2 to 5.4 centimeters. With its TAC "hat" on, the wing accepted AWS' position in principle, subject to numerous reservations.[44]

At a January 1972 meeting with Army officials it was revealed that the Air Force might underwrite procurement of six AN/TPS-41s with fiscal 1973 or 1974 funds for the Tactical Weather System. Since the TPS-41s would not be available in time for installation in Tactical Weather System shelters, the Air Force concept was to procure the TPS-41s in separate shelters so that they could be deployed independently of the parent system. But AWS voiced strong objection to an X-band TPS-41 at the meeting, noting that if the Army decided not to purchase X-band TPS-41s, it would do all it could to get funds to convert the TPS-41s to C-band models.[45]

During 1972, upon the 5th Weather Wing's advice, TAC's position supported a buy of six AN/TPS-41s in their own shelters--unless an alternative radar could be found with similar capabilities, cost, and weight.[46] It was generally believed that a determination of who would buy, operate, and maintain the AN/TPS-41s would have to be made at the Air Staff and Department of the Army level. Accordingly, the Air Staff addressed a letter to the Army in the late summer of 1972 soliciting a position on the joint procurement and funding of the TPS-41.[47]

After the Department of the Army demurred on contributing to the purchase, the Air Staff published a program management directive in early 1973 authorizing the Air Force Systems Command (AFSC) to procure through Army channels six X-band AN/TPS-41s it referred to as tactical weather radars.[48] For the purpose, it set aside $2.716 million in fiscal 1974 funds--about twice the original estimate. Adding to the cost was the refusal by AFSC and the Air Force Logistics Command to accept specifications for the TPS-41 developed by the Army.[49] Consequently, the Air Force would have to purchase new specifications.

Representatives from AFSC's Electronic Systems Division (ESD), which was to shepherd the radar acquisition, worked with the Army in late 1973 resolving differences in the specifications, deciding on a method of procurement, and drafting a formal memorandum of agreement.[50] ESD published a program management plan for the six AN/TPS-41s on 6 September 1973.[51] A memorandum of agreement between the Army and ESD for the purchase of six sets to support Air Force operations was completed in December 1973. Once signed, an interdepartmental purchase request was released to the Army in January 1974 for sole-source procurement from Fairchild.[52] It was planned to use shelters for the TPS-41s furnished from Army supply stocks at a cost of $3,000 each. The contract with Fairchild was expected to be consummated by July 1974, with delivery of the first TPS-41 anticipated a year later.

Meanwhile, the Army's prototype AN/TPS-41 was on display at Fort Rucker, Alabama, "in a final effort to solicit U.S. Army aviation support for some U.S. Army sets," read a TAC report; "if successful, the U.S. Army may append an option buy to the [Fairchild] contract."[53]

Fairchild's bid for the six AN/TPS-41s was received and reviewed by ESD in mid-May 1974. It was adjudged to be too high, and ESD informed the Army that procurement through Fairchild would not be pursued further.[54] "The TPS-41 has come under fire at the Pentagon [Air Staff] due to soaring costs (nearly $1 million each)," an AWS report read.[55] The Air Staff revised the program management directive to permit ESD to look at other radars that would fulfill the needs of the tactical air forces. With that decision, pursuit of a tactical weather radar reverted to "square one," essentially, after five years of effort.

## AN/TPS-68

As a ready alternative to the AN/TPS-41, ESD turned immediately to the Navy's Naval Avionics Facility Indianapolis (Indiana--NAFI), which designed and built the FPS-106 radar. NAFI estimated it could begin work on an engineering model of the tactical weather radar by late 1974, and have all six sets in the field by March 1977. A new program management plan was published by ESD on 30 August 1974. NAFI's formal proposal was delivered to ESD on 3 October, and on 4 November 1974 a formal memorandum of agreement for the production of six tactical weather radars was consummated by the two parties.[56] The Air Force transferred $1.3 million to the Navy for the design and test of the engineering or integration model.

Thus, development began on another tactical weather radar, expected to be less expensive than the AN/TPS-41. NAFI's version was to be a C-band (5.4 centimeter wavelength) model, weighing 5,000 pounds, with a 200 nautical mile range.

In the interim, on 2 August 1974, the 5th Weather Wing published a concept of operations for the tactical weather radar. It was acknowledged that commercial radars were available "off the shelf," but that they were not configured for tactical use and were not rugged enough. Selection of a wavelength was "extremely sensitive," and AWS preferred C-band models. The tactical weather radar's primary mission was to be used in support of tactical air forces at "bare bases" in conjunction with the Tactical Weather System; its secondary mission was in support of the Army in the forward battle area.[57]

In what became a precursor of events to follow, progress at NAFI on the tactical weather radar lagged in 1975 as unanticipated problems cropped up. The critical design review was deferred from November 1975 to April 1976, and the scheduled delivery of the first set slipped to July 1977. The main reasons for the slippage were that a vendor was late in shipping some electrical components, difficulties with receiver design and integration, and delays in programming software for the built-in test equipment.[58] ESD published a revised program management plan on 1 September 1975.

Fabrication of the tactical weather radar began in May 1976.[59] Delivery of the six sets was postponed to December 1977. A maintenance concept was developed, and TAC agreed that AWS should use the radars as contingency assets and, or gap-fillers.

In early 1977 the tactical weather radar was assigned the official nomenclature of AN/TPS-68. The program overran its budget by $663,000 and there was talk in March 1977 of reducing the final buy to five sets to keep the costs acceptable. But by mid-April ESD had been allocated additional funds to continue procuring six sets. The shelter contract was awarded in May 1977--two months after the date NAFI had originally forecast it could have all six sets in the field.

Fabrication of the first AN/TPS-68--the pilot or prototype model--was completed in September 1977. As 1977 closed, disputes with the contractor deferred the scheduled delivery of the shelters to May 1978, which, in turn, slipped the total TPS-68 program by at least another six months. Total program costs for the six sets was rapidly approaching $4,000,000.[60]

Preliminary testing of the prototype AN/TPS-68 by the Naval Avionics Center (NAC, formerly NAFI) in 1977 and 1978 uncovered numerous problems with such things as the wiring, circuits, antenna alignment, and power output. A problem with spare parts cropped up because the Defense Electronics Supply Center (DESC), which procured all standard electronic items for the Defense Department, would not order spares before the radars were turned over to the Air Force, and NAC would not manufacture the spares without a funded purchase order from DESC. A compromise was reached whereby DESC agreed to go ahead and procure spares, recognizing that the TPS-68 was not a standard inventory item, but was a one-of-a-kind breed.[61]

Of all the headaches that strung out the delays, the biggest involved the shelters for the AN/TPS-68. The original bids for the shelter contract were considered too high, so NAFI (or NAC) issued a second call for proposals. It then awarded a $125,000 contract to the Nordam Corporation of Tulsa, Oklahoma, to produce six shelters. A dealer in fiberglass products, it was the firm's first defense contract, and its bid was lower than the nearest competitor by more than half. Nordam prolonged delivery. When the first shelter was

finally subjected to transportability testing in 1978 it suffered structural failure, and was essentially destroyed. Nordam then notified NAC that no more shelters would be delivered until at least January 1979. Without the shelters the TPS-68s could not be used. So they became the pacing factor rather than the basic sets, which had also been delayed. The Navy initiated default proceedings against Nordam, but after months of deliberation, decided such recourse was fruitless because of the contract's vague wording. It appeared that there was no feasible alternative to waiting for Nordam to deliver. On top of that, it was evident that Nordam would demand, and be granted, at least another $100,000 to build six shelters capable of passing acceptance testing.[62]

Thus, after ten years, the Air Force still did not have the tactical weather radar it sought in 1969. And the cost of the one it had contracted for was about twenty-five times the cost of the only other "tactical" weather radar in the AWS inventory in 1978--the AN/FPS-103 (WTR-1), an X-band model rushed into service in Vietnam by AWS in mid-1968, but most of those in service with AWS in 1978 were used in a fixed or permanent mode.[63]

A desire not to expose any of the half-dozen costly AN/TPS-68s to threat by an enemy was one reason AWS offered officially for not actively seeking the tactical weather radar for support of the Army in the field. In a position paper it published in June 1978, AWS declared that all six radars would be used for "bare base" support of tactical air forces. AWS did not question the use of weather radar to support the Army in garrison, but in the field it not only would be vulnerable, but difficult to move about and keep in service. As an acceptable and viable alternative to the tactical weather radar, AWS suggested reliance on weather satellite data by locating direct tactical satellite readout facilities at "command and control centers"[64]--an evident euphanism for theater level headquarters such as USEUCOM, the United States European Command. Because, as the discussion that follows points out, the AWS and Air Force position was that if the Army wanted a direct tactical satellite readout facility at any echelon below the theater level--at the field army or corps, for example--it would have to buy it; AWS preferred indirect support--i.e., disseminating weather satellite pictures to the corps level by facsimile.

## Tactical Satellite Readout

Unquestionably, the greatest technological advance brought to bear by military meteorologists during Vietnam was the weather satellite. Data was available to AWS readout facilities in theater from two sources: civil satellites, the first of which, TIROS (Television and Infrared Observation Satellite) I, was launched in 1960;[65] and Air Force weather satellites (referred to in 1978 as DMSP--Defense Meteorological Satellite Program), first launched in the mid-1960s.[66] Positioned in sun-synchronous, near polar orbits, DMSP satellites offered pictures with nearly twice the clarity than available from civil satellites because, at their 450-mile altitudes, they were about half as far from the earth as their civilian cousins. But DMSP satellites also had better sensors, an infrared capability, superior processing equipment, more favorable orbital characteristics, and more accurate data location (gridding). In short, DMSP was designed to support military requirements. But pictures from either satellite, civilian or military, gave decision makers a look at the prevailing weather over hostile areas--areas from which conventional sources of weather data were shut off.

In conducting the air war in Southeast Asia, weather satellite products were relied on heavily, in particular for strikes against targets in North Vietnam. General Momyer, the Seventh Air Force commander from mid-1966 to mid-1968, described the weather satellite as "the greatest innovation of the war."[67] In the early 1970s, Air Force officials were publicly describing the DMSP satellites as the Defense Department's "most important single source of weather data," averring that they furnished "the best data possible to decision makers anywhere in the world whose operations are affected by weather."[68] Indeed, the Navy installed DMSP readout gear aboard the aircraft carrier *Constellation* in the early 1970s and, following tests during a combat patrol in the Gulf of Tonkin, concluded that it proved "conclusively its value to carrier tactical *air* [author's italics] operations."[69]* But only rarely during that war did Army decision makers at any level--from the field army (Headquarters USARV) through corps (I and II Field Forces) to division and below--benefit from the direct weather satellite support routinely made available by AWS to key Air Force decision makers in theater.

In general, AWS furnished indirect weather satellite support to the Army in Vietnam, and direct support to the Air Force. AWS operated a DMSP readout site in theater, as well as equipment at three different locales for receiving data from civil satellites†--all located with (or adjacent to), and directly serving, Seventh Air Force command and control facilities. Key Seventh Air Force decision makers had continuous direct access to pictures and data from both satellite sources, while their Army counterparts rarely saw them.

Army decision makers benefited from weather satellite data only in that it was one of several sources used by AWS' theater weather center at Tan Son Nhut Air Base to issue area forecasts and forecaster aids.** In turn, the center's area forecasts--when available, and once altered and refined--became the basis for terminal or tactical or mission control forecasts issued by AWS forecasters at corps and divisions. In March 1970, the center began transmitting satellite pictures from civil satellites over facsimile circuits,†† but it was

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*The DMSP receiver gear aboard the *Constellation* occupied one aircraft parking space, but the ship's skipper said "the trade-off has been more than justified." There were also a couple of occasions when the DMSP antenna system just below the flight deck inadvertently served as a handy arresting barrier for fighters that went out of control upon landing. See p. 4 of script of briefing on DMSP presented by Brig Gen Best, AWS comdr, to MAC commanders' conference at Ramey AFB, PR, on 23Mar72, on file in AWS historical archives. See also Vol I, "Narrative," pp. 738-39, of "History of Air Weather Service," (S), 1Jul71-30Jun72. Info used (U).

†At the time, DMSP readout sites were not rigged to acquire data from civil satellites, and the readout equipment for tapping the civil satellites could not get data from the DMSP satellites.

**The center's area forecast bulletins contained a section that discussed the satellite-derived data used in preparing the prognosis. And, beginning in 1968, the center also issued a special bulletin once a day containing a graphical representation of the satellite data, including the amount and type of cloud cover. Those products were available to AWS forecasters with units supporting the Army, and were used by them to produce tactical forecasts.

††For security reasons, the center could not transmit DMSP products--or at least identify them as such--over the unsecure facsimile circuits.

weeks later before the facsimile equipment was finally installed and working at 5th Weather Squadron units supporting Army elements. Not only were the facsimile pictures of poor quality, but by then, the Army was going home, and within a year the facsimile equipment was being removed.

There were exceptions to this general application of weather satellite support to the Army.* Pictures and data were used in briefing the USMACV commander (an Army general, heading a unified command) and his staff--usually at the regular Saturday morning situation conference, where a seven-day forecast was presented, but also when the tempo in fighting demanded closer attention to the weather. During the 1968 Tet offensive, for instance, AWS personnel briefed the USMACV commander daily, weather satellite pictures and data forming part of the presentations.

It was in 1968 that the 5th Weather Squadron commander, Colonel Cummins, used initiative to get DMSP satellite pictures for presentation to USARV officials at Long Binh. Because of the program's tight security, no one in his squadron--which supported the Army--was granted access to DMSP's details. Few of his men were aware of the DMSP pictures; but he was, and he arranged for them to be flown daily from Tan Son Nhut to Long Binh by Army helicopter. He asked no questions about their source, but he had pictures from the "morning" DMSP satellite pass up to Long Binh by noon to show USARV officials. They were shared with his forecasters supporting Headquarters II Field Force at Long Binh, and "every now and then" (about once a month),[70] when combat operations warranted it, Cummins arranged for an Army helicopter to take them to his people supporting Headquarters I Field Force at Nha Trang.†

While Colonel Cummins got the DMSP satellite pictures, which were quite valuable, his forecasters could have used DMSP data as well, in particular to support Army planning for extended combat operations. The staff weather officer to the I Field Force in 1966 agreed that he could have put the weather satellite pictures and data--from either the civil or DMSP versions--to good use, but it was not made available

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*In 1966, for instance, AWS' weather center at Tan Son Nhut issued special operational forecasts in direct support of 9th Infantry Division operations in the Mekong Delta--where, incidentally, weather was not the factor it was elsewhere in the country. And during the Tet offensive of 1968, the center issued five-day forecasts twice daily for selected areas near the demilitarized zone, and terminal forecasts for four sites of particular interest to the Army, including Khe Sanh and the A Shau Valley. Those forecasts were based, in part, on data acquired from weather satellites.

†Ironically, unbeknownst to Col Cummins or his people with I Field Force at Nha Trang, AWS personnel were couriers of DMSP pictures daily by aircraft from Tan Son Nhut to a 1st Weather Group operating location at Nha Trang supporting USMACV's covert SOG (Studies and Observation Group) operations. Extremely sensitive and highly secret at the time, SOG was a cover title for Army--as well as Navy, Air Force, and Vietnamese--Special Forces elements that ranged through Laos, Cambodia, and North Vietnam on clandestine guerrilla forays. See: Gen William C. Westmoreland, *A Soldier Reports* (Garden City, NY: Doubleday & Co., Inc., 1976), pp. 127-30; and Col Francis J. Kelly, *U.S. Army Special Forces, 1961-1971*, from *Vietnam Studies* (Wash DC: U.S. Govt Printing Office, 1973).

to him.[71] Major General Tolson said he could have used them during the 1968 Tet offensive.[72]

AWS had reasons for not making weather satellite data routinely available to the Army in Vietnam. First of all, throughout the war, the DMSP program was operated under such tight security wraps that only a few within AWS were aware of its existence--at least officially.[73] Fewer still in the Air Force and Army at large knew of it. In a word, it was inaccessible to all but a handful, and AWS, together with the DMSP program managers, determined who got access. Therefore, security precautions imposed by Air Force and Defense Department officials responsible for DMSP limited its utilization tactically. It was significant that, during final preparation for one of the Vietnam war's most spectacular operations, the daring (though unsuccessful) attempt by Army (mostly Special Forces) and Air Force volunteers in November 1970 to rescue American prisoners of war confined at Son Tay, access to DMSP products was initially denied by the 1st Weather Group commander, ostensibly for security reasons.[74]

Additionally, DMSP was a unique program (the only one of its kind in the Defense Department), paid for and delicately shepherded by the Air Force (within Defense Department guidelines) to meet the requirements of a high-priority Defense Department "special strategic" mission, and in its neophyte stages in the mid-1960s. With but one exception, strategic rather than tactical requirements--even in war--governed DMSP's orbital characteristics: in 1965 a DMSP satellite was orbited to meet Seventh Air Force's tactical requirements.[75]

Realistically, weather service was not much of a factor in close air support of Army operations in Vietnam. It was generally sought by Army decision makers before launching extended operations; but once launched, all supporting air strikes were handled by Air Force FACs--Forward Air Controllers. If the FAC could identify and mark a target it was struck; if it was obscured by weather, then he did not clear the air strike. Weathermen were more dependent on FACs for weather information than vice versa. If an Army unit in contact with the enemy called for airlift support--either Air Force fixed wing aircraft or Army helicopters--the pilots and crews responded regardless of the weather, particularly when resupply or extraction became a life-and-death matter for soldiers on the ground. Thus, there was a belief by AWS officials, reinforced by knowledge that Army commanders were generally unaware of the nature or extent of service available through AWS or how to use it, that weather satellite pictures were not routinely of value to Army operations. Seemingly, more uses for direct weather satellite service arose in conducting air operations than ground operations. AWS' position was that the indirect weather satellite service sufficiently met the Army's needs in Vietnam.

Yet studies by the Army in the 1960s and 1970s (discussed in detail below), addressing weather and weather service, concluded that it had been remiss in not exploiting operationally the technological advances in the field of meteorology, including computers, radar, and the satellite. Army decision makers in the field needed direct weather satellite support. As a consequence, Army overtures surfaced for introducing a tactical satellite readout capability at the corps level, at a minimum, and in some instances at division and brigade.

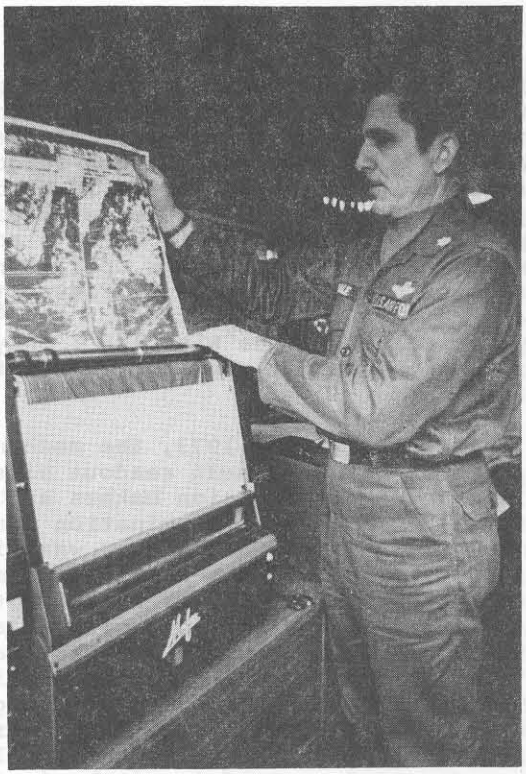
The Seventh Army in Germany and USAREUR (United States Army Europe) became bellwethers. In July 1972, USAREUR composed a ROC (Required Operational Capability) for a direct satellite readout capability. At the time, the only DMSP readout site in Europe was

operated by AWS at Ramstein Air Base, Germany--until October 1973 when it was moved eight miles south to Bann to provide improved coverage of the Middle East. USAREUR officials did not have direct access to DMSP products until 1973 when the program's rigid security restrictions were eased. They then had two means by which they could get DMSP data and pictures from AWS' readout site: by Army couriers hand-carrying the pictures daily, and through transmission over facsimile circuits. Couriers were a costly, cumbersome, and untimely means, and satellite pictures transmitted over facsimile circuits lost their clarity, and therefore their value. In fact, DMSP pictures received over facsimile circuits were of lower quality than pictures from civil satellites provided USAREUR officials--which were acquired with an AN/TKR-1 APT (Automatic Picture Transmission) mobile readout operated by the 2d Weather Wing's 7th Weather Squadron. But the AN/TKR-1 receiver was never modified to acquire data from the second generation, polar-orbiting Improved TIROS Operational Satellite (ITOS), launched in 1970, despite notices by the National Weather Service to APT users of the need to do so. Thus, real-time weather satellite imagery support to the Army in Europe ceased entirely in the early 1970s. So once USAREUR and Seventh Army officials were apprised of DMSP's capabilities, they recognized a need for direct access to them.

Brigadier General Aldrich, the AWS commander, was in Europe and had spoken with USAREUR and Seventh Army officials when the Yom Kippur War of October 1973 broke out. When he returned he asked his staff what had been done to get DMSP to the corps level, adding that he believed the Army should pay for it.[76] After some deliberation, it was decided to have the Army specify its needs in another ROC. Thus, on 17 July 1975, with the help of the 7th Weather Squadron, USAREUR and Seventh Army submitted for consideration by the Department of the Army a proposed ROC calling for a tactical direct satellite readout.

A month later, TRADOC asked USAICS (United States Army Intelligence Center and School) at Fort Huachuca to ascertain whether the requirement was valid. In mid-October 1975, USAICS advised that the need was well grounded, but suggested that a cost analysis be conducted to determine how best to meet it.[77] A direct readout capability was needed, but the readout vans AWS then used were too large and bulky. A smaller, portable van was preferable. By August 1977, to meet the USAREUR requirement, TRADOC had identified the Mark IV tactical transportable DMSP vans which the Air Force was then procuring at a cost of about $1 million each.[78]

By 1977, the responsibilities concerning the management and operation of DMSP were set forth in a formal memorandum of agreement consummated the previous November by the Army, Navy, and Air Force. In it were provisions for the Army to purchase, operate, and maintain its own tactical DMSP readout facilities, and for the Air Force, as the executive manager of DMSP, to provide contract management when asked for by the Army.[79] TRADOC wanted to modify the agreement to get the Air Force to operate and maintain any DMSP readout the Army procured and, until September 1977, assumed that the contract the Air Force was negotiating to buy four Mark IV readout terminals would include an option to buy additional units for the Army. But TRADOC's assumption was false: there would be no option for follow-on buys in the initial contract. If the Army wanted the Mark IV, under the agreement's provisions it would have to submit a formal requirement and negotiate a second contract.[80]



*At the right, Lt Col Walter M. Dale, staff weather officer to VII Corps and commander of the 7WS's OL-B, looks at weather satellite picture transmitted via facsimile.*

*Below, upon his promotion to colonel a few weeks later, in December 1974, Dale is congratulated by Lt Gen George S. Blanchard, commanding general, VII Corps. (U.S. Army Photos)*

TRADOC then directed its CACDA (Combined Arms Combat Development Activity) at Fort Leavenworth to review the need for, and potential location of, a direct tactical satellite readout at the corps level. CACDA's position as 1977 closed, was that there be one, Air Force (AWS) operated, direct tactical satellite readout in the

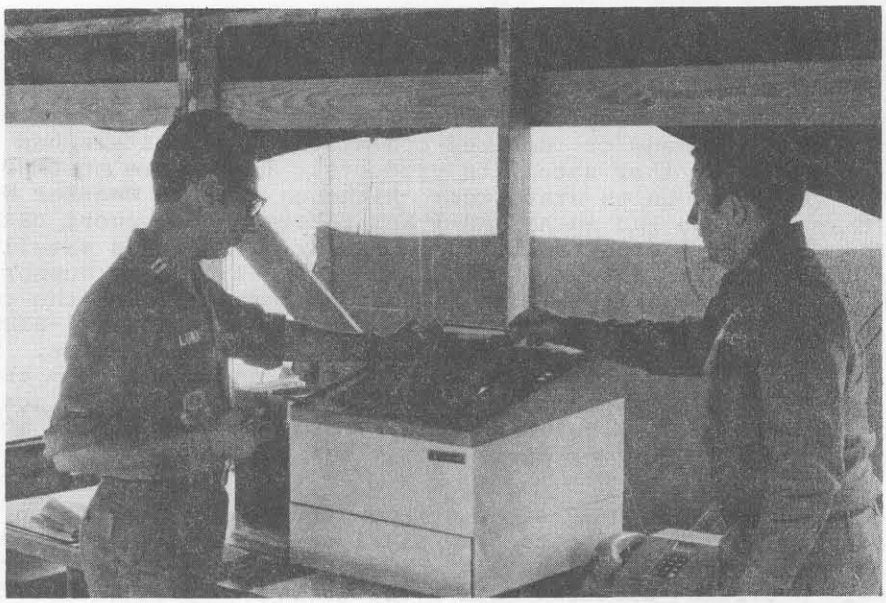
European theater, with a remote copier provided by the Air Force to CENTAG (NATO's Central European Army Group), with possible retransmission or relay to corps. As a second choice, CACDA opted for the Air Force to provide a direct readout at the army group with remote copiers at the corps. Only if both options were infeasible or impractical would CACDA consider a direct readout at the corps. Of primary consideration in CACDA's position was a desire to keep the number of people in corps operations centers or command posts as small as possible, and avoiding transportation or mobility problems associated with a satellite readout van.[81] Therefore, CACDA's and TRADOC's position was in gee with AWS': only one DMSP readout site was needed in Europe, and it need not be located with USAREUR or the Seventh Army.

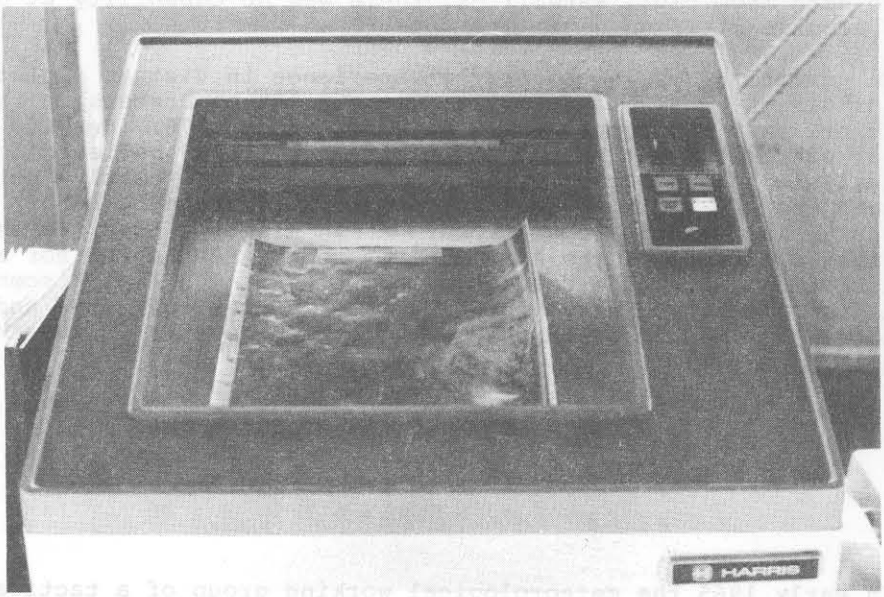
From at least 1973, the mechanism AWS envisioned for getting DMSP pictures from a single readout site in theater--be it Europe or a place like Korea--to decision makers at USAREUR and the corps level was the Satellite Imagery Dissemination System, SIDS. The problem with the high resolution DMSP imagery was disseminating it to decision makers, and by using "off-the-shelf" facsimile equipment, SIDS would permit the transmission of DMSP positive transparency data, with at least one nautical mile resolution, over existing facsimile circuits. Through SIDS, AWS could rapidly get DMSP data to a minimum of some three dozen "customers," including the respective headquarters of USEUCOM (United States European Command) at Vaihingen, USAREUR at Heidelberg, V Corps at Frankfurt, VII Corps at Stuttgart (all in Germany), and the Eighth Army at Yong San Reservation Army Installation, Korea.[82] A formal ROC for SIDS, specifying it be in the field ready for use by 1980, was forwarded by AWS in September 1976 for consideration by MAC. Estimates in 1977 for the overall cost of SIDS ran to $5,200,000. MAC was coordinating the ROC with other major air commands when, in September 1977, the Air Force scuttled the ROC process in favor of a GOR (General Operational Requirement) system. Thus, AWS had to rewrite some of the justification for SIDS. MAC then approved the GOR and, after securing the support of six other major air commands, forwarded it for Air Staff consideration in June 1978.[83] As 1978 closed, the Air Staff had taken no concrete action on it.

In the meantime, AWS was granted approval to proceed with a so-called "mini"-SIDS for Europe and Korea. The need was immediate; the equipment available.

A "mini"-SIDS in Korea became operational in October 1977. A leased Muirhead M-133A transmitter at the DMSP readout at Osan Air Base transmitted satellite imagery via facsimile to Muirhead K-300 recorders installed at Yong San (Headquarters United Nations Command-United States Forces Korea-Eighth Army) and Kunsan Air Base in Korea, and Yokota Air Base in Japan. The Muirhead recorders provided acceptable products, but they and the transmitter were extremely difficult to maintain. Consequently, the Muirhead system was replaced with Harris Corporation equipment that had been installed in Europe and worked so well. Installation of the Harris gear was completed in late 1978, at a cost of approximately $60,000 (excluding a recurring annual cost of about $9,000), and the quality of DMSP pictures received at Yong San was reportedly outstanding.[84]

The "mini"-SIDS in Europe became operational in November 1977. It consisted of a Harris Corporation Model 800 transmitter at the DMSP readout at Bann, and Harris Corporation Model 800 laser facsimile receivers at Ramstein Air Base (2d Weather Wing's weather support unit at Headquarters USAFE--United States Air Forces in Europe), Patch Barracks at Vaihingen (Headquarters USEUCOM), and at the NATO bunker






*At the top, Capt Frank Luna (left) and Maj Glenn W. McBride are removing DMSP imagery from Harris laser facsimile receiver during exercise Brave Shield XIII in Florida in 1975. Bottom photo is a closeup of the receiver. (USAF Photos)*

at Boerfink. DMSP imagery received via the "mini"-SIDS at those terminals in Germany was also reported to be excellent.[85]

By the close of 1978, therefore, few Army decision makers outside of unified command or combined operations headquarters had direct access to weather satellite products. There were no DMSP readout sites with Army units stateside. Although the 5th Weather Wing's 1st Weather Squadron had an AN/TKR-1 APT receiver to support USREDCOM, it could not acquire data from either DMSP or ITOS series satellites. Neither could the 7th Weather Squadron's AN/TKR-1 used to support USAREUR. DMSP data was available to Headquarters USEUCOM (the commander in chief of which was an Army general) via the "mini"-SIDS from the Bann site, but not to field army or corps decision makers. The same held true for Korea: DMSP products were transmitted from the DMSP site at Osan to Yong San where Headquarters Eighth Army was located, but Army decision makers below that level did not have direct access to data from either DMSP or civil satellites.

Additionally, the DMSP sites at Bann and Osan had not been modified to enable readout of data from civil satellites--an extremely important consideration in that, by 1977, civil polar-orbiting satellites were providing pictures with a resolution comparable to DMSP pictures, and because the performance of DMSP satellites (and hence, the availability of data) from 1975 through 1977 was marginal at best. In Alaska and the Panama Canal Zone the DMSP readouts were located on Air Force bases and, while the former site was modified in 1977 to receive data from civil satellites, there was no capability at Howard AFB to acquire civilian satellite data.[86]

In summation, while the Army's experience in Vietnam dictated a need for direct access to satellite data by its commanders in the field down to at least the corps level, none had it by 1978. Despite the tactical use that might be made of the products, AWS believed that direct satellite readouts available in 1978 were too costly, not mobile or rugged enough, and took too many people to operate to be of practical value to corps operations.[87] In a letter of 22 November 1978, the Department of the Army disapproved USAREUR's ROC for a direct tactical satellite readout capability.[88] The Army discontinued efforts to obtain the Mark IV DMSP vans for support of corps and divisions. Its new position, as 1978 closed, was that it was AWS' responsibility.[89]

## Tactical Area Weather Sensors

### EROWS

In early 1965 the meteorological working group of a tactical air capabilities task force published a report which was submitted to the TAC commander and the Air Staff. It recommended the development of an expendable, remote-operating weather station--capable of recording and transmitting temperature, humidity, pressure, and wind speed data--that could be air dropped into enemy territory. In July 1965 AWS sent for AFCRL's review a revision of a QOR (Qualitative Operational Requirement, the forerunner of the ROC system) for such a station drafted by the 2d Weather Group--forerunner of the 5th Weather Wing. AFCRL felt that it was "feasible," and that a prototype could be developed and tested for $180,000. On 26 August 1965, AWS

submitted the formal QOR to MATS (Military Air Transport Service--the forerunner of MAC) who, in turn, forwarded it to the Air Staff on 18 October 1965. The Air Staff sent it to the major air commands for comment. Based on the replies, the Air Staff, in May 1966, sent to AWS and AFCRL for consideration a slightly revised document. AWS went along with it. So did AFCRL--who estimated that it would take $350,000 to develop, procure, and test fifteen-to-twenty such stations.[90]

Meanwhile, all of the recommendations and comments regarding the Air Staff's revised document were incorporated by TAC into a ROC issued on 23 September 1966 for an EROWS--Expendable, Remote-Operating Weather Station. TAC's ROC mentioned an Army QMR (Qualitative Materiel Requirement) for a PAWOS (Portable Automatic Weather Observing Station), and stipulated that the differences between it and EROWS be resolved so that a single system could be manufactured to satisfy both the Army and the Air Force.[91]

After failing agreement with the Army, the Air Staff published its own ROC for EROWS on 7 August 1967. It was identical to TAC's ROC except that an EROWS was to weigh 100 pounds less. In a RAD (Requirements Action Directive) published on 18 November 1967, the Air Staff directed AFSC to have EROWS operational by June 1969. On 4 January 1968, AFSC passed the action to its Electronic Systems Division, who estimated it would be February 1970 before twenty EROWSs and a master station could be operational--all at a total cost of $245,000. Some differences developed between the Electronic Systems Division and AFCRL--of USAF's Office of Aerospace Research (OAR)--over whether EROWS should be a "man pack" station or air droppable. AWS' opinion was sought. Although the set would be incapable of measuring cloud heights, visibility, and precipitation amounts, AWS favored AFCRL's air droppable EROWS--which would measure temperature, pressure, humidity, and winds--and recommended in mid-1968 that it be pursued through development of a test model.[92]

A year later, on 17 July 1969, the Air Staff issued another directive ordering AFCRL--vice the Electronic Systems Division--to develop an EROWS based on the Air Staff's ROC of August 1967. Some of the Air Force's fiscal 1973 RDT&E (Research, Development, Test and Evaluation) funds were earmarked for EROWS, and in May 1971 the Air Force was estimating for Congress that $215,000 in RDT&E funds would be needed for fiscal 1971 and $220,000 for fiscal 1972.[93]

In the interim, in late 1969, and on 23 April 1970, the Air Staff asked AWS to review its need for EROWS. After polling its field units, AWS preferred graciously withdrawing its requirement because EROWS would not measure cloud ceilings, visibility, and precipitation amounts. However, for political reasons--the potential risks to other research and development programs AWS wanted, if it turned thumbs down on EROWS after the Air Staff had approved, and committed funds to, its development--AWS felt it was inadvisable to do so. Therefore, it was decided to have AFCRL continue with EROWS' development.[94]

In mid-1970 the Air Staff granted AFCRL permission to develop a prototype EROWS, and a contract was awarded to North American-Honeywell's Government and Aeronautical Products Division, St. Petersburg, Florida. The operational concept for EROWS was for a sensor package to be implanted by air or manually. Transmission of data from the package was to be relayed via aircraft to a data processing receiver. Operated by battery, and theoretically capable of transmitting data up to 200 miles, the 85-pound EROWS contained

a central recorder for interrogation and was to measure temperature, winds, pressure, precipitation, and cloud cover.[95] Category II testing, scheduled for November 1971 at Patrick AFB, was slipped to early 1972. Test results were marginal; many phases of the test were not completed due to failure of the components. On 10 February 1972, the Air Staff once again asked TAC and AWS to rejustify the need for EROWS.[96] TAC responded that it could not support further development unless EROWS possessed a capability to measure cloud ceilings and visibility.[97] The AWS Program Review Committee rejected EROWS as a viable solution to the problem of cloud ceiling and visibility measurement in denied areas of the battlefield. "The reason why . . . Air Weather Service was turned off on EROWS acquisition," the AWS commander remarked later, "was that it neglected the problem of communicating weather information from the battlefield back to where a decision-maker could use the information."[98] Thus, at a meeting in the Pentagon on 23 March 1972, the Air Staff decided to cancel EROWS. There had been a cost overrun of $180,000 and the contractor was seeking another $230,000--which the Air Staff decided was just too much. In a message the following day, the Air Staff directed "termination action on contracts for development" of EROWS "based on new requirements not now provided in the development plan and not available within the state of the art."[99]

BATSS and PRESSURS

With the Air Staff's decision of March 1972, it was "back to the drawing board," for all parties concerned. At the time an ad hoc committee of the Air Force's Scientific Advisory Board was looking at the problem of remote sensing techniques in support of tactical air operations, and in a report published in December 1972 recommended use of the Igloo White sensors--employed during the war in Southeast Asia--or RPVs (Remotely Piloted Vehicles) to acquire battlefield weather information.

TAC immediately began revising the Air Staff's EROWS ROC of August 1967 into a new ROC for a Tactical Remote Environmental Sensor System (TRESS) which it distributed for coordination among the major air commands in May 1973. USAFE and PACAF blessed it, but AWS and MAC recommended it be consolidated into a joint ROC with one AWS drafted. TAC agreed and, in January 1975, sent to MAC the draft of a Tactical Area Weather Sensor (TAWS) ROC which had been coordinated with PACAF and USAFE.[100*] Basically, the TAWS ROC called for measurement of the same elements EROWS did--winds, cloud cover and ceiling heights, precipitation, pressure, temperature, humidity, and weapon-to-target visibility. MAC directed AWS to prepare a concept of operations for TAWS. Two concepts were considered: one for an airborne system and one for a ground-based system. Because the Army's TESS (Tactical Environmental Support System--discussed below) addressed the need for battlefield weather observations, AWS decided to investigate the possibilities of a joint Army-Air Force or MAC-TRADOC ROC. The Army was developing a Remote Automated Weather Station (RAWS) to meet the shortcomings identified by TESS.

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*The coordinating draft of the TAWS ROC is included as Ref 1 to the Jul-Dec74 history of the Aerospace Rqmts Div, Directorate of Aerospace Services, DCS Aerospace Sciences, HQ AWS--itself included as Tab #4 in Vol V, "Supplements," of *History of Air Weather Service*, 1Jul74-31Dec75.

In March 1976, Brigadier General Rowe agreed to a proposal by his staff to split the TAWS ROC into two ROCs. One would address airborne sensors to measure elements in support of Air Force operations, but would also include some Army weather support requirements. The second ROC would address ground-based sensors that satisfied Army requirements but were difficult to justify to MAC and the Air Staff for support of the Air Force mission. The two ROCS were drafted in 1976: BATSS (Battlefield Targeting Support System) for an automatic unmanned, ground-based system that could be deployed manually or air dropped; and PRESSURS (Pre-Strike Surveillance/Recon System) for an airborne sensor system. The preferred solution to the BATSS ROC was the Army's RAWS. The PRESSURS ROC envisioned the use of RPVs to carry weather sensors into battlefield and target areas.[101]

By July 1977 drafts of both ROCs had been coordinated with the weather wings, and on the eleventh, the AWS Program Review Committee tentatively approved them for forwarding to MAC. But Brigadier General Rowe harbored reservations. He questioned tying PRESSURS to RPVs when the Air Force, in the intervening three or four years, seemed to have downplayed their future role in air operations. He also pointed out the difficulty of measuring cloud ceilings and visibility in the battlefield area. In line with his policy to have the Army assume a larger role in meeting its weather support needs, as addressed below, Rowe decided that AWS would rely on the Army's RAWS to satisfy the Army's minimum essential support requirements. Therefore, he ordered his staff to terminate the BATSS ROC.[102] In addition, he directed that a "tiger" team be assembled from his staff to study the state-of-the-art of remote measurement of cloud ceilings and cover and slant-range visibility in the battlefield area.[103]

Brigadier General Rowe's staff rewrote the PRESSURS GOR and it was forwarded under the AWS commander's signature to MAC on 1 May 1978.[104] It was approved by the MAC Council on 27 October 1978 and relayed to the Air Staff on 28 December 1978. However, the outlook for both PRESSURS and RAWS was not very promising because it was highly unlikely that the Air Staff would allocate money for the former system,[105] and the Army was already choking RAWS to death by curtailing funds.[106]

So, after thirteen years, AWS still did not have a tactical area weather sensor system to handle either Air Force or Army requirements.

## Communications

AWS believed that uninterrupted, two-way communications between weathermen at all Army echelons in the field were absolutely basic to providing acceptable service. Weather communications were always the life blood of any weather support structure; without them the structure collapsed. Degraded weather communications degraded weather support. It was axiomatic. Yet with the experience of three shooting wars, a handful of hot crises, and hundreds of field exercises and maneuvers at home and abroad, weather communications invariably loomed as *the* most menacing impediment to successfully supporting the Army.

And it was not as if weather communications were not recognized as *the* key problem in weather support to the Army, because they were. They were cited as a major drawback by the Army studies addressed below, Met-70, Met-75, and TESS. They surfaced as a principal item during an Army tactical commanders' weather requirements conference

at Fort Leavenworth in August 1977. Indeed, they were a prime topic of debate at each of AWS' Army weather support conferences, and each meeting of the AWS-Army joint working group on weather support to the Army, from the Seventies' first one in April 1970 to later gatherings in 1977. And within AWS they were acknowledged as a perplexing nuisance, be it those at the top associated with weather support to the Army, or the lowest ranking airman in the field trying to get an observation back from the brigade he was deployed with to the division command post. During an interview in mid-1978, Brigadier General Rowe, the AWS commander, acknowledged that it was a key problem because "communications are the life blood of our business."[107]

For some observers it was difficult to fathom why weather communications were such a bugaboo in supporting the Army when the governing joint regulation seemed straightforward enough in delineating the Air Force's and Army's responsibilities. Basically it stated that, in garrison at Army installations, the Army would provide, install, operate, and maintain "mainframe termination and on-post weather communications circuitry," while the Air Force would provide, install, operate, and maintain the terminal communications equipment.[108] For tactical army forces in the field, the Air Force would take care of everything down to the field army headquarters, while the Army would handle all of it below that level--*except* when the communications terminal equipment was unavailable from Army resources, at which time, or under such conditions, the Air Force would furnish it. The Army was also responsible for providing and maintaining the necessary facilities for disseminating weather information to Army users. Recognizing that situations might arise requiring adjustments to the responsibilities established above, the joint regulation authorized Army and Air Force officials at the local level to iron out mutually agreeable solutions.

What, then, were the problems? Most of those related previously, that resurfaced during Vietnam, lingered through 1977. Additionally, to many in the Army the joint regulation meant little. TOEs were everything. If it was not authorized in the TOE it was not provided. Thus, it became incumbent upon AWS weathermen at the local level to insure that TOEs for each Army unit they supported included the needed weather communications gear. Some of the communications equipment made available by the Army and Air Force was incompatible. Army teletype, for example, was operated at sixty words per minute, while Air Force teletype was operated at 100. Pertinent documents[109] authorized full-duplex (send and receive) facsimile support to corps and division, and applicable TOEs listed a specific piece of tactical facsimile equipment (the AN/GXC-5). But the Army had few such sets available in its inventory. In some instances, notably with airborne and airmobile operations, weather teletype equipment was too heavy and bulky for use at the brigade level. AWS believed that the Army Signal School at Fort Gordon was overly indifferent about solving the problems. It also felt it could not rely on one mode of communications; rather, it needed two independent methods to maintain the continuity of weather data bases at each echelon of the Army supported. Because Army units in the field moved about frequently, AWS thought it needed HF radio communications. Multi-channel teletype authorized from division command posts or operations centers to brigades and airfields was not adequate in a fluid environment.[110] Yet there was indecision within AWS as to precisely what type of communications capability was needed at each echelon of the Army it supported. For instance, some believed full-duplex facsimile service was needed down to corps and division level, and others did not; and there was indecision among those who did as to whether the same type of facsimile

service was necessary for armor or infantry units as for airborne or airmobile units. And AWS was not of one voice, as addressed in the following chapter, as to whether it was better to have the communications gear needed by its weather teams incorporated into Signal or Intelligence TOEs.

With weather communications so vital to support of the Army, and with so many of the problems occurring again and again over the years, one might question what was being done by AWS to overcome them. One of the first and most important attempts was to speak with one tongue, as to precisely what weather communications service and equipment was needed. In late 1974, the 5th Weather Wing attempted to develop a consolidated position with the 2d Weather Wing, the 7th Weather Squadron, and AWS. After reviewing the problems above, the wing suggested that teletype might not be needed at brigade, that FM radio voice communications dedicated to weather could meet the brigade weather team's needs; and that the dedicated, full-duplex weather telepype and facsimile authorized in appropriate TOEs was still required between division and corps weather teams.[111]

In early 1975, AWS developed a coordinated position on the subject of Army weather communications. AWS recommended that: existing TOEs be changed to identify a radio teletype augmentation package as an "organic" asset for use by weather support units in mobile or fluid operations when multi-channel teletype was unavailable; that radio communications be made available for intra-division use since teletype was rarely available to transmit weather information; and that receive-only facsimile should be put back in corps and division TOEs for weather support.[112]

In early 1976, the 16th Weather Squadron notified the 5th Weather Wing of its concurrence with the 2d Weather Wing and 7th Weather Squadron that weather teams at division had a valid need for a tactical facsimile capability. For the present, it recommended buying the AN/GXC-7A. The Army had eight AN/GXC-7As but, while it recognized that it was superior to teletype for transmission, TRADOC was not too interested in purchasing more because it had a major drawback of requiring four-to-six minutes to transmit a single page. TRADOC was looking to a tactical digital facsimile capability by 1982, and the biggest hurdle to it acquiring more AN/GXC-7As in the interim was a lack of money.[113]

In regard to weather teletype, TRADOC, in late 1976, was directed to delete the AN/UGC-74 and 75 teletypewriters from all TOEs because development had stopped and the Army would not be buying any. By mid-1977, after the teletypewriters were deleted from the TOEs, weather teams with Army tactical units were unable to requisition any tactical teletypewriters because the TOEs had not been updated to provide an interim or replacement teletypewriter. Therefore, in August 1977, it was decided to revert to using the older Kleinschmidt AN/FGC-25 and 25X teletypewriters which could handle the Air Force's 10 word-per-minute capability. As a result, by September 1977, the TOEs were updated to provide the AN/FGC-25 and 25Xs for use by the weather teams.[114]

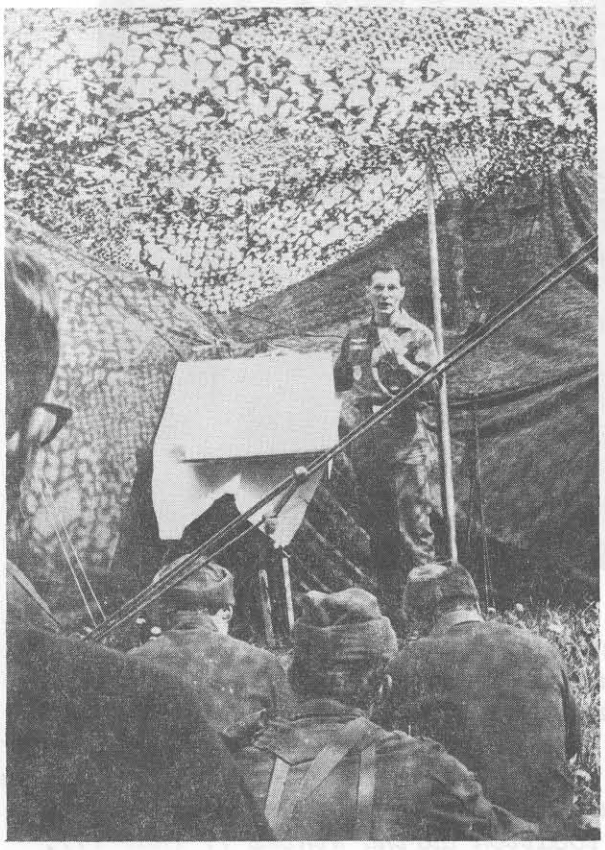
Late the next month, therefore, October 1977, the 5th Weather Wing advised the 5th Weather Squadron that it would have to face up to the fact that it was destined to live with the AN/FGC-25 and 25X teletypewriters until the early 1980s, and that it would have to put up with the Army's limited capability to maintain them. The wing passed along the following steps taken by the 7th Weather Squadron in Germany to overcome such impediments: brief the battalion Signal

maintenance officer and other officials at every opportunity regarding the problems, and make the Signal commander an addressee on all after-action or post-exercise reports; keep a copy of the teletypewriter technical manual on the meteorological vans they took to the field with; identify those spare parts which tended to fail most often and have Army supply people stock them; and operate the machines at least a week before deploying to the field, and as soon as they were in the field, to pinpoint problems early and get a jump on fixing them. "This concerted effort by all the SWOs [staff weather officer] in Europe significantly improved the teletype maintenance service in both the field and garrison," the wing concluded. "The real key was talking and writing the problem through the Signal community," because the "Signal commander was quick to respond when he saw his battalion appear in the after action reports."[115]

Such methods unquestionably helped, but tactical weather communications continued to be the biggest headache for AWS weathermen supporting the Army in the field. During the annual Reforger exercise in Europe in the fall of 1976, the tactical weather communications system below the corps level failed because units moved too often, the weathermen had too low a restoration priority, and because Army Signal units had too little time to make multi-channel connections between the corps operations center--which was stationary--and the units subordinate to it which were constantly on the go.[116] Weathermen from the 5th Weather Squadron deployed to Europe with the 101st Airborne Division and reported that the lack of multi-channel communications between weather teams at the division operations center and the brigade limited the use of brigade weather teams to taking an observation and passing an occasional forecast when available.[117] Six months later, during the Wintex exercise in Europe of March 1977, communications at the corps level and below was unreliable (although FM radios worked at some levels), and the massive volume of message traffic at USAREUR and CENTAG headquarters delayed receipt of AFGWC (Air Force Global Weather Central, Offutt AFB, Nebraska) products by as much as twelve hours.[118] And during the Reforger exercise in the fall of 1977, weather communications were still a problem, except for FM radio. The staff weather officer continued to spend too much time trouble-shooting his communications problems at the expense of supervising weather support. Attempts at intercepting weather data broadcast from the Croughton ADWS (Automated Digital Weather Switch) in England at 100 words per minute in the HF mode were unsuccessful, for the most part.[119]

The situation was much the same in Korea. During the Paul Bunyan crisis of August 1976 weather communications held up, but they were recognized as being vulnerable and none too reliable, and the Army units really did not deploy or move about enough to tax the teletype or facsimile systems.[120] Exercise Team Spirit early the next year underscored the problems once more.[121] Efforts were introduced in 1977 to overcome weather communications vulnerabilities in Korea--including relying on Navy links to Korea via commercial communications satellites, and broadcasting weather teletype and facsimile maps via HF radio from Yokota Air Base in Japan. But after two years, and a lot of foot shuffling and buck passing by commanders and communicators in all three branches of the military, weather communications in Korea in 1979 was still a rickety hodgepodge emanating every indication it would completely collapse under all but the slightest of strains.[122]

*At top, during Gordian Shield phase of Reforger 76 (September 76), in support of the 1st Armored Division, 1/Lt Gene A. Balantyne (left) receives orders for combat weather team of Det 12, 7WS, to move out, as Sgt Peter Delork (center) and SSgt Manfred K. Hellwagner prepare to patrol perimeter. The team operated from 2.5-ton van in background. In bottom picture, 3d Infantry Division staff weather officer's camouflaged location during Wintex 77 (Mar 77).*



*At left, Capt Wilbur G. Hugli, commander of OL-C, 7WS, briefs members of 2d and 4th Infantry Battalions during Exercise Alpine Friendship 77--a joint unconventional warfare maneuver in southern Bavaria in April-May 1977.*

*At bottom, Sgt Eugene S. Roberts, Jr, OL-C, 7WS, radios landing zone winds to assault helicopters during Alpine Friendship 77. (USAF Photos)*

MSQ-10 - and the Tactical Weather System

After tests with the Datalog DL-19W analog facsimile equipment were successfully completed in Europe in March 1976, the Air Staff directed AFCS (Air Force Communications Service) to terminate efforts with the trouble-plagued Weather Graphics System and use the DL-19Ws to satisfy AWS' weather dissemination requirements on the continent.[123] Upon the 2d Weather Wing's urging, AWS then approached AFCS about leasing deployable DL-19Ws for Army support.[124] After several delays, the DL-19W facsimile system in Europe--including the gear at 7th Weather Squadron sites--was accepted early in December 1977, but several problems arose during subsequent operational testing and evaluation.[125]

At about the same time, AFCS units in Europe began receiving the long-awaited Tactical Weather System--although they had yet to be declared operational. The requirement for such a system was formally established by TAC (Tactical Air Command) in the 1960s (who also purchased it), and it was designed to support tactical air forces during operations from "bare bases."[126] It was recognized that the Tactical Weather System was not designed to support the Army, but due to the incessant tactical communications problems associated therewith, AFCS officials in Europe agreed to test it for use in Army support during the 1976 Reforger exercise. The Tactical Weather Analysis Center (TWAC) modules of the Tactical Weather System were used in place of the MSQ-10 mobile communications van by the weather support unit deployed with USAREUR--the field army. The TWAC proved to be incompatible and unsuitable, although it was able to intercept the HF facsimile broadcast from the Croughton ADWS, which the 7th Weather Squadron considered a major breakthrough in its attempts to obtain a tactical link from the field army to the AWN--Automated Weather (Communications) Network.[127]

For the 2d Weather Wing and its 7th Weather Squadron it left them a situation pregnant with problems. The MSQ-10 vans were to be turned in by AFCS once the Tactical Weather System was officially declared operational. The MSQ-10 met part of the wing's needs in support of the Army (the USAREUR weather support unit), but not all of them, and not only was the TWAC not designed for Army support, and proved so during the 1977 Reforger, but it was committed to the contingency requirements of tactical air forces. Nevertheless, the wing and squadron were prepared to accept the deficiencies of the Tactical Weather System's TWAC because it provided a partial capability for use today to fill a void in the mobile weather communications capability in Europe. Thus in the early summer of 1977, the wing asked AWS to endorse its need for a dedicated TWAC for use by the 7th Weather Squadron in supporting the tactical field army.[128]

AWS rejected the idea on the grounds that there were too few TWACs, they were needed to support tactical air forces, and they presented too many problems when used to support the Army. Moreover, to have supported the 2d Weather Wing would have meant reversing the position AWS was then taking with AFCS and the Air Staff that, rather than considering the Tactical Weather System (or any part thereof) as a replacement for the MSQ-10, a separate replacement for the MSQ-10 was needed, designed specifically for Army support.[129]

In a reply to AWS of 7 June 1977, the Air Staff addressed two key areas: getting weather information to the highest Army echelon in a given theater, and the responsibility for providing weather

communications equipment to Army tactical units below that level in the field. The Air Staff recognized the Air Force's responsibilities under the joint regulation to introduce weather data required by AWS units for direct support of tactical army units into the Army system in each theater of operations. It also conceded that the Tactical Weather System's TWAC could not routinely be used for Army support, and that AFCS was not manned or equipped to continue use of the MSQ-10. Thus, the Air Staff suggested that AWS set down its needs for weather data at the theater level for Army support, and let AFCS determine how best to meet them. For the interim, the Air Staff directed AWS and AFCS to "implement mutually acceptable . . . arrangements." Beyond the theater entry point (the field army), the Air Staff's avowed goal was to eliminate any requirement for the Air Force to provide weather communications gear to support tactical Army units in the field. At the time, the Air Staff understood that it was a mixed bag; that in most cases the Army provided tactical teletype and receiver capability while the Air Force provided the facsimile, using the equipment installed at the garrison location of the Army unit supported. The Air Staff was also aware that AWS disliked such arrangements, preferring instead the development of a mobile communications capability to support tactical Army units deployed in the field. Accordingly, the Air Staff ordered AWS and AFCS to ascertain precisely what was needed--in weather data and weather communications equipment--at each Army echelon supported, after which the Air Staff would ask the Army to meet them under the joint regulation's provisions.[130]

During a meeting with AFCS early the same month, June 1977, attended by both Brigadier General Rowe and the AFCS commander, AWS made a presentation on the problems it had supporting the Army because of weather communications deficiencies. After discussing communications responsibilities under the joint regulation, AWS was taken aback when the AFCS delegation replied that the term "Air Force" in that directive did not necessarily translate into an AFCS responsibility--although AFCS was vague about who else within the Air Force could handle the job. When AWS, in testing the water, made a pitch for AFCS' assuming the responsibility for all communications in the tactical arena down to and including the corps level, the AFCS commander hesitated, saying his people would take weather communications to the highest Army echelon in the theater and no lower. However, AFCS did offer to act as the communications intermediary with the Army.[131]

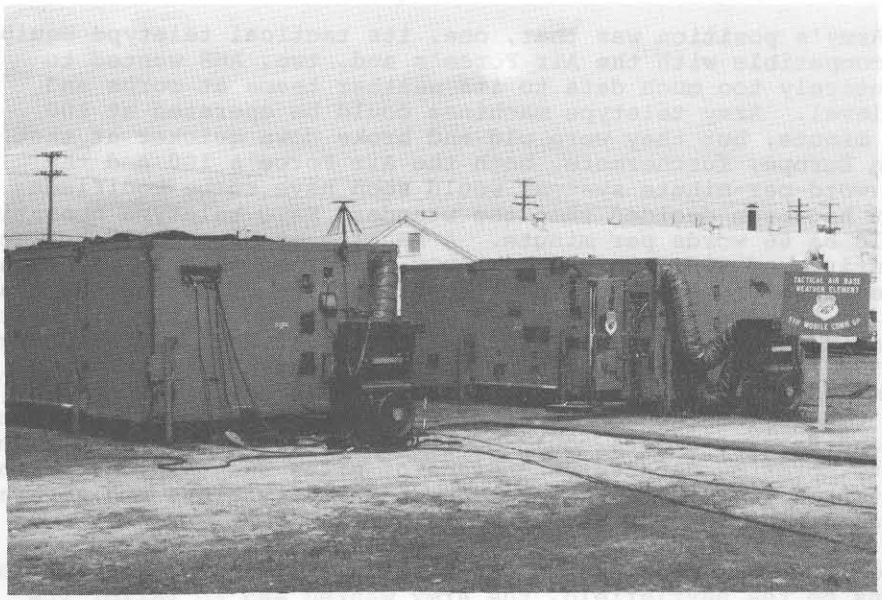
The question surfaced again in October 1977 when AWS, as discussed in detail below, was asked by the Air Staff to comment on a proposed rewrite of the joint regulation drafted by the Army. Seeing it as an opportunity to focus the Army's attention on critical issues, Brigadier General Rowe had the AWS staff draft its own rewrite. Among other fundamental changes, AWS proposed that direct Air Force and AWS support (to include providing needed weather and weather communications equipment) to tactical Army forces be chopped off at the corps level, and that the Army be made responsible for all direct support below that echelon. As to weather communications at Army installations, AWS opted for the status quo: the Army would take care of "main-frame termination" facilities and on-post weather communications circuitry, while the Air Force would be responsible for terminal communications equipment. But for Army forces employed in a tactical theater of operations, which represented the guts of the issue, the Air Force would be responsible for all weather communications (equipment and circuits) down to the corps,[132] while the Army would be responsible for disseminating AWS products to Army elements below corps, and to those Army echelons above corps not receiving direct weather support.[133]

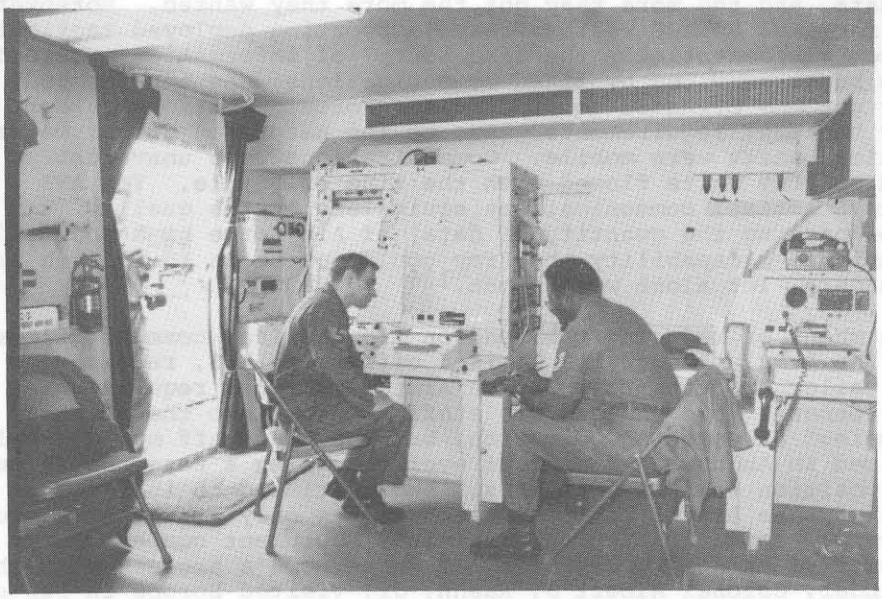
The Army's position was that, one, its tactical teletype equipment was compatible with the Air Force's and, two, AWS wanted to channel entirely too much data to its weather teams at corps and division level. Army teletype machines could be operated at 100 words per minute, but they were old and broke down quicker at that speed. In Europe, furthermore, both the Air Force's 100 and the Army's 60 word-per-minute systems would soon have to be modified because it had been decided that the standard NATO teletype operating speed would be 66 words per minute. A meeting in March 1978 between representatives of AWS, AFCS, and TRADOC confirmed that it was technically feasible and practical to transmit Air Force weather data at either 60 or 66 words per minute.[134] It was proved by the 5th Weather Wing during a communications training exercise at Robins AFB, Georgia, in June 1978.[135] The exercise also confirmed again that teletype and facsimile data transmitted by HF radio could be intercepted by a TWAC with the weather support unit at the field army level, and that teletype and facsimile data could be transmitted via HF radios from the TWAC to corps headquarters hundreds of miles away--which, in turn, could further disseminate the teletype data to divisions and separate brigades at distances up to 2,000 miles.

Not only was it possible to get by without landline weather communications on the battlefield, the Army wanted AWS to tailor its Army support products and thereby reduce the quantity of data AWS funneled through landline teletype circuits. It was the Army's contention that AWS forecasters were habitual "data hogs"--they insisted on more data, and the more they got the more they wanted. Moreover, the data received by AWS weather teams supporting deployed tactical Army forces was essentially the same "dump" of information provided Air Force bases serviced by fixed communications; and the "dumped" data they got was oriented to support Air Force operations rather than Army tactical requirements. Due to the nature of ground warfare, Army tactical units were mobile. Communications were unavoidably disrupted as Army units flowed with the tide of battle. Yet AWS wanted Army tactical communications equivalent to the quality (and capable of passing the quantity of data) of Air Force high-speed fixed communications--a capability the Army could not begin to furnish its own commanders, let alone weathermen.[136]

As a means of reducing the load on its tactical communications systems, the Army, through its liaison officer to AWS, recommended that AWS tailor products to meet the Army's tactical requirements. Brigadier General Rowe charged his staff to look into the alleged "data dumping" at corps and division, but the AWS staff moved slowly. Rowe retired in August 1978 without ever receiving a response because the Army position fell on deaf ears. AWS continued to insist that it could satisfy the Army's tactical requirements only if the Army provided tactical communications and terminal equipment comparable to that it enjoyed at Air Force bases.[137] When Rowe's successor as the AWS commander, Colonel Albert J. Kaehn, Jr, visited Europe in September 1978 and paid a courtesy call on General George S. Blanchard, the USAREUR commander told him he was very upset with the tactical weather communications imbroglio there, and that he had ordered his Signal commander to personally address himself to the situation. However, Blanchard informed Kaehn that AWS had to reduce the time needed to pass weather data in tactical situations, and one way of doing it was for AWS to tailor its Army support products and quit "dumping" data.[138]

To further compound the perplexing problems in Europe, AWS and the 2d Weather Wing switched positions with regard to the TWAC: AWS wanted to give it a shot in Europe, while the wing expressed reservations about



*Exterior and interior view of the tactical air base weather element of the Tactical Weather System. (USAF Photos)*

the concept AWS envisioned for employing the Tactical Weather System on the continent. The Tactical Weather System was at long last declared operational on 1 August 1978, and indications from AFCS were that no follow-on to the MSQ-10 was being programmed. Recognizing that the original concept of operations for the Tactical Weather System called for it to be used solely to support tactical air forces at "bare bases," AWS, in late 1978, proposed revising that concept to give the system a "secondary" mission: use of its TWAC for communications interface at the field army level. In September 1978, while Colonel Kaehn was in Europe, the 2d Weather Wing formally advised AWS that it could not justify a TWAC in theater. AWS decided to wait for AFCS' and the Air Staff's reaction to the idea of a "secondary" mission for the Tactical Weather System.[139]

As 1978 closed, therefore, weather communications for supporting tactical Army forces in the field were still in an extremely sad state--little better than they had been in Korea a quarter century earlier, and certainly no improvement from the Tet offensive a decade beforehand. Man had learned to communicate with space vehicles on or near the moon or Mars or Venus, but not with weather teams on earth deployed forward with Army tactical units. Because the Army had none, AWS was hauling facsimile machines to the field from the garrison weather stations. AWS and AFCS were improving facsimile by speeding up data flow from 120 to 240 scans per minute, and were looking at digital facsimile (480-720 scan) for the near future. There was no counterpart in the tactical Army inventory. Air Force teletypes were operating at 100 words per minute, while the Army operated its tactical teletypes at 60 words per minute, Air Force weather teletype circuits stateside were 2,400 words per minute, and AWS planned to extend them overseas--yet the Army had no plans for anything greater than a 300-600 word-per-minute capability. It all added up to AWS communications requirements being incompatible to Army capabilities at that point in the field where the responsibility for tactical weather communications was supposed to revert from the Air Force to the Army.

AWDS Era

By the early 1980s, AWS planned to be into electronic graphics with the AWDS (Automated Weather Distribution System) program. Manpower would be saved by automating weather observations at fixed bases; electronic graphics would replace weather teletype and facsimile; and centralized products would be transmitted from AFGWC and a tactical forecast unit in theater to the field. There the local forecaster (the "Advanced Weatherman"--the combined observer-forecaster), equipped with a "mini"-computer in the AWDS terminal, would refine the centralized products and make prognoses to support local tactical operations. The position AWS took on the rewrite of the joint regulation dovetailed with its plans to use AWDS in garrison weather support, and to take it to the corps level in the field where it would function as the focal point for weather support to tactical Army forces. The concept AWS envisioned saw its weather teams at corps equipped with an AWDS capability, providing forecasts--tailored to the needs of subordinate Army units--to the corps Intelligence officer for integration into intelligence material.[140]

Yet AWS could see problems with the AWDS in Army support. AWDS was like the Tactical Weather System in that it was originally conceived to support the Air Force (although from permanent bases), and mainly as an afterthought was serious consideration given to applying it in support of tactical Army forces in the field. AWDS flew in the

face of repeated warnings to keep weather equipment for tactical army support simple and unsophisticated and able to function without external power sources. It increased the pressure on reliable and continuous weather communications between AFGWC and the tactical forecast unit and the AWDS at corps. What happened when the umbilical cord to AFGWC was cut? Could the "Advanced Weathermen" manning the corps AWDS go it alone without the crutch that was AFGWC? There would be problems interfacing AWDS with computerized command and control communications systems the Army was investigating for the future such as TOS (Tactical Operations System) or ARTADS--Army Tactical Data System. Would they be compatible with AWDS; could the computers of one system "converse" (would the software be compatible) with another; would there be interoperability? Also, in the tactical role, AWDS only automated data handling functions at corps, which meant that weather teams with divisions or brigades in the field would have to continue taking weather observations manually, with equipment like the AN/PMQ-1s and 4s and the AN/TMQ-22s, until automated observing systems then on the drawing boards, so to refer, were developed--systems such as the Army's AMS (Automated Meteorological System) or RAWS (Remote Automated Weather Station), or AWS' BATSS (Battlefield Targeting Support System). And so, for the interim, there remained the age-old problem of getting manual weather observations from the weather teams at forward divisions or brigades (and those taken by Army elements) back to the corps, and of getting the weather forecasts from AWDS-equipped weather teams at corps to tactical Army commanders below that level--indirect weather support. One solution AWS pushed for was an MSQ-10 replacement.

Another solution was to use Army Intelligence communications channels. The Intelligence officer at division would have dedicated communications channels available, and the Army traditionally treated weather as intelligence. Intelligence communications channels between corps and division could be used not only to disseminate weather forecasts from corps to division or lower, but to relay manual weather observations from the battlefield back to the weatherman at corps.

As covered below, the Army placed considerable emphasis on its Intelligence function in the 1970s, considering it one of the principal ways to offset the superior numbers of enemy forces and weapons in places like Europe. However, because of the number of intelligence sources and the volume of intelligence data on the battlefield, the Army was looking at various ways to rapidly digest, condense, and present it to the local commander. By the close of 1977, the Army had not settled on anything definite. Even then, there was a question of whether weather would be included as a functional element because, due to the priority for other intelligence information, the Army could conceivably rank weather as a "soft" requirement.

## Maintenance After the Merger

Under the joint regulation, the Air Force was responsible for maintaining all Air Force owned fixed and tactical weather equipment used by AWS units supporting the Army, and for maintaining Air Force owned terminal and tactical weather communications gear needed by AWS units at Army installations and in the field. Until October 1977, AWS' own weather equipment repairmen performed organizational and intermediate level maintenance on Air Force equipment used in Army support, while AFCS personnel maintained Air Force weather communications equipment. After AWS' weather equipment maintenance mission--

and most of the associated manpower--was transferred by the Air Force to AFCS effective 1 October 1977, the responsibility for maintaining weather and weather communications equipment used by AWS to support the Army fell to AFCS.

Through the years, maintaining weather equipment used in Army support proved to be a very difficult challenge when AWS owned the maintenance men, but after they were transferred to AFCS there remained nagging doubts about AFCS' ability and willingness to perform in wars and crises as capably as it might in peacetime--despite provisions in the maintenance transfer plan covering such areas, and notwithstanding assurances by the AFCS leadership that weather equipment would be maintained as well or better under AFCS as it had under AWS. By late 1977, in Europe for instance, 7th Weather Squadron equipment at USAREUR bases was being maintained by three traveling AFCS maintenance teams based in Germany, and there were few complaints. But how good would it be in two or three years with a complete turnover in personnel, and after the senior enlisted men with experience in weather equipment maintenance transferred to other functions or retired? Therefore, once the bullets began flying, and each of his other "customers" began demanding support, how responsive to AWS' needs--with their traditionally low priority--would the local AFCS commander on the battlefield be?[141] If AWS' past experiences with battlefield communications were indicators, its weather equipment maintenance needs would go wanting.

CHAPTER 6 - TOES: SIGNAL OR INTEL "PROPONENCY"?

When the revised joint regulation (AR 115-10/AFR 105-3) was published in mid-1970, replacing the 1962 version, it contained a new provision whereby the Army was responsible for furnishing AWS weather teams all the supplies and equipment--such as vehicles and communications and weather gear--listed in the Army weather section of the supported unit's TOE--Table of Organization and Equipment.* The provision was in line with recommendations made in the Army's Met-70 study discussed below.** It recognized the fact that, theretofore, AWS personnel enjoyed only limited success in obtaining logistical support from the Army because, even though the joint regulation gave the Army the responsibility, the specific amount and type of equipment needed was not always listed in appropriate TOEs. Therefore, in mid-1970, Headquarters Combat Developments Command (CDC) approved and forwarded for consideration to the Department of the Army seven basic, "11"-series TOEs for Signal elements supporting the field army, corps, and division that covered AWS weather teams at each of those echelons.† The seven TOEs, which had all been approved by the Department of the Army by mid-1972, included all required organizational equipment and supporting Army personnel (two vehicle drivers per corps and division weather team) and communications equipment personnel--nine per corps, six per division.[1] Associated with the TOE action, the 5th Weather Wing, in coordination with CDC, developed special Army tactical communications doctrine that authorized sole user, full-period Army teletypewriters and facsimile circuits linking weather teams at field army, corps, and division levels. With the TOE action, for the first time ever, field army, corps, and division weather teams were authorized to draw, from the Signal element of the Army unit they supported, everything from expandable vans to rifles. In addition, they were authorized dedicated Signal communications circuits in the field, together with Army field radios, teletypewriters, and facsimile machines.[2]

While the problems with Army logistical support in garrison continued, the weather sections in the approved TOEs were a major step toward solving the problem of logistical support to AWS weather teams

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*It also contained a loophole in that the Air Force was responsible for providing mission-essential equipment and supplies to AWS weather teams not readily available through Army supply channels. See AR 115-10/AFR 105-3, "Environmental Services: Meteorological Support for the U.S. Army," 9Jun70, pp. 2-2, 2-3, included as a supporting document to this history.

**Met-70 was the short title for "Organizational and Operational Concepts for Meteorological Service in Support of Army Tactical Operations, 1965-70."

†The seven TOEs were: TOE 11-16G, Corps Signal Battalion; 11-35H, AIM (Armored/Infantry Mechanized) Division; 11-95G, Army; 11-18T, Air Cavalry Combat Brigade; 11-205H, Airmobile Division; 11-215G, Airborne Division; and 11-225H, Airborne Corps.

in the field. Army TOEs and, by the mid-1970s, MTOEs (Modified Table of Organization and Equipment) were absolutely critical to AWS weather teams. If communications were the life blood of weather support to the Army, and observers were the backbone, TOEs were the muscular system.

The TOE was the basic planning guide for the organization of any given tactical Army unit. It defined the unit's mission, and specified the equipment and personnel needed to accomplish that mission. MTOEs considered the peculiarities of a tactical unit's mission, provided organizational flexibility, and aligned people and equipment to meet local conditions of employment. The MTOE was the sole document authorizing Army personnel and equipment. If the MTOE of the Army unit he supported did not authorize the Army equipment and personnel he needed, then the staff weather officer--or the weather team--was not furnished them regardless of what the TOE or any directive--Army, Air Force, or joint--authorized for weather support. If they were not listed on the MTOE, then AWS weathermen could not requisition from Army supply sources such things as vehicles, weapons, and weather communications gear.* Changes to MTOEs had to be initiated at the unit level rather than at higher headquarters. Therefore, staff weather officers and weather teams had to initiate changes to MTOE weather sections through the Army unit they supported, even though all changes had to be coordinated beforehand with the parent weather squadron.[3]

In October 1974, during its second meeting, the joint Army-Air Force working group on weather support to the Army** tasked the 16th Weather Squadron to develop and coordinate mission statements for weather teams needed to support the Army's EAD (Echelons Above Division) decision, and draft MEFPAK (Manpower and Equipment Force Packaging) revisions to meet such missions, as well as coordinate TOE requirements to meet the proposed MEFPAK.[4] The squadron recommended to the 5th Weather Wing that the appropriate TOEs be reviewed and rewritten to reflect the MEFPAK changes necessitated by the EAD decision. In December 1974, 5th Weather Wing began an AWS-wide review of weather sections to Signal TOEs. Because of FORSCOM's interest, the scope of the review grew to encompass every major Army tactical command stateside and in Europe. All inputs were sent to the Signal School and, in addition, an AWS position was formulated with respect to corps, division, separate brigade, and armored cavalry regiment TOE weather sections. In concert with the Signal School's review of the TOEs, 5th Weather Wing began reviewing Army weather support UTCs (Unit Type Codes) to insure Army TOE resources and AWS personnel balanced.[5]

In early May 1975, the Army Signal School at Fort Gordon completed its proposed weather communications concept and TOE changes for corps, division, separate brigade, and armored cavalry regiments, and later

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*Even then, the fact that needed equipment was listed on MTOEs was no guarantee that it would be available, as discussed above in the case of weather communications gear. There were repeated instances where equipment listed in MTOEs simply was not available from Army stocks.

**The purpose of the joint working group was to provide a forum to identify weaknesses and deficiencies and propose workable solutions to joint doctrine, concepts, and procedures for weather support related to the employment of Army forces in a theater of operations. Its objectives were to identify mutually acceptable alternatives and, or, solutions to selected parts of identified problems, and to make recommendations for resolving deficiencies. Its scope was limited to

*TOE/MTOE-authorized Army vehicles assigned the 7WS's Det 1 in use during Reforger 77 exercise in Germany: in top photos an M-577 track, and at the bottom an M-561 Gama Goat manned by Det 1's TSgt Philip D. Henderson. (USAF Photos by TSgt Philip D. Henderson)*

that month began staffing the proposed changes with all the Army schools, CACDA, and AWS. AWS directed 5th Weather Wing to respond with a coordinated AWS position. The wing developed working papers which integrated proposed changes with tentative changes in working hours proposed by the Army's TESS study discussed below. It was the first attempt to develop new UTC mission statements and manpower, taking into account the requirement for AWS personnel to operate and maintain equipment furnished by the Army. By July 1975, the wing's working papers had been reviewed by AWS and the 1st and 2d Weather Wings, and work was underway to include UTC statements in official Air Force documents pending the Army's approval of TESS and the outcome that year of the Army's TARS-75 and MASSTER tests.[6]

## TARS-75

TARS (Tactical Reconnaissance and Surveillance)-75 was a one-year test, directed by the Department of the Army through FORSCOM, slated to begin in February 1975 with the 2d Armored Division at Fort Hood, designed to evaluate the functional capabilities of the "Division Military Intelligence Company" proposed as a major part of the division Intelligence subsystem. There were two objectives of TARS-75 of particular interest to AWS: evaluate a proposal to attach the division weather team and its TOE equipment to the division's Intelligence company; and evaluate the support provided by higher echelon weather units--e.g., AFGWC-- to the division weather team.

"A peculiar circumstance is becoming apparent," wrote Major Dell V. McDonald, the staff weather officer to CACDA (TRADOC's Combined Arms Combat Development Activity at Fort Leavenworth), to the 16th Weather Squadron in early December 1974,[7]

> On the one hand the Army is moving toward centralizing Intelligence assets as a part of the TARS-75 concept (underway since 1965) and on the other to decentralize assets as a part of FM 286 [the MASSTER test]. To say that the situation is confused at this point is an understatement. The only approach I can propose is that with each of these efforts we make an honest and intensive evaluation of the weather support aspects. Under TARS-75, the FORSCOM evaluation should show the advantages and disadvantages of being integral with the division combat Intelligence company. This of course involves an objective to determine whether the weather element of the Signal TOE should be converted to MI [Military Intelligence] or remain Signal.

The 16th Weather Squadron's position, as expressed by its commander, was that "the unit to which the weather team is attached for logistics and communications is not so important as its placement for support to the TOC [Tactical Operations Center, as tested in MASSTER] and its access to communications."[8] Whatever, the squadron advised the 5th Weather Wing that TARS-75 had "the potential of making the greatest impact on Army tactical [weather] support in the history of Army support."[9]

The 5th Weather Wing was not enthusiastic about TARS-75. It recalled that past problems in Army weather support centered primarily

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**(Cont) immediate or near-term, obtainable goals for improving joint aspects of weather support to the Army.

on inadequate communications, and that the attachment in 1972 of weather teams to Signal TOEs provided the "management tools" to eliminate those problems--resource support and direct access to the staff Signal officer. Moreover, attaching weather teams to Intelligence TOEs would not increase weather communications resources or priorities. A priority would have to be settled between intelligence and weather information, and the staff Intelligence officer would obviously rule in favor of the former. It took almost three years to gain the Department of the Army's approval for Signal TOEs that supported weather teams, and the wing believed that weather's attachment to Signal ought to be thoroughly tested before switching to Intelligence.[10] "We have serious reservations," the wing informed AWS in December 1974, "about the proposed attachment of the weather team to the Intelligence Company, especially the weather TOE equipment which is currently attached to the Signal Battalion."[11]

The concept of attaching the division weather team to the combat Intelligence company, and transferring its logistics and communications assets from Signal to Intelligence TOEs, was evaluated under TARS-75 by the 5th Weather Squadron's Detachment 14, (commanded by Major George L. Frederick, Jr) at Fort Hood, with the 2d Armored Division during exervise Brave Shield XII from 11-through-31 August 1975. The Army's final report noted that the weather team experienced great difficulty getting its authorized equipment; that the Signal battalion was not responsive to the weather team's requirements, and that the requisite equipment was not obtained until the weather team was attached to the Intelligence company. The report concluded that the Intelligence company provided the best support to the weather teams. It recommended that the weather team be attached to the Intelligence company permanently because Intelligence was the element having primary concern for weather data, and it would bring the weather team in closer contact with, and under the control of, the staff element having a vital interest in the weather team's operations.[12]

The anticipated change in "proponency" for weather team TOE support from Signal to Intelligence was discussed at length during an AWS tactical weather support concepts conference held at Headquarters AWS in mid-September 1975. It was brought out that, with his on-the-scene experience, Major Frederick supported the change. A majority of the conferees did also. Under Signal, the weatherman's communications were sometimes arbitrarily commandeered; under Intelligence, Signal responded to Intelligence's requirements, one of which was weather. It was also noted that with the change, all of the TOE weather sections would be written by TRADOC's and CACDA's USAICS (United States Army Intelligence Center and School) at Fort Huachuca. It was decided that, because of a lack of knowledge about TOEs and MTOEs by AWS personnel supporting the Army, AWS would publish a document containing related facts.[13]

At USAICS' suggestion, TRADOC asked the appropriate Army schools and CACDA to review the weather team proponency issue and provide it a position by late January 1976. For the Army, the issue encompassed the consolidation of all but its artillery meteorological function at USAICS, with CACDA retaining overall management responsibility for meteorological matters within TRADOC. While such action would transfer weather team TOE proponency from Signal to Intelligence, it would not negate the Signal School's responsibility to plan and provide communications doctrine to enhance weather support to the Army.[14]

On 17 February 1976, after all the Army schools agreed to the idea, CACDA recommended to TRADOC that proponency for general meteorological

and weather combat developments actions be transferred to USAICS, that proponency for ballistic meteorology be retained by the United States Army Field Artillery School at Fort Sill, and that the Signal School at Fort Gordon provide USAICS with technical assistance and insure that the correct Signal doctrine and concepts were applied to development of meteorological systems and weather team TOE sections.[15] On 24 March 1976, TRADOC approved CACDA's recommendation, thereby making USAICS accountable (the "proponent") for weather team TOE logistical and administrative support--Intelligence in place of Signal. USAICS was tasked to transfer the weather elements of Signal TOEs to "H"-series MI (Military Intelligence) TOEs.

By early April 1976, USAICS was officially handling the weather sections of tactical unit TOEs. Its staff weather officer, Lieutenant Colonel James C. Owens, completed and forwarded for consideration to the 16th Weather Squadron and 5th Weather Wing proposed weather sections of TOEs for corps, divisions, air cavalry combat brigades, separate brigades, and armored cavalry regiments*--which were scheduled for publication in September 1976 as changes to existing "H"-series MI (Military Intelligence) TOEs.[16] In July 1976, the Department of the Army approved TOE 30-19H for implementation at FORSCOM units, which meant that the logistical requirements of the division weather team would appear as an element of the combat Intelligence company TOE instead of the Signal battalion TOE--although implementation of the approved TOEs was the responsibility of the operating Army commands.[17] And in February 1977, USAICS forwarded for approval to TRADOC the weather team equipment portions of the TOEs that covered the Intelligence company at corps, and the Intelligence detachments at separate brigades and armored cavalry regiments.[18]

The switch from Signal to Intelligence TOE proponency was not immediately as apparent to AWS units in the field supporting the Army as it was to AWS' staff weather officers at USAICS, CACDA, and TRADOC, primarily because it took considerable time to implement the TOE changes. Lieutenant Colonel Owen Y. Macy, Lieutenant Colonel Owens' replacement as staff weather officer to USAICS, visited Headquarters AWS in late October 1977 and reported afterward to the 5th Weather Wing his amazement that "there are still people in HQ AWS who have not accepted weather support to the Army as an element of Intelligence."[19] But the fact of the matter was that the authorized Army equipment for most of AWS' weather teams was still listed on Signal TOEs because, while the Department of the Army approved the Intelligence TOE at division, for instance, not all of the Army's operating commands chose to implement it. Within FORSCOM, for example, which was supported by 5th Weather Squadron units, Army owned equipment belonging to the squadron's weather teams was still listed in a division's Signal battalion TOE by the close of 1977. In some cases the equipment authorized had never been issued.[20] FORSCOM had opted to delay implementing the Intelligence TOEs until the dust settled from various tests being conducted by the Army--as discussed below--to determine the role and composition of the Intelligence element at division level.

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*They were TOEs 30-18H and 30-19H which covered, respectively, the Military Intelligence Company at corps and the Combat Intelligence Company at division; and TOE 30-14H which covered the Military Intelligence detachments at separate brigades, armored cavalry regiments, and air cavalry combat brigades.

## CHAPTER 7 - DIVISION SUPPORT: DIRECT OR INDIRECT?

As mentioned earlier, the Army renewed emphasis on its Intelligence function in the 1970s, considering it one way to offset its disadvantage in men and weapons in places like Europe. An increased role seemed to translate to more Intelligence resources. But after Israel's experience in the Yom Kippur War of late 1973, the Army sought to disperse its assets, particularly at the brigade level, and to reduce the size, locations, composition, and electronic "signature" of its command posts, or operations centers, primarily at division level. Several tests of proposed concepts were conducted by the Army in the mid-1970s, some of which bore on the critical question of whether or not divisions needed direct or indirect--remote--weather support from AWS.

### MASSTER Test, FM-286, 1975

MASSTER (Modern Army Selected Systems Tactical Evaluation and Review) was a series of studies directed by the Army to improve command and control systems at and below division. MASSTER Test FM-286 looked at restructuring a tactical division's main command post (referred to as the DTOC--Division Tactical Operations Center) without losing the required functions. It was designed to make division command posts less vulnerable in the face of superior mobile armored forces yet, at the same time, make them more efficient and responsive to the commander.[1]

In November 1974 CACDA was directed to provide the methodology and an evaluator for the weather service aspects of MASSTER FM-286. The proposed concept involved moving the division weather team from the main command post to the division airfield and providing indirect weather support. Major Dell V. McDonald, the staff weather officer to CACDA, was selected as the MASSTER weather evaluator. "I have the initial feeling that the 'deck is stacked,'" he wrote the 16th Weather Squadron in December 1974, noting that the MASSTER test office did not consider weather support essential.[2]

The first increment of MASSTER FM-286 was conducted on 20-through-24 January 1975 with the 1st Cavalry Division (Armored) at Fort Hood. The Army's final report on that test indicated that the division weather team--minus the staff weather officer and an assistant--should be moved to the division airfield, and that the need for complete weather teams with armored and mechanized infantry divisions be reviewed.[3] However, Major McDonald's input noted that the full requirement for weather support was not exercised because only the headquarters elements of the 1st Cavalry Division were fielded, and the division airfield and many other player and controller elements were simulated. It resulted in an artificial arrangement for weather support. McDonald concluded, therefore, that removing the staff weather officer from the division's main command post significantly degraded weather support.[4]

According to Major McDonald, the MASSTER FM-286 test was influenced by the comments of Major General Robert M. Shoemaker, the commanding general of III Corps, who questioned the need for weather

*Army Lt Gen Shoemaker and Maj George L. Frederick, Jr during ceremonies on 9Apr76 at Fort Hood, Texas, marking formal dedication of the AN/FPS-77 weather radar there. Shoemaker commanded Fort Hood and III Corps, which included the 1st Cavalry Division (Armored) and 2d Armored Division. In early 1975, Gen Shoemaker commanded the 1st Cavalry Division used during the MASSTER tests. Maj Frederick commanded Det 14 of the 5WW's 5WS, which was responsible for supporting III Corps and the two divisions there. His work with the TARS-75 test during Brave Shield XII at Fort Hood in August 1975 was instrumental in the 2d Armored Division's conclusion that weather teams had to be located in the main division command post to successfully accomplish their mission. (USAF Photo)*

support to mechanized and armored divisions.* "My present concern," reported McDonald in February 1975,[5]

> is that the attitude existing at Ft Hood on the value of weather support to mechanized and armor division is gaining negative momentum. In my judgment this is caused in part by statements made to the FM 286 group by CG [Commanding General] 1st Cav Div who is now CDR [Commander] III Corps [at Fort Hood which included the 1st Cavalry and 2d Armored Divisions]. It escapes me why this attitude prevails in the CONUS while the US Army in Europe appears to place much higher priority on weather support. It will be difficult to obtain a realistic evaluation of the TARS-75 concept, consideration for follow-on MASSTER testing, and improved weather support to III Corps under this prevailing attitude.

In March 1975 USAICS presented briefings on MASSTER FM-286 to General William E. DePuy, the commanding general of TRADOC, who wanted the staff weather officer in the division's main command post. DePuy believed that the staff weather officer had to be directly involved in the decision making process.[6] Major McDonald learned informally that, in accordance with DePuy's wishes and the MASSTER FM-286 report, Major General John H. Cushman, the CAC (Combined Arms Center) commander at Fort Leavenworth, and Brigadier General Harry G, Hiestand, the USAICS commander, agreed that the staff weather officer would remain in the main division command post.[7]

By June 1975, the final report on MASSTER FM-286 had been reviewed by CAC and CACDA, Major McDonald reporting that,[8]**

> regrettably, the test report will likely go forward to TRADOC as written. An atmosphere prevails which does not lend itself to an appreciation of the value of weather support. The main thrust is to delete many of the support elements which have characteristically been integral support elements of combat forces. The MASSTER report is a typical example of how test results both quantitative and qualitative can be modified by opinion to reflect preconceived opinion.

CACDA forwarded comments--drafted by McDonald--on the MASSTER FM-286 report charging that the test did not reflect the true requirement for weather support because the findings related to division weather support were not supported by either "player or evaluater data," and because they presupposed that weather support could be provided remotely without degrading intelligence support. Therefore, CACDA recommended that weather support to armored and mechanized infantry divisions be evaluated further before being permanently discarded or altered. But for the interim it supported the MASSTER position that the division weather team be fragmented, with the staff weather officer and an assistant at the main command post, and the remainder of the team at the division airfield connected by a dedicated communications link.

### The AWS Position

Thus, for AWS, the problem became one of whether to provide remote or direct weather support to divisions. Opting for the latter

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*Maj Gen Tolson credited Shoemaker, who served with the 1st Cavalry Division (Airmobile) in Vietnam in 1970, with being one of the Army's foremost tacticians in airmobility from the early 1960s onward. (Tolson, *Airmobility: 1961 - 1971*, p. 222.)

**For his outstanding work in pioneering the use of climatological data in war gaming at the Army's Fort Leavenworth schools, Maj McDonald won the AWS Zimmerman Award for 1974.

method, the 5th Weather Wing opposed MASSTER's and CACDA's suggestion to fragmentize the weather team because experience with numerous field exercises proved that communications between the main command post and the division airfield were unreliable. The Army's TESS (Tactical Environmental Support System--see discussion below) asserted that AWS' support was inadequate, and the 5th Weather Wing believed that MASSTER's recommendation would further hamstring AWS' support. In adopting a position favored by USAICS, the 5th Weather Wing recommended to AWS in late August 1975 that the complete division weather team operate *near* the main division command post, that some electronic weather gear be dropped, and that the division weather team follow standard Signal concepts for using communications equipment in tactical operations. The wing believed that the place for AWS--hopefully the commander, Colonel Rowe--to formally state its case was during a meeting of the Army's Intelligence Advisory Group slated for late September at Fort Huachuca. "The IAG meeting cannot be overestimated," the wing closed, "since it will be very difficult, if not impossible, to reverse any decisions made by the IAG."[9]

At the 5th Weather Wing's suggestion, AWS convened a tactical weather support concepts conference at its headquarters in mid-September 1975, one purpose of which was to develop a position for the Intelligence Advisory Group meeting. It was agreed that, if the Army preferred indirect support, it would be provided by the weather team at corps. However, AWS favored direct support to division, provided through the Intelligence element by a weather team in full complement *at the main command post*. Furthermore, AWS decided that weather support to separate brigades and armored cavalry regiments would be the same as that tendered divisions, and that a division operating independently of a corps would receive normal weather team manning and be supported by an attached forecasting unit.[10]

AWS knew before the Intelligence Advisory Group meeting that its position faced tough sledding. It was briefed before the meeting by Major McDonald to the officer who would chair it, Major General Morris J. Brady, Major General Cushman's deputy at the Combined Arms Center who ran CACDA.* Brady agreed that the airfield was not a suitable place to support the main division command post, and expressed interest in supporting the staff weather officer at the command post from the corps weather team. He voiced doubt over the need for AWS weather observers at brigade because they added to its electronic "signature" and did not provide cost effective support. In reply to McDonald's point that observations were needed for forecasts, Brady said his men knew what the current weather was but needed to know target weather and, therefore, he wanted AWS to obtain its observations through alternate means.[11]

The Intelligence Advisory Group meeting was held at Fort Huachuca on 30 September through 1 October 1975, and AWS, led by its commander, Colonel Rowe, accepted Major General Brady's invitation to attend. The majority opinion favored the complete weather team and its associated communications equipment at the main division command post, but Brady countered by saying that the Army wanted to reduce the size and electronic "signature" of the main command post. He believed that the weather team should be anywhere but the main command post, and that the staff weather officer have access to it only when the division commander felt the situation warranted it.[12]

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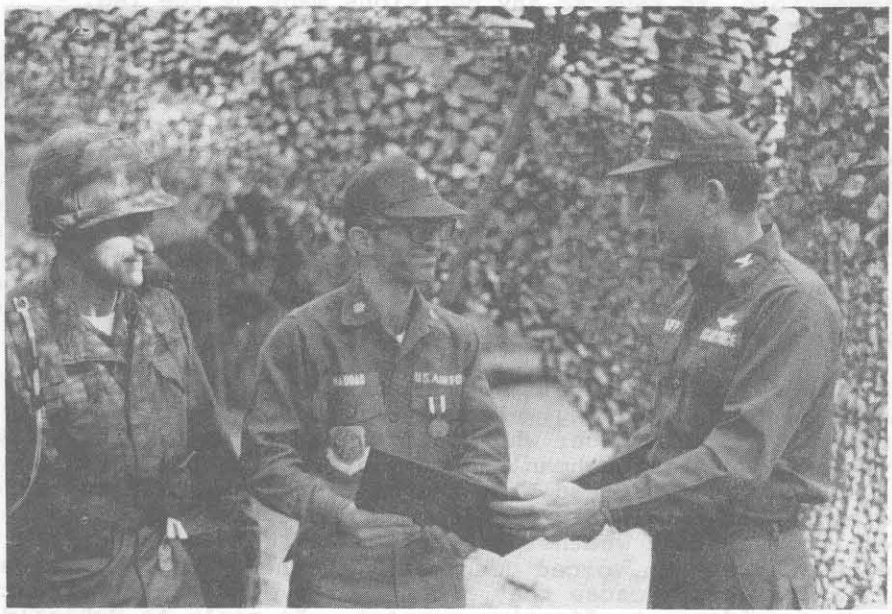
*Maj Gen Brady assumed command of the Combined Arms Center in February 1976, replacing Lt Gen Cushman who took over I Corps in Korea.

When reminded that his position conflicted with USAICS', Major General Brady remained adamant about trimming the size of the main division command post, noting that the weather team's function did not justify its presence there. According to him, the weather team was not around when decisions were being made, and the weatherman's language was not always understood by Army commanders. Yet he acknowledged that forecasts were a major factor in Army operations, and he recognized the need for interface between the staff Intelligence officer and the weather team. Nevertheless, after a discussion between Brady and Colonel Rowe, the Intelligence Advisory Group's position was to locate the weather team, in total, at the division airfield. Additionally, because the need for brigade weather teams was challenged, it was decided to review their role.[13]



*One staff officer at HQ 5WW in the mid 1970s who did yeoman work in attacking Army support problems, and who helped develop the position AWS took at the IAG meeting, was Capt Frederick F. Haddad, Jr. Pictured here in Nov77 as a major commanding the 7WS's Det 2 in Germany, Haddad receives the Meritorious Service Medal from the 7WS commander, Col John J. Elliff as Col Donald E. Eckelbarger, the 3d Armored Division chief of staff, looks on. (USAF Photo)*

The Intelligence Advisory Group's position not only invalidated the TESS study results, but it contradicted General DePuy's wishes. After the staff weather officer to USAICS, Lieutenant Colonel James C. Owens, called those facts to the attention of Major General Brady and the USAICS commander, it was decided to brief both the TESS results and the group's recommendations to DePuy and let the TRADOC

commander determine where the division weather team would be located.[14]

The weather issue did not end there. It surfaced again at the meeting when the 2d Armored Division briefed on the TARS-75 results during Brave Shield XII. As briefed, the test results stated that the weather team had to be located in the division command post if it was to be effective. With that conclusion from the field, the Intelligence Advisory Group became split on the weather issue: field evaluations did not support Major General Brady's position.[15]

As the meeting concluded, the Intelligence Advisory Group acknowledged that the division weather team could not operate effectively when fragmented. Thus, AWS' position was accepted. But there had to be a limit on the number of personnel in the main division command post and, therefore, the weather team had to be at the division airfield or with the division's combat Intelligence company. Thus, Major General Brady's desires were acknowledged. However, in recognizing the local commander's authority, the group concluded that he could locate the weather team wherever he wanted.[16]

The 5th Weather Wing believed that the Intelligence Advisory Group's final position represented the best possible compromise, but one that would be extremely difficult to translate into doctrine. It felt that the presence of Colonel Rowe at the meeting, coupled with the work of Major George L. Frederick (the commander of Detachment 14 of the 5th Weather Wing's 5th Weather Squadron at Fort Hood) on TARS-75, was instrumental in bringing the weather issue to a head. "The fact that the IAG could not actually make a decision on where to locate the weather team does represent some measure of success," the wing concluded.[17]

Because of the Intelligence Advisory Group's stance, the 16th Weather Squadron notified the 5th Weather Wing on 20 October 1975 that efforts to update doctrine in the joint manual (Army Field Manual 31-3/Air Force Manual 105-4, *Weather Support for Field Army Tactical Operations*) would be suspended pending a decision on how divisions would receive weather support.[18] Eleven days later, the squadron asked for the wing's and AWS' comments on the following position: that the staff weather officer was a member of the division staff, under general supervision of the Intelligence Officer, and required access to the main division command post; that he and his weather team would normally be located with the division's combat Intelligence company, except when the division commander wanted direct support at the main command post; and that an observer team would be located at the division airfield and at each brigade.[19] In a reply of 19 December 1975, the wing advised the squadron that the coordinated AWS position was essentially as the squadron presented it. For AWS the issue boiled down to direct support to the division decision maker or degraded support by remote means. "If remote weather support to the division is acceptable to the Army," the wing wrote, "then we desire to provide this support from the corps weather team and save the cost of personnel and equipment currently allocated to the division," and it directed the squadron to have CACDA decide whether the division commander would get direct or remote support.[20]

CACDA's staff weather officer, Major McDonald, thought the issue ought to be settled by the Air Staff and the Department of the Army, and that Army field commanders should take a "strong stand" on the location and configuration of division weather teams.[21] He attended the third meeting of the joint Army-AWS working group on Army weather

support, convened at Fort Huachuca on 20-21 January 1976, and reported that that body supported the Intelligence Advisory Group's position above *provided* reference to the weather team being at the division airfield was deleted.[22]

Meanwhile, 16th Weather Squadron officials pressed TRADOC for a decision on how divisions would receive weather support, urging it to adopt AWS' position.[23] General DePuy saw the main division command post--the DTOC--as "one big bull's eye," and many people and their associated equipment were removed to reduce its "signature."[24] Yet the TRADOC commander knew first hand the value of weather support to a division engaged in combat. DePuy, it will be recalled, while commanding the 1st Infantry Division in Vietnam during late 1966, approved the award of the Bronze Star Medal to all eighteen members of a 5th Weather Squadron unit for "exceptionally fine weather support" during Operation Attleboro--reported to have been the most successful to that time in the Bien Hoa area in terms of Viet Cong losses in men, materiel, and base camps.[25] On 30 January 1976, TRADOC verified the weather team requirement for DTOC support, although it did not concur in dropping the distinction between direct and remote support in processing formal SORs--Statement of Requirements.[26]

## IOSS

Related to the question of direct or indirect weather support to divisions, and to the weather team TOE "proponency" issue, was the Army's IOSS (Intelligence Organization and Stationing Study), a rewrite of which USAICS finished in February 1976 and forwarded to TRADOC. IOSS recommended how Intelligence units should be organized and operated to support corps and divisions. It was complete to the point that it contained proposed TOEs. In USAICS' rewrite, the AWS weather team at corps would be in the headquarters and operations company of the combat EWI (Electronic Warfare and Intelligence) group; at division, the weather team would be in the headquarters and operations company of the combat EWI battalion. At both echelons the weather teams would work in the combat EWI operations center. In other words, the IOSS rewrite called for direct support from weather teams located in or near the main corps and division command posts.[27]

## TCATA CEWI Test, FM-362, 1977

The IOSS rewrite was approved by TRADOC in February 1976. The Department of the Army assigned FORSCOM the responsibility for testing the concept. Formally designated as the "Combat Electronic Warfare Intelligence (CEWI) Battalion (Div), Test FM 362," the test, which was to have taken place at Fort Hood in the fall of 1976, slipped to February 1977 due to "TRADOC-FORSCOM conflicts." By then MASSTER had been redesignated--effective 1 April 1976--as the TRADOC Combined Arms Test Activity (TCATA), and Lieutenant Colonel Owen Y. Macy, the staff weather officer to USAICS, was designated as TCATA's weather evaluator for CEWI Test FM-362.

The initial phase of the test was conducted on 8-through-10 February, and the final phase on 22 March-through 1 April 1977 at Fort Hood during exercise Gallant Crew 77 in support of the 2d Armored Division. The only conclusion from the final test report that caused

AWS concern was that one of the two multi-channel communications circuits between corps and division weather teams should be deleted.[28]

Through 1978, therefore, AWS continued to provide direct support to divisions, as well as to selected separate brigades and armored cavalry regiments. It did so notwithstanding the fact that, in late 1977, while commenting on a rewrite of the joint regulation sponsored by the Army, as detailed in a discussion that follows, it reversed itself by making a startling proposal to limit direct support to the corps level. The Army's position, expressed in a letter to the Air Staff of 26 January 1979, was that[29]

> direct weather service support by the USAF Air Weather Service must be provided to separate brigades, Armored Cavalry Regiments, Air Cavalry Combat Brigades, and Special Forces Groups when requested IAW [In Accordance With] AR 115-12. This position applied to active Army, Army Reserve and Army National Guard units, and assumes that direct weather service support will be continued at division, corps and echelons above corps as currently provided.

## CHAPTER 8 - ARMY REQUIREMENTS

### SORs

As discussed above, the Army's requirements for direct support from AWS in peacetime were formally handled through SORs--Statement of Requirements. Under the 1970 version of the joint regulation, and the applicable Army regulation,[1] the Army unit needing the support initiated the SOR. Once approved by the Department of the Army, it was forwarded to the Air Staff--the Assistant for Weather, AF/PRW. After the SOR was sent to MAC and AWS for review, the Air Staff decided whether additional Air Force manpower and equipment was needed to satisfy the SOR, and where it would come from.

One problem with processing SORs in that fashion was that it was time consuming. At the AWS tactical weather support concepts conference in mid-September 1975 it was recommended that the coordination time be shortened by eliminating the Department of the Army and the Air Staff from the process, except when additional Air Force manpower was needed to meet the requirement.[2] By the close of 1975, AF/PRW and the Department of the Army had agreed. The new process went into effect with the publication of 2 August 1976 of the revised Army Regulation 115-12, "U.S. Army Requirements for Weather Service Support."[3]

Another problem with the process was that those SORs translating into additional Air Force manpower were often suspect, in the Air Staff's eyes, because most were prepared by, or with the assistance of, the AWS staff weather officers at the particular Army units. Of necessity, in most instances, the staff weather officers became involved because the local Army commander and his key staff officers were generally unaware of the weather support available, and how it could profit their operations. Aware of that fact, AF/PRW sometimes questioned whether the SOR was a bonafide Army requirement or an attempt by AWS at empire building. Because of AWS involvement, the SORs lacked credibility, in the Air Staff's eyes, and warranted close scrutiny.

The situation became particularly acute in the early 1970s when Army requirements mushroomed at the same time the Air Staff and MAC were chopping AWS' authorized manpower by nearly forty percent. At one point, the Air Staff wanted AWS' staff weather officers to drag their feet if an Army unit asked for assistance in putting together an SOR. It placed AWS in a dilemma. General Best, the AWS commander until mid-1973, objected because he felt that all of the Army's requirements must be formalized. Then the Air Staff could inform the Army that there were insufficient Air Force resources to meet Army requirements. Best went so far as to imply that his staff weather officers were not initiating or preparing the SORs for Army units.[4] In fact, however, they were,[5] and in acknowledging that truth, General Rowe, the AWS commander through mid-1978, claimed it posed yet another problem: it resulted in proposing Air Force solutions to Army problems. Army tactical commanders had to get more involved in stating their weather support requirements, Rowe believed.

Because the SOR still had to go to the Air Staff if more Air Force resources were needed, the streamlined SOR procedure above did not eliminate the credibility question for AWS. But Rowe said he had no problems living with it because the same procedure--and involvement by AWS--applied to Air Force requirements for weather support. It was, therefore, the Air Staff's inherent responsibility to rule on the credibility question, and whether or not additional Air Force assets would be allocated to meet formally stated requirements.[6]

## Met-70 and Met-75

Due in part to incessant urging by AWS to state its requirements for weather support, the Army commissioned a succession of internal studies designed not only to list requirements, but to identify shortcomings in weather support. AWS' staff weather officers to the Army organizations involved helped prepare the studies.

One such study by the Combat Developments Command's (USACDC) Communications Electronics Agency at Fort Monmouth, was entitled "Organizational and Operational Concepts for Meteorological Support of Army Tactical and Logistical Operations, Army-75." More commonly referred to as simply Met-75, it bore heavily the hand of the staff weather officer there, the 5th Weather Wing's Lieutenant Colonel Malcolm Reid. Met-75 was a follow-on effort to a December 1965 study with a similar title ("Organizational and Operational Concepts for Meteorological Service in Support of Army Tactical Operations 1965-1970," ACN 01647), referred to as Met-70, which, among other findings, recommended establishing TOEs to support AWS weather teams. By 1970 a preliminary version of Met-75 was circulated for coordination, AWS being one organization that reviewed and analyzed it. Met-75 looked at the lack of training on the use of weather information in tactical situations; incomplete weather doctrine, and Army doctrine which lagged behind state-of-the-art advances in meteorology in areas such as satellite and computer applications. Met-75 was approved by USACDC and submitted to the Department of the Army which, in early 1972, expressed satisfaction but recommended that its publication be deferred and incorporated into TESS (Tactical Environmental Support System).[7]

## TESS

TESS, which traced its origins to early 1970, was approved for study by USACDC on 24 November 1971. "Proponency" for it was transferred late the following month to the Intelligence Agency (USACDC/-INTA) of USACDC's Intelligence and Control Systems Group at Fort Huachuca--which, in 1973, became the U.S. Army Intelligence Center and School, USAICS. The TESS charter, which originally envisioned the development of a comprehensive meteorological plan for the army in the field for the 1976-82 period, identified three problem areas in weather support to the tactical Army. First, weather support doctrine was incomplete and ambiguous. Secondly, the meteorological state-of-the-art had outpaced weather support doctrine in such areas as satellites, radar, computer applications, and weather modification. Finally, there was a lack of training within the Army on the tactical use of weather support. It was not adequately addressed in the Army's schools, and weather was not integrated into field exercises.[8]

Work on the TESS study continued through 1972 and 1973. Its primary author was Mr. James D. Rustenbeck, the USAICS meteorologist. Once again, Lieutenant Colonel Malcolm Reid played a key role in its development, as did Lieutenant Colonels Marion L. Hershberger and James C. Owens, the staff weather officers--in succession--to USAICS.* All major Army commands and schools expressed their environmental support requirements. A major change in the TESS charter was revealed in late May 1974. Instead of addressing near, mid, and far term deficiencies in weather support, the TESS study advisory group was directed to investigate current deficiencies.[9]

A draft executive summary of the TESS study report was published in August 1974. Among other findings, the TESS study substantiated that:

- "numerous" Army requirements for observing and forecasting support were not being met.
- the scale of weather support to the Army was unsatisfactory.
- current forecasting accuracies were of little value to the Army.
- current and envisioned meteorological products available to support Army tactical units required "significant" improvements in forecasting accuracy and in obtaining accurate weather observations from remote areas.
- 24 hour-per-day forecasting support (as opposed to the 18 hour-per-day support provided by AWS) was needed at division level, 24 hour-per-day observing support (as opposed to the 12 hour-per-day support provided by AWS) was needed at brigade level, and there was no concept for furnishing weather support to the air cavalry combat brigade--when that brigade was independently employed, the Army preferred an eight-man (3 forecasters and 5 observers) weather team furnishing 24 hour-per-day forecasting and observing support.
- the Army wanted weather modification support, to include fog dissipation and rainmaking.
- most Army requirements were mesoscale, but only a "limited number [56] of critical values"--defined as those limits of meteorological parameters that significantly impacted Army operations--for meteorological elements were determined.
- no Army computers were available for making forecasts, and none existed, or were planned for, capable of supporting the Army's total environmental data handling requirements.
- weather communications equipment and concepts were inadequate.
- weather support doctrine in the joint regulation and manual was outdated and ambiguous.
- Army and AWS weather support assets were improperly managed.

*For his outstanding contributions to TESS' completion, Lt Col Owens won AWS' Best Award for 1975.

- Army officers attending military schools received too little training on weather's impact on tactical operations.

- AWS personnel received little or no training to prepare them for army support roles.

The TESS study concluded that, for the efficient use of all Army and Air Force weather support capabilities, all weather support units should be managed as a single entity. Among other alternatives, it suggested that a single organization be assigned the responsibility for total weather support to the Army--either AWS, an Army Weather Service, or a Department of Defense Weather Service to support all three service branches. It also concluded that it was very difficult to determine specific meteorological limits critical to tactical operations. In many cases only the commander on the scene could determine what was critical meteorologically, depending on mission urgency and importance. Finally, in addition to nine other suggestions, TESS recommended that a weather automatic data processing capability be developed, one candidate being a combination of the Army's AMS (Automatic Meteorological System) and AFGWC; that Army weather communications and data handling systems be designed for compatibility with Air Force systems; that a centralized means to manage Army meteorological assets be determined by the Army and the Air Force; and that additional critical meteorological values be determined by field tests and be incorporated into appropriate manuals as guidelines for tactical users.[10]

The TESS study results were briefed to Generals Cushman and Brady at the Combined Arms Center, Fort Leavenworth, on 13 August 1974, and, according to Lieutenant Colonel Owens, Cushman became "an enthusiastic supporter" of the effort.[11] Early the following month CACDA sent it to the field for comment, Major McDonald, CACDA's staff weather officer, noting that,[12]

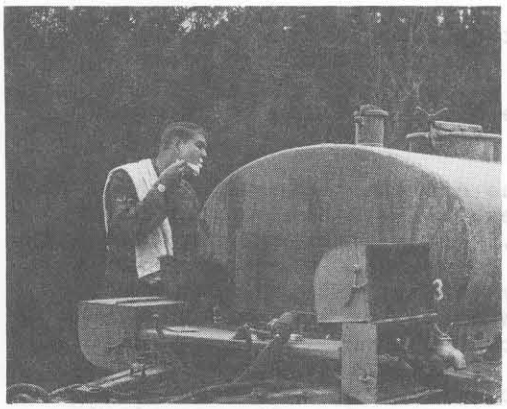
> With TRADOC approval of the TESS Study, hopefully in December 1974, a clear definition of US Army requirements and recommendations for improving weather support to the Army will exist. The TESS Study, however, like all studies, will be only as valuable as the implementation of its recommendations. The big challenge from here on is to transform those recommendations into hardware acquisition programs and doctrinal and procedural changes.

On 20 May 1975, the TESS study was approved by the Combined Arms Center and forwarded to TRADOC for action, Major McDonald reporting that,[13]

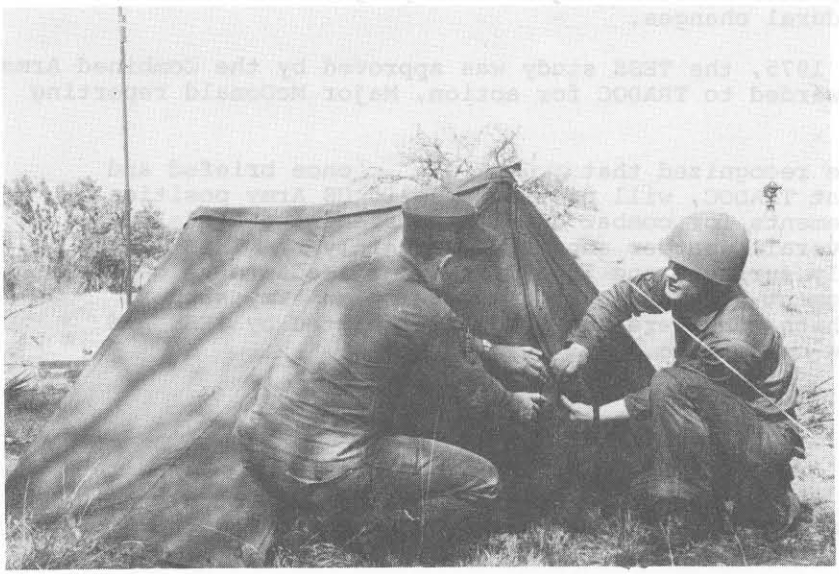
> It must be recognized that . . . TESS, . . . once briefed and approved at TRADOC, will provide a solid US Army position on requirements for combat developments and the needs to upgrade overall weather support. Certainly . . . TESS . . . by itself only surfaces and identifies what needs to be done. In my judgment, the AWS must now develop an Army support concept which considers the needs articulated by TESS and its follow-on actions.

MAP/SAMSR

Remarking on the scheduled briefing of the TESS study to TRADOC the following month, the 16th Weather Squadron informed the 5th



*One complaint frequently heard was that AWS personnel were not trained to survive with the Army in the field. Men from 16WS adjusting to such life in 1962 are, clockwise from the top: A/2C Jimmy Palmer shaving in the early morning, using his helmet as a wash basin; A/2C Hatcher, AN/PMQ-1 strapped to his back, camouflaging his helmet; an unidentified airman with AN/PRC-25 radio, using a jeep hood for a desk top; and A/1C Alfred Griffis (left) and A/2C Earl Armstrong erecting a "pup" tent. (USAF Photos)*



Weather Wing in September 1975 that,[14]

> the timing . . . is not especially good in that the study has been overcome by events. Rotations/retirements of generals more familiar with the study than those presently in a position to bless it have had an effect. Also, actions to reduce the size of the DTOC will impact heavily. TESS is still a good package for the USAF.

The TESS study was briefed to TRADOC on 6 October 1975, and was approved as presented, the 5th Weather Wing reporting that "this represents the first successful attempt by the Army at analyzing its total tactical weather support requirements for the short (present to 1976) and mid (1977-1982) time frames."[15] In a letter of 12 December 1975, TRADOC directed CACDA to convene a working group to prepare a Master Plan for the Satisfaction of Army Meteorological Support Requirements--MAP/SAMSR. CACDA was to exercise overall management of MAP/SAMSR, while USAICS had "proponency" responsibility.[16] The object of MAP/SAMSR was to implement the TESS study recommendations.

A joint working group on MAP/SAMSR met at Fort Huachuca on 22-23 January 1976 and prepared a draft plan. It was approved by USAICS on 11 March 1976 and forwarded to CACDA who, fifteen days later, sent it to appropriate Army agencies and schools and AWS for comment.[17] It would then go to the Department of the Army and the Air Staff for approval as a joint plan.

In a letter to the 5th Weather Wing of 8 April 1976, the 16th Weather Squadron recommended that AWS approve the MAP/SAMSR plan. Continuing, the squadron noted that,[18]

> we welcome the increased interest in Army weather support from AWS. The need for both intermediate and long-range requirements are recognized but a note of caution is needed. For too long, the OWT [Organic Weather Team] has not had the equipment to perform its mission nor all the support or understanding from higher headquarters necessary to correct these deficiencies. On the other side of the coin, many people in Army weather support fought against centralized support. Happily, we are seeing changes for the better in both of the latter areas. We strongly recommend primary emphasis be placed on those actions that can be taken now to help the OWT do a better job. Let's not let the intermediate and long-range requirements overshadow taking what is available now and using it to do a better job.

The squadron further recommended that AWS place emphasis on immediately securing a DMSP weather satellite readout capability for the deployed forecast unit or Tactical Weather System, followed shortly thereafter by a readout at the corps; continue emphasis to get AFGWC into exercise support; use more frequently the joint Army-AWS working group on Army weather support; and select more personnel with experience in Army weather support for key positions than AWS was then doing.

MAP/SAMSR was briefed to the CACDA deputy commander on 22 June 1976, approved and sent to TRADOC the next day. Major McDonald wrote that[19]

> the plan represents six months of intensive coordination. The tasking and milestone appendix identifies specific actions,

responsible agencies and completion dates for satisfying the TESS Study recommendations. The potential for across-the-board improvements in Army weather support resides in MAP/SAMSR. Like all studies and plans, however, continued emphasis and priority must be attached to it for a realization of the objectives.

The final TESS study report, dated February 1976, was distributed by USAICS in July 1976 to Headquarters AWS and AWS field units, but it was 30 August 1977 before TRADOC distributed the final coordinating MAP/SAMSR draft it approved to major Army commands and AWS for comment. TRADOC anticipated having all of the comments in by mid-October 1977, and submitting the final MAP/SAMSR draft to the Department of the Army and the Air Staff for joint approval by November 1977.

Of course TESS and MAP/SAMSR contained no surprises for Headquarters AWS because AWS personnel played important roles in shaping their contents. The staff weather officers to USAICS, CACDA, and TRADOC were deeply involved, and Major Carl H. Chesley, perhaps *the* expert on Army weather support on the AWS staff between 1975 and 1978,* made several trips to Fort Huachuca and elsewhere to help draft the documents and represent AWS' interests.

The final TESS study report of early 1976 was essentially identical to the August 1974 draft version covered above. With some changes in the wording, its thirteen conclusions and thirteen recommendations were basically the same--except that reference to the formation or designation of a single meteorological organization responsible for all weather support to the Army was deleted; and where reference was made to developing an automatic weather data processing capability, software (computer programs) was specified, as opposed to hardware (computers), and they would address mesoscale meteorology only.[20] Summarized, the TESS study represented one inescapable truth: weather support to the Army was unsatisfactory.

TRADOC's MAP/SAMSR draft set forth specific tasks, guidance, and milestones for Army and Air Force organizations to correct the inadequacies in weather support to the Army identified by the TESS Study. "Non-implementation or only partial implementation of this plan could have a detrimental impact on tactical meteorological support to the US Army," read MAP/SAMSR, emphasizing that it could not be fully implemented without proper funding and resources, and without continuous coordination and dialogue between the Army and the Air Force. Conversion to automated systems for collecting, processing, and disseminating meteorological information was necessary for the Army to meet its tactical meteorological support responsibilities, MAP/SAMSR read, but it cautioned that, while the incorporation of weather into Army decision making had to expand, austere budgets dictated husbandry of men and materiel. Approval of MAP/SAMSR by the Air Staff and the Department of the Army would constitute an order to Air Force and Army organizations involved to accomplish the plan's tasks, according to the plan's provisions. It would also constitute authority to establish a formal Army-Air Force joint working group on MAP/SAMSR,** co-chaired by a representative from CACDA and AWS, whose

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*Maj Chesley had formerly served as the staff weather officer to the 82d Airborne Division.

**Which would have supplanted the unchartered joint Army-Air Force working group on Army weather support then in existence.

charter would be to make sure the assigned tasks were completed.[21]

Having obtained an extension from TRADOC, AWS' comments on TRADOC's MAP/SAMSR draft were posted to MAC on 15 November 1977. In effect, AWS disapproved it by disarming it. AWS wanted to change TRADOC's draft by deleting specific reference to tasks and milestones, and deleting reference to Army and Air Staff approval constituting authority for getting on with the job of correcting inadequacies in weather support to the Army identified in the TESS study. AWS proposed forming a joint Army-Air Force working group comprised of general officers from TRADOC, FORSCOM, DARCOM, MAC, AFSC, and AFCS, to review and recommend policy, and coordinate and implement actions in the area of weather support to the Army.[22] TRADOC's draft was a plan of action for who should do what, when, which, if implemented, would have carried teeth. AWS' suggestions watered it down considerably.

While TRADOC was ready to act, AWS was not because, insofar as it was concerned, the TESS study and MAP/SAMSR were overtaken by events. In late 1977, as discussed below, while reviewing TRADOC's proposed rewrite of the joint regulation, the AWS commander, Brigadier General Rowe, directed that, in order to focus the attention of Army leaders on the problems associated with Army weather support, AWS propose chopping off its direct support at the corps level.

Aware of Brigadier General Rowe's position, MAC, in its reply to TRADOC of 20 January 1978, declined to forward AWS' proposed rewrite of MAP/SAMSR. MAC's position was that MAP/SAMSR should not be a joint Army-Air Force document. "Our [AWS'] charter is to provide weather support," MAC responded, and since MAP/SAMSR was a comprehensive source document for the Army's weather support requirements, it would be "inappropriate for the Air Force to become explicitly involved in stating support requirements."[23] MAC suggested that TRADOC forward the requirements in MAP/SAMSR to the Department of the Army for validation, after which the Army and the Air Staff could settle among themselves how best to satisfy them.

TRADOC then recommended to the Department of the Army that MAP/SAMSR be an Army plan only, not a joint document. In its letter of 23 January 1978, it also recommended that the Air Staff and the Department of the Army sanction a joint Army-Air Force committee on weather empowered to ensure that the Army's tactical weather support requirements were met.[24]

Although TESS and MAP/SAMSR were overtaken by events because of Brigadier General Rowe's stance, some of the TESS study recommendations had already been acted upon. Logistical support for weather teams was being switched from Signal to Intelligence TOEs, and increased emphasis had been placed on educating Army officers on the impact of weather and weather support on tactical operations. To educate AWS personnel on the Army mission and organization, the first cadre of eight AWS officers attended the allied officer preparatory course at the Army's Command and General Staff College at Fort Leavenworth from 28 July through 6 August 1976.[25] Yet Rowe's dramatic proposal to limit direct AWS support to the corps level and above spiked TRADOC's efforts to revise the joint regulation and manual to reflect up-to-date doctrine for tendering weather support to the Army.

Tac Requirements Conference, 1977

Another action taken by TRADOC to address the TESS study recommendations was to convene a conference of Army tactical commanders and have them more specifically define their weather support requirements.[26] They would also address such problems as tactical weather communications, automation, operational weather support forward of division, and Army and Air Force research and development responsibilities for meteorological equipment. The conference was hosted by CACDA at Fort Leavenworth on 15-through-17 August 1977.

In his opening remarks to the conference, Major General Glenn K. Otis,* the CACDA deputy commander, made a strong pitch for the attendees to develop a firm list of Army weather support requirements, consider all conventional means of communications to support them, and only then look at possible automation requirements. He was deeply concerned with the proliferation of systems competing for automation, and he insisted they all be "scrubbed down" to determine what, if any, data should be automated.[27]

Split into work groups, the conferees developed a statement of weather impacts in "Army decisionmaker's terms" for thirteen operational areas. A prioritized list of specific weather elements was then proposed for each area and by the echelon at which it was required. Weather observing and forecasting deficiencies were then summarized. It was agreed that CACDA would work with USAICS in "finalizing" the requirements by a "strawman" circulated through each of the TRADOC schools and centers and selected combat users, accompanied by guidance on stating temporal, spatial, and accuracy needs for each weather element or product. Once completed and approved, the Army's list of requirements would be used as a baseline for automation and communications needs, for developing and revising Army weather support doctrine, and for updating the TESS study and MAP/SAMSR requirements.[28]

Once the Army's weather support requirements were listed, the conferees discussed, and made recommendations to resolve, recurring deficiencies in tactical weather communications. In addition, a separate joint working group on communications was arranged by TRADOC to resolve problems in that area. Further development of any weather automation concept was deferred until the Army's weather support requirements could be "finalized" and weather data collection and dissemination plans developed by conventional communications means. Then, if the volume of data to be analyzed and processed to support the overall Intelligence effort needed it, a concept for automation of selected weather elements or tailored products would be considered.[29]

The Army's "strawman" was mailed on 25 November 1977 to various organizations whose efforts to further delineate the Army's weather support requirements were to be back at CACDA by mid-January 1978.[30] The joint Army-Air Force working group on tactical weather communications met at TRADOC on 15-16 November 1977. Once again the Signal School at Fort Gordon declined to attend, electing instead to have a Signal officer at TRADOC represent them. Lieutenant Colonel Darrell T. Holland, the staff weather officer to CACDA, reported that the interface problem between Army and Air Force teletype machines

*In November 1977, Maj Gen Otis was selected to command the 1st Armored Division in Germany.

(operating at 60 words per minute versus 100) might be resolved with the Army's purchase in about a year of the AN/UGC-74 (XV) teletype, but that no short-term solution to the facsimile problems was in sight.[31]

By March 1978, all of the Army organizations--except USAREUR, as reported below--had responded to CACDA. In May, Lieutenant Colonel Holland visited USAICS to help synthesize the Army's tactical weather support requirements. Due to the shotgun approach used by several organizations, the weeding-out process was slow. In late August the requirements package was returned to CACDA who, after further review, sent it on to TRADOC on 25 October 1978. It contained a matrix of weather elements versus the detailed requirements of each Army customer.[32] By early 1979, TRADOC had relayed the package of Army requirements to the Department of the Army which, in turn, passed them to the Air Staff for information. After over three decades of volleying, the ball was back once again in the Air Force court.

Meanwhile, as a follow-on to the requirements package, CACDA directed USAICS to develop a concept for weather support to tactical Army forces, including observations, communications, and the nature of weather support products to be furnished each echelon from the field army downward.

## USAREUR

In November 1977, Lieutenant Colonel Swayne, the Army liaison officer to AWS, accompanied Brigadier General Rowe on a command visit to Europe. In a report to the Department of the Army summarizing the trip, Swayne concluded that USAREUR's tactical weather requirements were not being satisfactorily met by AWS, and that there was no interoperability between the various military and civilian meteorological services supporting assets under NATO's control. During a meeting with General Blanchard on the fourteenth, Rowe told the USAREUR commander in chief that one reason AWS fell short was because USAREUR's tactical weather support requirements were imprecise. Blanchard immediately directed his deputy for Intelligence to develop a comprehensive statement of USAREUR's requirements.[33]

By March 1978, with the 7th Weather Squadron's help, USAREUR had come up with a tentative list of requirements and, typically, AWS sent it back, averring that the accuracy standards USAREUR proposed were too "stringent." USAREUR and the squadron had tentatively identified 50 weather or environmental elements (such as cloud ceiling and sky cover, snow depth, and "seeability") and 27 environmental products (forecasts, advisories, warnings, observations, studies, etc.) impacting Army operations in Europe. Its major subordinate commands were instructed to use them as a guide to provide quantitative data to satisy both General Blanchard's wishes and CACDA's effort above. USAREUR gave AWS a crack at the tentative requirements so that it could provide short-notice comment on the final version. AWS concluded that it could satisfactorily observe and forecast 40 percent of the weather elements USAREUR identified; forecasting and observation accuracy improvement was needed in 37 percent of the weather elements; and of the environmental products AWS furnished USAREUR, 43 percent did not meet USAREUR's requirement for accuracy. However, AWS believed that many of the required accuracies were too stringent, and it recommended that USAREUR and the 7th Weather Squadron re-

evaluate the accuracies to ensure there was a real need for them. AWS also recommended that USAREUR prioritize the weather elements and products based on the environment's effects on specific tactics and operations. Afterwards, AWS would calculate the resources and development effort it would take to meet the shortfalls USAREUR identified.[34]

Lieutenant Colonel Swayne went back to Europe in September 1978 with Brigadier General Rowe's successor as AWS commander, Colonel Kaehn. The Army liaison officer found that weather support to USAREUR units, and the Army's utilization of weather data, had improved over the interval, due mainly to efforts by the 7th Weather Squadron and 2d Weather Wing to ameliorate the problems, and the personal emphasis General Blanchard focused upon their resolution. Two areas that continued to bar USAREUR from receiving and utilizing the full potential of weather support available from AWS were the joint regulation (because of Rowe's counter-proposal to the Army's suggested rewrite, addressed in the following chapter, the 1970 version remained in effect, complete with what Swayne believed was a vague delineation of responsibilities), and inadequate and insufficient tactical weather communications circuitry and equipment. A third handicap was the absence of a precise compilation of USAREUR's tactical weather support requirements, and during a courtesy call on the USAREUR commander in chief, Kaehn and Swayne were told by Blanchard that every effort was being made to complete that project.[35]

In February 1979, through Lieutenant Colonel Swayne, USAREUR provided AWS an advance copy of the final tabulation of its tactical weather support requirements. Swayne wrote that, together with the requirements package the Army had just passed to the Air Staff, they provided "a definitive response to a HQ AWS and HQ MAC contention that Army complaints of unsatisfactory tactical weather support is due in part to the Army's failure to explicitly state the products and resolution needed to satisfy Army tactical requirements."[36] Two months later, in mid-April 1979, the Army formally announced General Blanchard's intention to retire that summer.[37] Swayne did too, meaning that the principal players in the two-year tete-a-tete over USAREUR's weather support requirements were replaced by a new cast with different persuasions, personalities, purposes, and priorities.

## National Guard and Reserve

Like the weather support requirements of active duty Army units, those of the Army National Guard and Army Reserve spiraled in the 1970s under the Defense Department's "total force" policy of relying more heavily on reserve components. It put AWS in a quandary because, while such support was implied, it was not specifically addressed in either the joint regulation or manual, and AWS lacked the necessary manpower. However, at the 5th Weather Wing's urging, as an interim measure until the joint directives were revised, AWS, in a letter of 16 January 1975, issued a policy directing field units to provide support to Army reserve components, when it was asked for, so long as it could be accomplished within the manpower levels then authorized. AWS suggested that maximum use be made of Air National Guard and Air Force Reserve forces to meet such requirements.[38]

In October 1975, the MAC Inspector General wrote a finding challenging AWS' policy, recommending that specific AWS units be

tasked for the support, the same as for Air Force Reserve and Air National Guard units. AWS' position was that it had no charter to provide such support and, in January 1976, it asked MAC to seek an Air Staff ruling on the issue.[39] MAC sought a position on both direct and remote AWS support, adding that "it should be recognized that AWS lacks resources for direct support to ARC [Army Reserve Components] today, and further reductions will eliminate or greatly reduce their capability for remote services."[40] It was a reference to General Carlton's mandate to Brigadier General Rowe the previous month that AWS trim itself of about 1,900 manpower spaces (some thirty-two percent of the total manpower AWS was then authorized)--the so-called "400"-space-reduction exercise.[41]

The Air Staff's position, as set forth in a letter from Colonel Cummins (AF/PRW) to the Department of the Army on 9 April 1976 (copies of which were sent to MAC and AWS), was that where feasible, some services were provided by AWS units to Army reserve forces, but that "there is no precedent for deploying USAF weather resources to support Army reserve forces in a peacetime garrison situation."[42]

In May 1976--based on visits to Army National Guard units between July 1975 and April 1976 by a team under Lieutenant Colonel Duane H. Matters, formerly of AWS--the Air Force Inspector General reported to General Carlton that AWS support was "passive" and unsatisfactory. The MAC commander then wrote Brigadier General Rowe his belief "that we can do better without asking for more people," and to "get with it and brief me how!" Rowe agreed that AWS could do more without additional manpower, and promised to do what he could to get an Air Staff decision regarding the limits of AWS' jurisdiction in the matter. "Put in squarely to Air Force for mission tasking," Carlton ordered.[43]

Colonel Cummins responded in July 1976 to the Air Force Inspector General finding, advising that the Air Staff was still reviewing the question of weather support to Army reserve forces, but that "fiscal limitations will normally preclude direct service (on base, face-to-face) when the unit is not on an active base," just as was the case with Air Force reserve units.[44] The next month, August 1976, following an inspection of the 203d Weather Flight (Air National Guard), the MAC Inspector General once more admonished AWS for a lack of policy guidance to its field units on the matter. AWS' reply was that it was awaiting a policy declaration from the Air Staff.

It came on 24 September 1976, when Colonel Cummins informed MAC and AWS that AWS' basic mission regulation would be revised to specify that the Air Force--AWS--was responsible for weather support to Army reserve forces. For the interim, MAC and AWS were directed to determine the magnitude of the job. The Air Staff was to be informed if the requirements outstripped available AWS manpower, keeping in mind that any thoughts of increasing AWS' population should be evaluated against the wartime needs of both active duty and reserve forces. As 1976 closed, AWS' preliminary look at the job indicated that it would require quite a bit of additional manpower to satisfy, but it believed it could not do much until the Army and the Air Staff straightened out some of the basic directives.[45]

After several informal discussions with MAC and Air Staff representatives, AWS agreed in late 1976 that a conference should be convened at AF/PRW to help AWS assess the Army reserve support requirements.[46] The conference was held on 8 February 1977 and the conferees, including agents from the Army, agreed that Army reserve requirements were identical to those of the active duty force; that AWS was responsible for arranging or providing the needed support--with emphasis on

arranging support since face-to-face service would not be the rule; and that support would be limited to reserve flying units (at approximately 129 bases). Discussions revealed that Army reserve flying units preferred flight clearance briefings from AWS forecasters, but would accept support from Federal Aviation Administration (FAA) flight service stations. Finally, it was agreed that FORSCOM, with AWS' assistance, would survey the Army reserve flying units to assess the adequacy of current support and, based on the results, AWS would develop a plan for satisfying those requirements and forward it to MAC and AF/PRW for review.[47]

Between December 1976 and March 1977, AWS used a reserve weather officer to provide staff weather officer support to FORSCOM's Fifth Army (which, together with FORSCOM's Sixth Army, was responsible for the training and readiness of all Army Reserve and Army National Guard units) as a test and concluded that it was a workable idea. In March 1977 AWS developed strawman tasking of specific AWS units to provide liaison with known Army reserve units. In April the 5th Weather Wing's mission regulation (MAC Regulation 23-45) was altered to make provision for weather support to Army reserve units. The FORSCOM survey was received in late August 1977, providing AWS with its first comprehensive look at Army reserve flying unit requirements. Many shortcomings and unfulfilled needs were identified and AWS decided that, in consonance with the review ordered by Brigadier General Rowe on AWS' Army weather support policy above, an AWS policy on Army reserve component (Army Reserve and Army National Guard) support was also needed.[48]

On 10 November 1977, AWS sent its proposed policy to the weather wings for comments.[49] Early the following month, the AWS staff made policy recommendations through the AWS Council * to Brigadier General Rowe who approved them on 5 January 1978.[50] The AWS policy was forwarded to MAC the same day.[51]

AWS' policy--which was predicated on the 1970 version of the joint regulation, and *not* upon the change addressed below, proposed by Brigadier General Rowe, to chop off all direct AWS support at the corps--was that when Army reserve units were in training, AWS' primary support role was to assist them with readiness for war. It would provide or arrange support for reserve aviation facilities and the headquarters of armored cavalry regiments, separate brigades, divisions, and EAD corps. Air Force Reserve weather personnel would be used as much as possible in tendering the support, and existing facilities--including FAA flight service stations--were to be used wherever possible. Army reserve control tower personnel could provide weather service if within their capabilities, and when operational activities permitted. AWS would provide support when it was infeasible to arrange for it, or for Army reserve personnel to provide it. Logistical support was to be provided by the Army reserve to Air Force weather units on a common service basis equitable with that furnished Army reserve units of comparable size and activity. On a common service basis also, the Air Force would procure, install, and operate all fixed and tactical weather equipment, and maintain it at those sites where AWS had a support responsibility. When required under the joint regulation, and when the necessary Modified

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* As a lieutenant colonel in the plans shop of HQ AWS, Berry Rowe was the father of the modern AWS Council, reincarnated in Nov67 with a composition and charter--a body to review and recommend policy to the AWS commander--identical to the defunct AWS Policy Board established in August 1949. See Fuller, *Air Weather Service, 1937-1977: An Illustrated Chronology*, Jul77, pp. 11-12.

Tables of Organization and Equipment (MTOEs) were provided, AWS would furnish weather teams for mobilized divisions, separate brigades, and armored cavalry regiments. Where practical, the weather team would be led by the reserve weather officer designated to assist with staff support to the Army reserve unit. AWS estimated it would take from twenty-three to twenty-eight additional manpower spaces to implement its policy.

AWS' policy was put to the test by a formal SOR (Statement of Requirements) for direct observing and forecasting support to Muir Army Airfield at Fort Indiantown Gap, Pennsylvania. In response to the July 1977 SOR, MAC conceded that direct support was needed, but informed the Army that AWS lacked the necessary manpower. In March 1978, MAC forwarded to the Department of the Army and FORSCOM a concept calling for direct observing support at Muir, and remote forecasting service from McGuire AFB, New Jersey. In a personal message to Major General Collens, the former AWS commander then serving as the MAC chief of staff, Major General Charles M. Hall, the acting FORSCOM chief of staff, took exception to the concept. Pilots at Muir were receiving their weather briefings by telephone from both Fort Meade, Maryland, and the Federal Aviation Administration's flight service station at nearby Harrisburg, Pennsylvania. Neither method was acceptable, Hall wired in early May 1978 in asking Collens to personally review the situation. After summoning Brigadier General Rowe for consultation, Collens agreed with Hall that weather service at Muir needed improvement. Unfortunately, MAC and AWS did not have the manpower to provide Muir direct forecasting support. So, in line with AWS' policy, remote service from McGuire would have to suffice--which, Collens assured Hall, was consistent with weather service extended to Air Force Reserve and Air Narional Guard units, and would work if the Army discharged its responsibility under the joint regulation to take care of the necessary communications support. In reply, Hall noted that he fully appreciated the manpower shortage in AWS and agreed to give the remote forecasting concept a try.[52] In mid-August 1978, AWS assigned three observers to Muir and an additional forecaster at McGuire--a precedent setting event, not only because the personnel assigned were active duty Air Force, but because, rather than directing AWS to take them from "lower priority" resources, the Air Staff authorized the extra manpower spaces.[53] By mid-October 1978 the Army airfield commander at Muir was well pleased with the observing support AWS was providing, but the forecast briefing service was unsatisfactory because communications were poor.[54]

Manpower problems appeared to be compounded further by an Air Staff decision in mid-1978 to reduce Air Force weather reserve forces. In 1977, during its annual review of manpower needed to fulfill wartime requirements, the Air Staff altered the ground rules to such a degree that there were insufficient requirements to justify the number of manpower spaces authorized to the 100-series Air National Guard weather flights--those weather flights dedicated to supporting Air Force reserve units, manned by both Air National Guard and Air Force Reserve Individual Mobilization Augmentees (IMAs). The Air Staff decided to cut 63 IMA weather authorizations (approximately 37 percent of the total) and 224 of the 596 Air National Guard manpower spaces authorized the weather flight program. Representatives from the National Guard Bureau, MAC, and AWS met in October 1978 to ascertain how to distribute the cuts, and how the remaining weather flights would be organized and aligned. It was determined that Air National Guard weather flights would be aligned primarily to provide support to Army reserve units. AWS informally agreed to convert 18 of the 31, 100-series Air National Guard weather flights to Army support

aligned with separate brigades and armored cavalry regiments of the Army National Guard and Army Reserve.[55]

*Ready for a Pibal run for support of the Army in 1968 are SSgt Earl E. Craig and A/2C Ted L. White from the 207th Weather Flight, Stout Field, IN. (USAF Photo)*

But the eight existing 200-series Air National Guard weather flights, manned by 128 officers and enlisted men, were in extremely poor shape. Visits by MAC Inspector General teams to selected flights in 1976-77 resulted in several unsatisfactory ratings. Manning levels were generally up to established standards, but the weather people assigned were not "in bed" with the Army reserve units they supported, and the Army was not providing them field gear. As a consequence, the MAC Inspector General acceded to AWS' request in early 1978 for a moratorium through that fall on inspections of 200-series weather flights to give them time to bring themselves up to speed operationally.[56]

## IDA Study, 1977

In early January 1977, officials from the Institute for Defense Analysis (IDA) visited TRADOC to discuss a two-phased study they were commissioned to conduct by the Defense Department's DDR&E (Defense Development Research and Engineering) on the value of weather support to the Army. Phase one would evaluate the utility of improvements in mesoscale forecasting to Army combat forces, and the second phase would identify improvements offering potentially significant operational benefits to the Army. IDA had until June 1977 to design the study, and another year to complete it.[57]

Army organizations IDA representatives visited included CACDA, the infantry school at Fort Benning, Georgia, and the field artillery school at Fort Sill. Among other questions, they wanted to know what decision would be made or action taken if the decision maker could be assured of a given weather forecasting accuracy. At the infantry school they were advised that improved accuracies would have limited tactical application at battalion and company level, but would help a great deal at the division and corps levels if accurate forecasts could be provided three-to-five days in advance.[58] The artillery school's position was that few, if any, actions would be taken based upon any forecast with less than about a ninety-percent reliability. If a forecast for one-half mile visibility in fog were made for the following morning, for instance, no action would be taken to relocate weapon systems or change the mix of electro-optical systems. The decision maker wanted to know that visibility would be impaired, but would take no action other than to anticipate that he would be unable to acquire targets as soon as he would if visibility was unrestricted.[59]

In the spring of 1978 TRADOC received a preliminary draft of the IDA study, dated 13 March 1978, and entitled "Assessment of the Operational Utility of Mesoscale Weather Forecasting Improvements for Army Forces." It concluded that estimates of how mesoscale forecasting accuracy could be improved were extremely optimistic. TRADOC took exception to many of its conclusions because the IDA consultants, not being meteorologists, had asked poor questions and had incorrectly interpreted the data so gathered. Nevertheless, IDA planned to continue with the second phase of its study in which it would determine the Army's requirements for combat weather information--low level winds and stability for chemical operations, for example, or temperature, density, and winds for artillery fire. Its evident goal was to define contemporary capabilities in mesoscale meteorology; estimate future capabilities in that area; quantify the value and utility of mesoscale observations and forecasts on the battlefield; and determine if research and development money should be invested for improvements in mesoscale meteorology.[60]

## Support To NATO Army Forces

At the request of the Federal Republic of Germany on 30 April 1976, addressing the subject of weather service interoperability in support of NATO (North Atlantic Treaty Organization) tactical army forces in Europe, the 5th Weather Wing, together with Lieutenant Colonels Macy and McDonald (the staff weather officers, respectively, to USAICS and CACDA), worked jointly with TRADOC to define the anticipated weather support requirements in Europe through 1985. TRADOC's reply of 3 June 1976 was significant in that it formally addressed weather support

concepts above corps level for the first time since the EAC decision discussed earlier herein.[61]

Subsequent to his command visit to Europe in November 1977, Brigadier General Rowe directed his staff to develop an AWS NATO support policy, which the AWS commander approved in July 1978. AWS declared that it would provide weather support to Air Force and Army units under NATO command and control, including separate brigades, armored cavalry regiments, divisions, and corps. The Air Force was to encourage NATO to provide or arrange the best possible weather support to its command and control elements with jurisdiction over Air Force and Army resources; consider NATO interoperability while developing weather plans, programs, and systems; and, through AWS, use standard NATO codes, formats, and procedures, etc., to present weather information to participants in NATO operations. AWS advocated that forecasts from a single source be used to support NATO operations and, to the extent possible, it vowed to pattern its peacetime weather support to NATO designated forces after that planned during wartime.[62]

## The AWS Position

Despite the fact that the Army had repeatedly responded, AWS' traditional position through the years from World War II onward was that the Army had failed to be specific about its requirements for weather support. The litany from AWS was heard in the Korean War and after. Once the Army forwarded a comprehensive set of requirements--in 1956 and again in 1958 and 1959--the Air Staff would not cough up the manpower to satisfy them. The Air Staff's position in the late 1950s was to balance Army requirements with Air Force assets and, if overall Air Force interests were jeopardized, suggest the Army provide the manpower or identify lower-priority AWS resources that could be shifted.

The Army's specific weather support requirements could be found in several sources. They were listed in the joint manual and the joint regulation--both the 1962 and 1970 versions. They could be found in TOEs and MTOEs. They were available in several official Army studies such as MET-70, MET-75, and TESS. Even the Air Force's multi-volume Weather 85 mission analysis of AWS published in 1973 contained a section addressing the Army's requirements out to 1985.* And of course the requirements were manifested on an individual unit basis in the formal SORs insisted upon by the Air Force and AWS. Yet when the Army landed in force in Vietnam in the mid-1960s, the Air Force and AWS could not keep pace with their SORs. And after that war, while AWS' manpower pool was being bled dry by a succession of drawdowns, Army requirements state-side and in Europe mushroomed, and the Air Force and AWS had to reduce 14-man corps and division weather teams back to 4- or 6-man "cadre" teams while in garrison.

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*See Section I, Vol III, *Air Force and Army Requirements for Weather Support, 1972-1985*, of *Mission Analysis On Air Force Weather Mission - 1985*, (L. G. Hanscom Fld, MA: Electronic Systems Div, AFSC, Jan73), (S). Info used (U).

Therefore, despite the fact that Army authorities were generall unaware of what AWS support was available or how to use it (a deficiency AWS' staff weather officers with Army units were responsible for overcoming), and notwithstanding AWS' allegation that they were too vague, the Army requirements for weather support (which were quite specific in many instances) were on record, for those truly interested in them. The problem was that they translated into more manpower and resources, which AWS did not have (unless it chose to cut support to some Air Force units), and the Air Staff would not allocate.

Brigadier General Rowe, the AWS commander from mid-1975 through 1977, harbored particularly strong views on the subject, which influenced his proposal to cut off direct AWS support at the corps level. Asked in an interview whether AWS support to the Army was "second class" or "token," as some officials in AWS had characterized it, Rowe confessed that it was a "little on the marginal side," even "potentially unsatisfactory," but that the Army received a "fair share" of AWS' attention and resources "consistent with known [Army] requirements." "The Army has not asked for, in my view, the support they really ought to have," he said. Asked why the Army was compelled to submit formal SORs when it was not required of Air Force units for routine support, the general replied that it was not true. The Air Force used a process similar to the SORs. The problem with SORs, he continued, was that they were generated--in concert with the staff Intelligence officer--by AWS staff weather officers. It raised questions about credibility by the Air Staff, and led to Air Force-proposed solutions to Army problems because the Army had more importan things to worry about. When MET-70, MET-75, and TESS were recalled in response to his premise that the Army was not adequately stating specific requirements, Rowe countered by saying that the drawback with those studies was that they were done more in an academic environment than in a field command; they were done by support and staff officers--including AWS' staff weather officers--rather than by the users, the Army decision makers. "The Army people who are going to have to fight the battles need to get involved in what they require from Air Weather Service," the general responded. When reminded that the Fort Leavenworth tactical requirements conference of August 1977 cited requirements identical to those spelled out in TESS, Rowe replied that the test of their validity was whether or not the Army was willing to obligate assets to fulfill them. Questioned why the Army should have to commit resources when it was AWS' mission to furnish the support, Rowe said the joint regulation specified that forward of division, "the Army would do things meteorological for itself," but that the Army had "totally abrogated that agreed position." In fact, the joint regulation specified that AWS would furnish forecasting support forward of division, and that the Army would provide all communications below the field army level and observations forward of division--although it contained loopholes engineered with Rowe's help, whereby the Air Force could furnish observations and communications below division level.[63] However, notwithstanding the fact that the Army had done so in Vietnam with its Special Forces teams, Rowe was correct in pointing out that the Army had not routinely furnished surface observations forward of division, not only for its own use but for use by AWS to support it. Until the Army committed resources to perform such tasks, it was Rowe's opinion that the Army considered studies like TESS "documentary exposés and not requirements." Committing its own resources to meet them, Rowe believed, would be defacto recognition by the Army that the requirements set forth in TESS were indeed valid instead of "nice to haves."[64]

FALOP

Brigadier General Rowe believed that the Army's involvement in the Forward Area Limited Observation Program (FALOP) was a step in the direction of the Army's recognizing its responsibilities under the joint regulation by committing resources to meet its own requirements.

Developed by Colonel Walter M. Dale, commander of the 2d Weather Wing's 7th Weather Squadron, and staff weather officer to USAREUR, and tested in the 1st Armored Division during several field exercises between November 1975 and March 1976, FALOP was designed to increase substantially the number of weather observations taken forward of division. Intelligence personnel in brigades and battalions of infantry and armored divisions, and armored cavalry regiments, were trained by 7th Weather Squadron people to take limited weather observations using forester or belt weather kits. Trouble was encountered during the tests in getting the observations back to division because there were no dedicated weather communications facilities. Nevertheless, it increased surface observing sites from 4 to 17-to-20 per division, and from 4 to 8-to-12 per armored cavalry regiment. While informing the Department of the Army about FALOP, and the fact that it would be implemented throughout USAREUR, the USAREUR chief of staff called it "a step forward in solving a long standing deficiency."[65]

Brigadier General Rowe agreed that FALOP was a praiseworthy innovation and a "significant milestone in Army weather support"--as he described it to the USAREUR commander in chief.[66] After directing his people to extend the FALOP concept to other Army organizations, the AWS commander asked the Air Staff (AF/PRW) in late January 1977 to inform Department of the Army authorities of AWS' support, and solicit their aid in widening its use.[67]

In line with AWS' policy, TRADOC was urged in 1978 by its staff weather officer to direct USAICS to formally implement FALOP throughout the Army.[68] Early that fall, TRADOC asked USAICS to determine if there was a need to do so.[69]

Meanwhile, FALOP was implemented by other Army units, including the Eighth Army in Korea, where it became fully operational in May 1978.[70] Efforts had been hampered by a shortage of belt weather kits within AWS, their unavailability through Army supply channels and, in the case of the Reforger 77 exercise in Europe, because the operations and intelligence communications net was not always free of traffic to relay the observations back to division.[71] FALOP was a good concept, but would not benefit either AWS or the Army unless a way was found to ensure that the observations got from the forward areas to the people who could make use of them. Furthermore, FALOP reportedly did not provide observations of a quality good enough to benefit AFGWC and, indeed, AWS had to determine whether or not there was really a need to relay them back to AFGWC.[72]

CHAPTER 9 - CONCEPTS, POLICY, AND DOCTRINE

## Air Force

Basic Air Force and Army policy governing the provision of weather support to the Army was set forth in the joint regulation and joint manual addressed below. They reflected official Air Force policy. Yet the key policy issue for the Air Force was whether or not AWS should support the Army and, if so, to what degree--and no discussion of it ever found its way into the directives, although it was every bit as binding for AWS.

While high-level Air Force authorities in the late 1950s opposed continuation of AWS support to the Army, as addressed above, such beliefs evidently were not aired during the 1960s--probably because the war in Vietnam somewhat eased the pressure on Air Force resources. Army weather support requirements equated to Air Force resources, and while the Air Staff recognized the desirability of AWS supporting the Army, the Air Staff would not allocate resources for Army support if Air Force interests were jeopardized. If they were, the Army would be accorded the option of transferring Army manpower to meet its requirements, or of identifying lower-priority AWS resources already allocated for Army support which could be shifted.

With their resources undergoing cutbacks in the early 1970s, top Air Force officers once more questioned why AWS supported the Army. The question was posed by the Air Force vice chief of staff in late 1971, and by the Air Force chief of staff some eighteen months later. Although not voiced to those two particular officers, one reply by an Air Staff official (AF/PRW), as relayed by the AWS commander, General Best, was rather succinct, if academic: "for the same reason that the Air Force provides close-air [even airlift] support to the Army."[1] It was a matter of roles and missions. Air Force officials continually had to discomfit efforts by Army counterparts who would have liked an "organic" close air support or tactical airlift capability--and who could say for certain they would not relish an "organic" Army Weather Service. Hang a few more gun mounts and rocket pods on their helicopters, give them back the C-7s the Air Force took in Vietnam, and organize the 800-plus weathermen they had and the Army would be in business. If the Air Force abdicated its responsibilities under joint doctrine the Army did not care. But both branches would suffer because of it.

As the 1970s dawned, the Air Staff (AF/PRW) was indifferent toward the formation of an Army Weather Service. To begin with, informal contacts with the Army unearthed a disposition to let AWS assume the entire Army weather support mission, as discussed below. Moreover, reasonably secure in the belief that the Army could not afford an Army Weather Service in the post-Vietnam era of shrinking defense budgets, or that budget beagles from the legislative and executive branches would not support such duplicative efforts, the Air Staff could be niggardly in allocating Air Force assets to Army weather support requirements. The fiscal facts of life dictated the Army and Air Force positions in the affair.

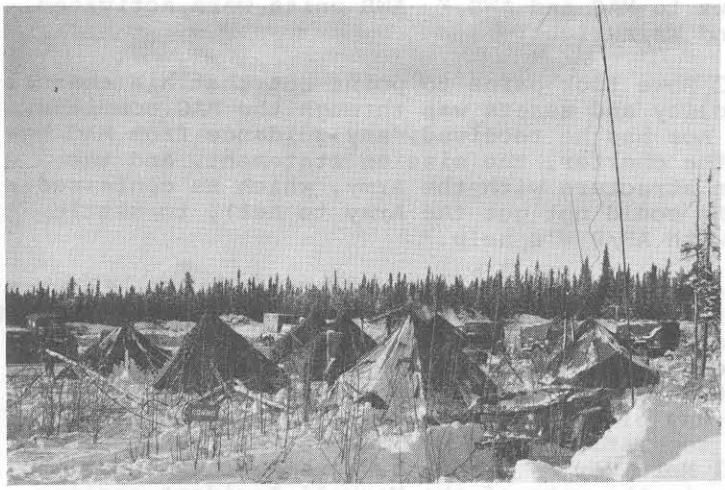
The Air Force did not hold a resource purse with no bottom. Air Force assets were finite. It looked askance at Army efforts to tap its till. As Brigadier General Best emphatically emphasized, while mentioning the Air Staff's resistance to devoting more Air Force assets to Army weather support, "*the cupboard is bare.*"[2] The three-star general on the Air Staff to whom AF/PRW answered told Best personally that he "wanted Air Weather Service support of the Army no worse, nor no better, than that to the Air Force,"[3] At one point the Air Staff wanted the Army to reimburse it for services rendered--which the Army adroitly sidestepped by reminding the Air Force of the roles-and-missions agreements under the National Security Act of 1947, and that Defense Department directives excluded reimbursement by one branch to another for tactical support, which the Army interpreted as including all AWS support. The Air Staff looked critically at Army SORs, and asked AWS to drag its feet in helping the Army submit them.

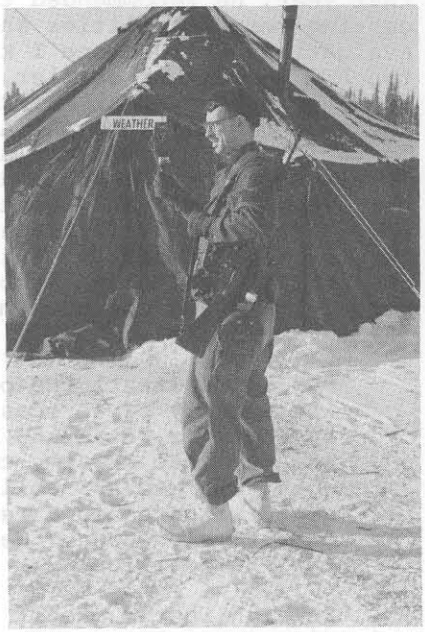
By the mid-1970s, with Brigadier General Rowe's ascendence to the AWS helm, the Air Staff's tacit position had not changed much. Colonel Cummins, who served as the Air Staff's assistant for weather (AF/PRW) from mid-1975 to mid-1978, said that during his tour no high-level general officers on the Air Staff had questioned the necessity for AWS' supporting the Army, but that guidance from his superiors inferred that the Air Force would continue to underwrite the effort only so long as the Army chipped in with some help.[4]

Brigadier General Rowe, who led AWS while Colonel Cummins was the Air Staff's assistant for weather, reported that he had received no specific guidance from the Air Staff, but that,[5]

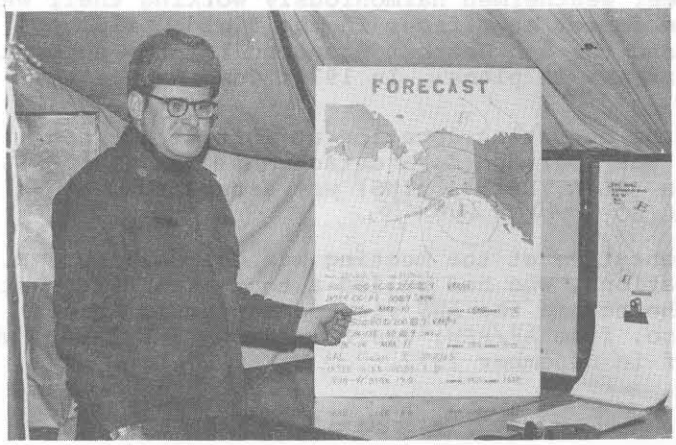
> I can infer guidance by actions of the Air Staff in resource control. I could translate those to say: "There are only so many resources available. You do with those resources what you can. Come and ask us to do other things that require more resources." My general feeling is that had I asked for more resources the answer would have been: "no, try and readjust your priorities to accommodate new requirements with existing resources." As you know, we have told the Air Staff we don't have the assets to satisfy specific SORs . . . .But I think that if I had asked for guidance, I would have gotten essentially the same thing that General Best got.

Indeed, the Air Staff's cupboard was still bare in 1977 as evidenced by its response to the Army's desires for direct support in Alaska. In late 1976 the Army submitted SORs for direct observing and forecasting support at Forts Richardson and Wainwright. It was ascertained by AF/PRW (Colonel Cummins), through AWS, that it would take thirteen AWS manpower spaces, but Cummins advised the Army that AWS did not have them. In late November 1976, therefore, the Department of the Army surveyed each of its major commands, asking them to scrub down their requirements in an effort to come up with spaces for Alaska. The need for direct weather support "must be reduced to a minimum level consistent with operational and safety requirements," the Army wrote; "commanders must make every attempt to arrange for remote . . . support and to substitute remote service for direct weather service support during periods of limited flying activity."[6] In a letter to the Air Staff--Cummins--of mid-February 1977, the Army noted that by reducing requirements for direct support at Forts Knox, Leonard Wood, and Rucker it came up with about eleven AWS spaces that "should provide a nucleus for the establishment of AWS detachments at Forts Richardson and Wainwright."[7] Ten days later






*AWS support to the Army in Alaska: during exercise Jack Frost 75 (Jan-Feb75), 11WS weathermen "camped out" (top photo) with soldiers of the 172d Infantry Brigade near Fort Wainwright. At right, SSgt Larry L. Johnson uses anemometers, while at bottom, Lt Col Edward Smoot briefs Army field commanders on current and forecast weather--snow, maximum temperature of -13°F, and a minimum temperature of -28°F. (USAF Photos)*



Cummins passed the news to MAC and AWS.[8] AWS units were activated at Forts Richardson and Wainwright.*

Brigadier General Rowe took pains to point out that his channel to the Air Staff on policy and assets was through the MAC commander. He had not asked for, nor had he received, any guidance from MAC because he felt he had the charter, the mission statement, and the mechanism (the liaison structure with the Army, which he confessed to be delusory after he could not get the Army to act), to settle basic issues himself, with AF/PRW's help.[9]

Particularly discomforting to the AWS leadership in the 1970s was opposition evidenced by the Air Staff's assistant for weather (AF/PRW) towards AWS' data automation and centralization concepts. "When we optimize for peacetime service, keep this tenet in mind," the AWS commander, Brigadier General Collens, urged his people in mid-1974: "will it work in war--any place, any time regardless of level of conflict or degree of sophistication?"[10] Just as his predecessor at AF/PRW had, Colonel Mortimer F. Bennet had just such a tenet in mind in mid-1974 when, in the wake of the Maxwell Incident earlier that year, he recommended that further centralization of AWS' forecasting responsibilities should only be undertaken after thorough evaluation.[11] "No one I know" on the Air Staff, Bennet had cautioned the AWS leadership earlier, "is interested in a better forecast."[12] Bennet's successor at AF/PRW, Colonel William E. Cummins, ran into the same obstacles on the Air Staff while trying to sell AWS' requirements for AWDS and bigger and better computers for AFGWC. With only mixed success, the AWS leadership met with AF/PRW several times in the 1970s to sell AWS' centralization concepts because of AF/PRW's role as the Air Staff linchpin for AWS programs seeking more Air Force assets. "PRW position is that MAC/AWS has gone too far in centralizing weather production functions at AFGWC," a MAC staff officer reported following one such meeting with Cummins at AF/PRW in February 1977;[13]

> PRW holds [that] the pace of centralization has reduced the ability of forecasters to stand alone in the field and support Air Force and Army operations. Hence, centralization has cut into AF/Army combat capability. Additionally, PRW questions MAC/AWS ability to transmit AFGWC data to contingency/war area in a reliable and timely manner. Basic PRW thrust--slow down. We (MAC and AWS**) were unable to modify the PRW position.

It highlighted one of the peculiarities of the AWS "family," as Brigadier General Best liked to refer to the inbreeding in AWS. In 1967-68, as lieutenant colonels, Cummins and Rowe were blood brothers in the AWS "family," career weathermen harmoniously working their way up through the ranks--the former an officer in the field, prior to going to Vietnam to command the 5th Weather Squadron in Army support, the latter at Headquarters AWS in plans. In 1971, Cummins was the

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*Effective 1Feb77, the operating location at Fort Richardson (OL-J, Det 4, 11WS, 3WW) was upgraded to a detachment (Det 4, 11WS), and an operating location (OL-A, Det 4, 11WS) was established at Fort Wainwright. See MAC SO G-407, 24Nov76.

**Senior AWS representative at the meeting was Col Salvatore R. LeMole, the DCS for Operations, who had pulled a tour at AF/PRW just prior to mid-1974, and who became the AWS vice commander in August 1978. At the meeting also, from AF/PRW, was Col Ramon C. Wilkins, who became AWS chief of staff in December 1977.

number two man in operations at Headquarters AWS when the AWS leadership was displeased with disabling manpower cuts levied by the Air Staff under quotas Rowe helped establish while in the AF/PRW shop. On the other hand, AF/PRW was annoyed by AWS' eternal quest for bigger and better (and costly) computers, or with AWS' vacillating position on a piece of tactical meteorological gear with the exotic acronym EROWS--Expendable Remote-Operating Weather Station.* In 1975-77 Rowe was at the helm of AWS discrediting AF/PRW as he tried to sail the ship of state upstream against storm warnings from Cummins that too much centralization and automation too fast by AWS was undermining the Army's combat potential, and that AWDS could not successfully compete for Air Force money with programs like the F-15, the E-3A, and Minuteman. Various positions of responsibility had a strange way of reversing viewpoints of the Air Force's career weathermen.

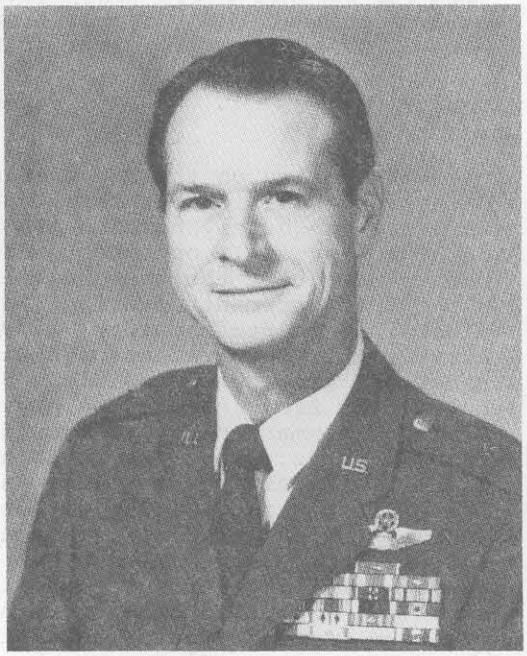
AWS

AWS policy on the key problem areas in Army weather support was detailed in earlier chapters. Summarized, AWS did not believe the Army was adequately stating its requirements, or asking for what it ought to have. It opposed the formation of an Army Weather Service, but would accept the responsibility for meeting all the Army weather support requirements provided adjunct resources came with it. In line with Air Staff policy, it was dedicated to holding the line on Army weather requirements equating to more Air Force assets, even reducing them where possible. Support to divisions should be direct, but if the Army insisted on prying the weather team from the main division command post, it should be provided remotely by the weather team at corps. Doctrine in joint directives was outdated and ambiguous. Recurring drawbacks in tactical weather communications needed resolution. Tactical meteorological equipment had to be simple, rugged, and preferably not dependent on external power sources. Complete MTOE support of weather teams was a must. A direct satellite readout capability was not needed at corps level or below. Support to the Army had to be in gee with AWS' centralization and computerization concepts for the AWDS era. There was a need to educate Army officers on the value of weather support, and AWS officers on the Army's tactical concepts for winning the land battle--its primary mission.

The AWS leadership in the 1970s devoted more attention to supporting the Army than at any time since the 1950s. It was prompted by the experience in Vietnam; changes in the Army's fundamental fighting concepts; tacit recognition that AWS support to the Army was "token" and "second class," and knowledge that the Army was spotlighting that deficiency in various studies; and the realization that, while Army personnel levels shrunk, its requirements for weather support were expanding at a time when AWS' support could very well be eroded further due to Air Force and MAC-imposed cutbacks in its manning. It became a matter of policy for the AWS leadership to meet head-on the problems in supporting the Army. It resulted in improved and expanded dialogue with the Army, manifested primarily in four Army weather support conferences, and five meetings of a newly-

*For a synopsis of EROWS--whose immediate ancestry went to 1965, but also had roots in the Army Signal Corps' SCM-19 Automatic Weather Station, developed in the late 1940s and tested in 1951--see the discussion in Chapter 4 herein.

*Brig Gen Best*



*Brig Gen Collens*

*Brig Gen Aldrich*

established joint working group, between 1970 and 1977, as discussed below, each attended by Army representatives--sometimes general officers. "We have come to grips with the challenge of improving our support to the U.S. Army," Brigadier General Best told one such conference in January 1971, [14]

> We recognize that Army support is a different breed of cat, in other words, there are significant differences between the functions of the normal base weather station and the . . . field army. Unfortunately, within the latter area there is considerable difference in our mode of operation. Army support should be examined to achieve a greater degree of standardization--standardization should move ahead to the degree possible. In the manpower area, austerity is the word for the future. We must scrutinize our force for potential resource savings. Some cuts will be effected in both Army and Air Force support; however, the reductions will be made with a view toward making our support to the Army as good as that provided the Air Force.

By the end of his tenure as commander, in mid-1973, General Best thought AWS was doing a good job of supporting the Army, but could do better if it had more resources. The Army appreciated the job AWS was doing for it, the AWS commander said, but its officials were still too unfamiliar with meteorological state-of-the-art to appreciate how much more AWS could be exploited.[15]

Brigadier General Best mentioned General Carlton's "wall-to-wall scrubdown" of AWS in 1973, which concluded that the entire United States Army received service from AWS approximately equivalent to that provided a major Air Force command. One MAC official reported that the Army got less service from AWS than did the Air Force "by a factor of four or five," while another said the Air Force was favored by AWS by a factor of eight-to-one.[16] In fact, the MAC commander's "scrubdown" of AWS revealed that AWS had 6,913 manpower spaces engaged in weather support (excluding its weather reconnaissance force), 1,146 of which were devoted to support of SAC, 929 (13%) to the Army, 652 to TAC, and 639 to PACAF, representing the four biggest investments in AWS manpower; AWS' total costs were $71,040,500 (salaries and O&M--Operation and Maintenance), $11 million of which was devoted to SAC, $9 million to the Army, $6.9 million to PACAF, and $6.4 million to TAC. That, despite the fact that the Army had more people and airplanes (only one Army airfield in the United States received 24-hour observing and forecasting support from AWS)* than did the Air Force--and even then the Air Force chief of staff felt it was too much, and wanted to know why AWS was supporting the Army at all.

Of the AWS commanders in the 1970s, Brigadier General Rowe, to his credit, devoted more time and energy to Army weather support than did his predecessors. The reason he was able to do so, he said, was that he had more time available because he did not have to fiddle with the burdensome and demanding weather reconnaissance mission and resources, which General Carlton got the Air Staff to give to ARRS (Aerospace Rescue and Recovery Service) in September 1975, and the weather equipment maintenance mission and resources which, at Rowe's urging, under pressure by Carlton to cut AWS further, the Air Staff transferred to AFCS in October 1977.[17] Rowe had less than half the

*By contrast, the vast majority of MAC's fourteen main operating bases in 1976, and all of SAC's, enjoyed 24-hour observing and forecasting support from AWS.

*Brig Gen Kaehn being interviewed by CMSgt Q. J. Keaveny (left), during NATO field training exercise, Constant Enforcer 79.*

people, and none of the five dozen airplanes, that Brigadier General Best started with in 1970. Of the 4,720 manpower spaces authorized AWS in May 1978, 802 (17 percent) were dedicated to Army support.[18]

Aside from the fact that it was part of his responsibility as the AWS commander, two other factors that heightened Brigadier General Rowe's interest was the importance he attached to weather support to Army units in combat, and the "deficiencies I've seen in the ability of our people to do the job."[19] Rowe characterized AWS support to Army under his administration as satisfactory, but that it "could be evaluated a little on the marginal side in a lot of respects," and "I think [the characterization] 'potentially unsatisfactory' is what moved me to do what little I have been able to do."[20]

Answering allegations that uncertainty existed among his field units and within the Army over who precisely within AWS was responsible for formulating and articulating policy on weather support to the Army, Brigadier General Rowe conceded that, to a degree, they were probably on the mark. Moreover, he was responsible for formulating policy. But because the Army had largely neglected its "obligation to be a player in that policy," Rowe said it resulted in unilateral AWS-Air Force policy and "Air Force solutions to Army problems."[21]

## Field Unit Views

It was "intelligence" from AWS field units, as Brigadier General Rowe phrased it, that kept Headquarters AWS mindful of the fact that all was not well in the Army support game. During the Army weather

support conference of January 1971, a 5th Weather Wing official mentioned the gratification his wing felt over AWS' increased attention to the matter, saying that the wing had made "significant strides" in improving AWS support to the Army and that it was the wing's responsibility that "this support is not again relegated to a second-class status."[22] A year later the 2d Weather Wing and 7th Weather Squadron commanders told a visiting officer from Brigadier General Best's staff that AWS was furnishing mere "token support" to the Army in Europe, and that AWS should support the Army fully or get out of the business.

In late 1973, Brigadier General Aldrich directed the 16th Weather Squadron commander to investigate ways to further reduce "cadre" weather team manning and, paradoxically, improve weather support to the Army. Responses from the squadron's weather teams raised both old and new issues. Special training was needed before assuming staff weather officer duties with the Army; communications support by the Army varied from good to bad; there were inconsistencies between communications equipment authorized in TOEs and that on hand; and some Army communications equipment was incompatible with Air Force equipment. A proposal to locate the staff weather officer in the Intelligence office at each Army element was almost unanimously opposed! As a result of its survey, the squadron offered suggestions to "higher headquarters" for improving AWS support of the Army. For the long term, the joint directives needed revising, and TOE authorizations had to be consistent with Army doctrine. For the short term, among other ideas, the squadron suggested that AWS officers assigned to Army support be experienced and graduates of special courses and schools; there be more crossfeed of information among people in each weather wing supporting Army elements; and that the MAC Inspector General teams concern themselves more with Army support concepts and doctrine than with routine Army airfield support.[23]

In early December 1974, Colonel Leonard E. Zapinski, the 5th Weather Wing commander,* informed the 16th Weather Squadron that his wing was going to play a more active role in managing its assets committed to Army support, and that "the bulk of the AWS concepts and doctrine for Army support, . . . with your assistance, *must* emanate/pass through this office."[24] Interestingly enough, the subject of Army weather support was not on the agenda during a conference Zapinski hosted for his subordinate commanders the same month.[25]

Six months later, as a follow-up to Colonel Zapinski's instructions, the wing proposed to its units--and answered--the question of "where are we going in Army weather support?" It reviewed the wing's "modest" but "tangible accomplishments" the past six months, and then went on to note that,[26]

> if we are to continue to "move out" with improving weather support to the Army, we must become more involved. In the future, the 5WW staff will function as the "catalyst," with the assistance of the other wings and AWS, in the coordinated staffing process required to approve doctrine and changes thereto, translating the doctrine into reliable operational

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*Before assuming command of the wing in October 1973, Zapinski headed in succession, the plans and operations staff agencies at HQ AWS, and before that had commanded the 1st Weather Group in Vietnam--whose 5th Weather Squadron supported Army units there.

concepts, and insuring that proper monitoring and feedback channels exist between operational and doctrinal units. This function is the key to the program.

Along the lines of communicating his policy to his staff, the 5th Weather Wing, and other AWS field units, Brigadier General Rowe was asked what specific guidance he had issued. "I've basically told them," he responded, that[27]

> we don't have surplus assets; that it's difficult for us to meet new requirements. . . . Be as realistic as possible. Don't ask for nice-to-haves. . . . But if you have a hard, supportable, documentable requirement, send it in. In essence, keep the cards and letters coming in on Army weather support. . . . I think my wing commanders understand there is no lid on Army support. [However,] there are practical limits. We must act under current guidelines. . . . They also have a responsibility to solve today's problems, . . . but we have to live in today's world. . . . Now, whether we have communicated that down below the wing commander level--perhaps we've not done as good as we could.

Joint Force/Tactical Support

For the sake of keeping rein on the study's scope, most of the foregoing discussion was limited to support of the Army; but it must be understood that by no means did that support exist in a vacuum. It was inextricably tied to the reality that Army elements were generally employed as part of joint forces--unified commands comprised of Army, Air Force, Navy, and Marine Corps components--for combined operations in places like Korea, Vietnam, and Europe. Because of that fact, AWS support to Army units had to be delicately blended--in terms of men, materiel, and services--with its support to Air Force elements attached to the same joint force. When one considered the many variables involved--peacetime versus contingency or wartime, garrison versus field support, deployment of stateside Army and Air Force units overseas for assignment to, and employment by, unified commands, etc.--it was an extremely complex arrangement. It was to that question, to that matter of support, that AWS and Brigadier General Rowe, at the 5th Weather Wing's urging, took a closer look in the fall of 1975.

In a letter to AWS of 8 July 1975, the 5th Weather Wing forwarded a "status report" on tactical weather support concepts. It looked at contemporary concepts and policy, and future problems, regarding support to both the Army and Air Force. Addressing tactical weather support in the 1980s, the wing envisioned it revolving around AWS' centralized production facilities. It questioned whether their products would be timely enough to meet the needs of the tactical forces, and whether AFCS could get the products into the tactical arena. Looking at such future communications systems as Joint Tactical Information Display System (JTIDS) and WWMCCS, the wing was in doubt over which data would be transmitted over which system; which computer weathermen in the tactical arena would use, and whether it would be "ruggedized" and miniaturized for Army support; and what information did the centralized production facilities need from the tactical arena to provide the needed mission-tailored weather products? The wing recommended that a working group be formed to investigate such problems. The joint directives needed updating, the wing noting

that "completing the joint regulation is a key item in any Army weather support program." "Better harmonization is mandatory at DA-DAF [the Army and Air Staff] level in the development of tactical meteorological equipments/sensors and . . . communications systems," the wing concluded; "with today's 'crunch' on DoD resources, it is no longer practical for each Service to have a 'go-it-alone' policy."[28]

In response to the wing's concern, AWS convened a tactical weather support concepts conference at Scott AFB in mid-September 1975. In his opening remarks, Colonel Rowe said that AWS had to mesh all of its efforts in the tactical support area into one united effort. No longer could AWS afford the luxury of separate concepts, organizations, and operations, for tactical support of the Army and Air Force. He went on to say that AWS had to give equal and due emphasis to Army support, and insure that its concepts addressed the entire spectrum of contingency and war situations for all Army, Air Force, joint, or unified actions. The conferees ironed out a position for AWS to take at the Army's IAG meeting at Fort Huachuca the following month, as discussed previously; they debated the change in weather TOE "proponency" from Signal to Intelligence, and decided that, because AWS personnel knew too little about them, AWS publish a source document for all TOEs; they surfaced the need to shorten the processing time for SORs; and they agreed that AWS should try to establish a liaison office in the Department of the Army.[29]

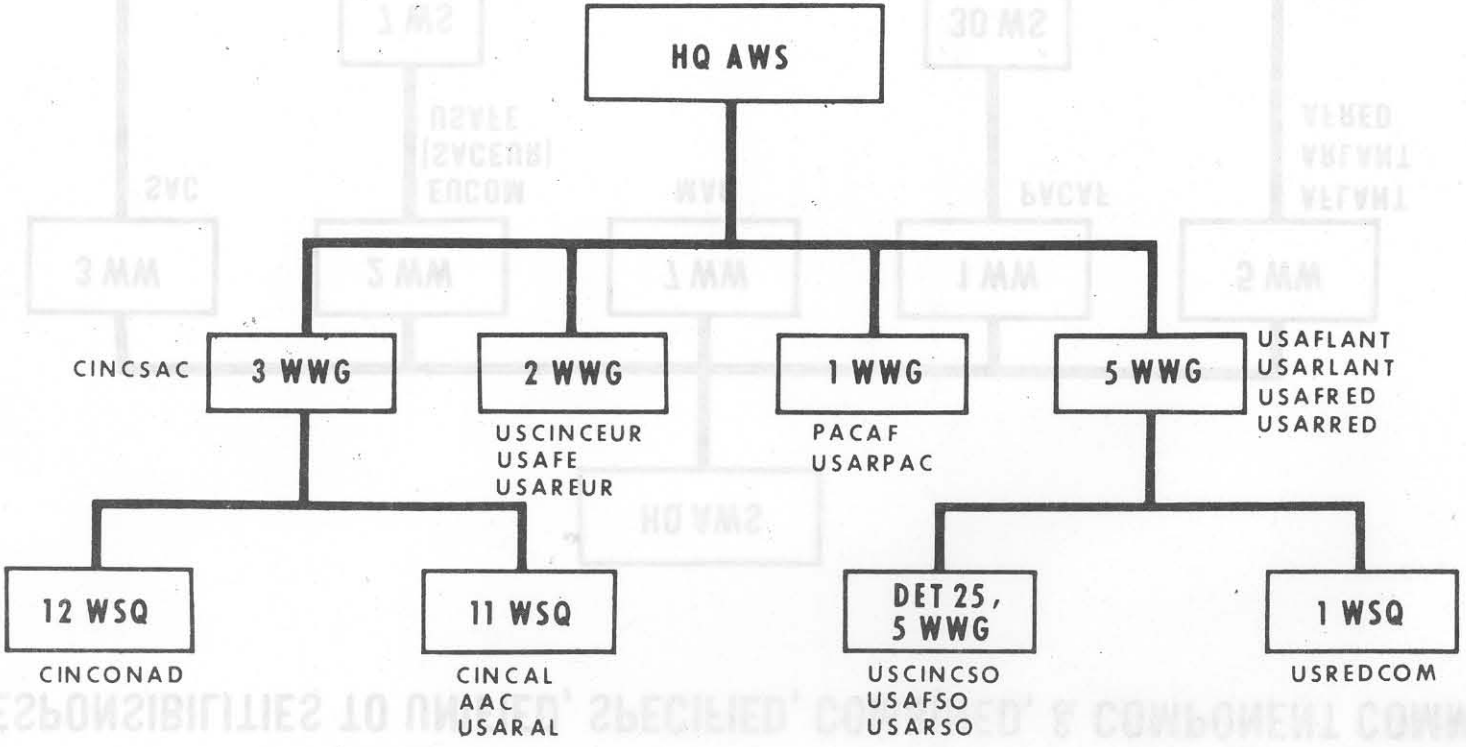
During a conference at Headquarters AWS two months later, in November 1975, the weather wing commanders were presented the AWS policy on tactical weather support. There would be a single manager for the entire system: Headquarters AWS--the operations staff agency--would exercise overall management and make all policy decisions. Communications up and down the chain of command was very important, as was crossfeed among AWS units. Once AWS established policy and concepts for organization and operation, employment methods and operational procedures would be developed by the wings. Because of its broad range of support to tactical Air Force and Army units, 5th Weather Wing was designated as the AWS "executive agent" for developing operational procedures in tactical support.[30]

## AWSM/R 55-2

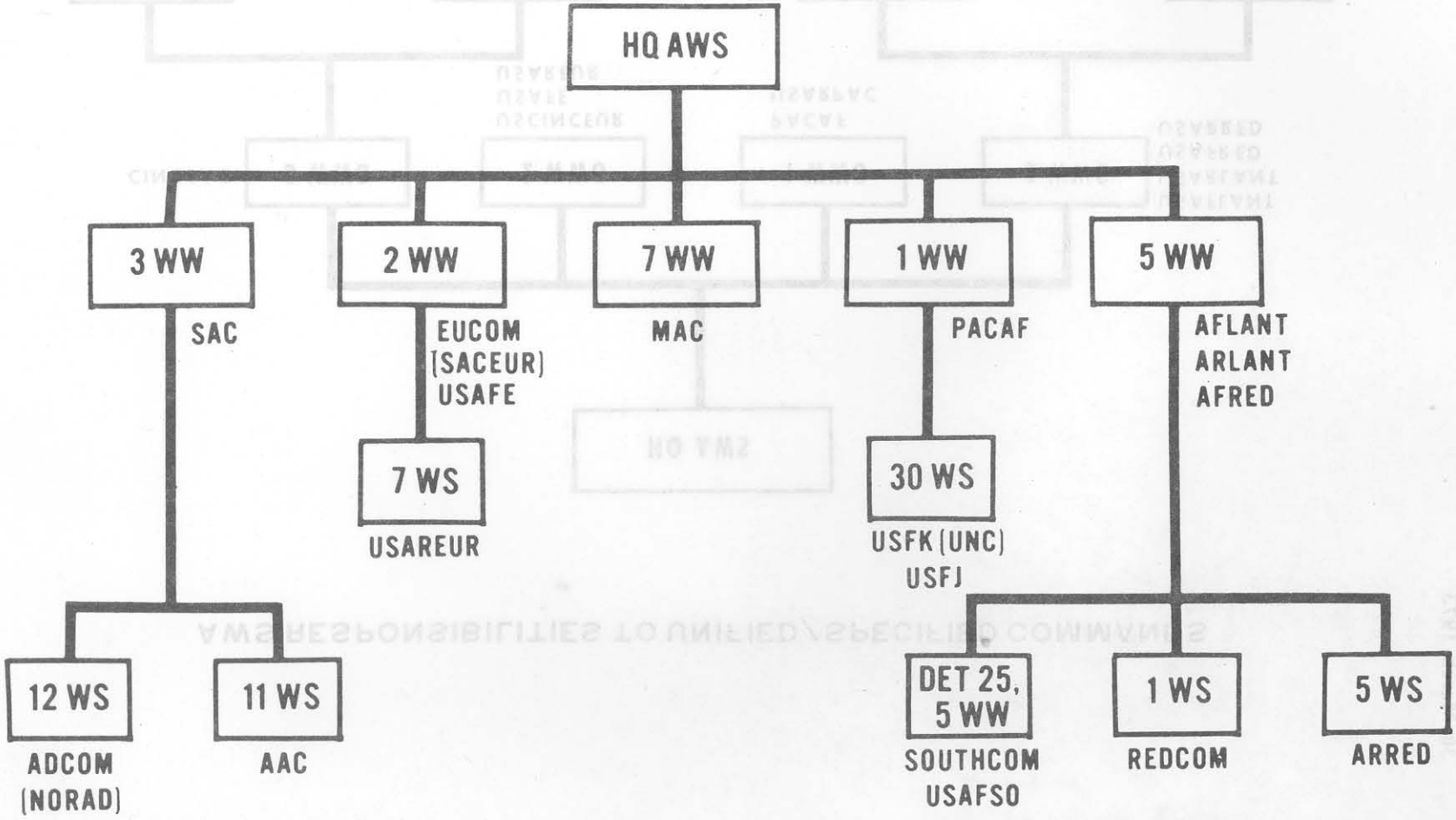
Until January 1975, the directive which outlined its policies, concepts, and procedures in such areas was AWS Manual 55-2, *Operations: Weather Support for Joint Force Operations*, dated 30 March 1973. It superseded a November 1967 version and it addressed support to unified commands. It covered such things as the role of AFGWC, and the Air Force's MEFPAK system, including UTCs and MANFOR listings for weather team support to corps, divisons, and brigades.

One drawback with the manual was that, in addressing the critical issue of command and operational control of AWS forces supporting unified commands, which caused AWS embarrassment when it surfaced three times in Southeast Asia,[31] it left the door open to conflicting interpretations. At one point it stressed that AWS had to be responsive to the weather support requirements of Air Force and Army components of unified commands. Then it stated that "component force elements may be from various commands but *operational control* [author's italics] is assumed by the designated joint force commander as directed by the Joint Chiefs of Staff," To that

## AWS RESPONSIBILITIES TO UNIFIED/SPECIFIED COMMANDS



# AWS RESPONSIBILITIES TO UNIFIED, SPECIFIED, COMBINED, & COMPONENT COMMAND




COMBINED COMMANDS SHOWN IN PARENTHESIS ADJACENT TO THE US COMMAND

as those incorporating use of the helicopter--which outgrew adolescence in the 1950s and gave birth to airmobility concepts tested by fire in Vietnam. "Airmobility came of age in Vietnam," testified Army chief of staff General Westmoreland before Congress in 1971; "it has changed the nature of ground warfare" and "has broad implications which extend far beyond Vietnam."[34] The helicopter significantly furthered infantry's mobility--an infantryman airlifted by "chopper" could move about the battlefield twenty times faster than his cousin with the foot infantry, and eight times as fast as mechanized forces.[35]

From airmobility arose the "Tricap" concept, bringing together for the first time in one division the triple capabilities of air cavalry, airmobile infantry, and armor to maximize combat power and battle area coverage. The 1st Armored Division at Fort Hood, redesignated as the 1st Cavalry Division in May 1971, was a "Tricap" division.

Nevertheless, infantry, the largest branch, held the upper hand in the Army. Of its sixteen active divisions in 1978, five were foot infantry; and of the thirteen Army chiefs of staff since World War II, nine were from the infantry, three from artillery, and only one was from armor.[36] Yet in 1978, a decade after the Tet offensive and five years after the last soldier left Vietnam, Army authorities informed Congress that the vast majority of their troops had not seen combat.[37]

Army doctrine in the 1970s dealt with such matters as increased weapons lethality, helicopter firepower, and the size of the battlefield; the role of the tank as the single most important weapon in the land battle;* shortages of tanks and armored personnel carriers; the need to train to fight outnumbered and with fewer weapons (though believed to be superior in firepower, accuracy, and lethality due to advantages in technology) than the enemy, yet win the first battle of the next war because it could well be the last battle; mechanization of the infantry (by the mid-1970s, one out of every two infantrymen was a member of an armored personnel carrier force); self-propelled artillery instead of towed; night fighting; electronic warfare as a form of combat power; and organizational and force structure trends stressing tactical mobility--mechanized and armored divisions combining the principles of maneuverability and firepower.[38]

Some numerical comparisons illustrated bedrock differences in Russian and American doctrine. The Russian army was the most tank heavy of any nation on earch--almost 16 tanks per 1,000 troops. A Russian armored division of about 9,500 men had 325 tanks; a United States armored division of approximately 16,500 men was equipped with 324. A Russian motorized rifle division of 12,000 men had up to 90 artillery pieces and 18 multiple rocket launchers; a United States mechanized division of 16,300 men had 66 artillery pieces,

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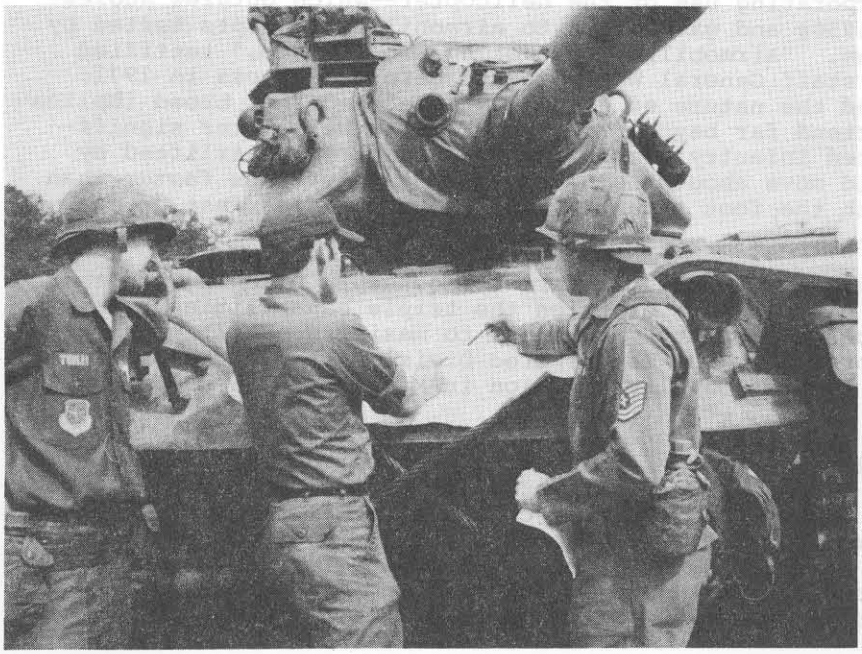
*The tank provided the bulk of the Army's firepower--about 36 percent. Moreover, the cost of its tank forces in 1978 amounted to only about 20 percent of the Army budget, and all of its tank crews totalled only 2 percent of its manpower. "Against an armor heavy Warsaw Pact threat, the tank is in fact the Army's most important system," Army officials told Congress in 1978; but "the one advantage that we've traditionally held over the Soviets, that of tank-for-tank quality, is rapidly disappearing." See U.S. Congress, Senate, Subcommittee of the Committee on Appropriations, *Hearings, Department*



*Support of 197th Infantry Brigade at Fort Benning, GA, in March 1978: at the top, A/1C Russ J. Turley (left), an observer, and TSgt Paul D. Bradley, a forecaster, brief tank crewmember; in the bottom photo A/1C Turley is at left, and TSgt Bradley is at right. They were weather team members from Det 10, 5WS. (Photos by 1/Lt John M. Brown, USAF)*

From the estimated 4.3 million men and women Russia kept under arms in 1978, it manned 169 divisions. Russia's tank inventory of approximately 45,000 compared with 9,247 tanks the United States Army could bring to bear in 1977; its armored personnel carriers and fighting vehicles numbered 55,000, while the United States total was 22,000; and it had 40,700 artillery pieces (including mortar and rocket launchers), compared to the 14,500 the United States had. Production rates between 1972 and 1976 favored Russia by a ratio of six to one in tanks, three to one in armored personnel carriers, and eight to one in artillery. In 1970 the United States Army had roughly 10,000 helicopters while Russian ground forces had 1,000; five years later the Army had 9,000 helicopters and Russia had 3,000.[39]

Looking at the likelihood of a short, violent, non-nuclear war in Europe, Army officials testified in 1978 that the possibility of a surprise attack under cover of adverse weather or darkness, or both, appeared strong. Over 40 percent of the Warsaw Pact's exercises were conducted at night, and the Russian soldier was constantly trained in snow and bad weather. With a short, limited mobilization, Warsaw Pact nations could strike in central Europe with 58 divisions armed with 16,000 tanks, supported by over 3,000 aircraft. Russian doctrine called for its forces to stockpile enough materiel to fight alone for approximately three weeks. They would advance at the rate of 20-to-40 kilometers per day in the breakthrough stage, and 50-to-80 kilometers in the exploitation phase. Russia fully expected to park its tanks along the English Channel a week after crossing the West German border.[40]

Other changes in Army concepts and doctrine, too numerous to enumerate here, sired some changes in Army weather support requirements. The helicopter's expanding role included Army expectations to offset tank shortages by arming "choppers" with sophisticated anti-tank weapons. But like the Air Force's electro-optical or laser-guided weapons, they were more sensitive to meteorological elements than conventional munitions. Israel's costly losses to hand-held, surface-to-air missiles in the Yom Kippur War of 1973 prompted the Army to look at NOE (Nap Of the Earth) helicopter assault tactics--tree-top flying with a minimum of avionics aboard. They required more precise forecasting. By 1977, Army doctrine placed more emphasis on the use of smoke as an obscurant on the modern battlefield,[41] resurfacing challenges in wind forecasting dating to at least World War I.

By 1978 changes in Army doctrine included dispersion of assets at the brigade level--or decentralized control of brigade-level operations. Because they were high priority targets for sabotage and direct enemy action, tactical automatic data processing systems were being re-evaluated as to their applicability in a highly mobile tactical environment, and Army emphasis was in the direction of less automation[42] --a direction diametrical to AWS'. Asked by a 7th Weather Squadron representative in January 1976 whether the Army was planning centralized or decentralized command and control of its forces, a CACDA officer replied that centralized command and control would likely exist down to the corps rear boundary, and decentralized control from there to the forward edge of the battle area.[43] "The Army will likely continue to operate with less centralization than the USAF," the 16th Weather Squadron operations officer reported the same month,[44]

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*(Cont) *of Defense Appropriations for Fiscal 1979*, 95th Cong, 2d Sess, Pt 4, 1978, p. 248.

> General DePuy , . . will adopt *new techniques* to make up for our inferiority in number of personnel and equipment. New techniques may include tighter control of the division by the corps than in the past. An example of this is the use of airmobile units to defend or attack tank units. . . . It could be that weather support at corps can have more impact on decisions than in the past.

"The Bible": FM 100-5, *Operations*

"The Bible" on Army doctrine, which should have been a primer for all AWS personnel--top to bottom--directly or indirectly engaged in Army weather support, was Army Field Manual 100-5. A 6 September 1968 version entitled *Operation of Army Forces in the Field* was superseded by a version dated 1 July 1976, entitled simply *Operations*, which remained in effect through 1978. "This manual sets forth the basic concepts of US Army Doctrine," read the preface, which said it all: "these concepts form the foundation of what is taught in our service schools, and the guide for training and combat developments throughout the Army" and, "most important, this manual represents the principles for accomplishing the Army's primary mission - *winning the land battle.*" [45] Described by the preface as the "capstone" of all Army field manuals, it was practical, comprehensive, attractively packaged, and easy to understand.

"Weather and terrain, although uncontrollable, must be used to our advantage," read a portion of the chapter on Intelligence: [46]

> Weather factors must be considered and worked into tactical operation plans. Commanders who understand the limitations and advantages of weather and terrain can combine this with their knowledge of the enemy to tilt relative combat power in their favor.

Joint Conferences/Meetings

Heightened interest by the AWS leadership in its Army support mission resulted directly in several formal conferences and meetings with Army representatives in the 1970s. The first Army weather support conference hosted by AWS in the 1970s was held at Headquarters AWS on 27-28 April 1970. It was followed by conferences sponsored by AWS at its headquarters in January 1971 and on 20 February 1974, and another hosted by the 5th Weather Wing on 23-25 February 1977. An indication of the Army's interest was that two of its general officers attended the 1974 conference. Recurring themes through the conferences were austerity and manpower cuts in AWS, and how AWS hoped to bridge the gap in support through increased automation and centralization--embodied principally in AFGWC. The TESS study and the EAD decision were agenda items at the 1974 conference, among others, and it was agreed thereat to form a joint working group to handle mutual problems. [47]

Joint Working Group

The Army hosted the first meeting of the joint working group at Fort Leavenworth on 16 May 1974. It was established that the purpose

*Three key staff chiefs from HQ AWS visited Det 3 of 5WW's 16WS at Fort Bragg, NC, in mid-Sep74 to see first hand some of the problems involved in weather support to the Army, and to investigate the potential for providing the Army centralized AWS support. Det 3 supported the XVIII Airborne Corps and 82d Airborne Division. Pictured from Det 3 are Sgt Mitchell D. Edwards (second from left) and Capt Wilbur G. Hugli (far right). From HQ AWS, from left to right, are Cols Joseph M. Tyndall, Castor Mendez-Vigo, and Hyko Gayikian, the deputy chiefs of staff, respectively, for aerospace sciences, systems, and operations. (USAF Photo)*

of the group was "to provide a forum to identify weaknesses and deficiencies and propose workable solutions to joint doctrine, concepts and procedures for weather support related to the *employment* of Army forces *in a theater of operations*." Its objectives were "to identify mutually acceptable alternatives and/or solutions to selected parts of identified problems," and to make recommendations for resolving deficiencies.[48] Its scope was "limited to immediate or near term *obtainable goals* for improving joint aspects of weather support to the Army." By agreement, the co-chairmen of the group were selected by position instead of by name, and in the Air Force's case it was the assistant deputy chief of staff for operations at Headquarters AWS--a colonel's slot. The only agenda item at that meeting concerned concepts for weather support to the EAD corps.

The group's second meeting was held at Langley AFB on 22-23 October 1974. Primary topics of discussion included: inadequate tactical weather communications; the EAD decision's effect on weather support doctrine; the lack of appreciation by Army commanders and staff officers for the utility of weather service, and AWS officers unknowledgeable about Army doctrine, organization, and operations;* unrealistic testing of weather support concepts in the field due to considerations for flying safety, simulation of AWS centralized support from AFGWC, and the fact that fourteen-man weather teams were never fully manned; post-exercise reports that did not consistantly document all of the problem areas (i.e., absence of facsimile at corps and division, lack of weather radar and satellite readout capability, etc.); and the lack of an objective system for evaluating weather support procedures or Army useage of weather data, which perpetuated questionable TOEs, hindered development of meteorological equipment to meet justifiable requirements, and resulted in valid weather support procedures not being incorporated into joint doctrine. The group tasked the 16th Weather Squadron to develop and coordinate mission capability statements for EAD corps weather support organizations, and draft MEFPAK revisions to meet such missions, as well as coordinate TOE requirements to meet the proposed MEFPAK, and coordinate a position paper with USAICS for tactical weather communications requirements.[49]

One outcome of the conferences and meetings above, and the TESS study recommendations, was a letter in late 1974 from Brigadier General Heistand, the USAICS commandant at Fort Huachuca, urging TRADOC's schools to pay closer attention to weather and weather support problems in their curriculae: He mentioned instructions from General DePuy in which the TRADOC commander charged him to find ways to improve the integration of tactical intelligence from all sources. Weather was intelligence. Therefore, Army commanders and staffs had to use the staff weather officer in a more positive fashion. Heistand emphasized that the place to start was the Army school system. He encouraged use of realistic "bad weather" in school tactical exercises and war gaming which would penalize the student who ignored weather. "I am suggesting," Heistand wrote, "that a concerted effort to train our officers to constantly ask for weather information in specific terms may eventually lead to a level of demand for precise weather information sufficient to cause a significant step forward in that science."[50]

During the third meeting of the joint working group, held at Fort Huachuca on 20-21 January 1976, the attendees heard a briefing on AWDS as well as a pitch by AFGWC officials on centralized support to deployed Army forces. A review of the tasking from the second meeting included an update on the "proponency" issue--Signal or

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*The Department of the Army once asked the Air Force School at Chanute AFB, IL what source material they used. "Training For AWS

Intelligence--for weather team TOE support. The Army's Signal School did not send representation. It hampered a full discussion of tactical weather communications problems, according to the 16th Weather Squadron's operations officer, who wrote that "this lack of enthusiasm by the Signal School was one of the reasons we favored the Intelligence School's having proponency for weather."[51] Major action items from the meeting charged USAICS to transfer weather team support from Signal to Intelligence TOEs, while TRADOC and CACDA were to see about testing AWS' centralized weather support concepts in the annual Reforger exercises.[52]

One agenda item at the fourth meeting of the joint working group, convened at Headquarters AWS on 13-through-15 October 1976, was TRADOC's strawman revision of the joint regulation. The question of Army reimbursement for services rendered surfaced again, but was shelved as being beyond the group's purview. Discussed also was a new pamphlet AWS published in August 1976 entitled *Training: Army Staff Weather Officer Guide*.[53] AWS agents reported on the FALOP system, and use of the new MSI concept (Mission Success Indicator--a fancy new title for the old probability forecasting technique) in the Reforger 76 exercise in Europe that fall--the first real incorporation of centralized support (AFGWC) to tactical Army operations, Brigadier General Rowe presumptiously labeling it "a significant turning point in the history of Air Weather Service."[54]

AFGWC provided MSI forecasts for four "operational decision thresholds" involving the employment of tanks, helicopters, and close air support aircraft in Reforger 76.[55] Post-exercise reports from the AWS units involved indicated that MSI products, when combined with conventional weather support, had the potential to magnify the Army's combat effectiveness. However, MSI forecasts during Reforger 76 were of "questionable value," as one report read.[56] Army commanders and staff officers lacked training in their use and did not like "kill factors" included in the MSIs. Additionally, AWS needed to refine the concept as applied to Army support--i.e., determine how to get MSIs from AFGWC over existing communications systems to a corps' deployed units; increase the density of the grid points because the grids in Reforger 76 were so coarse that they did not always coincide with the area of operations; etc.

During Reforger 77 and 78 centralized probability forecasting in support of tactical Army units was a huge disappointment. For Reforger 77 it was limited to climatological MSIs because AFGWC and AWS recognized the need to conduct a "major reprogramming" in order to meet the Army's weather support requirements in Europe, as postulated by the 7th Weather Squadron.[57]

The probability technique was dressed with yet another title for Reforger 78--Weather Impact Indicator, WII. Because he was taking so much flak from Army commanders about combining weather and operational data into MSIs telling customers their probability of mission success, Brigadier General Rowe decided AWS had better stick to more traditional methods of furnishing the weather input to the decision making process. Thus, WIIs were introduced in 1978, and Rowe determined that AWS would supply MSIs to customers only when asked for, WIIs contained weather information only. No matter. They failed to neutralize the acid distaste Army tactical commanders had for the

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*(Cont) personnel on Army organization and concepts," read the classic reply, "was taken from the *Air Force Times* and *Aviation Week [& Space Technology]* magazine." Shortly afterward, TRADOC was ordered to furnish Chanute with somewhat more authoritative source material. (See ltr Mr. Beck, Dept of Army (DAMI-ISP) to MAC (HO), "AWS Support to the U.S. Army: Vietnam to AWDS," n.d. (*circa* Mar80).

*Working on a probability forecast in support of the 2d Armored Cavalry Regiment during Reforger 77 is Capt Alan E. Ronn of 7WS' Det 1. (USAF Photo by TSgt Phillip D. Henderson)*

underlying probability concept. In fact, due to communications difficulties, WIIs from AFGWC were received by only one customer, the 3d Armored Division, and then only for one week of the one month deployment during Reforger 78. The division's decision makers preferred categorical forecasts. They spurned 7th Weather Squadron efforts to use WIIs in mission planning and execution. Acknowledging that MSIs and WIIs were concepts undergoing testing, the 7th Weather Squadron concluded that, not only were there technical problems with the products, most Army customers did not understand how to use probabilities in decision making; and, while its own forecasters understood probabilities, they were uncomfortable with them and therefore lacked confidence in them.[58]

Thus, the ultimate questions to be answered through exercises such as Reforger were: was there a role for AFGWC support to the tactical Army and, if so, to what degree--what mix of local and specialized support?

The Army Signal School was once again not represented at the fifth meeting of the joint working group, conducted at Fort Sill in mid-April 1977. One of the discussion items addressed communications shortcomings continuing to plague field weather support. Among other action items established at the meeting was one to proscribe procedures for requesting wartime weather modification support from AWS and, because of the need for more of them in the tactical area of operations, getting artillery

*Army and Air Force Special Forces: much of AWS' capability to support unconventional warfare operations resided with the 3WS's Det 75 at Hurlburt Field, FL. Men from that unit saw action in the Dominican Republic in 1965, and in Laos and Cambodia from 1965 through 1973. Pictured here from that unit in scenes shot in 1977 are: TSgt George M. Scott (billed cap with jump wings); SrA Gary A. Ferracane (holding balloon); and SrA Thomas R. Austin (sitting in front of raft). (Photos by TSgt Dan Doherty, USAF)*

meteorological sections to take limited surface observations.

Additionally, Lieutenant Colonel Macy, AWS' staff weather officer at USAICS, was to develop the necessary doctrine and TOEs for weather teams supporting Army Special Forces--neither of which existed at the time, although SORs had been prepared for direct weather support to Special Forces and the UTCs were ready for approval.[59] The issue arose in mid-1976 when the 5th Weather Wing asked its 16th Weather Squadron to reconfirm the need for direct weather support to Army Special Forces--the squadron replying that there was a need down to Special Forces' operations base level.[60]

With inputs from Lieutenant Colonel Macy and selected AWS units, and guided by Brigadier General Rowe's November 1977 decree addressed below that AWS would provide direct forecasting support to only the highest echelon Special Forces unit in a theater of operations,[61] the 5th Weather Wing forwarded for Headquarters AWS' endorsement in April 1978 a concept for weather support to Special Forces unconventional warfare operations.[62] It noted that little by way of formal concepts and doctrine had been accomplished by AWS in the area. It recommended that AWS provide staff weather officer and direct forecasting support to Army and Air Force Special Forces at both the joint unconventional warfare task force level, and at Army forward operation bases and Air Force Special Forces facilities--four-man teams at both levels, comprised of an officer and three dually-qualified (forecaster and observer) enlisted men, all parachute qualified. Below those levels, either at remote forward bases or behind enemy lines, AWS personnel would be employed only when the mission demanded it--such as from 1965 to 1973 in Laos where the American ambassador overruled repeated objections by AWS authorities to having their people working clandestinely under hazardous conditions to obtain observations they believed were of questionable value.[63]

The conferences and the meetings of the joint working group outlined above were worthwhile if for no other reason than providing a continuing forum for dialogue between Air Force and Army personnel wrestling with the problems of furnishing weather support to the Army. While progress toward solving many of them moved at a tortoise's pace, at least the far-flung outlands of the Air Force and Army bureaucracies were talking and working with one another. "My personal feeling is that these meetings are a definite step in the right direction," astutely observed Lieutenant Colonel Owens, the staff weather officer to USAICS; however, "progress will be much slower than the real-world situation demands."[64] The meetings resolved some headaches, "but the hard core issues ultimately disintegrate into a jurisdictional debate of who is responsible for funding, manpower, etc.," AWS noted, "*cooperation stops when resources are needed* [author's italics]."[65]

## FM 31-3/AFM 105-4, 1969

The problem with AWS' directives addressing joint force or tactical weather support--such as the 55-2 manual or regulation--was that they carried little or no weight in unified commands. As the 2d Weather Wing reminded AWS in late 1975, "even though the 2WW is obliged to comply with AWSR 55-2, USEUCOM, component commands, or other commands are not bound to recognize such [an] AWS document."[66] The governing weather directive for joint forces was JCS Publication 2--more commonly

referred to as "JCS Pub 2." Yet its wording was vague and contradictory. For instance, on the key issues of command and operational control of AWS elements supporting unified or specified commands, the November 1959 version of JCS Pub 2 left the door open for either the AWS, MAC, or unified command commander to exercise such power, while the version replacing it in October 1975--which was in effect through 1978--did not even address the issue![67] Thus, basic doctrine and policy governing weather support to Army elements--either unilaterally or as components of unified commands--was left to the joint Army-Air Force regulation and manual, for the most part. The consensus by those most closely involved in the 1970s was that the joint regulation and manual were in dire need of revision.

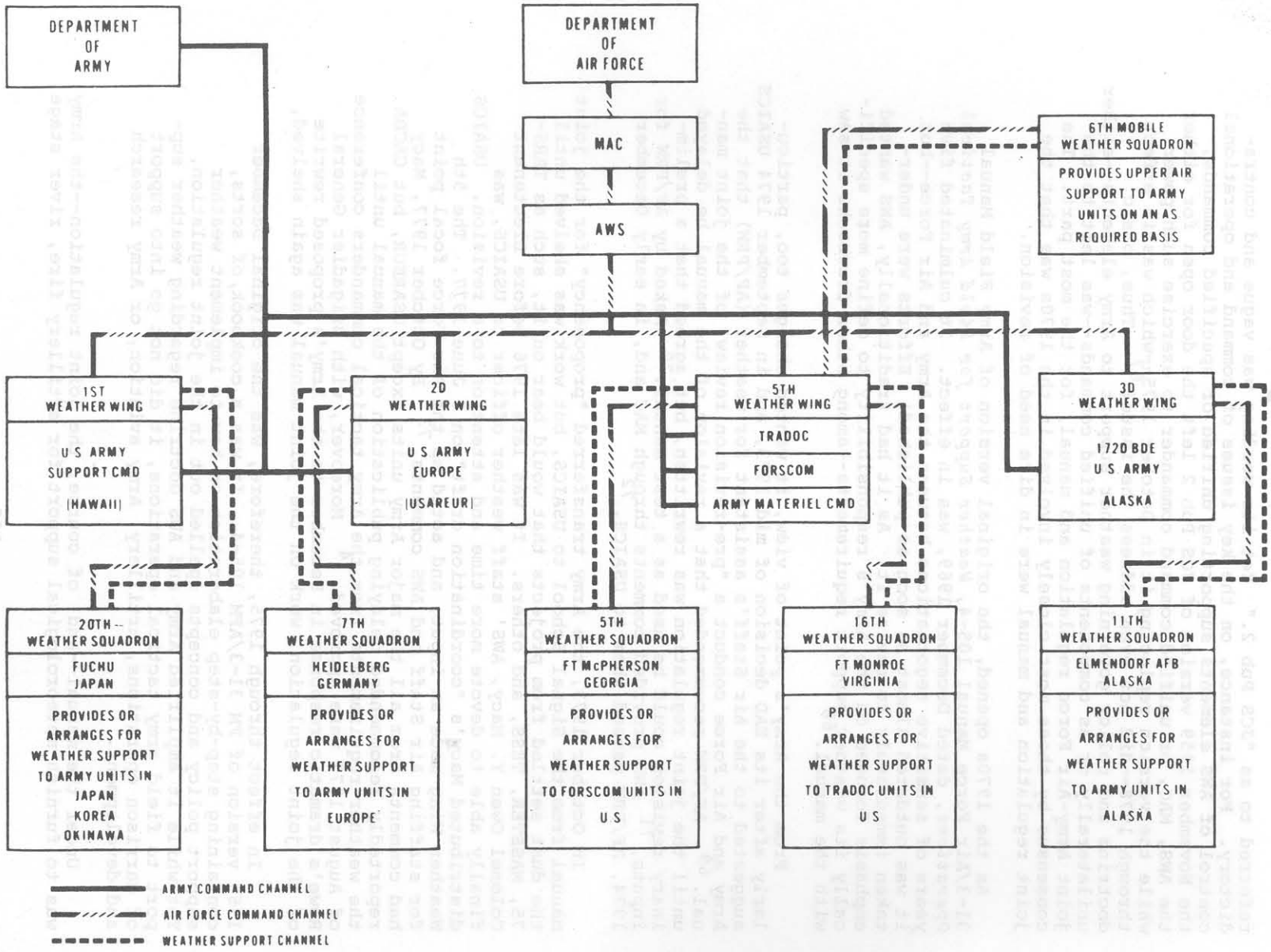
As the 1970s opened, the original version of Army Field Manual 31-3/Air Force Manual 105-4, *Weather Support for Field Army Tactical Operations*, dated December 1969, was in effect. It culminated five years of sensitive negotiations between the Army and Air Force--but it was outdated almost as soon as published! Efforts were undertaken immediately to revise it. As it had traditionally, AWS wanted emphasis focused on the Army's responsibility to define more specifically its weather support requirements--among other drawbacks it saw with the manual.[68]

From the Army's point of view, it wanted changes too, particularly after its EAD decision of mid-1973, and in September 1974 USAICS suggested to the Air Staff's assistant for weather (AF/PRW) that the Army and Air Force conduct a "pre-revision review" of the joint manual.[69] AF/PRW recommended that a revision of the manual be delayed until the joint regulation was rewritten, but agreed that a preliminary revision could be used as a test manual.[70] Asked by AF/PRW for inputs,[71] AWS provided comments through MAC and, in early December 1974, AF/PRW passed them to USAICS.[72]

In October 1973, the Army transferred "proponency" for the joint manual from the Signal School to USAICS, but work was shelved until the dust settled from projects that would bear on it, such as TARS-75, MASSTER, TESS, and others. It was late 1976 before Lieutenant Colonel Owen Y. Macy, AWS' staff weather officer to USAICS, was finally able to devote more time and attention to a revision. USAICS distributed Macy's "coordination draft" on 3 June 1977. The 5th Weather Wing made an input, and acted as the Air Force focal point for staffing Air Staff and AWS comments.[73] By October 1977, Macy had comments from all the major Army units except USAREUR, but CACDA reportedly recommended delaying publication of the manual until the weather requirements from the Army tactical commanders conference of August 1977 were approved.[74] Moreover, with Brigadier General Rowe's dramatic response in December to the Army's proposed rewrite of the joint regulation, work on the joint manual was again shelved.

In effect through 1975, therefore, was the original December 1969 version of FM 31-3/AFM 105-4. It was a cookbook, of sorts, containing step-by-step elaboration on how to implement weather support policy and concepts spelled out in the joint regulation. Yet while it amplified Army and AWS doctrine regarding weather support to field army tactical operations, it did not go into support of garrison operations, artillery, Army aviation, or Army research and development.

Under the manual--and, of course, the joint regulation--the Army was to furnish meteorological support for artillery fire, river stage




1975 ARMY WEATHER SUPPORT STRUCTURE.

and flood forecasting, observations by Army units with organic observation capabilities, and observations forward of division--except, as the manual read, "that brigades will usually include an assigned AWS met team." AWS was responsible for all other support to Army tactical units--including, according to AWS' 1975 supplement to the manual, direct support to each Army echelon from major commands to brigades and armored cavalry regiments when required.

The joint manual of 1969 stressed weather as an element of intelligence, equal in importance to field army tactical operations as terrain and climate. It spelled out in some detail the urgency for teamwork among the Army's staff Intelligence officers and AWS' weather teams and staff weather officers. Access by the staff weather officer to the Army unit commander and his staff was through the Intelligence officer, the G-2. In addition to being accountable for assuring that the AWS weather team was provided authorized communications, logistics, and administrative support by the Army, and informing subordinate Army units of the staff weather officers' observation requirements, the staff Intelligence officer at each Army echelon was responsible for initiating, coordinating, and consolidating Army requirements for weather support with the staff weather officer. A section of the manual contained the weather support requirements of all field army agencies and elements, but it stressed that they should be considered as guidelines only, that specific requirements should be set forth--usually by the Intelligence officer and staff weather officer--in weather annexes to the Army units' operations plans.

The operational control of AWS personnel supporting Army units was not discussed, but the manual specified that the AWS commander would establish, administer, and exercise "command jurisdiction" over AWS units supporting the Army.

In other of the manual's highlights, AWS' centralization and data automation concepts--as embodied by AFGWC--were emphasized. The Army was to furnish administrative and logistical support to AWS elements, including weapons, field rations, vehicles, work facilities, and communications--teletypewriters, facsimile, and terminal equipment and maintenance. AWS was to provide and maintain all tactical meteorological observing and forecasting equipment used by its people, and insure they were adequately trained in how to get along and survive in the field. And finally, on the crucial issue of communications, the Air Force (AFCS) was responsible for furnishing and maintaining long-line weather communications down to the weather team at the field army level (or "major tactical maneuver force"). Beyond that point the Army was accountable for the local collection and exchange of weather data, and for the dissemination of forecasts and weather reports.[75]

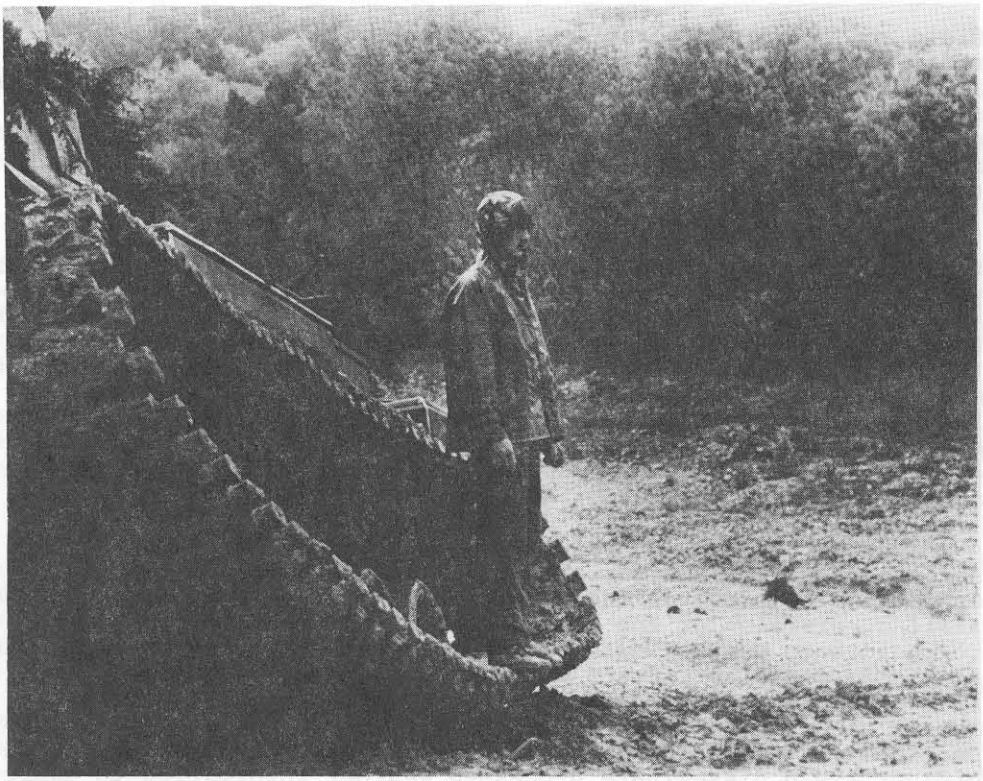
AR 115-10/AFR 105-3, 1970

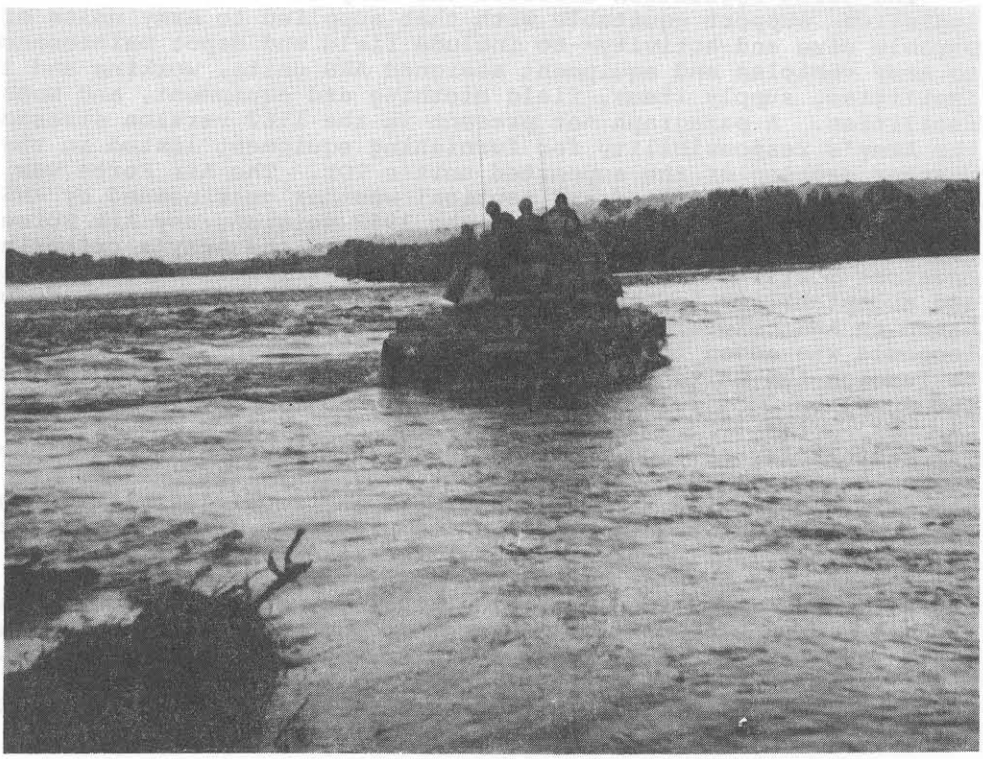
One of the main reasons why work on revising the joint manual dragged so was that it was somewhat dependent on the joint regulation and efforts to bring the 1970 edition up to date. But, as discussed below, agreement could not be reached on a rewrite of the joint regulation and, therefore, the 1970 edition remained in effect through 1978.

The 1970 version of Army Regulation 115-10/Air Force Regulation 105-3, entitled "Environmental Services: Meteorological Support for the U.S. Army," had a 1 June date of publication but did not go into effect until 1 August 1970. It superseded the 23-March-1962 edition reviewed in the first chapter herein.

As the primary document expressing Army and Air Force policy and concepts for furnishing weather support to the Army, the joint regulation published in 1970 directed the Army to advise the Air Force of its requirements for direct weather service during peacetime

Trafficability Problems *(USAF photos): Under a Signal Corps contract awarded in 1953, Oregon State College examined weather's effects on over 3,000 major Army actions in WW-II and Korea, concluding that the operation most often sensitive to weather was trafficability (about 45% of the instances of Army operations affected by weather), followed by tactical air support--about 24% of the instances. In the 1970s, the Army still considered soil trafficability its biggest weather-restricted operation, more so than weather's effects on tactical air support or Army aviation. A major mission analysis of AWS completed by AFSC's SAMSO in 1970 concluded that adequate procedures for operational soil trafficability forecasts did not exist, and recommended a joint board be formed by the Corps of Engineers and AWS to establish a workable division of responsibility for soil trafficability forecasts, and to devise a methodology for making such forecasts. (See: Dr. Fred W. Decker, Russell L. Lincoln, and John A. Day, Oregon State College, seventh quarterly progress rprt, 15Jan-14Apr56,* Weather Effect on Army Operations; *and Vol I, "Narrative," pp. 349-65, of "History of Air Weather Service," 1Jul70-30Jun71.)*





field and garrison operations. "Army contingency or war plans which require Air Force weather service will include a weather annex," the directive read; "initial wartime or contingency weather service requirements will normally be satisfied from resources previously allocated to support Army peacetime operations," and, in a departure from the earlier version, "Air Force weather units supporting Army tactical units will accompany Army units when deployed."[76]

The guts of the joint regulation lay in a section addressing responsibilities. In a change from the earlier version, the Army was to fulfill its own needs for soil trafficability forecasting. Weather observing and observations--but not forecasts and forecasting--forward of division headquarters was the Army's job; however, the critical ambiguity in the 1962 version remained: "this will not exclude placing Air Force weather personnel at brigade locations and in other forward areas when required by appropriate plans or circumstances." Otherwise, the Air Force, through AWS, would provide or arrange for all other Army operational weather support--including forecasting service (direct or remote) forward of division.

Unlike the joint manual, the joint regulation specified that the AWS staff weather officer at all Army echelons would come under the operational control of the Army commander supported, and under the staff supervision of the Intelligence officer--although he was free to coordinate weather matters directly with the Army commander and his staff agencies. Staff weather officers were to assist Army units in determining their weather support requirements, but the unit Intelligence officer was to coordinate them. The Army would provide personnel to take forward-area observations, and the Intelligence officer would disseminate processed weather information to appropriate command elements.

The joint regulation directed the Army to furnish AWS units logistics support equitable with that supplied to Army units of comparable size and activity--to include field and depot maintenance to Army vehicles and equipment assigned AWS units, working and living facilities, supply items, field clothing and equipment, and mess facilities. A paragraph not present in the 1962 version stressed the Army's responsibility for furnishing equipment listed in the weather section of the supported unit's TOE. The Air Force was to provide and repair fixed and tactical weather gear needed by AWS units but, in a provision not in the 1962 version, any Air Force weather gear operating in combat had to meet the Army's criteria for tactical mobility, target signature, cross-service maintainability, and acceptability in the Army electromagnetic environment. Moreover, based on AWS' experiences with Army support in Vietnam, another loophole was added to the joint regulation whereby the Air Force was to furnish AWS units and personnel with mission-essential equipment and supplies "not readily available through Army supply channels."

Another key section of the joint regulation addressed weather communications responsibilities. At Army installations the Air Force (AFCS) would provide, install, operate, and repair terminal communications equipment needed by AWS units providing direct support to Army elements, while the Army was to do likewise for "mainframe termination and on-post circuitry." For tactical forces in the field, the Air Force (AFCS) would provide, install, operate, and maintain complete weather communications systems down to and including the field army headquarters, while the Army would do so for AWS units providing direct weather support below that level. However, in deference to AWS' bitter experiences in Vietnam, the joint regulation

recognized that "situations may arise where provision of adequate communications will require local *adjustments of* [the] *responsibilities* [author's italics]" it established. Therefore, it contained one other significant loophole whereby the Air Force (AFCS) was responsible for all weather communications below the field army headquarters whenever the needed equipment was not available in Army resources.

In summary, the Air Force and AWS believed they had been forced to make substantial concessions to the Army in the 1970 edition of the joint regulation because of a basic fact of life: experience in countless field exercises and in Vietnam combat proved that the Army was incapable, or unwilling (or both), to uphold its end of the bargain under the joint regulation. The Army was supposed to provide observations forward of division but did not, for the most part, and hence the provision in the joint regulation that AWS would help fill the gap. The Army was supposed to provide logistics support to AWS weather teams but did not, for the most part, and hence the provision for the Air Force to do so. The Army was supposed to take care of AWS' communications needs below the field army level but did not, for the most part, and hence the provision for AFCS to take up the slack.

From those same experiences, for the Army's part, it knew that, under the stratagem that the formal weather support requirements expressed by the Army were not specific enough, the Air Force and AWS were niggardly in allocating manpower to meet the Army's needs. There were not enough AWS personnel allocated to meet the Army's war or extended contingency needs, despite Air Force assurances that peacetime "cadre" weather teams could be, and would be, beefed up to authorized strength. The people AWS did provide were not generally disposed or prepared to live and function by their shoestrings in a spartan field environment or in the hazards of combat. They were "data hogs," and the weather and communications gear they insisted on dragging to the field to appease their appetites was too sophisticated and unwieldy; garrison "nice-to-haves" were impractical in the field. In short, the Army knew that AWS was not doing, or could not do, all that should be done to furnish the weather support it needed to fight and win the land battle.

## Air Staff's Proposed Revision

With such misgivings and suspicions evident on behalf of both services, it was not long before attempts surfaced to revise the joint regulation of 1970.

In October 1972, following preliminary efforts at the working level, the Air Staff invited the Department of the Army to join it in undertaking a comprehensive review of the joint regulation, particularly with a view toward solving the cardinal issue of how to meet the Army's increased requirements for direct weather support (including observing service forward of division) at a time when the Air Staff felt compelled to cut AWS' manpower because of budget pressures.[77]

The invitation was drafted by Colonel Mortimer F. Bennet, the Air Staff's assistant for weather--AF/PRW. In 1971, prior to his Air Staff assignment, Bennet was stationed in Vietnam commanding AWS' 1st Weather Group, whose 5th Weather Squadron supported Army units there.

Very familiar with the problems associated with supporting the Army in combat, Bennet viewed his position on the Air Staff as opportune for channeling high-level attention to dissolving them.

After the Army reflected receptiveness to a review, Colonel Bennet hosted a meeting of MAC and AWS representatives in early April 1973 to iron out an Air Force position. Sitting in on the discussion was Salvatore R. LeMole, a lieutenant colonel from Bennet's office who eventually did much of the work incorporating his boss' guidelines into the revision. Representing MAC was Colonel Alfred C. Molla, Jr.[78] LeMole and Molla were career weather officers who later served at Headquarters AWS during Brigadier General Rowe's administration--the former as Rowe's deputy for operations before replacing the latter as AWS vice commander in August 1978. Before 1972, when AWS transferred him to Vietnam to succeed Bennet as the 1st Weather Group commander, Rowe pulled a tour with AF/PRW and was the "action officer" who pushed the 1970 edition of the joint regulation through the cumbersome coordination process--complete with the loopholes AF/PRW wanted.[79]

At the April 1973 meeting, Colonel Bennet tried to assure the MAC and AWS representatives that the review was not intended as a means to cut more AWS manpower; instead, in repeating the instructions his boss on the Air Staff had given the AWS commander (Brigadier General Best), Bennet said it was to insure that AWS support to the Army was of a quality comparable to that furnished the Air Force.[80] In later recalling that period, Colonel LeMole said that Bennet wanted to "straighten out" the roles and missions of those involved in weather support to the Army; both believed that, if necessary to obtain resolution, the issue should have been elevated to the secretarial level in the Departments of the Army and Air Force.[81] Furthermore, about that time LeMole was being told informally by the officer (a major) responsible for such matters at the Department of the Army that, with Mrs. Frances Whedon retired, the Army was about ready to seriously entertain the notion of AWS' assuming the entire Army weather support mission. While LeMole was skeptical, the opportunity to review the joint regulation might provide the impetus.

On the subject of weather support forward of division, according to the AWS report of that meeting,[82]

> all parties agreed that the joint regulation should not be changed--that AWS support forward of division level should be based on USAF requirements, not Army. Although it may be politically advantageous to have the paperwork recognize these AWS authorizations in a USAF PEC [Program Element Code, an Air Force manpower management system that tabbed each authorized slot with a function category--i.e., Army support, weather central operations, etc.], there is no known clear way of doing this yet retaining Army administrative support. Therefore, it was decided to leave the Army TO&E and organic weather team wiring diagram alone. Future Air Staff and MAC replies to SORs requesting support at brigade level will state that the weather service is primarily in support of USAF requirements.

In Colonel Bennet's opinion, based on his tour in Vietnam, the Army believed that "a 'blue suiter' in combat is a liability"--could not pull his weight.[83] Hence, the position the Army took with the joint regulation of keeping AWS weathermen off the battlefield, back at the division headquarters or airfield. Nevertheless, Bennet and AWS saw

a vital need for observations forward of division and decided to keep their sleeves rolled up and continue doing the job.[84] That loophole would remain. Finally, Colonel Molla and the AWS representative agreed that the regulation should direct AWS to support the Army National Guard and Army Reserve forces--on a reimbursable basis for all direct support rendered.

"The new executive game in the Pentagon," Colonel Bennet informed the AWS leadership in July 1973, was "M.B.P. ('Make the Bastards Pay')," and he relayed Air Staff concern that AWS "is one of the [Air Force's] largest, if not *the* largest, giver of gratis support to the Army."[85] Behind the Pentagon's novel "executive game" was a new Defense Department directive, numbered 4000.19,[86] which attended the subject of reimbursement between branches of the military for services rendered each other. In fact, when 4000.19 originally hit the streets in early 1972, the military branches were given ninety days to get all interservice support agreements reviewed and revised in compliance with the new directive. While the subsequent furor by the military branches was successful in delaying implementation of 4000.19, it was still to be complied with. In reply to specific queries by MAC, Air Staff guidance in early 1973 on 4000.19 was that the joint regulation, which was still valid, "establishes that interservice support integral to the Air Force's provision of weather services to the Army will be on a non-reimbursable basis," but "the fact that . . . Air Weather Service has a mission to support another service is not by itself sufficient justification to establish that interservice support will be non-reimbursable."[87] "The senior people of the Air Force are wondering why they have to provide people [and] resources . . . to support" the Army, Bennet cautioned the AWS leadership a few months later while briefing them on 4000.19.[88]

Thus, in October 1973, when Colonel Bennet was finally able to submit a proposed rewrite of the joint regulation to MAC and AWS for review, its most controversial provision--driven by 4000.19--called for the Army to reimburse the Air Force for all non-tactical meteorological support it enjoyed from AWS. Other major objectives of the rewrite were to tie Army SOR processing to the annual budget cycle, tighten management of AWS resources allocated to Army support, clarify and redefine the Army's and AWS' responsibilities, and expand the definition of weather support to the Army to include Army National Guard and Army Reserve forces. Although Bennet and his staff continued to maintain that Air Staff pressure to whittle AWS manpower was not a consideration in the revision attempt, his cover letter noted that the reimbursement provision could save the Air Force up to 200 AWS manpower authorizations. In a reply drafted by Colonel Molla, MAC, in concert with AWS, * objected vehemently to Bennet's rewrite. MAC and AWS believed that meteorological support to the Army should be provided on a "common service" basis without reimbursement, and Molla's letter went on to imply that if the regulation's definition of Army support encompassed reserve forces, it would more than eat up the 200 spaces that might be saved by making the Army pay.[89]

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*Because of a tight deadline for a response to MAC and the Air Staff, AWS was only able to contact the 5th Weather Wing and its 16th Weather Squadron for opinions on Col Bennet's rewrite. Both units opposed the reimbursement provision. See: ltr Col Isaac S. Israel, 16WS comdr, to 5WW, "Draft AR 115-10/AFR 105-3," 26Oct73; and ltr Lt Col Joseph E. Tucker, ch, ops and trng br, ops div, HQ 5WW, to AWS (DOQ), "Draft AR 115-10/AFR 105-3," 30Oct73--both included within Sup Doc #18 to "History of OL-A, C, and E, 5th Weather Wing," Jul-Dec77,

Colonel Bennet met with Colonel Molla and AWS officials at Headquarters AWS in late February 1974 to resolve their differences before submitting a rewrite for the Army's consideration. Bennet conveyed the Air Staff position that the precedent of AWS' providing meteorological service to the Army on a non-reimbursable basis prior to 4000.19 did not warrant a continuation of that practice, MAC's concern, as professed by Molla, was not with the theory of reimbursement, but with knotty mechanics of implementing an accounting system for AWS support to the Army that would result in an overall savings to the Defense Department.[90] Compromise was reached on most chokepoints, but Bennet was intrasigent on reimbursement.[91] Despite AWS' and MAC's consternation over the reimbursement issue, Bennet took back to the Air Staff an agreed-to rewrite of the joint regulation--copies of which AWS distributed to its wings for information purposes in May 1974.[92]

Because of the Army's distaste for the reimbursement provision, Colonel Bennet never submitted his proposed rewrite of the joint regulation to the Army for formal consideration. In recalling the situation, Colonel William E. Cummins, who succeeded Bennet at AF/PRW in August 1975, said that preliminary informal probing by Bennet's people with the Department of the Army uncovered unyielding resoluteness in the affair. To begin with, the Army took the position that all AWS service was tactical support and that 4000.19 excluded reimbursement by one branch to another for tactical support. Secondly, the Army reminded Bennet's people of the roles and missions agreements under the National Security Act of 1947 whereby the Air Force would furnish meteorological service to the Army. Therefore, the Army's informal response to Bennet's people was "please continue your efforts along those lines"--in Cummins' paraphrasing of the exact words used.[93] When AWS inquired in August 1975 as to the status of the proposed rewrite, Cummins replied that "this complex matter is getting additional attention, but we see no possibility of a revision in the immediate future."[94]

Army's Proposed Revision

In view of the Army-Air Force standoff in 1975, Colonel Cummins did not feel he could get the Air Staff to reopen the case for revising the joint regulation. Instead, he envisioned an alternate, two-prong approach to the problem. First, he thought he could get the Army to initiate a rewrite because Mr. Beck was handling weather affairs at the Department of the Army, and Beck was anxious to bring the regulation up to date. "We could really work with him," Cummins said of the ex-AWS officer, meaning that Beck was amenable to removing the roadblocks to satisfactory support of the Army. Through Beck, Cummins said, "we finally had the Army in such a position that we felt that we could make the kinds of changes [in doctrine, through the joint regulation] we wanted."[95] Secondly, Cummins believed the regulation should be approached on a "piecemeal" evolutionary manner--i.e., by issuing immediate changes to clean up such long-standing issues as tactical weather communications, while leaving more profound and weighty issues like basic doctrine to a total rewrite. It paralleled closely a recommendation from the joint Army-

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*(Cont) itself included as Appendix 2 in Vol 1 of "History of the 5th Weather Wing," Jul-Dec77.

Air Force working group on Army weather support, which prompted TRADOC, in a letter to the Department of the Army on 24 January 1975, to submit a change in the joint regulation regarding tactical weather communications. The Department of the Army agreed to the change, but indicated that it would not be included until the regulation was next revised. [96]

Colonel Cummins' efforts were buttressed by a timely visit to the Department of the Army and Mr. Beck's office in early 1976 by the AWS commander, Brigadier General Rowe. On 13 July 1976, in a letter drafted by Beck, the Department of the Army directed TRADOC to review the joint regulation and suggest changes. [97] One year later, on 4 July 1977, TRADOC forwarded a proposed rewrite but, since there was disagreement among several major Army commands, the Department of the Army--Beck--hosted a meeting to resolve the differences. [98] Reporting on the disagreements, the staff weather officer to USAICS, Lieutenant Colonel Macy, wrote that "several axes were being ground," and that "the materiel developers--ECOM and ASL--are attempting to develop within the draft regulation a requirement for the Army to establish a forecasting capability and satellite program." [99] Macy's input to the Army meeting included recommendations that the regulation bring specific roles into clearer focus, but blur the distinction between peacetime and wartime support because the former was often translated into garrison airfield support while, in actuality, the Army trained for war during peace; and that it direct AWS weather teams to support brigade-level operations.

In September 1977, a proposed rewrite of the joint regulation was forwarded for review by the Department of the Army to the Air Staff who, in turn, passed it to MAC and AWS for comment. [100] The Army rewrite broadened the directive's scope to include support of Army reserve components, but made no mention of reimbursing the Air Force for non-tactical support furnished by AWS. Army and Air Force weather communications, logistics, and administrative support specified under the directive would be tendered on a "common-service" basis. Traditional Army and Air Force roles and responsibilities remained unchanged, except that mention of the field army was stricken in favor of the corps--the 1973 EAD decision--or the phrase "highest Army component employed in a theater of operations," and direct (as opposed to remote) weather support by AWS to Army tactical units (corps, division, separate brigades and regiments) was specified. Research and development would remain essentially an Army job, but the Army added a loophole whereby the Air Force could, by "mutual agreement," perform it for meteorological equipment satisfying "joint Army/Air Force requirements." Words or terms such as tactical, weather modification, and weather satellite support were emphasized more in the Army rewrite, which also added definitions of terms like mesoscale, operational weather support, and direct and remote weather support. Finally, the Army rewrite stressed the need for compatibility between Air Force and Army communications equipment used in weather support.

## Rowe's Counter-Proposal

AWS' response, incorporating explicit instructions from Brigadier General Rowe, was shocking: AWS scrapped the Army's rewrite in favor of a counter draft it forwarded that proposed chopping off *all* direct AWS weather support--and Air Force communications and meteorological equipment support--at the corps, and handing the Army the job for *all* such support forward of corps headquarters. [101] AWS weather teams at

corps headquarters would make weather support products available to the corps Intelligence officer for dissemination to lower echelons. AWS advocated other changes in the regulation, including an expansion of terms to encompass support to the Army National Guard and Army Reserve forces. While terms like direct and remote weather support were defined, AWS omitted reference to tactical weather satellite or radar support. AWS preferred the Army provide its own weather modification support in "combat areas," but AWS would arrange for airborne weather modification outside the battlefield. Most weather support outlined by AWS in its counter proposal would be tendered on a "common-service" basis. Beyond that, Defense Department directive 4000.19 and other pertinent Army and Air Force directives regarding reimbursement would apply--i.e., the Army would pay for any weather satellite imagery dissemination equipment it wanted for garrison support, and for the weather observer training provided by the Air Force for Army control tower operators and observers. AWS wanted the Army held accountable for the research and development of meteorological equipment *and* techniques for its own people--*and* for AWS personnel if to satisfy "unique" Army requirements. In deference to what Rowe viewed as a key issue, AWS opted for the designation of single contacts within the Army and Air Force for processing Army weather support requirements and coordinating communications programs. Echoing its stand with MAP/SAMSR, AWS also wanted a committee of Army and Air Force general officers established to oversee Army weather support policy and responsibilities. On the topic of weather communications, AWS recommended the status quo insofar as Army installations were concerned; but in the tactical theater of operations, the Air Force would take care of everything down to corps and the Army would be accountable for everything below that echelon. In another striking change, AWS recommended that the Air Force assume responsibility from the Army--and its TOEs--for logistical support of AWS weather teams providing direct support to tactical Army units--which, with Rowe's basic change, meant the corps level and above. Of the alterations recommended by AWS in Army weather support policy, however, none were so impacting as the one to lop off AWS' involvement on the battlefield at corps headquarters.

Informing the MAC commander of his intentions to propose a withdrawal of AWS' direct support back to the corps level, Brigadier General Rowe cautioned that he fully expected to "evoke considerable controversy in AF/PRW and Army channels," but he believed it necessary to get a top-level clarification of responsibilities and resolve "substantial problems" in Army weather support.[102] Major General Collens, the former AWS commander then serving as the MAC chief of staff, believed Rowe's efforts with the joint regulation would "flush out a long-standing argument on how much [the] AF is willing to invest in Army wx spt to fulfill the AF charter"; while the MAC commander's response was "keep me informed."[103]

On 17 January 1978, in forwarding AWS' draft to the Air Staff--AF/PRW--as written, the MAC staff noted that weather support to tactical Army operations--particularly below the corps level--was "inefficient and needs improvement." AWS' counterproposal to the Army's rewrite would more clearly define Army and Air Force roles in the matter. Conflicting points of view would have to be resolved at the Army and Air Staff level, MAC suggested, keeping in mind that manpower assets allocated AWS for Army support were "limited and must be used in the most cost effective manner."[104]

Brigadier General Rowe knew that the change he advocated would elicit considerable controversy. Not only did it turn aside

policy evolved from nearly three decades (and three wars) of experience, it had already raised hackles among his staff, his field units, the MAC staff, and with the Air Staff's assistant for weather, Colonel Cummins--AF/PRW. Many on his staff and at MAC were astonished by Rowe's stance, and even after several meetings with some of them the AWS commander would not be dissuaded.[105] The 2d Weather Wing commander's position was that AWDS, which Rowe wanted to place at the corps level *when*--or *if*--it became available to AWS in the 1980s, "will not work in the tactical NATO role,"[106] while the 5th Weather Wing believed that concepts and equipment AWS envisioned for the future should not be cemented into contemporary directives.[107]

Colonel Cummins paid one of his periodic visits to Headquarters AWS in early November 1977. When briefed on Brigadier General Rowe's policy switch, Cummins reacted tepidly. He said he welcomed any effort to develop a policy that would be adhered to by *all* of AWS--reminding AWS officials that the Army's proposed rewrite theoretically reflected AWS "policy," since AWS officers at the headquarters and in the field at USAICS and CACDA and TRADOC collaborated in its formation.[108] With his sudden policy reversal, Rowe put Cummins in an awkward and compromising position with Air Staff contemporaries, and with counterparts at the Department of the Army. "Air Weather Service kind of jumped the track," Cummins said later, adding that Rowe's decision to use the joint regulation rewrite to attract high-level attention was "a very unusual tack."[109] Cummins believed that, reduced to its simplest form, the question at the time was whether the political climate on the Air Staff and at the Department of the Army favored subtle--but necessary--changes in the joint regulation or a major policy alteration in the way the Air Force supported the Army. Not only was Rowe's decision at odds with the direction Cummins favored, but Cummins thought the counter proposal AWS drafted was little less ambiguous than the 1970 version. It sent everybody "back to the drawing board," Cummins concluded, prophesying that it would take years before the Air Staff and the Army could agree to a compromise rewrite of the 1970 edition of the joint regulation.

## Rationale: "Trip Wire" For A "Sleeping Giant"

Why? That was the question uppermost in the minds of those most closely associated with weather support to the Army. Why did Brigadier General Rowe decide to propose pulling back AWS support to the corps? There were several reasons. None were so clear cut or preeminent as to provoke a policy reversal by themselves. But taken together they pushed Rowe to the point where he considered all other alternatives barren of substance and hope. They would not help him. They would prove fruitless. Most likely they would compound rather than lay to rest the perennial problems in Army weather support that came to a head during his administration and were an open abcess drawing attention he did not want. His answer to "why," was "why not?"

The change had obviously been fermenting in Brigadier General Rowe's mind when, in mid-1977, the Army formally asked AWS to comment on its MAP/SAMSR implementation plan for the TESS study--which concluded that weather support to the Army was unsatisfactory. About the same time, as addressed in an earlier chapter, the MAC Inspector

General rebuked AWS because the 7th Weather Squadron did not have enough AN/TMQ-22s (tactical meteorological measuring set) to support USAREUR in war. He recommended that AWS stop the Air Force from purchasing more of the unreliable and costly sets ($3,500 apiece), and authorize the reliable, battle-tested, and less-costly ($126.05 apiece) belt weather kit as a substitute. "Where does it say our observers go into the battlefield?" Rowe heatedly responded, [110]

> Let's get on this one vigorously! I want a clear-cut policy that can be understood by MAC/IG, 2WW, 7WW, etc., on how far down in the Army our people will operate. Our equipment requirements will be based on this. Where we have violated the established policy and directives outline for me where we need to change and how best to do it. Prepare policy statement for me to send out to our people and our customers.

While his staff was at work on a policy, General Rowe amplified his beliefs somewhat in August 1977 and furnished some rationale. He was determined to cut direct AWS support off at the EAD corps or division, but would await a staff position on which it should be. It was preferable to cut off support at a specific echelon rather than tell the Army there was no more AWS manpower available to meet its requirements. The "basic guideline is that we're not going to put Air Force blue suiters into combat with the Army," Rowe wrote.* AWS had been "usurping Army prerogatives" by furnishing observations forward of division, "so what we're in right now is a withdrawal from those areas where we've usurped what's really an Army function, observing-wise, and strictly stick to forecasting." "The biggest problem," he continued, "is going to be with our own people, who want to go gung ho in supporting the Army wherever we can do the things they see as needed for support." FALOP observations taken by the Army were "sub-professional," he wrote in agreeing with a position taken by the 2d Weather Wing; but the unattractive alternatives to accepting them--in lieu of automated battlefield sensors--were using AWS observers, which he already ruled out, or the Army's developing a weather career field for enlisted men, followed logically by the creation of an Army Weather Service. "That means that we've got to get off the kick of less than professional," he went on, and decide that "we'll accept it [FALOP] until we can get something better." Addressing the headaches in tactical weather communications, Rowe wrote "let's don't [*sic*] try and cast the Army in an Air Force mode" or "mold"; make do with what the Army provided between corps and division if the decision was to chop direct support off at the division level. Finally, in regard to whether his staff weather

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*In the late 1960s the MAC commander launched a publicity campaign to shore up what he termed "the combat image of MAC." But other than the ARRS effort in Southeast Asia, one of the few things MAC could capitalize on propaganda-wise (there was no way to dress strategic airlift and make it come out as combat) was AWS' "combat weather teams"--as they were referred to then--in Vietnam supporting the Army. The resultant weather team publicity (see Robert P. Everett, "Combat Weather," *Airman*, Vol XIV, No. 1 (Jan70), pp. 13-15) drew Cheshire grins from "grunts" who knew that the occasional sapper attack or mortar barrage on a base camp the weathermen had to put up with was not quite the same "combat" as flushing "Charlie" from his backyard jungle hideouts each day.

officers should be under G-2 (Intelligence) or G-3 (Operations), he reminded them that the Army favored the G-2 so "I think we ought to quit trying to fight it,* and get in bed with the G-2, and make the thing work." [111]

The comprehensive and candid policy review, conducted under the direction of Colonel LeMole's operations staff agency at Headquarters AWS, took the better part of seven months to complete--from May through November 1977. "Army weather support over the years has suffered from many problems," AWS proclaimed; "it too frequently has been relegated to a second class status (importance) by AWS and the AF community and it has not been fully exploited or used by the Army." "Most AWS personnel do not understand real Army weather needs," AWS continued, and there was a "lack of knowledge and a lack of willingness by AWS officers to acquire understanding on the concept of operations for Army forces." "Perhaps one of the major reasons behind our 'problems in Army support,'" AWS hypothesized, "has been our desire to fit the Army into our AWS support mold," and, therefore, AWS attempts at so doing "are doomed to failure." AWS got itself into a manpower squeeze by acquiescing to loopholes in the joint regulation in the beginning, and then furnishing observing support forward of division to the extent that Army requirements inevitably outstripped AWS' assets. AWS support to the Army had to be cost effective; but, in the face of continued manpower cuts levied by MAC and the Air Force, "expansion of Army support may result in decreased services to USAF." AWS was committed to automating the base weather station and its tactical weather support system (the so-called "tactical" AWDS), and "now is the time," AWS concluded, to mesh its centralization and automation concepts with support to tactical Army elements. [112]

After considering the replies from a canvass of the weather wing commanders in October and November 1977, [113] **his staff, through the AWS Council, made the following key recommendations, among others, to

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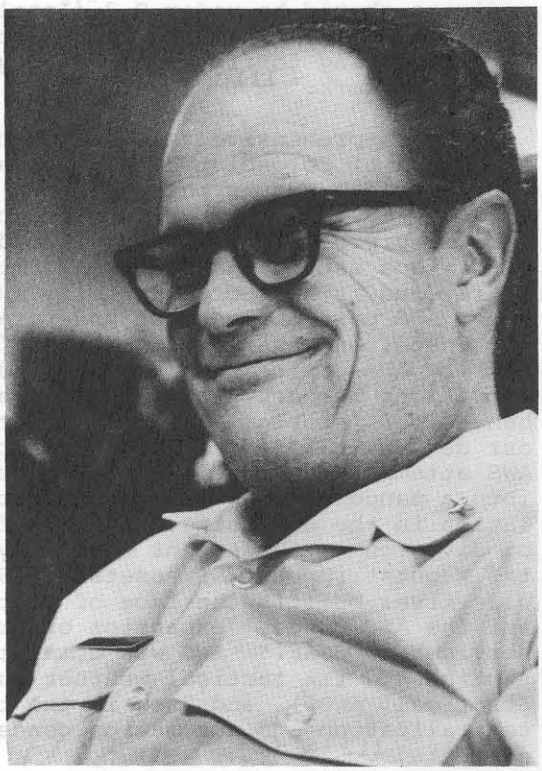
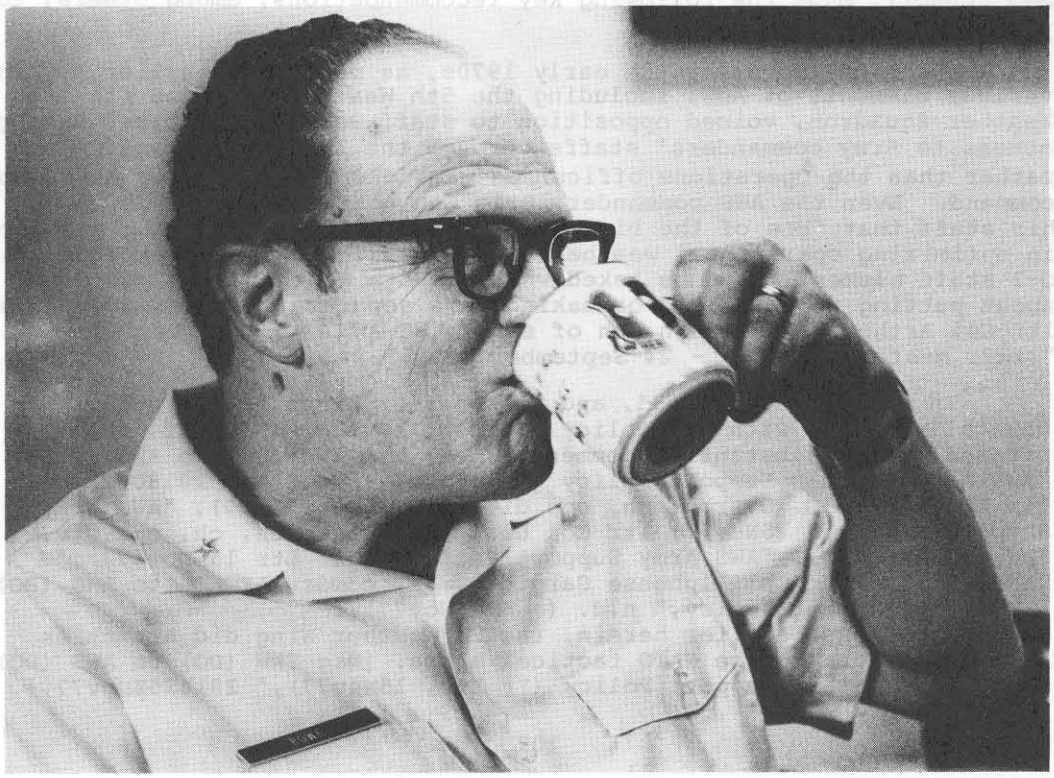
*Periodically during the early 1970s, as mentioned earlier herein, various elements of AWS, including the 5th Weather Wing and its 16th Weather Squadron, voiced opposition to staff weather officers' having access to Army commanders' staffs through the Intelligence officer rather than the Operations officer as was done in supporting Air Force command. Even the AWS commander, Brig Gen Best, in late 1970, told his staff that "one of the big difficulties [a "long standing problem"] in optimizing operational weather support is that weather is under the G-2 staff element," and he asked what the 5th Weather Wing had done about putting it under G-3 or making it a separate staff agency. (See ltr Col Arthur W. Anderson, ch of staff, HQ AWS, to AWS (DP, *et al.*), "Staff Meeting Actions - 24 September 1970," 24Sep70.

**In reply, the 1st, 3d, and 7th Weather Wings, and AFGWC, basically agreed with the policy proposed by the AWS staff, and offered little substantive comment. [See: msg 1WW (CC) to AWS (CS), "AWS Army Weather Support Policy (Your ltr, 15Nov77)," 281800ZNov77; ltr Col Ronald C. Overby, ch, ops div, 3WW, to AWS (DO), "AWS Army Support Policy," 25Nov77; ltr Col Duane M. Griesbach, ch, ops div, 7WW, to AWS (DO), "AWS Army Support Policy (Your Ltr 15 Nov 77)," 28Nov77; and ltr Col Alphonse Gargiulo, Jr, comdr, AFGWC, to AWS (DO), "AWS Army Support Policy," n.d. (*circa* Nov77).]

As mentioned earlier herein, the 2d Weather Wing did not think AWDS would work in the NATO tactical arena. [Msg 2WW (DO) to AWS (DO), "AWS Army Weather Support Policy (Yr Ltr, 15Nov77)," 281425ZNov77.]



*Brig Gen Rowe*



Brigadier General Rowe regarding fundamental AWS policy on support to tactical Army forces: Army support would enjoy an equitable share of AWS' resources; AWS would provide forecasting and staff weather officer support down through separate brigades, armored cavalry regiments, and Special Forces bases, but--in deference to Rowe's dictates--AWS observer support would stop at the corps headquarters, and AWS would rely primarily on manual or automated observations taken by the Army from the division forward on the battlefield; AWS would program for all the tactical and fixed meteorological gear needed by its people supporting the Army; and Air Force communications would extend to the corps under AWDS, while the Army would take it from there forward.[114] In essence, the AWS commander went along with his staff's recommendations, with one major exception: Rowe's dictum was that *all* direct AWS and Air Force support to the tactical Army forces would stop at the corps headquarters level. And he saw the offer to comment on the Army's proposed rewrite of the joint regulation as a "trip wire" for formally airing his proposed change to the Air Staff and the Department of the Army.[115]

Another reason for Brigadier General Rowe to make some kind of dramatic move was the shadow cast on his leadership by reports of unsatisfactory AWS support to the Army that kept coming to the attention of the MAC commander, the Air Staff, and high level Army officials.† In early 1976 his staff was admonished by the MAC Inspector General--in a repeat writeup--because the AWS detachment at Fort Bragg did not have enough parachute-qualified people to meet its wartime mobility mission. In November 1976, and again in May 1977, the MAC Inspector General reproved his staff for not providing enough tactical equipment to units supporting the Army. In a report to the MAC commander in May 1976, the Air Force Inspector General charged AWS with providing "passive" support to Army Reserve units.[116] In August 1977, TRADOC's MAP/SAMSR implementation plan for the TESS study proposed corrective measures for overcoming the unsatisfactory weather support to the Army, but AWS spiked it, in effect. In November 1977 his staff formally acknowledged what many had been saying privately: AWS support to the Army was second class. Later that same month, after assessing the weather support to USAREUR while accompanying Rowe on a command visit to 2d Weather Wing units, Rowe's Army liaison officer drafted a report to the Department of the Army that, while laying much of the fault on the

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**(Cont) It also felt that FALOP observations taken by Army personnel would not provide the quality needed by AFGWC to make forecasts, and that support to Army Special Forces envisioned by the AWS staff ("AWS will provide *only* [author's italics] direct forecasting support to the highest Special Forces unit in a theater of operations.") was directly opposite to the position agreed to by AWS field units at a recent conference.

The 5th Weather Wing opposed the idea of incorporating concepts and equipment (AWDS) envisioned for the future into a revised joint regulation that AWS people would have to live with today. (See ltr Col Reams, ch, ops div, 5WW, to AWS (DO), "Army Support," 25Nov77, included as Sup Doc #29 in Vol 3 of "History of the 5th Weather Wing," Jul-Dec77.

†At the same time that the Aerospace Defense Command was complaining about the "totally unacceptable" observing support it was receiving, and the Government Accounting Office was charging AWS with providing costly redundant support to military aviation. See Vol I, *Narrative*, pp.13-22 of *History of Air Weather Service*, (S), 1977. Info used (U).

Army's doorstep, also concluded that AWS support to the Army was unsatisfactory.[117]* Taken by themselves, none of the reports were indicting; but collectively, the scenario they sketched was not propitious. Rowe's best defense, therefore, was a good offense.

So when Brigadier General Rowe informed his boss, the MAC commander, of his intent to propose slicing off direct AWS tactical support at the corps, he confessed it was to overcome "substantial problems" and help reverse the "marginally satisfactory" support AWS was giving the Army.

Another reason the AWS commander cited for his proposal was the conceptual approval--sans funds--the Air Staff granted on 3 November 1977 to AWS' formal petition for AWDS, and the concept that accompanied it for AWDS to terminate at the corps level and be the focal point for tactical Army support. It was a major milestone in AWS' automation and centralization doctrines, and use of the Intelligence officer at the corps to disseminate AWDS-derived information would tie nicely into the Army's increased emphasis on intelligence. "Boy, that plays right into the Air Weather Service game plan," Rowe remarked when informed in October 1975 of Army plans to automate the Intelligence function down to division; "Hell, we could plug right into that thing from Global!"[118]

Progress was slow trying to work the problems through Army and Air Force "channels," Brigadier General Rowe wrote, which was disquieting because, at the same time, he saw trends in evolving Army battlefield doctrine that translated to more AWS support to Army combat units, more AWS manpower, and he did not want his people on the battlefield. As an example, Rowe cited a message from the Army vice chief of staff on 22 November 1977, stressing that, unless weather factors were cranked into weapons systems acquisition and training programs "the Army will find itself unable to fight, survive, and win on the modern battlefield."[119] So, in discussions with the MAC commander's staff, Rowe said he was making his proposal, via the medium of the joint regulation rewrite, to force a dialogue with the Army and focus high-level Army and Air Staff attention on the root problem: meshing spiraling Army requirements for battlefield assistance with AWS' melting manpower.[120] Automation was AWS' solution.

By taking AWDS to corps headquarters, and sweeping the battlefield clean of his people from there forward, Brigadier General Rowe could recoup about 100 of his active duty weathermen, and the 128 in the 200-series Air National Guard weather flights committed to support of divisions in wartime--the MAC commander rapidly and painstakingly pointing it out to the Air Force chief of staff as a "potential for considerable savings."[121] Under pressure from the previous MAC commander to cut his force further, Rowe acceded to Air Staff overtures and, in October 1977, gave his maintenance mission to AFCS at a net

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*After enumerating the causes for inadequate weather support to the Army that were traditionally cited, Swayne sided with Rowe by writing that "the basic problem is that Army weather matters have historically been, and continue to be, addressed by dissociate activities with provincial interests rather than being monitored and directed by a single Army weather manager IAW [In Accordance With] a comprehensive Army weather policy." Swayne recommended that a "single manager for weather" be designated by the Army, and that its "dissociate activities" speak with one voice to a coordinated and comprehensive Army policy on weather support.

savings to the Air Force of 91 spaces;[122] and he admitted that the lure of manpower savings in Army support was equally attractive, an "attention-getting" factor for the Air Staff to ponder while debating his proposal.[123] However, Rowe said it was not the driving factor.

Neither was AWDS. With AWDS becoming a reality, Brigadier General Rowe said, "I could see those problems caused by that distribution of responsibilities in the joint directive magnifying to unmanageable proportion in future years," and so AWDS was a "pacing factor" in his decision to propose the change.[124] Asked if he thought AWS might be out of step because the Army operated in a less centralized and automated structure than did AWS, the AWS commander replied negatively. "They expect to have an automated, highly effective command-and-control system down to . . . corps . . . and I don't think our AWDS concepts are out of step with that at all." "The amount of information that has to be digested by a commander today is so large," Rowe continued, that he needed all the help he could get, and automated data-handling systems gave him that tool.[125]

The two factors that keyed his interest in Army support, Brigadier General Rowe said, were the "importance that I see for weather service to the Army in . . . combat," and "the deficiencies . . . in the ability of our people to do the job."[126]

One such deficiency was weather communications. There were problems with the Army, but Brigadier General Rowe said the "Air Force's skirts . . . [are not] clean on that either," particularly overseas in theaters like Korea and Europe where it was "degraded, if not totally unsatisfactory."[127]

He remained convinced of the need for facsimile forward of corps level in the field. The Army, however, had not recognized the need with the same priority AWS did. "So we have to bastardize, as it were, the equipment supply system to take Air Force weather equipment into a totally Army environment and hang it on Army communications lines," Rowe said. "That's a basic deficiency because we . . . have structured our support--and have been tacitly supported . . . by the Army--in a configuration of centralized production of processed information for use [via facsimile] by our outlying units." The loophole Rowe helped engineer into the joint regulation permitted AWS to haul its facsimile to the field as an "expedient"; but, the general asked hypothetically,[128]

> why don't I use it [the loophole] now? Because I can't afford to follow that route any more. I can't legitimately . . . recommend any longer to my bosses that they spend Air Force money to solve Army problems . . . . I have to get the Army to solve those problems.

In proposing to lop off direct AWS support at the corps, Rowe said he hoped to force the Army to decide if it was going to take facsimile below corps. If they decided against it, and would provide teletype only, then Rowe's reply was that the Army did not need his weathermen below corps because the Intelligence officer at the company or brigade could read weather messages off the teletype just as well as his weathermen. In effect, Rowe said he would leave it up to the Army: if there was not to be facsimile below corps, then there would be none of his weathermen either.[129]

Asked if the indecision evident among Army general officers and their contradictory statements on the need for AWS support affected his decision, Brigadier General Rowe said, no, because until about 1975-76 Army commanders and their staffs, the "Army . . . people that will command and fight the battle," had "bigger problems," "fierce substantive problems," to worry about. Therefore, they left the weather problems to their staff weather officers, which meant that "we probably have been a victim of Air Force solutions to Army problems." [130] After that, Army commanders "with their feet in the fire," such as General Blanchard in Europe at USAREUR, recognized the "absolute necessity" for weather information and have helped "overcome the lethargy . . . at higher levels in the Army structure of the need to begin accounting more seriously for the weather part of the triumverate--enemy, terrain, and weather--that . . . will determine the outcome of future battles." [131] "Timing is fairly important in something like this," Rowe said of his proposal. "And I think the time is right" because "the Army has solved some of these overriding tactics problems" and could now "consider the refinements" like weather support--a so-called "force multiplier, force intensifier" that helped commanders like Blanchard overcome the disadvantage in tanks and troop levels he had. "History may prove me wrong," Rowe offered, "the timing may have been off." [132]

Continuing that trend of thought, Brigadier General Rowe said that in talks with General Blanchard as recently as November 1977 it was apparent that icing on rotary wing aircraft--"a prime combat vehicle"--was a significant problem in the European theater. Yet when he took it upon himself to approach the Army with the problem "I drew a blank"--he was informed by "enclaves" in the Army stateside that the Army did not have problems in that area. "One of these centers [the Army Aviation Center and School at Fort Rucker]," he continued, said [133]

> no, the Army doesn't require something that the field commander said is absolutely necessary. I got caught in that bureaucracy. . . . That's one of the things that really hit me between the eyes . .. that really keyed my thinking to say something's got to be done.

Brigadier General Rowe said he originally tried to tackle such problems through "our liaison structures of officers that live and work with the Army" at USAICS, CACDA, and TRADOC, and "through channels." "But it's not possible," he said, "that's my conclusion, and that's why when the trip wire . . . the joint directive, hit my desk I saw this as an opportunity . . . [to get] some action, [to take "*some dramatic measure*"--author's italics], of overcoming the lethargy or the inability to act." [134] Rowe believed that AWS' staff weather officer and weather liaison structure had not worked "because the Army has had a problem fully integrating that expertise into their system because it belonged to somebody else." Not that he believed the structure had outlived its usefulness, because such officers provided a "vital dialogue" with the Army, furnished AWS feedback on Army trends, and stayed atop issues vital to AWS' interests, such as TOE support for weather teams. But they were not "brushed with brown," Rowe maintained, and they were not "at the level required to influence the kind of policy decisions that were required." "I had reached a point of frustration," Rowe confided, "where I had to admit that I couldn't work the problems through our existing structure." [135]

*While on a command visit to his units in Europe in Nov77, during which he discussed weather problems with Gen Blanchard, Brig Gen Rowe took time out to lunch with some of his enlisted men (pictured here with Amn Larry R. Daugherty) at the Ramstein NCO Club. (USAF Photo)*

What was needed, Brigadier General Rowe believed, was "a counterpart focus" in the Army to himself.* "One of the first things . . . that really hit me right head-on when I got this job was the structure of the Army," the AWS commander noted; "the Army is structured in a series of enclaves . . . and centers" so strong and so parochial that neither he nor the AWS liaison structure could permeate them.[136] Rowe evidently never survived the shock when, at the Army's Intelligence Advisory Group meeting at Fort Huachuca in late September 1975, in his initial confrontation with the Army as AWS commander, while still a colonel, CACDA's Major General Brady overrode his position, USAIC's, and the TESS study findings on the need for direct support at division. Rowe

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*One thing Rowe had in mind was an Air Force staff weather officer on the Department of the Army staff, which was somewhat ironic in view of earlier efforts along those lines. One of the action items arising from the initial Army weather support conference in April 1970 was for a staff weather officer to the Department of the Army. Brigadier General Best, the AWS commander, took the matter up with the Air Staff's assistant for weather (AF/PRW), Colonel Louis A. Gazzaniga. Gazzaniga would not hear of it, and the item was tabled. The number-two man in Gazzaniga's shop at the time was Colonel Berry Rowe. See: ltr and 5 atch Lt Col William E. Cummins, II, Ch, Rqmts Val & Func'tnl Spt Div (AWS/AWOORV), DCS Ops,

thought that someone was needed "on the Army side to work the problem of policy with, that has basically the same authority" he had. Asked if Mr. Beck was filling that void at the Department of the Army, Rowe said no, because "his authority was no more than just a staff member of the headquarters who had to follow" the chain of command--"he had no ability to cross . . . these lines" of authority in the Army's "enclaves." "It was a step in the right direction," Rowe responded, "but certainly wasn't an answer to the problem." [137]

Brigadier General Rowe was asked if, in his proposed rewrite of the joint regulation, he was aiming for a straightforward, clear-cut directive that totally delineated Army and Air Force responsibilities and roles at each echelon. He said he was not. It was both impractical and undesirable. "An organization is most effective when it's least regulated," he offered. [138] Exorcise the loopholes yes, and clarify basic roles, but leave sufficient elasticity to make it workable.

In summary, while reflecting upon his dramatic proposal to keep AWS weathermen off the battlefield back at corps headquarters, Brigadier General Rowe said he recalled the reaction of Lieutenant Colonel Swayne, the Army liaison officer on his staff: "you may have undertaken something that's awakened a sleeping giant, and you probably are going to get more than you can handle." "I suspect that may be true," the AWS commander concluded. [139]

## Postscript

With his proposal, Brigadier General Rowe got the high-level Army attention he wanted. But, inside a year, the waters from the splash he made were once again tranquil, as officials nodded their concern before turning the matter over to the staffing process that studied his ideas to death. None of them became realities. The joint directives were no closer to being revised in 1978 than they were in 1970. Normalcy quickly set back in. Rowe could see signs of it as early as May 1978 when he surprised his staff by announcing his decision to retire late that summer, one year earlier than his mandatory retirement date. Seven months after Rowe retired, his heir designate scrapped his mentor's proposal.

Responding to instructions to keep him informed, Brigadier General Rowe offered some of the rationale for his proposal discussed above, to the MAC commander in chief in a presentation given on 22 February 1978. [140]

Given a green light to proceed, the AWS commander took to the road over the ensuing five months and gave essentially the same pitch to about a dozen Army general officers. Actually, Rowe had already sounded his proposal in the late fall of 1977 with Lieutenant General John H. Cushman at I Corps in Korea, and to General Blanchard at USAREUR. Then in January 1978, during a visit to Headquarters FORSCOM

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*(Cont) HQ AWS, to 1WW, *et al.*, "Army Weather Support Conference," 18May70; and ltr and 13 atch Lt Col Cummins to 1WW, *et al.*, "Second Army Weather Support Conference," 24Feb71.

on the twenty-sixth, he spoke to it with Major Generals John K. Singlaub and Robert Haldane, the chief of staff and deputy chief of staff for operations, respectively. On 1 March Rowe briefed his position to Mr. Beck's boss at the Department of the Army, Major General Edmund R. Thompson, the assistant chief of staff for Intelligence. Rowe followed it up with briefings to Brigadier General James G. Boatner, the commander of the 172d Infantry Brigade at Fort Richardson in early April; to Major General James H. Merryman, the deputy chief of staff for combat development at TRADOC on 1 May; to Lieutenant General John R. Thurman, III, and Brigadier General Fred K. Mahaffey, the commander of the Combined Arms Center, and the deputy commander of CACDA, respectively, at Fort Leavenworth on 19 July; and to Brigadier General Albert N. Stubblebine, III, the USAICS commander at Fort Huachuca the following day. In each instance the generals expressed interest. Thurman went so far as to wire Thompson and Merryman a suggestion to meet and discuss the issues Rowe raised.[141] At FORSCOM, Singlaub and Haldane assured Rowe they were satisfied with the weather service received during stateside maneuvers. "I agreed that if all future wars occurred in the CONUS," Rowe wrote, "I would quit worrying about weather communications and data deficiencies in overseas areas."[142]

In the meantime, the Army Audit Agency issued a report on the Army's meteorological activities. It included an excellent discussion of the Army's requirement for meteorological data during the materiel acquisition process, training, and in combat, and the necessity of instructing Army personnel on the proper use and integration of weather into the planning and decision making processes. It was critical of the Army's management of its meteorological activities, and recommended that a single focal point be designated to oversee them.[143]

To address the deficiencies cited by the Army Audit Agency, and develop a plan for correcting them, the Department of the Army chartered a special meteorological task force. Chaired by Colonel Thomas W. Fuller, from Major General Thompson's Intelligence staff agency at the Department of the Army, the task force held its first meeting from 18 through 24 April 1978, and drafted a plan of action it circulated for review among Army staff agencies and major commands.[144] A second meeting was held during the week of 24 July, after which a revised plan of action was circulated for comment. As 1978 closed, Fuller's shop was incorporating the comments into a final version of the plan, and it had directed the major Army commands to determine the additional manpower and money it would take to implement it. He then planned to convene a conference of general officers before submitting the final plan for consideration by the Army vice chief of staff.

AWS' chief criticism with the drafts it reviewed--a position most of the Army commands echoed--was that it merely reemphasized responsibilities at the various commands without identifying a strong focal point for managing the Army's meteorological resources. Reflecting Brigadier General Rowe's position, AWS recommended that the Intelligence staff agency at the Department of the Army be exclusively earmarked as the focal point for overall meteorological support to the Army, and empowered with the necessary authority to carry out that task.[145]

So on the eve of his retirement, just seven months after formally surfacing his dramatic proposal, Brigadier General Rowe was skeptical that anything positive would result from it. In an end of tour

report to the MAC commander in chief, the AWS commander noted heightened interest and a flurry of activity within Army circles. "However," he concluded,[146]

> I have observed similar flurries of activity in the past on this same general subject. The extensive internal Army and Air Force coordination and approval echelons/procedures have been very effective in dampening out such perturbations, protecting vested interests and ultimately returning everything to a peaceful status quo. I already see indications that this same process is beginning. . . . Continuing "Command Interest" in both Air Force and Army channels will be needed to sustain the effort. In my judgment, if deficiencies in this area are allowed to persist, the Army's combat capability will suffer, and Air Force will continue to invest resources in services which won't help the Army win its battles.

Following up on Rowe's point about continued "command interest," the MAC vice commander in chief wrote the Air Staff in December 1978 asking what was holding up action on Rowe's proposed rewrite of the joint regulation. All that could be done was being done, the Air Staff responded, including extensive discussions between the Air Force and Army staffs throughout the spring of 1978. MAC was advised that the Army would be ready to resume discussions in March 1979, once AWS' staff weather officer to TRADOC, Colonel Cummins, presented a proposed position to the Army staff.[147]

Colonel Cummins remained opposed to Rowe's proposal. His carefully worded response to the Department of the Army, through TRADOC, was that the Army should sue for support commensurate with that AWS furnished the Air Force. Translated, it meant that AWS should provide direct support to Army tactical forces below the corps level--a position the Department of the Army conveyed to the Air Staff in early 1979, in yet another proposed rewrite of the joint regulation. Aware of the development, the AWS staff, through the AWS Council,[148] recommended to Colonel Kaehn in March 1979 that AWS overturn Rowe's canon by supporting the Army's position. The AWS commander approved the switch on 17 April 1979.[149] Through 1986, AWS would continue providing direct observing, forecasting, and staff weather officer support to each tactical Army echelon down through divisions, separate brigades, and armored cavalry regiments.

Less than a month later, as a footnote to the saga documented in this study, Chief Master Sergeant George M. Horn, the senior enlisted advisor to the AWS commander, visited 7th Weather Squadron units supporting the Army in Germany. Upon his return, he reported to the AWS staff and commander that the traditional problems in supporting tactical Army elements in the field (outdated directives, poor communications, unsatisfactory TOE and MTOE support, etc.) were beginning to adversely affect the morale of rank and file weathermen trying to make the system work in spite of itself.[150]