



**HISTORY
OF THE
CANADIAN FORCES
WEATHER SERVICES**

1939-1989

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故曰：知彼知己，勝乃不殆；知地知天，勝乃可全。

Translations of Chinese text on page 2:

1. Gen Huddleston, in the Foreward to the History of the CFWS:

Know the enemy, know yourself, your victory will never be endangered;

Know the ground, know the weather, your victory will be total.

2. "The Art of Strategy" and subtitled "A New Translation of Sun Tzu's Classic *The Art of War*" by R.L. Wing, the quote appears, along with many others. Therefore, it is translated as:

Know the other and know yourself: Triumph without peril.

Know Nature and know the Situation: Triumph completely.

3. From Qing Liao, CMOS Office Manager (August 2008) - it is a proverb that every Chinese schoolchild learns very early in school. It is highly relevant to many situations, but notably war and warriors.

Know the other, know yourself; you will win easily.

Know the place and know the weather; you will win completely.

故曰：知彼知己，勝乃不殆；知地知天，勝乃可全。

FOREWORD

from the Deputy Chief of the Defence Staff

Military tacticians are fond of quoting the following from Sun Tzu's "The Art of War" (circa 500 B.C.):

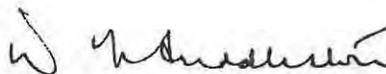
"Know the enemy, know yourself, your victory will never be endangered."

One seldom hears the rest of the quote:

"Know the ground, know the weather, your victory will be total."

The relationship between weather and military operations was recognized 2500 years ago. As the effect of the weather continues to be demonstrated, from Napoleon's disastrous Russian campaign to the Normandy landings in 1944, the military professional must continue to heed Sun Tzu's advice despite the advance of technology.

Serving members, both past and present, of the Canadian Forces Weather Services are to be congratulated on their first fifty years of providing excellent support to the Canadian military. I am sure that the next fifty years will be as successful.



D. Huddleston
Lieutenant-General

ACKNOWLEDGEMENTS

The contributions of the following individuals are recognized in the production of this brief history of weather services in the Canadian Forces.

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THE HISTORY
OF THE
CANADIAN FORCES WEATHER SERVICES

Meteorological services in the Canadian military predate the Second World War. At one stage they consisted of a few personnel in the Royal Canadian Air Force (RCAF) Met Observer Trade. The provision of weather information, however, to the military came before this. As early as 1917, the Royal Flying Corps at Camp Borden received daily forecasts for flight training. In the early 1920's, a meteorological service for operational flying consisted of pilot balloon observations at several Air Board stations. An aviation forecast and briefing office was established at St. Hubert, Quebec in anticipation of a British Empire-wide airship service. The weather office did not survive the 1930 crash in Europe of Britain's R.101 airship.

On December 1, 1938, the Royal Canadian Air Force (RCAF) asked that meteorologists be attached to specific units in the field. This request was not approved until April 1, 1939. That summer the first meteorologist (forecaster) with a meteorological assistant (observer) arrived at the RCAF station in Vancouver.

THE SECOND WORLD WAR

On September 3, 1939, Britain declared war on Germany and, one week later, Canada followed suit. Meteorological information and weather forecasts were the responsibility of the Department of Transport (DOT), but it was readily apparent that the Department of National Defence (DND) would have to acquire its own information and personnel. On September 4 the question of a forecast office at Halifax to serve the Eastern Air Command was first raised. At the same time, the British High Commissioner requested that Canada provide weather services on the east coast to the Royal Navy.

The Halifax office opened for operations on September 11 with a staff of eleven persons. The Trenton RCAF station also established a meteorological training school in September 1939. Students (all male) chosen for the six months course had to be, at the least, high school graduates. The course graduates were assigned to coastal operation stations to observe and to interpret forecasts for air crew until full-fledged meteorologists or meteorological assistants could be trained. This was only the tip of the iceberg, as DND was obviously in need of meteorological personnel for many of its other stations across Canada.

The demand for trained meteorologists and meteorological observers was made even greater with the inauguration of the British Commonwealth Air Training Plan (BCATP) in December of 1939. This

was an agreement for the training of Commonwealth aircrew across Canada. The initial DND request to DOT was for seventeen meteorologists to provide forecasts, briefings, and lectures for the BCATP student pilots. However, the opening of Service Flying Training Schools (SFTSs) at Edmonton, Saskatoon, Regina, Calgary, Brantford, Dunnville, Fort Macleod, Moncton, Kingston, Moose Jaw and Calgary, plus bombing and gunnery Schools at Jarvis and Mossbank and air navigation schools at Trenton and Rivers in 1940, made these numbers seem paltry. Not only were forecasts and briefings needed, but with the proliferation of students, a meteorologist was needed at each base for endless hours of teaching and lecturing. Advertisements were run in newspapers across the country seeking 90 meteorological assistants.

Meteorological service was a priority for the safety of the convoys that were formed up to ship vital goods to the war effort in Europe. Canada's eastern seaboard also needed protection from German submarines and constant surveillance of the area from Halifax to the Labrador coast. Meanwhile, Ferry Command shuttled planes to England.

Trained weather personnel did not exist in sufficient numbers to meet these urgencies of war. The government formed the Wartime Board of Technical Personnel. University students were used to fill positions of urgent demand. Science graduates were sent to the University of Toronto to complete a Masters degree in Meteorology. Those students that were to teach at the BCATP school received a special course to qualify them as instructors. The Deputy Minister of DND gave approval for meteorologists to be brought in as officers and meteorological assistants as senior noncommissioned officers (NCOs). Airmen drafted from the ranks were trained by the meteorologists to take observations and perform routine duties. The first meteorological course for women was held in Toronto. It consisted of 20 students.

In 1941, most BCATP schools had increased their staff from one to two meteorological officers. It was 1942 before all schools were so staffed. Home War Establishment Units, where civilian meteorologists provided the weather information, had to wait even longer for a full complement of meteorologists.

All forecasts were prepared in Toronto and were sent to each base by teletype. There was a major problem with this. Not all bases had teletypes. The shortage of teletypes was not the only problem as circuits to carry the information to the new bases were nonexistent. A test using Bell Telephone lines into Trenton worked successfully and solved part of the problem. The meteorological airmen plotted teletype data of weather observations at both schools and Home War Units on synoptic and other auxiliary charts. The plotted synoptic chart involved recording the figures and symbols for pressure, temperature, wind, cloud and weather data for some 300 stations. Data for each station were clustered around its position on the map. Sixteen hour days became the norm for the meteorological airman.

In the spring of 1941, the meteorological airmen at BCATP schools became dissatisfied with their category in the RCAF. In Home War Units, they had been allowed to remuster into the meteorologist trade. In schools, however, the positions were held by general duty airmen who could not remuster to this trade, which carried prestige and more pay. The problem was corrected by allowing the meteorological airmen at the schools to remuster to a trade classification, subject to passing the usual trade test. The establishments at schools were also changed to include an additional corporal position. The following year a position for a sergeant was provided. At the same time, the trade was renamed "Meteorological Observer".

In the summer of 1940, the RCAF began using Gander as an operational base for anti-submarine patrols. During the same period, a decision was made to fly new aircraft made in American factories across the Atlantic to Britain. For this operation, Dorval produced the forecasts and modifications were made at Goose Bay and Gander, where the pilots and navigators were briefed. Before Goose Bay and Dorval were built, Gander had been producing the basic forecasts (since 1938).

On the Pacific coast, the only base, initially, to have forecasters was Patricia Bay. The outbreak of war with Japan, however, brought about an abrupt change to this situation. By the end of 1941, all Pacific bases had forecasters. In addition, the proposed North West Staging Route became a reality.

Three months after the war began, Meteorological Assistants, Grade 3, were posted to Grande Prairie, Fort St. John, Fort Nelson, Watson Lake and Whitehorse. There were ten radio range stations, seven pilot balloon stations and two equipped with radiosondes. Western Air Command completed this network by making Edmonton a forecast centre in 1943 and Whitehorse and Prince George forecast centres in 1944.

The demand for weather services by the United States military was so great that they were authorized to set up their own facilities in Canada. They set up forecast centres at Edmonton, Prince George and Whitehorse, briefing offices at five intermediate airports and more than 24 observing stations in northwest Canada.

The rapid expansion of meteorological services not only required additional trained personnel, but it also outstripped the availability of equipment and supplies. Only airports which had meteorological service did not require the additional equipment. In an agreement between DND and DOT, DOT would purchase the equipment required and DND would then reimburse DOT. The equipment purchased included radiosondes, ceiling balloons, ceiling projectors, aneroid barometers, thermographs, hair hygrometers, psychrometers, anemometers, and pilot balloons.

With training and equipment programs progressing, meteorological services settled into a routine. For example, at one air observers' school, the day began at five in the morning with the

FINDING THE STEVENSON SCREEN



Meteorological Observer taking readings for a weather observation.

arrival of a meteorological airman to turn on the teletype. The machine hammered out a picture of the day's weather, which included the regular forecast and analysis made up by the district forecast office from the 0130 Eastern Standard Time synoptic map. The airman would then prepare the first of the day's series of local weather reports. Weather data were now available for the meteorologist to prepare the forecasts used to brief each of the flights. The second meteorological airman, arriving later in the morning, took the local observations and read and recorded the readings of each instrument. Reports of these readings went by teletype to the district forecast office every hour. It was these readings on the synoptic map that the meteorologist based the forecast on.

In March 1944, the HMCS Sackville was stationed 670 kilometres west of the Queen Charlotte Islands. She remained on station reporting weather observations around the clock.

The airmen and the NCO's reported to civilian meteorologists on air bases and schools. This situation sometimes created difficulties for the base commanders, the meteorologists and the enlisted personnel. In February of 1943, a request to Treasury Board asked that all civilian meteorologists in Home War Units and RCAF training schools be commissioned. In addition, all forecast centres were to remain civilian, including those on the North West Staging Route and in Newfoundland and transatlantic organizations. 246 meteorologists enlisted in the RCAF, while 983 remained with the DOT.

During the Second World War, 17 forecast centres and 58 weather offices at air training schools and Home War Units across Canada were established. With victory assured in Europe, the Home War Unit bases began winding down and operational squadrons were disbanded. The need for meteorological information lessened considerably. Two thirds of the civilian meteorologists trained during the war were no longer required.

THE BUILDING YEARS (1945-59)

During the war, the Canadian military had come to rely on the meteorological information for the safety of their aircraft and crews. One basic requirement is reliable weather observations at airports. Wind direction and speed, visibility, weather and cloud height, temperature and pressure are needed for take-offs and landings. Wind information is used to select runways and to determine the maximum allowable take-off and landing weights. Temperature is a factor in speed and engine performance on take-off. High temperatures mean lower air density, which in turn reduces carrying power, resulting in the need for high take-off speeds and more runway length. If the runway length is too short, then take-off weight has to be reduced. Wind direction and speed plus temperatures along the flight path of the aircraft determine its flight path, loading capacity and fuel consumption.



Row 4 (l to r): Art H Lamont, Roy J Woodrow, B Vern Benedictson, Rod K Holbrook, AF McQuarrie, Ralph H O'Brien, JA McCallum, Fred (Bud) R Mahaffy, WSC Wallace, George L Pincock, Al H Osborne, Harvey W Johnston, Bob C Graham.

Row 3: Des B Kennedy, John J Moakler, Lloyd T Millar, HF Cork, R (Dick) HW Hill, CL Johnstone, Aldo Missio, W (Bill) EH Cooper, John R Lauder, Ken M Korven, Jim M Leaver, EJ Kermode, Patrick D McTaggart-Cowan.

Row 2: Walt R Fryers, Bill F Ganong, Hugh Cameron, Harry V Tucker, Charlie F Hunt, Maurice Hardman, Lamont B "Monte" Foster, George M Busche, Laurie L Primeau, W (Bill) C Thurber, WD Murden.

Front Row: Paul R Kowal, George H Gilbert, Don G Black, RB McDonald, Wing Commander LA Hillgartner, Don G McCormick, Frank W Benum, Keith T McLeod, WH Mackie.

Wind and temperature information at various altitudes or flight levels are also important to aviation. Through the expansion of the radiosonde network, wind and temperature information could be collected at the varying altitudes used by aircraft. The radiosonde is a small package equipped with sensors, switching and modulation circuitry, an antenna, a battery and a transmitter. The package is attached to a balloon which takes it aloft. As it ascends, it transmits the readings of the temperature and pressure sensors back to a ground receiving station. The balloon is also moved by the wind as it passes through various altitudes. Through a correlation of this movement, wind speed and direction are measured at various altitudes.

Radar, developed during the Second World War, proved to be another important meteorological tool, especially in areas where surface observations were lacking. It became possible to observe the occurrence and movement of precipitation and thunderstorms out to 300 kilometres from the radar site. In aeronautical meteorology, the feasibility of locating thunderstorms and of measuring their vertical extent was a major step forward.

In the years following the Second World War, the Canadian military continued its meteorological cooperation with DOT. Civilian meteorologists continued to do the forecasts and military NCO's provided its resource pool. One important new area for the military was the Canadian Arctic. The military expanded its role in the Arctic with the establishment several air bases and weather stations. The expansion was accomplished through the joint efforts of DOT and DND.

On April 4, 1949, Canada and eleven other nations signed the North Atlantic Treaty Organization (NATO) agreement. This committed the Canadian military to an expanded role in the defence of Europe and the Western World. For the next number of years, as Canada committed squadrons of aircraft to Europe, weather services were needed for these bases of operation. Canada became a member of the NATO Standing Group Meteorological Committee (SGMC) in 1950 (renamed the Meteorology Committee Meteorological Group in 1968).

According to the NATO agreement, each nation was to be responsible for detailed meteorological support, forecasts and briefings to its own forces. For the Europeans, this usually meant expansion of their own already established military meteorological organizations. For the RCAF, it meant the setting up of a new meteorological service remote from the main body in Canada. Until then, all RCAF meteorological offices were staffed with civilian forecasters from DOT. In moving to Europe, the need to have Met Officers in the military was apparent. To speed up the process, candidates selected from DOT's Meteorological Branch volunteered to join the military on a seconded basis at the rank of Captain and serve for a fixed tour of duty overseas.

The Korean War (1950-53) called for more weather services. Air training was increased and some Second World War bases were re-opened. With the additional requirements for the military weather services, some form of agreement on the expanded operation was needed. This agreement was signed in 1953 between DOT and DND. It explained what DND would be responsible for and what DOT would provide. By this meteorological agreement, DOT would provide weather forecasts for both the RCN (Royal Canadian Navy) and RCAF and personnel for bases outside Canada. This agreement also outlined an emergency plan in the event of war.

To obtain necessary weather data the Canadian bases in Europe joined the European Weather Circuit in 1955. This service was closely tied to the United States Air Force Air Weather Service, through the USAFE Tactical Weather Network. The European radio channels, however, were usually so full of interference that the meteorological technicians (Met Techs) used the telephones instead.

In 1956, DND signed an agreement for the army with DOT for weather services similar to those provided to the RCN and RCAF. This agreement was necessary since the artillery had its own radiosonde units, operated by Met Techs.

Ice forecasting was started by the RCN for DOT in 1958. The ice forecasting was taken over by the DOT Meteorological Branch on October 1, 1959. This service was part of a coordinated Canada/United States (CANUS) program to provide assistance to Atlantic shipping and to resupply the northern DEW (Distant Early Warning) Line sites.

THE 1960's - INTEGRATION AND OTHER DEVELOPMENTS

The RCN, RCAF and the Army updated their cooperation agreement with DOT in 1962. This agreement detailed the responsibility for each facet of the military's ever growing need for weather information. The Meteorological Branch of DOT was to provide analysis, prognosis and forecasting. It was to have a central analysis office connected to DND facilities.

DOT was to maintain a high level forecasting facility and to operate principal forecasting offices in Vancouver, Edmonton, Winnipeg, Toronto, Montreal, Gander and Goose Bay. DOT would continue to operate its weather reporting facilities, a network of hourly surface weather reporting stations and the radiosonde program with four ascents daily to 100,000 feet. These data would be transmitted over the existing DOT Meteorological Communications Network. DND was to continue its existing Meteorological Communications Network and to receive forecasts and analyses from DOT. DND must continue to operate its present reporting facilities and any additional reporting stations, required for special military purposes. DND was to continue training of Met Techs going on ships. This specialty training would be done at the Fleet School in Halifax. Upper air training

was to be carried out at DOT's Upper Air Training School in Scarborough. The artillery meteorological training was done at the Royal Canadian School of Artillery (RCSA), Shilo, Manitoba.

Military hardware was changing rapidly, and the weather services needed to keep pace. For example, the arrival of the Argus aircraft, capable of flying non-stop for 32 hours, meant that weather information from Manitoba to Europe was needed in a single briefing. This need was further amplified in 1964 when the air division began using Yukon and Hercules aircraft.

The space program, however, brought in new technology and gave new tools to weather forecasters. The Telecommunications Supplement agreement between Canada and the United States was signed in 1965. It gave Canada access to satellite weather information. Receiving systems for automatic picture transmission (APT) from satellites were installed at DOT's Meteorological Branch at Halifax, Toronto and Cold Lake. In January of 1968, satellite image reception trials were conducted aboard HMCS Bonaventure. With a specially designed omni-directional antenna, the first satellite weather information was received aboard ship.

The arrival of the computer at DOT enabled a major step forward, in the handling of weather information. By 1966, it had changed the speed of teletype transmissions from twenty words per minute to one hundred words per minute.

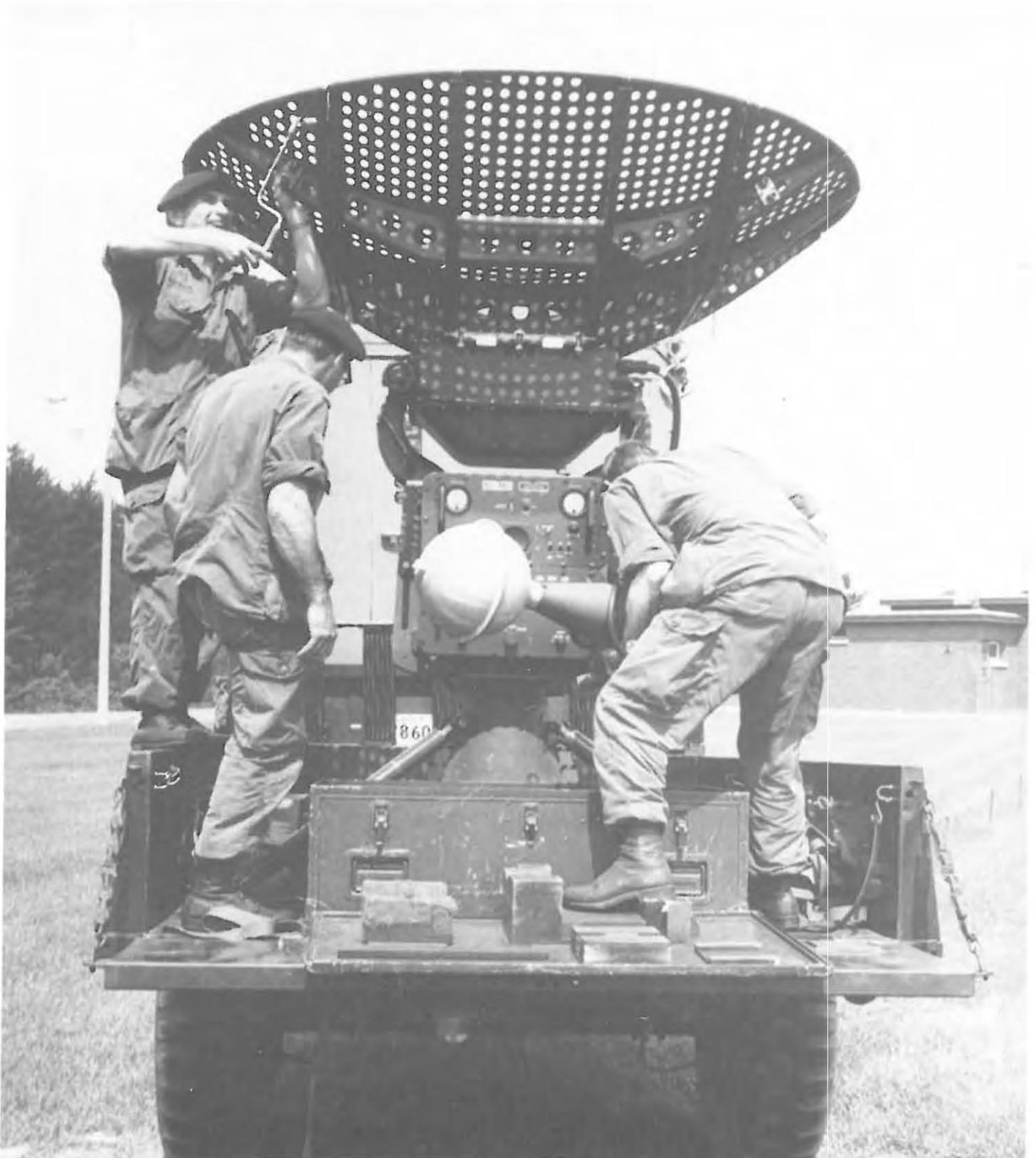
In addition, the radiosonde staff at CFB Cold Lake began rocket tests of the upper atmosphere at heights of 100,000 to 300,000 feet. Rocket firings continued at Primrose Lake three times a week, as part of the meteorological rocket program of the United States Air Force (USAF) Air Weather Service.

Mobile Command of the Canadian Land Forces received a mobile radiosonde tactical unit. This first unit supported a field unit at CFB Shilo in 1967. The unit consisted of radiosonde recorders, a plotting table and compilation equipment, telephones and wireless communications facilities in a two-and-a-half ton van. Another two-and-a-half ton trailer held generators to power the equipment and the antenna unit was transported in a second one-and-a-half ton trailer. A second van served as a mobile warehouse for supplies such as tanks of helium along with other expendables.

In 1967, the Canadian Forces base (CFB) at Lahr, West Germany opened and was making weather forecasts by September. When the first forecasters went to Europe, in 1953, there were only three, but by 1967, there were 18 forecasters and 32 Met Techs attached to the Air Division.

In Canada, technological advances continued into the late 1960's. Closed circuit television (CCTV) weather briefing facilities were installed, on a trial basis, at CFB Comox, British Columbia. CCTV provided weather support for a diversity of air operations, air defence, transport and maritime search and rescue. The

MET TECHS IN MOTION



Mobile ballistic meteorology team prepares for action.

Meteorological Section could transmit to monitors in the squadron briefing and operation rooms. A continuous supply of weather information was now available twenty-four hours a day.

Five locations received the Runway Visual Range (RVR). This system measured visibility at the touch-down area on the most commonly used runways. RVR systems went into Cold Lake, Bagotville, Chatham and No. 1 and 4 Wings in Europe.

The reorganization of Canada's armed forces into a single unified force begun in the early 1960's, became effective on February 1, 1968. The reorganization process, introduced as integration in 1964, created the single Chief of Defence Staff and deleted the three separate Chiefs of Staff. Integration, the second step in the process, united the three services under single control and management using common logistics, supply and training systems. The adoption of unification began on February 1, 1968 and the Canadian Army, RCAF and RCN became a unit called the Canadian Forces (CF). It could be noted that the support service structure now provided broader career opportunities. In some situations, however, the opposite had occurred; but in the Canadian Forces Weather Services (CFWS), the general consensus was that the Met Techs' reclassification proved beneficial.

The management side of the weather services was also examined. The Director, Management Engineering, conducted a review of the CFWS with respect to militarization. Also, new financial management responsibilities, with respect to the control of funds appropriated by DOT for the CFWS, was examined. The study contained several far reaching recommendations concerning the CFWS organization and funding of meteorological services. Recommendations about the status, employment and careers of CFWS staff, both meteorologists and technicians, went under review. New career progression requirements went into effect on January 1, 1969. The training standards under the new program were implemented first in ballistic meteorology at RCSA Shilo and for Navigator's Yeoman at the Fleet School in Halifax.

Following the changes in the meteorological support requirements, the services at CFB Cold Lake were re-organized. The established unit consisted of one meteorologist and five meteorological technicians. It was part of the Aerospace Engineering Test Establishment, responsible for the Primrose Lake Evaluation Range. This distinct meteorological unit operated the radiosonde and other meteorological facilities as part of the rocket program. This rocket program provided useful weather data to a maximum altitude of 65 kilometres, some 35 kilometres above the normal maximum for balloon-borne radiosondes.

With the new program to centralize the career management function, the Met Tech 121 trade became the responsibility of the Posting and Careers Directorate, Air Operations and Service. The integration policies also meant broader training for all Met Tech personnel. The trade specifications included a course centred on briefings which all Met Techs had to pass. The new plan called

SOMEWHERE ON THE STORMY NORTH ATLANTIC



HMCS Bonaventure ("The Bonnie"), decommissioned in 1969, had a meteorological unit consisting of 2 meteorologists and 8 meteorological technicians.

for the reorganization of some Canadian Forces Weather Offices (CFWOs) so that Met Techs performed briefing functions under the direction of the Base Meteorological Officer (BMetO). The changes were as a direct result of the reductions in appropriations and reclassification under unification.

There were two changes in the weather service operation in 1969 which impacted on the meteorological program. One was the ending of the role of the aircraft carrier in RCN plans. The CFWS lost its largest ship-borne weather facility. Meteorological support for HMC ships was then found on Canadian destroyers and supply vessels, with particular emphasis on ships carrying helicopters.

The second major change was the introduction of meteorological satellite data acquisition through the facsimile circuit. Computer processed products from the United States National Environmental Satellite Centre and direct transmission from APT ground receivers were available to weather offices connected to the supplementary circuit. The first offices equipped with photo-facsimile equipment were Maritime Forces Weather Centre (MFWC) Halifax and CFWO Comox.

The demand for oceanographic services began to grow. In 1963, Canada and the United States formed an oceanography sub-committee of the CANUS Military Cooperation Committee. At the same time, NATO formed the NATO Military Oceanography Committee. In Canada, synoptic oceanography was assigned to the Directorate of Meteorology and became part of the day-to-day operations at the newly created Halifax Meteorological and Oceanographic Centre.

As the decade closed, the new CFWO Petawawa office began operations and the CFWO at Zweibrücken, West Germany, closed down after 16 years of operation.

THE 1970's - THE CREATION OF ENVIRONMENT CANADA AND ITS IMPACT

The Department of the Environment (DOE) was created in 1971. The responsibility for Canada's weather service was transferred to it from DOT. Now under the new department, the Canadian Meteorological Service became the Atmospheric Environment Service (AES). DOE immediately began a review of the Canadian weather service forecasting system. The Benum report of 1959 and the Cameron and Kruger survey of 1969, provided a basis for an examination of the Weather Centre/Weather Office concept. The evaluation, with respect to the Canadian Forces weather facilities, dictated a forecasting role at many locations plus consultation and briefing commitments at other weather offices. The Weather Centre/Weather Office concept and its introduction, in the early 1960's, have given the DND weather offices more forecast responsibility.

With the re-evaluation of expenditures and the examination of requirements for personnel, DND opted for more automated equipment. This resulted in the installation of units which

could take unmanned readings and transmit them to a weather office.

Change never seemed to stop! On top of everything else, a program was instituted for the conversion to metric measurement. Also, many positions in the weather services became designated as bilingual, consistent with the overall Canadian government policy.

Following the change of responsibility for weather services from DOT to DOE, the relationship between DND and DOE was examined in detail. The first significant alteration came in 1975 with the move of financial responsibility to DND. The arrangements for civilian personnel, communications and equipment resources had been provided by DOE. This responsibility was transferred to DND; a move made possible with a three million dollar increase in the DND budget.

The examination of the CFWS during this period, pointed out problems that existed in the operation. The interdepartmental arrangement provided for career AES/DOE meteorologists to be either on secondment to DND to meet requirements in Canada or on leave without pay from DOE, while serving as CF commissioned officers. DOE advised DND that it could not provide fully qualified and experienced duty meteorologists for all bases. It was suggested that the problem could be resolved by expanding the role of the Met Techs in the provision of weather services to include doing weather briefings. It was also pointed out that DND could take greater advantage of the new technology available. This would enable CFWS to eliminate the need for forecasters at every air base and move to a regional forecasting system.

On the other side of the coin, the Met Techs pointed out to DND that meteorological briefings had been slated as a function of appropriately qualified technicians. Few Met Techs had advanced to that position. This situation appeared in the Men's Career Development Program Advisory Paper, which stated that this was a source of serious dissatisfaction in the Met Tech trade. From 1977 to 1979, twenty forecaster positions were replaced by military noncommissioned officer (NCOs) briefer positions.

DOE and DND, having examined the ramifications of providing weather services to the Canadian Forces, signed a memorandum of understanding (MOU) on August 29, 1977. This agreement stated the following: DND would maintain and administer the CFWS with support from AES; a joint DND/DOE meteorological and oceanographic service would operate as reorganized in 1977; DND would be responsible for funding the CFWS and DOE would provide DND with material resources and services, subject to incremental cost recovery.

The CFWS in 1977 operated 22 weather facilities which included: Canadian Forces Forecast Centres (CFFCs), Meteorological and Oceanographic Centres (METOCs), Canadian Forces Weather Offices (CFWOs), Ballistic Meteorological Sections and Upper Air Sections

and 24 ships with Cpl Met Tech Observers/Navigator's Yeomen or Warrant Officer Met Tech Briefers/Forecasters.

The re-organization of the CFWS, which had begun in 1977 to overcome the meteorologist staffing problems and to provide better career opportunities for both meteorologists and Met Techs, did not solve the all problems. Nevertheless, it was considered a success. Through the creation of new forecast centres and the corresponding assignment of regional responsibilities to these centres, the CFWS became more responsive to the comprehensive weather support requirements of the Canadian Forces.

In 1974, fire destroyed the Meteorological School at CFB Trenton. A new school was established at Air Command Headquarters (HQ), CFB Winnipeg. The move to Air Command HQ was in line with the major activity of CFWS. The primary role of meteorological personnel was to provide weather services at all Canadian air bases for both fixed and rotary wing flights.

To increase the capability of CFWS, the CF METOC Centre in Halifax received the first minicomputer system in 1978. Forecast Centres at Trenton and Edmonton also received mini-computer systems.

By the end of the decade, the rapid pace of technological advances had impacted on the CFWS. The acquisition of equipment to receive satellite imagery, new generation radars and minicomputers enhanced the service available to the Canadian Forces. Weather information could be stored and called up on video display terminals. The forecast conditions were put into the data base by the CFWO and/or CFFC through remote computer terminals. Weather information from other bases could be acquired by a direct connection to the Terminal Radar Control System (TRACS) processor and the land-line AES teletype circuits. The CFFC could both input local data and edit other meteorological data displayed by the system. The upgrading to the new system and other technical advances moved the CFWS into the 1980's.

THE 1980's - CHANGING WITH THE TIMES

A renewed interest in the possibility of militarization of CFWS developed in 1981. To many, this idea was a cure-all for every problem. It could also offer new opportunities for development into senior management. To others, this idea was such a radical change that it would cause the end of the CFWS. A series of discussions on the subject was held.

The report, which followed, recommended the implementation of partial militarization. Over a ten year period, a limited number of positions, including the Director of Meteorology and Oceanography (DMetOc) position, were to be militarized with no organizational (reporting) changes to be made. CFFCs were to

STRENGTH IN DIVERSITY

CFWS Workshop, CF School of Meteorology, Winnipeg, 21 - 24 October 1985



Back row (l to r): Abe Pelley, C Tierney, Stu Arkwell, D Ross, Arne (Arnie) P Mathus, Andy O'Doherty.

Fifth Row: Ben Friesen, Bernard Mongeon, Mike Balshaw, Gerry Reichheld, Lou Ranahan, Blake Watson, Paul Delannoy, LCol D Danielson USAF.

Fourth Row: Brian Wong, Dennis Massicotte, Bob Hawkins, Blaine Jelley, Ralph Bigio, LCol J. Lehrter USAF, Kiely MacDonald, Doug Fraser.

Third Row: Don Clark, Cdr R. Coleman USN, Chris P St. Pierre, Roy Jacquard, Rob Cross, Maj G Hull, Mike Blake, Dave Craig, John Elliott.

Second Row: Pat Walton, Ted Koolwine, J (Chummy) MacDonald, Réal Daigle, Denis Dupuis, Ron Colpitts, Rod Simms, Norm Peacock, Pat Sarty, Orest Shewchuk, Mike McGillivray.

Front Row (from left): Joe Zatwasky, Paul Kowal, John Dmytriw, Dave Nowell, Richard Asselin, Dave Pollock, Louis Legal, Gary Kierstead, Cal Finlay.

Missing: Bill Hartman.

Personnel from both military and civilian streams create, in the CFWS, a reservoir of diverse experience and expertise from which to draw.

remain in the base/command structure. This proposal was to be reviewed after eight years to consider the feasibility of switching to militarization.

The centralization of forecasting production ended the close rapport between meteorologists and air crews. The replacement of meteorologists with Met Tech briefers took the operationally oriented meteorologists and grouped them in forecast centres. Briefers took over the user/customer service role. With the increased workload of the forecast centres and with briefers on-site, the briefers were to provide direct input to their respective CFFCs. This would enable the forecasters to respond more directly to local conditions. The test of this concept was tried at two locations; CFWO Cold Lake/CFFC Edmonton and CFWO Shearwater/CF METOC Centre Halifax.

The North America Air Defence (NORAD) Northern Region Weather Centre went into operation on June 13, 1983. CFWS units in Comox, Edmonton, Trenton and Halifax provided forecast guidance. These units also were to provide weather warning service to NORAD, within their areas of responsibility.

In terms of technological improvements, AES provided two Alden facsimile radar recorders to the CFWS for use at CFFC Trenton. These were connected to the Carp and Woodbridge radars. Enterprise radar receivers were installed at CFB Cold Lake and CFB Bagotville, with the outputs also available at adjacent bases.

Consistent with the spirit of cooperation between DOE and DND, the CFWS participated in the planning of a new communications system being designed for AES. The system was divided into two parts; the National communications Computer System, to replace all the teletype circuits and the Meteorological Satellite Information System, to replace the facsimile and photofacsimile networks. The latter is a state-of-the-art, high speed communications system to transmit graphics, satellite imagery and radar data.

Aviation weather services remained the primary product of the CFWS. It was important to involve the users, during this period of rapid change. A significant training milestone was a new manual produced by CFWS, entitled "Air Command Weather Manual". The mid 1980's could be noted as a period when CFWS were supplying high quality service to the Canadian Forces, while planning for long-term future requirements and adaptations. A future where each station could call up information, run analysis programs, generate composite charts, create graphic overlays and add text to prepared local, regional or world-wide forecasts from an expanding information base.

CFWS - 50 YEARS OF SERVICE

In 1989, the Canadian Forces Weather Services marked 50 years of operation. With the arrival of forecasters and observers at the RCAF station in Vancouver in the summer of 1939, followed by the opening of the RCN weather office in Halifax on September 11, 1939, the CFWS joined the Canadian military. Over the past fifty years, the service has continued to grow using both military and civilian personnel. The unit was first affiliated with the Department of Transport and later, after 1971, with the Department of the Environment. These affiliations have created some concerns for the civilian personnel who have had to serve two masters. Moreover, the arrangement kept the military personnel from advancing beyond a point in their trade.

As early as 1943, it was suggested that the operation should be militarized. This idea resurfaced periodically in the years that followed. It was not until 1977-79 that meteorological technicians replaced forecasters in providing weather briefings at Canadian Forces bases. As the CFWS entered its fiftieth year, an agreement to partially militarize some civilian positions was being considered.

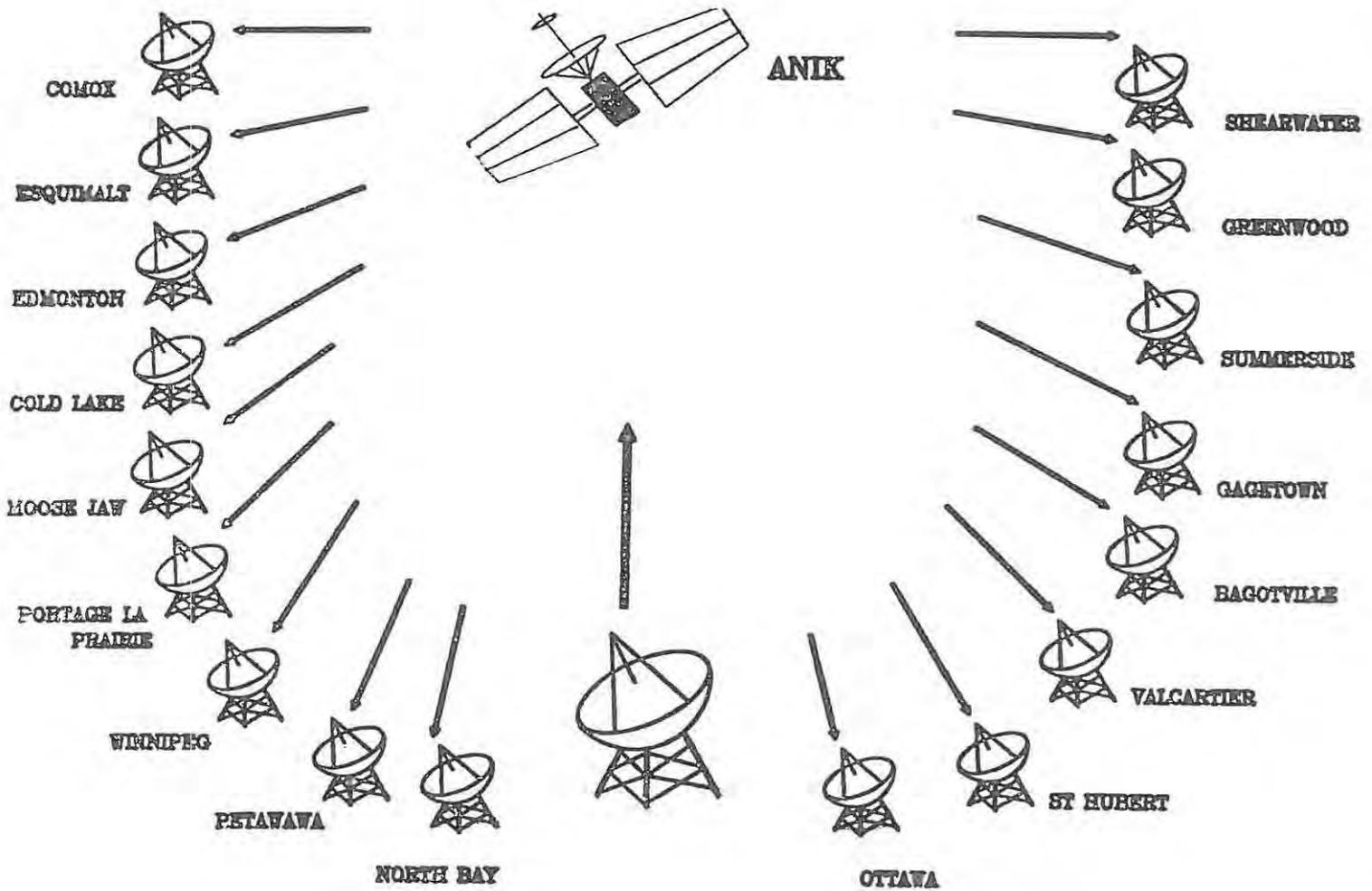
The CFWS have, from the beginning, been in a state of constant technological change. Since 1939, every year has brought the introduction of new equipment. When computers and facsimile machines began to appear, it marked the beginning of an information explosion. The CFWS had to advance with the times, retraining and revamping much of its operations.

Many outside influences also caused changes in the CFWS. The development of the oceanographic services and the ice watch for the navy had its impact. The RCAF changed from propeller aircraft to jets and the army became involved in the rocket program. The CFWS had to meet these new challenges while still accomplishing its tasks with a high degree of skill.

As weather satellites orbit the earth, measuring and transmitting information on weather patterns, the CFWS are moving to provide the Canadian Forces with an expertise that would meet their ever increasing requirements.

With DND approaching the 21st century, it is apparent that more advanced military capability in terms of new military hardware and weapons systems will demand increasingly sophisticated meteorological and oceanographic services. The Canadian Forces Weather Services will, as it has done in the past 50 years, move forward to meet these demands.

THE FUTURE



CFWS meteorological communications system reaches ahead into the 90's.

ANNEX

THE CANADIAN FORCES WEATHER SERVICES - 1989

In 1989, the Canadian Forces Weather Services functioned from the following locations:

National Defence Headquarters, Ottawa

DMetOc is responsible to the Deputy Chief of the Defence Staff for planning and organizing the provision of meteorological and oceanographic services to the Canadian Forces.

Command Headquarters

- a) Air Command Headquarters, Winnipeg, Manitoba
- b) Maritime Command Headquarters, Halifax, Nova Scotia
- c) Mobile Command Headquarters, St. Hubert, Quebec
- d) Canadian Forces Europe Headquarters, Lahr, West Germany

Senior Staff Officers (SSOs) advise their individual commands on matters relating to their weather services. Air Command and Mobile Command each have an SSO Meteorology position while Maritime Command has an SSO Environment Services position. The commander of Canadian Forces Europe has a Staff Officer Meteorology position assigned to the command to serve as the principal advisor on weather services.

Canadian Forces Forecast Centres (CFFCs)

Comox, BC	Trenton, ONT
Edmonton, ALTA	Halifax, NS
Baden-Soellingen, West Germany	

The CFFCs are responsible regionally for weather watches, weather warnings, aerodrome forecasts, special forecasts and advice and consultation to weather briefing offices and military commanders. The CFFCs employ most of the meteorologists in the Canadian Forces Weather Services.

Meteorology and Oceanography Centres

Esquimalt, BC	Halifax NS
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These centres provide oceanography services in addition to meteorological services.

The weather office at Greenwood NS has a forecast as well as a weather watch responsibility for local weather and mission weather. This weather office is staffed with meteorologists to

fulfil the forecast mandate. This makes Greenwood unique, with regards to the other CFWOs which are staffed with Met Tech briefers.

Briefing Offices

Goose Bay, NFLD	Chatham, NB
Gagetown, NB	Summerside, PEI
Shearwater, NS	Bagotville, QUE
Valcartier, QUE	Ottawa, ONT
Petawawa, ONT	North Bay, ONT
Alert, NWT	Winnipeg, MAN
Portage La Prairie, MAN	Shilo, MAN
Moose Jaw, SASK	Cold Lake, ALTA
Lahr, West Germany	

These CFWOs, staffed by Canadian Forces Met Techs, have local responsibility for weather watch and advice to military commanders. There are also briefing offices in 24 HMC ships, staffed by Canadian Forces Met Techs.

Scientific Units

The CFWS also operate Scientific Units at the Aerospace Engineering Test Establishment Cold Lake, Alberta (one meteorologist, five Met Techs) and at the Defence Research Establishment at Suffield, Alberta.