SEMAPHORE TO SATELLITE

A Story of Canadian Military Communications 1903 – 2013

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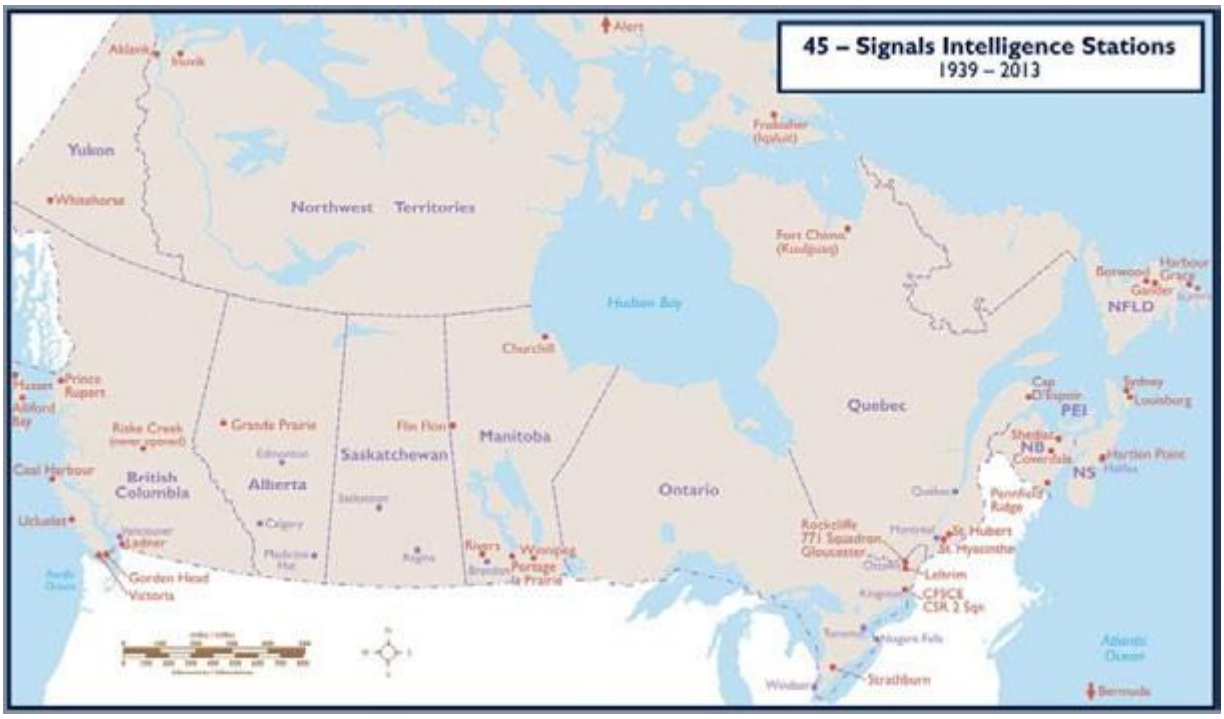
chapter eleven

Canada forms Signals Intelligence units during the Second World War, and continues afterwards with the Canadian Forces Supplementary Radio System, and later with the Canadian Forces Information Operations Group on operations during the Cold War, and in the fight against terrorism

The invention of wireless communication at the beginning of the twentieth century was to revolutionize the world of communications. Wireless had the great advantage over telegraph and telephone in that messages could be sent and received without a connecting wire but it had two disadvantages: one, the messages were not secure and two, the location of the sender could be determined. Once a message was sent into the earth's electro-magnetic spectrum it could be received by anybody anywhere in the world by equipment operating on the same frequency as the sender. This scientific fact complicated the use of wireless for confidential or secret messages by necessitating the use of codes, which significantly delayed the passage of information. By simple triangulation, it was possible for two widely dispersed receiving stations to locate the position of the sender. These two damaging characteristics of wireless were what gave rise to signal intelligence (SIGINT) by military forces.

Nevertheless, the growth of wireless was exponential, and especially in naval circles where the traditional form of communication by wire was not practical. Whether from shore stations or on ships, navies were also able to take advantage of the fact that low frequency wireless signals traveled over salt water better than over land. It was reasonable therefore that signals intelligence became a naval enterprise. In 1925, the British Admiralty requested the Royal Canadian Navy (RCN) to build a wireless, high frequency direction-finding (HFDF) station at Esquimalt, BC, which would be manned by Royal Navy (RN) personnel for use by the Admiralty. In spite of the knowledge that the RN was in the field of SIGINT, there was little interest by the Canadian military until 1938. On 5 August 1938, Maj W. H.S. Macklin, a RCCS officer who was a First World War veteran and a graduate of the British staff college at Quetta, India, submitted a memorandum to Army Headquarters (AHQ) recommending Canada should enter the SIGINT field to protect its coasts by intercepting foreign messages. The memo received the concurrence of the Chief of the General Staff (CGS), MGen E.A. Ashton, and the Minister of National Defence (MND), the Hon. Ian Mackenzie, who approved a tri-service Wireless Intelligence Service on 8 May 1938. This date has become the birthday of what became known as the Supplementary Radio System. (SRS).

On 18 May 1938, the first meeting of a subcommittee of the National Defence Headquarters (NDHQ) Joint Staff Committee, consisting of the Director of Naval Intelligence, the Director of Signals (Army), and a RCAF staff officer took place. Although it was suggested that the RCN seek assistance from the RN to set up HFDF stations, the Chief of the Naval Staff declined saying the low strength of the Service, weakened by fiscal re-



straints of the Depression, made it impossible. There was, therefore, no progress in the field of SIGINT until the outbreak of war in September 1939.

In September 1939, Department of Transport (DOT) stations at St-Hubert, QC; Shediac, NB; Louisbourg, NS; and Botwood, NL reported to HQ RCN that they were receiving coded messages from somewhere in the North Atlantic. The immediate assumption was that German naval forces were already active there. The use of DOT stations, already equipped to locate and guide aircraft, was crucial because the same equipment could be used to locate surface vessels or submarines on the surface. These stations continued to be operated by DOT personnel and to act as HFDF stations for the benefit of the RCN. It was not until 8 December 1939, however, that the RCN took over a DOT site at Strathburn, ON. It had, however, begun in mid-August to intercept messages at a station in Ottawa. The Strathburn station continued until 1946 during which time the majority of the operators were women.

On 5 December 1939, the RCCS set up a wireless intercept operation in the basement of the AHQ Radio Station in the Elgin Building, Ottawa, which had the call sign "VER." This became No. 1 Wireless Station and it increased in personnel strength to the point it outgrew the available space. The station was moved to a building belonging to the RCCS Signals Inspection and Test Department at RCAF Station Rockcliffe on the outskirts of Ottawa. In June 1942, No. 1 Wireless Station was moved to a fifty acre farm site near Leitrim, ON, south of Ottawa. It was called a "Y" (for WI or wireless intercept) station to hide its true purpose, which was to have foreign messages intercepted by signal personnel, and then handed to intelligence personnel to be decoded and translated. This initial work led to the formation of RCCS field units to work in the European Theatre of Operations; their history is found in Chapters Six, Seven, and Eight. The history of the one unit formed to work in Australia is found in Chapter Nine.

There was a large measure of truth to the rationale of the Chief of Naval Staff in 1938 for refusing to commit personnel to SIGINT. The RCN, although formed in 1910, had been starved for funding until 1936, when the government finally began to supply new ships and to increase its personnel strength. Even so, by September 1939, the RCN consisted of only

about 2,000 all ranks with another 1,000 in the Royal Canadian Naval Volunteer Reserve (RCNVR). The fleet had six destroyers and five minesweepers but none had experience in anti-submarine warfare, especially in the use of Anti-Submarine Detection Investigation Committee (ASDIC) a British anti-submarine underwater sound-ranging device or HFDF as a means of detecting submarines on the surface. This discrepancy was serious as the main role of the RCN during the Second World War became the provision of escort service to convoys of merchantmen carrying vital supplies of food and war material from North America to Great Britain. Once Germany had taken over the western coasts of France in June 1940, the German Navy moved its submarine fleet there to dominate the North Atlantic. The lack of suitable Canadian escort vessels, with the latest submarine detection equipment and trained crews, produced a serious situation in the western convoy routes. By 1941, the German wolf packs were sinking merchant ships almost at will. Canadian-built corvettes, with no ASDIC to locate submarines underwater or HFDF to locate them on the surface, were at a serious disadvantage. It soon became a necessity to monitor German submarine wireless transmissions to try and break their code and to locate their position, since they had to surface to re-charge batteries and to send and receive messages. The RCN by 1942 had begun to enter the world of signals intelligence on both land and sea. The responsibility for SIGINT, previously the prerogative of the Director of Naval Intelligence, was now divided between the newly formed Signal Division and the Operational Intelligence Centre. The latter was decommissioned in 1945 but the work in SIGINT was continued by the Signal Division after 1946.

On 4 June 1940, the RCN's first station, located on the west coast at Gordon Head, BC, became operational. Two buildings were erected: one to intercept messages and one to operate HFDF equipment. It had a complement of 65 RCNVR operators who were replaced in 1944 by 65 members of the Women's Royal Canadian Navy Service (WRENS). It was the only Canadian station

CFB Leitrim, the centre for Signal Intelligence.

that had a continuous and significant role in the war against Japan. On 8 June 1940, after permission was granted by the British government, the airport at Gander, NL, established in 1938, was taken over by the RCAF and the HFDF facility was operated jointly by the RCN with a contingent of four sailors and the DOT. After the war, the facility was taken over entirely by the RCN. On 21 June 1940, after the collapse of French resistance, the British Admiralty requested the RCN to monitor French naval activities, and the RCN to take over the DOT Station at Forrest, MB (it moved into Winnipeg in May 1942). The intercept station continued to be operated by DOT personnel but the HFDF facility was manned by RCN ratings throughout the war. In December 1941, four RCAF sites with HFDF equipment were manned by four RCN telegraphists each: Pennfield, NB; Cap D'Espoir, QC; [Footnote. It was completely destroyed by fire on 11 November 1942 but was rebuilt by the RCN and manned by 12 personnel until the end of the war.] Sydney, NS ; and Rivers, MB. At the same time, DOT built a HFDF station at Hartlen Point near Halifax to target U-boats using both Radio Detection Finding (RDF) and wireless intercept; it was manned entirely by DOT personnel throughout the war. The RCN built a HFDF station at the local airport at Harbour Grace, NL for the same purpose. It was three miles from the town and had primitive accommodations. The RCN detachment of 33 was forced to live in private homes and to have their meals in boarding houses. Three RCAF British Columbia seaplane bases were also used by the RCN: Ucluelet, Coal Harbour, and Alliford Bay. The first two moved to Gordon Head later in 1942.

As the number of RCN ships and shore facilities increased, including HFDF and "Y" equipment, the requirement for trained signallers grew rapidly. The small prewar naval wireless school at Halifax was inadequate and a large new school, consisting of 73 buildings on a 25 acre site was opened at Saint Hyacinthe, QC in the summer of 1941. Over 3,200 officers, ratings, and WRENS were trained here during the war in all phases of communications, especially Morse Code wireless at 30 to 35 words a minute. The training of women as wireless intercept operators began in February 1943, and they excelled at this type of work.

On 17 April 1942, a tri-service conference recommended to the Chiefs of Staff that a Canadian "Y" committee be established to coordinate the efforts of all three Services. In late 1942, a Canada, United Kingdom, United States (CANUKUS) SIGINT conference took place in Washington, DC. Already, the Canadian West Coast HFDF stations had been linked to a USN West Coast HFDF network that stretched from Alaska to California. As part of this system, the RCN Ship-to-Shore Station at Masset, BC, established in the fall of 1942 on the northern tip of Graham Island, the largest of the Queen Charlotte Islands, was revamped on 23 February 1943 to have "Y" and HFDF facilities. In 1944, 35 operators trained in the Japanese "Kana Code" arrived and the station remained active until the end of the war.

The value of these stations in providing intelligence in terms of message deciphering and ship locations caused both the Army and the RCAF to enter the field. In addition to No.1 Special Wireless Station at Leitrim, the RCCS opened No. 2 Special Wireless Station at Grande Prairie, AB, and No. 3 Special Wireless Station at Victoria, BC in July 1942. The Grande Prairie site was one originally chosen to be part of the Northwest Territories and Yukon (NWT&Y)Radio System and had been partly built before the outbreak of war closed it down. The RCCS re-occupied the site's original farm house and stayed in operation until 1947. The Victoria Station operated a HF-DF site in a farmer's field at Nanaimo about 60 miles north of the City of Victoria. The station was moved to Ladner, south of Vancouver in 1949. During 1942 - 1943, the RCAF began to establish a total of 40 radar stations on the east and west coasts of Canada, including four specifically tasked with surfaced submarine detection. In October 1942, the Saint-Hubert Station began a constant watch on German naval frequencies.

By the end of 1942, the RCN was receiving intercept intelligence from 19 sites: 7 "Y" stations, 4 HFDF stations, and 8 combined "Y"/HFDF stations. At the same time, the RCN

became part of a world-wide network of HFDF and "Y" stations: 10 in Canada and Newfoundland, 10 in the USA, 13 in the UK, 2 in South Africa, and 5 in other parts of the world. In addition to these static stations, all naval vessels became equipped with HFDF. The combination of both land and sea SIGINT and the work of the British ULTRA code-breaking success eventually conquered the German submarine menace. Without the Allied victory on the North Atlantic, the war could not have been won.

Early in the war, the RN developed a means of identifying wireless transmitters by the characteristics of the signal emitted. The system known as Radio Finger Printing (RFP) used equipment given the code name TINA. The system was transferred to the RCN in January 1942 and after a great amount of experimental work became operational at the Naval Radio Station (NRS) station at Gloucester, near Ottawa, in May 1943. This Station, which was in the middle of an agricultural area, became a HFDF site on 23 February 1943 and was staffed entirely by WRENS, formed on 31 July 1942. Later TINA was moved to Harbour Grace, NL. The system was useful in identifying the specific identity of enemy vessels and sometimes could track their movements.

By the use of TINA, HFDF, and "Y" intercepts, the Allies by early 1943 were able with 40 stations all over the world to track enemy units at sea. In Canada, more stations continued to become operational. On 1 August 1943, NRS Churchill, MB was established as an ionospheric station as part of a HFDF U-boat net. Gordon Head, BC, became the centre for the interception and analysis of Japanese messages, which were in Kana Morse code. The Japanese phonetic alphabet system involved 71 Morse symbols instead of the standard English 26 letters. By October 1944, 85 WRENS arrived at Gordon Head to undertake this difficult work and soon replaced all the men. In the eastern part of Canada, NRS Coverdale, near Moncton, NB, was constructed in early 1944 as both a HFDF and a "Y' site. It was staffed by 80 WRENS and 10 men and was commanded by CPO Irene Carter, who received the British Empire Medal (BEM) for her leadership. Coverdale was the first Allied station to intercept a message from the German Naval Commander, Admiral Karl Doenitz (who was Hitler's successor) announcing the death of Adolph Hitler on 30 April 1945.

By the end of the war with Japan in August 1945, there were three RCCS "Y" Stations: No. 1 at Leitrim, No. 2 at Grande Prairie, and No. 3 at Victoria, and three RCN Stations: Coverdale, Gloucester, and Gordon Head. The majority of naval operations at RCAF/DOT sites were deactivated shortly afterwards, however the RCN took over the RCAF/DOT station at Gander, NL, which became a NRS HFDF Station. NRS Gloucester became a training facility for Communications Special Branch tradesmen, and in 1948 became the official school superceding HMCS Saint Hyacinthe, QC, which remained a general school for signalmen, telegraphists, coders, and electronics tradesmen.

In February 1949, Signal Division was renamed the Directorate of Naval Communications. In September, however, the SIGINT field was moved into a newly formed Directorate of Supplementary Radio Activities (DSRA). By 1951, it had grouped seven RCN stations under the Senior Officer Supplementary Radio Stations (SOSRS), who was also the Commanding Officer of HMCS Gloucester. The other six stations were HMCS Coverdale and Churchill, and NRS Gander, Aklavik, Masset, which had been reactivated in 1949, and Fort Chimo (closed in 1952 but re-opened in 1953 as NRS Frobisher Bay, NWT). A Joint Canada-United States Agreement in 1950, integrated all these stations with USN HFDF nets, with Coverdale acting as an Alternate Net Control for the Atlantic Net. From this point onward the term Supplementary Radio System (SRS) was used by the RCN to describe its HFDF and communication intercept activities.*

In 1946, a National Signals Intelligence Centre known as the Communications Branch of the National Research Council (CBNRC) was established by Order in Council dated 13

*See Appendix 1 for a list of Commanders.

April 1946. At the same time, the Canadian government authorized the Joint Chiefs of Staff to continue "Y" and HFDF work in support of Communications Research. The RCN was granted 40 positions: 20 at Coverdale, 13 at Churchill, and 7 at Prince Rupert, BC, which closed in 1948 and the positions allocated to the RCAF at Whitehorse. The Army was similarly granted 40 positions: 15 at Leitrim, which was renamed Ottawa Wireless Station in 1949; and 25 at Victoria, which moved to Ladner, BC in 1949. It had been the site of a RCAF Station at Boundary Bay and became Vancouver Wireless Station. The third Army station at Grande Prairie was closed in 1947. The RCAF was granted 20 positions at Whitehorse, YK. It became known as No. 5 Radio Unit, which ceased operations in 1968. In July 1949, the RCN expanded its operations into the Northwest Territories by establishing NRS Aklavik and NRS Fort Chimo, QC. Aklavik was an old town site at the mouth of the Mackenzie River but by the early 1950s it was becoming unsuitable for permanent occupation. The federal government decided to open a new town site east of Aklavik to be called Inuvik and the RCN moved its SIGINT station there in 1961. NRS Chimo was built on the site of a former USAF base, and in 1950 became part of the Atlantic HFDF Network, a joint RCN-USN enterprise.

NRS Chimo also became a part of the Canadian Supplementary Radio System. The system worked on the principle of mutual dependency. If one station picked up a signal from an unknown source, it flashed the details of the emission, its call sign and frequency to all the stations in the network. Each station tuned in on the signal and took bearings, which were reported to a control centre. The bearings were collated and the location of the signal recorded. Chimo (now Kuujjuaq) was shut down in 1952 for logistic reasons and its operations were transferred to Frobisher Bay on Baffin Island, which began operations in 1953. The USAF were already operating there as part of the US Strategic Air Command and initially the Canadian HFDF operators were accommodated by the Americans. In 1956, a permanent RCN facility was built including married quarters. In 1958, in addition to its duties as part of a SIGINT network, NRS Frobisher Bay (now Iqualuit) acted as a Naval Communication Facility for the US Military Sea Transport Ships replenishing and supplying DEW Line stations in the Eastern Arctic. In 1961, new quarters for the RCN personnel were constructed, which had a short life as the station closed on 1 November 1967.

By 1950, the Cold War between the USSR and the West was becoming more serious. In July, North Korea invaded South Korea and Canada agreed to send a brigade to bolster the UN Forces in a police action that was to last three years. In 1951, Canada sent a brigade to West Germany to join other NATO countries opposing any move by the Soviet Union towards western Europe. These actions heightened the need for increased SIGINT. In 1952, electronic warfare operators accompanied HMCS Haida, Iroquois, and Huron to Korean waters to intercept messages and radar emissions from unfriendly vessels. The Arctic was an area of particular concern and NRS Churchill was upgraded and commissioned as HMCS Churchill. NRS Masset, damaged by an earthquake in 1949, was reopened in 1951 and integrated into the RCN-USN Eastern Division Pacific HFDF network. In addition to the triple ring of RCAF-USAF radar stations built across the Canadian north from 1952 to 1958, the RCAF opened up an experimental arctic communication unit in Alert, NWT on 14 June 1955. In 1958, the RCCS took over the Alert Wireless Station and expanded it to include 18 buildings and a complement of 3 officers and 93 men. In 1958, NRS Inuvik, NWT was under construction and became operational in 1961, which allowed NRS Aklavik to close. In 1959, RCAF Station Flin Flon, MB began operations.

From 15 to 28 October 1962, during the Cuban Missile Crisis, the Canadian HFDF and intercept stations played an important role in the US stand-off with the USSR. One of the reasons that the Russians withdrew their forces was the knowledge (passed to them by President Kennedy) that the US knew exactly where both the Russian surface and underseas vessels were and that they had been targeted.

It was the success of the HFDF system that helped to end the near-war crisis. The increased interest by the Russian Navy in the Atlantic Ocean was the cause for the opening of NRS Bermuda with a complement of one officer and 14 men. The Atlantic HFDF net of 15 stations now included five Canadian stations: Frobisher, Coverdale, Gander, Gloucester, and Bermuda, which became a permanent station in 1964. NRS Inuvik was upgraded and commissioned as HMCS Inuvik in 1963.

On 1 November 1965, all Supplementary Radio Stations became the responsibility of the Director of Intelligence Operations (DIO) as NDHQ became CFHQ in compliance with stage one of the Canadian Forces Integration Act. Stage Two took place on 12 July 1966 with the creation of the Canadian Forces Supplementary Radio System (CFSRS). Stations that had been controlled independently by the three Services were now directed by the DIO through a Commander with his headquarters at HMCS Gloucester. All of the existing 13 stations became Canadian Forces Stations (CFS):

former Army: Alert, NWT; Leitrim, ON;
and Ladner, BC;
former RCAF: Whitehorse, YK; and
Flin Flon, MB;
former RCN: Churchill; MB, Gloucester, ON;
Inuvik and Frobisher Bay, NWT;
Coverdale, NB; Gander, NL; Masset, BC;
and Bermuda.

The RCN commitment to SIGINT was the greatest of all the Services consisting of 40 officers and 1,200 men. On 1 October 1966, a new Military Occupation (MOC) 291, Communicator Research (Comm Rsch), was created, which incorporated the RCN Radioman Special (RS) trade, the RCCS Radio Telegraphic Operator (R & TG) trade, and the RCAF Communications Operator (Comms Op) trade. All training for the new trade, 291, was to be conducted at CFS Gloucester. This amalgamation of the training of the three Services was followed on 1 February 1968 by the Unification of the Forces, and the continued creation of new organizations to cope with the melding of the navy, army, and air force into a single entity. When Gloucester closed in 1972, as part of the plan to centralize Communications and Electronics training at CFB Kingston, the amalgamated training was transferred to the Canadian Forces School of Communications and Electronic Engineering (CFSCEE). Echo Squadron became responsible for delivering Comm Rsch 291 and CELE 42 training for NCOs and officers respectively. Echo Squadron was housed in the newly constructed Gloucester Building, where the Gloucester Cairn was unveiled on 8 May 1977 to recognize the birthplace of SRS training.

On 1 November 1967, Frobisher Bay was closed as the CFSRS began to put Project Beagle into effect.* It had a goal of reducing maintenance costs and enhancing operational effectiveness, while maintaining continuity. On 15 June 1968, CFS Churchill ceased operations, followed by CFS Whitehorse on 1 July. As stations closed the remainder were modernized. In 1970, CFS Bermuda received new wide band direction finding equipment. When CFS Ladner ceased operations on 15 July 1971, its personnel and equipment were moved to CFS Masset, which had just opened a new operations building, and added new married quarters, a gymnasium, headquarters, maintenance shop, and hospital. On 15 June 1971, CFS Coverdale ceased operations and a number of personnel was moved to CFS Gander, where there was a newly constructed operations facility, named HMCS Coverdale Building, making it the largest station in the SRS.

On 4 January 1971, CFSRS HQ moved from CFS Gloucester to be co-located with the Director General Intelligence Services (DGIS) in "A" Building, Cartier Square, Ottawa. In March 1973, CFS Flin Flon ceased operations. About the same time, No. 2 Squadron of 1 Canadian Signal Regiment (1 CSR) stationed in Kingston was made an Electronic Warfare

* The RCA Company was the prime contractor for the new electronics purchased as part of Project Beagle. The RCA Vice President Government Relations was AVM (Ret'd) H.B. Godwin, one of the founders of RCAF Telecommunications, who worked on the upgrades to Gander, Masset, and Bermuda.]

(EW) squadron. Initially, it had a jamming and communications security (COMSEC) role but in time with new HFDF equipment it began to have a SIGINT role with the Canadian Forces Europe (CFE). It was deployed regularly in the late 1980s on the annual NATO FALLEX. Its involvement in Europe led to the establishment of a CFSRS detachment of 30 personnel at an US Army Field Station in Augsberg, West Germany in 1989. With the end of the Cold War, this commitment only lasted four years as the US Army closed their facility, as a cost-saving measure, in 1993. The Canadian personnel, as a result of their excellent work during the Gulf War, were transferred to the US National SIGINT Operations Centre in Fort Meade, Maryland. Because 1 CSR's No. 2 Squadron was committed to the CFE, a Reserve EW Squadron was established on 1 July 1986 and stood up on 18 September to support the Canadian Air Sea Transportable (CAST) Brigade training in Norway. Consisting of 7 Regular Force and 127 Reserve Force C&E members, the Reserve EW Squadron was stationed at CFB Kingston as a detachment of 763 (Ottawa) Communications Regiment. In 1990, it was made an independent Squadron under command of 70 Communications Group, receiving a significant set of EW vehicles and equipment in purpose-built permanent accommodation. In 1993, it was moved under the operational control of the CFSRS. On 8 March 2005, the EW Squadron became 772 EW Squadron, an independent unit with 84, Reserve 291 positions; 15, Reserve 215 Sig Op positions; and 18, Reserve 111 Int Op positions. In 2000, 2 EW Squadron became an independent unit and on 1 April 2010, it was amalgamated with 722 EW Squadron to form 21 EW Regiment. The new Regiment, a total force unit, was stood up on 17 April 2010.

On 1 April 1975, the Communications Security Establishment (CSE) replaced the CBNRC. Eventually, the shuffle of departments caused by the integration and unification of the three Services had the administrative command and control of the CFSRS transferred from CFHQ-VCDS to the Commander of the Canadian Forces Communication Command (CFCC) in February 1976. This change of command caused the move of CFSRS HQ at CFHQ to Tunney's Pasture, Ottawa, the location of CFCC HQ. At that time, CFSRS had SIGINT facilities at CFSs Leitrim, Alert, Inuvik, Gander, Bermuda, and Masset.

On 9 February 1977, 770 Communication Research Squadron (CRS) was formed from the operational SRS personnel at CFS Gander. 770 CRS became a lodger unit on CFS Gander, which now reported to Air Command. In 1980, DND began a trial period of three years to test the posting of women to isolated stations. It was considered a success and beginning in 1984 women Comm Rsch 291 operators were once again serving in outstations.

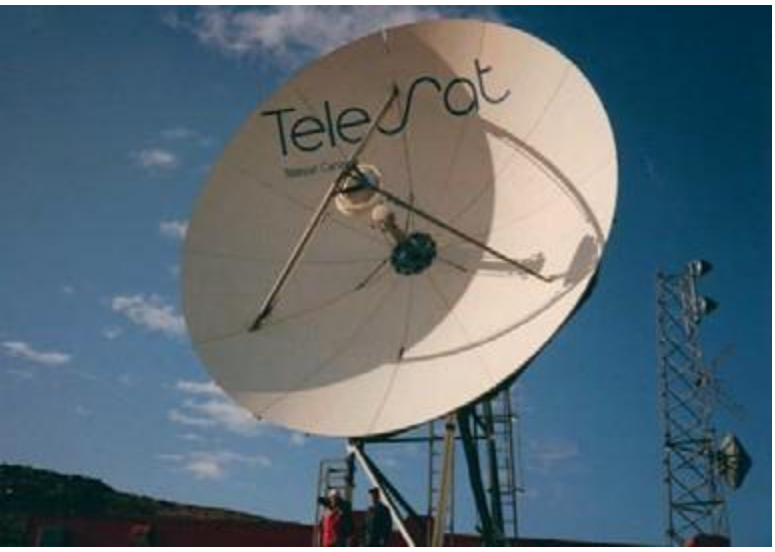
Until 1982, the work of the CFSRS was considered SECRET, hence the term Communications Research and cover stories such as HFDF support to search and rescue operations were being used to describe signals intelligence activities. That summer, however, following the lead of the UK government, the MND, the Hon. Jacques Blais, announced, "(that) CSE, with the support of the Canadian Forces Supplementary Radio System, provides a service of signals intelligence in support of Canada's Defence and Foreign Policy." Still, the work of the CFSRS continued to be hush-hush in military circles. However the work of signals intelligence was carried out, it was becoming more difficult because of the rapid spread and complexity of wireless technology. By the late 1980s, the world-wide HFDF Network, known as BULLSEYE, needed to be modernized to cope with modern signals and modulation types appearing on the HF band. Project POLO was initiated to do this and the work began with a review of the entire CF SIGINT program. The study took a year to gather reports on the HFDF program, the Electronic Intelligence (ELINT) program, tactical support to CF operations in the Land, Sea, and Air environments, and the broader CF contribution to the CSE managed National Cryptologic Program (NCP). It was shown that CFSRS reports were being used in NORAD and Maritime operations but operational commanders had little idea of the source of the intelligence. The work of the SRS was invisible

and, in times of reduced funds for DND projects, the relevance and the future of SRS programs were in question.

On 1 April 1986, CFS Inuvik, which had a complement of 6 officers and 257 other ranks but had been reduced to 4 officers, 143 other ranks, and 26 civilians, ceased operations and some of the personnel were absorbed into 1 CSR in Kingston as part of the Electronic Warfare (EW) Squadron. Others were moved to Ottawa, where on 14 October 1987, 771 Communications Research Squadron was authorized to be stationed at CSE. It was disbanded on 11 December 2002. In March 1988, a Letter of Agreement was signed by CFSRS, MARCOM, and CSE to establish a Cryptologic Direct Support Element at 770 CRS at Gander. Its personnel were specifically trained to operate SIGINT equipment onboard RCN ships. The first major commitment came during the Gulf War, 1990 - 1991, and since then Comm Rsch personnel have been available to serve on RCN ships whenever required.

On 30 October 1991, a CC-130 Hercules aircraft crashed about 16 kilometres south of CFS Alert. There were five fatalities and 13 survivors who were rescued and returned to Alert. Among the dead were two CFCC members: Capt J. Trepanier and WO R. Grimsley; six of the injured survivors were members of the C&E Branch. The tragedy brought to the consciousness of Canadians the existence of military outposts in the far North of Canada. Alert is the best example as it is the most northerly permanently inhabited settlement in the world. Situated on the northern tip of Ellesmere Island, it is only about 817 kilometres from the North Pole but 4,344 kilometres north of Toronto. Established as a joint US-Canada Arctic weather station in 1950, it was taken over by the RCAF in 1956 as an experimental arctic communication site. In 1958, it was given to the RCCS which had experience working in the North. In addition to supplying weather service and acting as a service centre for Arctic researchers, it has HFDF and SIGINT capabilities that proved most valuable during the Cold War. The site consists of an operations building, a mess hall, three accommodation buildings, a power house, a large HFDF complex, and a vehicle maintenance building. Initially, it had a station complement of only 27 men but soon grew to 92 in 1959. Just before unification, the strength

Fort Eureka, Ellesmere Island, NWT, 500 kilometres south of CFS Alert.



A Satellite Dish at Eureka connected to a satellite dish in Ottawa.

was by proportion 7 RCN to 9 RCCS to 4 RCAF. By 1970, as CFS Alert, the military population numbered 200, mostly members of the CFSRS. It was a six month's posting, with no leave, and for men only until 1980.

In 1980, the Canadian Forces began the Servicewomen in Non-Traditional Environments and Roles (SWINTER) Project. Included in the project was a three-year trial posting of women to CFS Alert. Capt J. R. Leitch, at CFSRS HQ, created a plan that would see the rotation of servicewomen through 20 designated positions in support trades, serving six month tours in Alert. The plan also included in the initial rotation a C&E technician and a Nursing Officer, who would also act as Station Administrative Officer (nicknamed Madam Admin). In 1984, the Comm Rsch trade was opened to women and they began serving in outstations, and restrictions on serving in CFS Alert were removed. Also, in 1980, a new operations building, Polaris Hall was opened. In 1976, work had begun to install the High Arctic Data Communication System (HADCS) that was designed to speed up the passage of information from Alert to Ottawa. It involved the installation of two satellite antennas and a base station in Eureka, NWT, a weather station founded in 1947 on Ellesmere Island about 500 kilometres southwest of Alert, and six microwave repeater stations between Alert and Eureka. HADCS was completed in 1982 with satellite termination at the Sir Leonard Tilley Building in Ottawa. This system was upgraded by HADCS II in 1998 that increased the system's capacity by a factor of four. At the same time, the system brought the FAX capability, TV channels, and internet access to Alert. A valuable innovation was the installation in 2003 of vertical solar panels to maximize the capture of the sun's rays to provide power to the repeater stations, which substantially reduced their maintenance. The annual maintenance of HADCS became an event every summer as OP HURRICANE (in 2009, renamed OP NEVUS) involving helicopters, aircraft, technicians, and a substantial support staff to change batteries at extremely remote sites.

A special isolation allowance was paid after 1980, and in 1992 DND announced that all who had served there for a full tour of 183 days were entitled to the Special Service Medal with an Alert Bar. In 1994, Alert operations began to be converted to remote control and the number of personnel began to drop. Prior to 1997, it was guaranteed that Comm Rsch 291 operators would serve a tour at Alert every four years. Thankfully over time, the living conditions improved significantly, especially as a three week vacation was allowed in the middle of the six month posting. There were also individual TVs and plenty of recreational facilities: two gymnasiums, a theatre, bowling alley, and games rooms. One of the site's favourite pastimes is listening to the in-house radio station, CHAR-FM 105.9. After the site was converted to remote operations in 1997 - 1998, the number of personnel dropped from 215 to 74 of which only 7 were directly involved in SIGINT. The remaining 67 are required to operate and maintain the site and airfield, and to provide support to the world's most northerly weather station.

Special Service Medal with Alert bar

On 1 April 2008, due to the greatly reduced number of SIGINT personnel, the responsibility for CFS Alert passed to 1 Canadian Air Division. In September 2008, to mark the 50th anniversary of the opening of Alert by the RCCS, a tour was made by 50 veterans of Alert service, including a survivor of the 1991 crash. Since the acquisition of the CC-177 Globemaster III by the RCAF in 2010, the number of supply runs to Alert were much reduced. Also, in 2010, the RCAF acquired the latest version of the Hercules aircraft, the CC-130 J, which made an initial flight to Alert on September 10. It can carry much heavier loads and burn less fuel which is important when refueling at Alert.

In the early 1990s, on completion of the SIGINT Review, Project POLO was approved and packaged into a group of projects called CFSRS Modernization. This program included upgrading the collection "front ends" in Masset, Gander, and Alert, and by the use of remote controls their information could be sent to CFS Leitrim, which after a $20 Million expansion became the centre of SIGINT activities. CFS Bermuda was not to be included for modernization and it was closed in 1993. By using remote controls and closing Bermuda, significant personnel savings were achieved. In addition, the station infrastructure at Masset was largely eliminated and at both Alert and Gander the station infrastructure was also reduced. The business case for CFSRS Modernization involved the reduction of over 600 military person-years, included 350 Comm Rsch positions.

In a major organizational shuffle, CFCC was disbanded on 15 July 1994, with its units becoming part of the newly created Defence Information Services Organization (DISO), which in turn became the Assistant Deputy Minister Information Management Group (ADM IM). CFSRS saw its responsibilities grow and was renamed Canadian Forces Information Operations Group (CFIOG). A number of changes in the electronic information environment were taking place in the mid 1990s, that brought about the evolution of CFIOG. First, CFSRS was becoming obsolete. Its focus was on supporting CSE in the gathering of SIGINT on our Cold War adversary but that war had ended in 1989. Based on some recent successes in Bosnia, CFSRS was increasingly being tasked to provide SIGINT support to deployed operations. Second, the Directorate of Electronic Warfare had been moved out of NDHQ and had essentially lost contact with the operational groups it was trying to support. With a return to NDHQ, it was named J6IO (Joint Headquarters Signals Information Operations), and successfully re-established contact with all elements of the Joint Operations Staff. The direct result was a re-focusing of all aspects of CFIOG on operations and an opportunity to demonstrate its value to senior operational staff. Third, the explosive growth in computer information networks demanded a new approach to security. It was no longer sufficient to simply encrypt the information at either end. The concept of "active defence" was developed because networks needed to be monitored in real time for malicious activity, and any such activity immediately engaged. While these changes were taking place, the commonality caused Signals Intelligence, Information Security, and Electronic Warfare to come together under the umbrella of CFIOG, where the Information Operations (IO) of Computer Network Operations (CNO) were

One of six repeater microwave stations connecting CFS Alert and Fort Eureka.

evident in exploitation, defence/security, and attack. As part of concentration of EW assets, the Reserve EW Squadron became part of CFSRS after the disbandment of CFCC.

CFIOG provided a number of independent detachments under an exchange agreement with the United States Navy, which had personnel serving at Gander and Masset. These detachments included:

US National Security Group Activity (NSGA), Whidbey Island, in Washington State, that was stood up in 1997 and closed in 2002; the Canadian complement was one warrant officer and one corporal;

NSGA Northwest, in the State of Virginia, which was closed in 2001 and the six Canadian personnel transferred to NSGA Norfolk also in Virginia; by 2013 only two Canadians remain in Norfolk as part of the 10th Fleet Naval Cyber Development Operations Centre;

US Army Signals Training Centre at Fort Gordon, Georgia, with nine Canadians attached, opened in 2003;

Medina Regional SIGINT Operations Centre at San Antonio, Texas, with nine resident Canadians;

US National Security Agency and US Cyber Command at Fort Meade, Maryland, with 23 attached Canadians;

UK Joint SIGINT Support Unit, RAF Digby, England with two Canadians attached;

US Naval Security Group Headquarters in Washington, DC with three resident Canadians;

NSGA Kunia in Hawaii with eight Canadians attached;

NSGA San Diego in California with six Canadians attached;

US AFB Elemendorf, Alaska with seven Canadians attached.

Much of the work of the CFSRS had been Cold War related either in support of NATO or NORAD. Canadian operations in the United Nations Protection Force (UNPROFOR) in the former Yugoslavia became one of peacemaking rather than the traditional peacekeeping. The siege of Sarajevo began in 1992 and as the years passed the situation continued to deteriorate. Canadian SIGINT participation in UNPROFOR, however, was very limited. The US and the UK called on Canada to supply EW trained personnel fluent in the Slavic languages. 2 EW Squadron deployed several soldiers to the British Army's 14 Signal Regiment, while remote linguist support was made available to US Forces. Almost at the end of the UNPROFOR mission, mobile EW Technologies (MEWTs) were deployed mounted in Bisons, land armoured vehicles (LAVs). When the UNPROFOR mission ended in December 1995, the MEWTs were withdrawn.

The bloody situation in the former Yugoslavia called for more stringent measures and NATO stepped in with a Stabilization Force (SFOR) in 1996, which Canada joined under the codeword OP PALLADIUM. For unknown reasons, the MEWTs were not included with the Canadian contingent. In October 1998, the Canadian Contingent Commander, Col W. Natynczk, later the CDS, requested EW support. On a previous tour, he had been aware of the intimate intelligence support provided by the UK 14 Signal Regiment. An EW Troop with its distinctive LAVs became a part of OP PALLADIUM in 1999. CFIOG provided Comm Rsch personnel to the Canadian Intelligence Centre in Sarajevo and to the EW Troop.

By the time of 9/11, the world of SIGINT had expanded. The increased use of the Internet, cell phones, Blackberries, and other handheld wireless devices enhanced by satel- lite communications made it possible for EW units to play a much bigger part in operations. After 9/11, Canada launched OP APOLLO to combat terrorism. Land EW assets were deployed from the beginning and SIGINT resources were made available to the commanders of OP APOLLO and later OP ATHENA, and to the SIGINT community of Australia, Canada, United Kingdom, United States, and New Zealand (AUSCANUKUSNZ). CFIOG support to the Canadian Army combat forces on the ground in Afghanistan began in February 2002 with CFS Leitrim deploying a EW team to Kandahar airfield (KAF) to provide Force Protection, Targeting, and

Indication and Warning (I&W) to 3 PPCLI. Force Protection provided information to commanders to allow them greater freedom of action. Targeting was support to target analysis leading to attack recommendations to assist in mission planning and execution. I&W was the identification of specific indicators that are easily recognized but when linked together individually or as a group lead to identifiable activity by an adversary. The first deployment brought significant challenges in terms of culture, language, and environment. The Taliban technological communications means were sophisticated and the deployed EW operators had to adjust quickly to the new situation. With perseverance and determination the detachment, with 24/7 support from CFS Leitrim and our intelligence partners, was able to provide essential SIGINT to the Canadian Commander.

In addition to SIGINT support to the Army, CFIOG provided support to the RCN and the RCAF during OP APOLLO. CFSOC provided a Cryptologic Direct Support Element (CDSE) to most warships deployed to OP APOLLO. The support was so effective that the RCN included a modification to include a permanent space for a CDSE in its ships. This will mean a reduction in mission specific modifications and a quicker ability to install CDSE equipment for deployments. Also, CFEWC deployed a detachment to provide real time analysis and support to RCAF elements at Camp Mirage.

In July 2003, SIGINT personnel were sent to Kabul as part of OP ATHENA to help form an All Source Intelligence Cell (ASIC). They were part of a multi-disciplinary team that included SIGINT, Human Intelligence (HUMINT) analysts, and ground imagery (mapping and charting). SIGINT was able to provide near real time Targeting, I&W, Force Protection, and preventative measures against Improvised Explosive Devices (IEDs), and insurgent activity identification and location. SIGINT was also able to provide information on insurgent morale, weapons inventory, and battle tactics. From the ASIC and the SIGINT Team, the Task Force Commander received a daily intelligence briefing providing crucial information on strategic capabilities, intention, activities, and organization of hostile entities. I&W was also provided to the tactical commanders in the field.

In 2006, OP ATHENA transferred from Kabul to Kandahar Airfield where SIGINT personnel were employed not only in ASIC but also in Regional Command South (RC (S)), in the Air Wing, and in support to Canadian Special Operations Command (CANSOFCOM). EW detachments operated with the forward companies and became an essential company level combat asset. On several occasions, SIGINT contributed significantly in preventing enemy attacks and saved Canadian lives. An attack on Strong Point Centre on 14 October 2006 was an example of the power of SIGINT information. Charles Company of the 1st Battalion, Royal Canadian Regiment (1 RCR) was protecting the work of Canadian Combat Engineers while they were building Route Summit in the Pashmul area of Kandahar Province. The Commanding Officer of 1 RCR, LCol Lavoie, arrived at Strong Point Centre at 1455 hours and dismounted to discuss an IED incident with the local platoon commander. Just as the CO's Tactical HQ was about to depart a warning message came over the air, "a Canadian position is under imminent threat of attack." LCol Lavoie was urged to mount up and his Tac HQ had moved only about 80 metres when a RPG rocket struck the ground where he and the platoon commander had been standing. The threat warning provided by SIGINT sources and relayed through the ASIC had saved several Canadian lives.

EW and SIGINT support provided by Comm Rsch operators in KAF continued until the ASIC was dismantled in November 2011. Although the combat mission ended, SIGINT support continued to support the Mission Transition Task Force as well as the KAF Base Commander who was in charge of the logistics associated with the CF departure. The success of Canadian SIGINT in OP ATHENA was a combination of 24/7 support from CFS Leitrim as well as EW and SIGINT assets deployed on the ground. The exemplary level of professionalism displayed by CFS Leitrim per-

sonnel and operators from 2 EW Squadron, in spite of the arduous and unending nature of the work throughout the Afghanistan campaign, was an example of outstanding team spirit and individual technical skill. Their work in the modern complex and expanding wireless environment was a credit to CF SIGINT working in its many locations under the leadership of CFIOG. This proud record of achievement has shown the way for the challenges of an even more complex and vital future.