SIGINT in Paradise: Canadian Forces Station Bermuda, 1963-1993

by David A. Charters

Introduction

From 1963 to 1993 the Canadian Forces operated a High Frequency/Direction Finding (HF/DF) signals intelligence (SIGINT) station in Bermuda. Canadian Forces Station (CFS) Bermuda was established on a small scale in the summer of 1963. Its location and the start date suggest that it might have been created as a response to the Cuban Missile Crisis, which had occurred eight months earlier. However, the available evidence does not support that notion. Rather, the station had a longer and more complex gestation that pre-dated the crisis. CFS Bermuda was later expanded with modernized equipment and a larger staff contingent. The Canadian government closed it in 1993 as part of the post-Cold War retrenchment and budget reductions. Relatively little is known about it, since sources are few and fragmented. So, this paper represents an attempt to consolidate what is known and to fill that gap in our knowledge.

It will first explain the relationship between SIGINT and DF, then discuss the Atlantic HF/DF Network. The creation of and operations of the Bermuda station will be described next. The remainder of the paper will explore the genesis of the station. It will explore the possible relationship between the Cuban Missile Crisis and the creation of the station. Then it will explore the wider context in which CFS Bermuda developed, including Canadian SIGINT, the Canadian Forces Supplementary Radio System, the Communications Security Establishment, and the likely process involved in standing up the station between 1961 and 1963. A concluding section will attempt to identify future avenues for research.

SIGINT and Direction-Finding (DF)

In the first volume of the official history of British intelligence in the Second World War, former Bletchley Park analyst Harry Hinsley and his co-authors identified the four main SIGINT processes: interception; traffic analysis; cryptanalysis; and interpretation. They included Direction-finding in the intercept function. Britain used the term "Y Service" for all intercept activities, including DF.[1] As cryptography historian David Kahn explains it,

> "Direction-finding locates radio transmitters. Since radio signals are heard best when the receiver points at the transmitter, sensitive antennas can find the direction from which the signal is coming by swinging until they hear it at its loudest. If two direction finders take bearings like that on a signal and a control center draws lines of direction on a map, the point at which they cross marks the position of the transmitter. Such a fix can tell quite precisely where, for example, a ship is operating. Successive fixes can plot its course and speed."[2]

Intelligence historian Michael Herman, who had served in Government Communications Head-quarters (GCHQ - Britain's SIGINT service), observed that, to guide naval operations, "The more bearings, the smaller the area in which the enemy had to be sought, the fewer aircraft and ships needed for search, and the greater the probability of engagement."[3]

While DF can be used for other purposes, such as search and rescue (SAR) or monitoring shipping traffic generally, the fundamental point one draws from these sources is that its primary role was/is to support signals intelligence. DF is central to the SIGINT function, since locating a signal must precede all the other tasks. As will be shown below, CFS Bermuda was part of Canada's Cold War SIGINT system. It also was integral to several larger allied DF and SIGINT networks, such as the 'Five Eyes', and the North Atlantic Treaty Organization (NATO).

The Atlantic HF/DF Network

CFS Bermuda was part of the Atlantic HF/DF network, that, in turn, was a sub-set of the World-wide HF/DF network run by the US Department of Defense. Radio DF pre-dated the First World War, and it expanded during the inter-war period. But it was a slow process, not suitable for capturing brief signals. Research by Robert Watson-Watt in the mid-1920s, using a new type of antenna and an oscilloscope to locate thunderstorms, demonstrated the ability of these technologies to capture and locate a signal as brief as a thousandth of a second. Two antennae, oriented on a north-south (X) axis and an east-west (Y) axis respectively, could indicate the location of a lightning strike, or – relevant for SIGINT – the source of a radio transmission. More antennae arranged in arrays, and multiple antennae sites using their arrays in tandem to achieve triangulation, could determine signal locations with much greater precision.[4]

Starting with a station at Bar Harbor, Maine, in 1918, the US Navy (USN) started creating a network of medium frequency DF stations along the Atlantic coast and around and across the Pacific. By 1924, some 52 sites were in place or under construction. At this time, they were used primarily as navigational aids for naval and merchant ships, but their potential intelligence value was also recognized. Eventually, the increasing use of high frequency (HF) radio made those stations obsolete. By the Spring of 1940 the USN was operating sixteen HF/DF stations, and only six of the original medium frequency sites were still in operation. HF signals (also called short-wave) were optimal for long-distance communication, because they could be aimed into the sky and bounced off the ionosphere to reach over the horizon (as opposed to line-of-sight transmission). The relevance of HF communications to naval operations and to SIGINT is readily apparent.[5]

During the Battle of the Atlantic HF/DF was used to detect U-boats and direct escorts onto them, and also to re-route convoys around them.[6] David Kahn asserts that the arc of HF/DF stations deployed around the Atlantic exploited the U-boats' practice of regular reporting that had been imposed by Admiral Donitz.[7] John Ferris, GCHQ's historian, explains that the U-boat offensive was defeated in 1943 by "a symbiotic combination of Ultra, radar, traffic analysis and HFDF", along with additional destroyers and aircraft. Centimetric "Radar and HFDF located submarines as they attacked convoys and guided escorts against them."[8]

That relevance did not end with the close of the Second World War. If the Cold War had turned hot in Europe, the Atlantic would have been a crucial theater of operations, with anti-submarine warfare (ASW) as its centerpiece. The US, Canadian, and other NATO navies were expected to protect convoys sailing from North America to Europe, to try to prevent the Soviet Northern Fleet from breaking out into the open Atlantic, and to detect and sink Soviet ballistic missile submarines.[9] Even in peacetime, Soviet shipping of all types transited the Atlantic, using short-wave radio to communicate. Over time, Soviet communications became more technically sophisticated, using, for example, burst transmissions that lasted mere seconds. So, it made sense to blanket that ocean with HF/DF coverage. The Royal Canadian Navy (RCN) and the USN reached an agreement in 1950 (re-ratified in 1959 and 1971) to coordinate and standardize their HF/DF activities ashore. This led to the creation of the Atlantic HF/DF network. It included 10 American and five Canadian sites, and several more in other countries bordering the Atlantic. The Net Control station was located initially at Cheltenham, Maryland, with the alternate control station being Canadian Forces Station Coverdale, New Brunswick, until it was closed in 1971. Control was switched between them at least once a week to ensure that the back-up system worked.[10]

Building an HF/DF Capability in Bermuda

Bermuda was a familiar locale for the RCN. It had a base there (HMCS Somers Isles) during the Second World War. In the 1950s, Bermuda served as a winter training base for the RCN. The new HF/DF station opened officially on a trial basis in July 1963, and it became a permanent installation in April 1964.[11] Caught up almost immediately in the Canadian Forces unification process, it underwent several name changes over a short period, from Naval Radio Station Bermuda to HMCS Bermuda, before being designated Canadian Forces Station (CFS) Bermuda, the name it retained until its closure in 1993. From 1966 on it was part of the Canadian Forces Supplementary Radio System (CFSRS). More will be said on this below. The station included two locations: the main site at Daniel's Head and the transmitter site on the property of a former Royal Navy radio station on Ireland Island North. The original transmitter was a US Navy AN/FRT39D 10 kW Single Sideband HF system.[12]

In 1967, a new operations and stores building was constructed to house new DF equipment that arrived in March. The building was ready in May, and in June a team from RCA Victor Canada arrived to install the equipment. However, the work was delayed because the equipment had been damaged in transit. But when it commenced operations on 22 September 1967, it effectively doubled the station's operational capability.[13]

Shortly thereafter, according to S. A. Grey, a combination of technological changes and a perceived need to cut costs led to Project BEAGLE. This involved closing several CF stations: Frobisher (1967), Churchill and Whitehorse (1968), Coverdale and Ladner (1971). As a result, the stations at Alert, Inuvik, Masset, Leitrim, Gander, and Bermuda were all expanded and modernized.[14] At CFS Bermuda, one aspect of the modernization process entailed the installation of recorder-reproducers in the operations building. A team from RCA (initially three persons and

eventually thirteen) commenced work in July 1970 and completed it in January 1971. They installed seven units, but only by cannibalizing parts from one additional unit. They would repair that one once the parts were shipped from the factory. At the same time, the station received a new administration communications link to the Canadian Defence Liaison Staff in Washington, DC. This eliminated the need to route communications through US Naval Air Station Bermuda, "in effect" connecting CFS Bermuda to the CF Communications Command (CFCC) network.[15] Then, in 1973, preparations were completed for installation of an extended memory unit.[16]

February 1976 saw the completion of a communications link between the station and the USN VP (Maritime Patrol) squadrons based at the Bermuda naval air station. This led to a close collaboration between the two units, including familiarization flights for station personnel, which they found "enlightening and educational."[17] Those flights would have allowed them to see how their DF work vectored the aircraft onto detected signal targets.

The DF receiver was upgraded in or after 1977 to an AN/GRD-6 High Band 'Pusher' Circularly Disposed Antenna Array (CDAA). The station's *Annual Historical Report [AHR]* for 1977 states that in April, Captain James visited from CFCC headquarters to discuss and assess the local situation "for the installation of the Pusher antenna system."[18] The AN/GRD-6 was a smaller version of the USN's standard (and large) FRD-10 "Elephant Cage" CDAA, and was designed for sites with less space, such as that at Daniel's Head.[19] But sources provide no details on when the Pusher was actually installed and became operational.

In March 1980, a lightning strike caused extensive damage to the Pusher antennae and took out the station telephone system as the same time. Phone service was restored three days later. However, as late as May the damaged antennae had not been repaired, due to delayed delivery of the essential parts from the manufacturer (Plessey) in Britain.[20]

The 1984 *AHR* reported that operations received a much-needed boost with the updating of equipment as a part of Project ASPIC. In September a team from CFS Leitrim installed a new RF antenna switch matrix. Then on 1 November all HF/DF operations ceased in preparation for installation of a new narrowband system. A crew from 1 Construction Engineering Unit Winnipeg began to renovate the operations area in preparation for the narrowband equipment installation, resulting in a greatly improved work space. The work on Project ASPIC was completed in December, and the station began to prepare its Operations personnel for training on the new equipment.[21]The new HF/DF equipment underwent site acceptance tests in January 1985, and began operational use in February.[22] Upgrades and maintenance continued right until the eve of closure. For example, in February-April 1992, after the intention to close the station had been announced, the Operations staff received five new persons from CFS Masset who had been made surplus by the installation of new equipment there.[23]

CFS Bermuda eventually comprised some twenty buildings and other facilities, including barracks, messes, workshops, storage, recreation facilities, a CANEX, housing, and, of course, the transmitter and receiver. The *Annual Historical Reports* show that construction, repair and maintenance were constant features of station life. Construction engineering support usually came from CFB Greenwood, Nova Scotia, which served as the station's primary logistics and support hub. While some single personnel lived on site, married personnel and dependents lived in nearby communities.

The initial RCN contingent comprised 15 persons: one officer and 14 other ranks. At its peak strength (1977) the station had a complement of 96 (four officers, 13 warrant officers, 15 NCOs, and 64 other ranks).[24] At the end of 1992, just prior to closing, station establishment was 88 people, including one US Navy exchange member.[25]

HF/DF Operations

As already noted, CFS Bermuda did not operate as an autonomous unit, but as a key component of the Atlantic HF/DF network. Taskings originated with the Net Control station. According to retired Chief Warrant Officer Jim Humes, who served as a SIGINT operator at the Bermuda station from 1977 to 1979, when trying to locate a target, Net Control would send short messages between all the stations to ensure they were all looking at the same target (frequency) at the same time. Net Control would then receive all the bearings manually and mark them on a plot form map to produce the 'fix'. This fix would then be sent out to the various entities that needed to know the location of the target, such as ASW ships and aircraft, which then could be vectored onto it. The USN code-name for this network and for the detection systems (antenna arrays) deployed at the stations was BULLSEYE. The Bermuda station covered both wide band and narrow band frequencies.[26]

Lieutenant (N) Les Lindstrom (ret.), who served at CFS Bermuda from 1976 to 1978, added some detail to Humes' summary:

> "Each target sent out by net control was known as a flash and consisted of the frequency, followed by a short pause, then the target identity. When required, Coverdale could originate flash directives which were picked up on broadcast frequencies by the net's outstations. This info was encrypted in a one-time pad system that was very easy to use and very rapid. Each flash was given a number, one-up daily. The Atlantic net control identified its flashes by the letter F. Alternate Control (Coverdale) used the letter 'M'. As an example, to collect the bearings, NSS would send: NAQ de NSS XDY F15 K. This meant "report bearing obtained on flash number F15". Stations would then report in predetermined sequence and send their bearings encrypted in a four-letter code. The

> received flashes were decoded, targets searched and target bearings observed, then encoded and reported to Net Control, either by HF radio or landline. There were a lot of stations and it was all encrypted and classified …. Communications was mainly handled by landline teletype with CW as a backup. The net used its own set of operating signals as opposed to Q or Z signals. They all began with X. The number of stations in the Net remained constant well into the … 1960's until more modern HF/DF technology and cost cutting measures caused a reduction in their numbers. The collective call for all stations of the Atlantic net was NAQ, while the collective call sign for the Canadian stations was rarely used and only when CKT (Coverdale) was net control. It should be noted that in the period prior to Coverdale assuming the duties of Alternate Net Control, the operator(s) in the DF shack copied the flashes and responded to them directly. However, when Coverdale took over duties as Alternate Net Control, the plotting and assignments were done in the operations room, and they spoke to the shack via the intercom."[27]

Humes explained that the stations sent high speed data by the most expedient manner: landline telephone cables, satellites, commercial companies, or any other method that could be encrypted to the highest level and processed at the highest speed. In the 1980's CFS Bermuda was connected to the net control via a commercial telecom company that could send but not read the traffic. Each station had a computer called an OPU (outstation processing unit), which processed all the incoming and outgoing data required to fulfil the mission. There was a manually operated CWDF (channel watch) position that the operator could tune to a range of frequencies (usually 2 to 32 mHz) so that they could observe a particular frequency when needed. There also was an NBDF position, that was controlled by the OPU to tune to the incoming frequency as flashed by the net control. This allowed all net stations to look at and

identify the target of interest at the same time. If the outstation obtained a positive line of bearing, it was sent back to the net control, which had a much more sophisticated computer that could handle all the net communications and produce a fix with all the bearings associated with that event. This information was then sent to the intelligence service or other authorities that had requested it.[28] That included maritime patrol squadron VP 23, based at Brunswick Maine, that rotated its aircraft through NAS Bermuda in 1983 and 1990.[29]

He goes on to say that the station's capabilities were very good. It had excellent equipment that had good "hear-ability" and signal fidelity. The personnel were "very well trained through USN Courses and on-the-job-training."[30] That included briefings from the US National Security Agency. The commanding officer's assessment included in the 1977 *AHR*, which was probably not entirely objective, asserted that "Personnel now on strength are highly competent and professional in their conduct and performance. An excellent rapport has been achieved with agencies using station product. I would judge CFS Bermuda to be highly effective in satisfying its operational and military tasks."[31] Lindstrom, not surprisingly, agrees. He writes:

> "During my tour with the USN [Naval Security Group HQ] in Washington I was tasked with collecting data for the LANT HFDF Net which Bermuda was part of. From the data collected it was determined that Bermuda was the most effective member of the network in that nearly all the fixes provided relied on Bermuda's cut off bearing. This information did nothing to change the political move to close the station."[32]

According to Yeates, the station's prowess was validated on 3 October 1986, when its DF located Soviet Navaga [Yankee] Class ballistic missile submarine K-219 in distress 680 miles northeast of Bermuda, following an explosion and fire in a missile tube. That allowed a P-3 Orion of VP 5 to visually monitor the incident, which ended when the sub sank on 6 October.[33]

Nevertheless, a CFSRS document from 1990 stated that due to "fiscal restraints", CFS Bermuda was "deemed expendable" and would cease operations in 1993.[34] But there was more to this than simple budgetary concerns. As Humes points out, technological change reduced the utility of HF/DF stations. Satellites, over-the-horizon radars, and transponders on ships now could provide the essential locational data, and satellites can 'grab' communications signals.[35] The government's announcement referred to "changing geostrategic conditions",[36] obviously referring to the end of the Cold War. With that apparently over, the need to track Russian subs and other vessels probably seemed less pressing.[37] And, of course, the Bermuda station's fate was not unique. The long-standing Canadian bases in Germany also were being closed for the same reasons. So, CFS Bermuda's personnel returned to Canada, most of the buildings were torn down, and the lease with the Bermuda government was terminated.[38] Today, the Daniel's Head site is a park with access to a beach.

Station Life

Obviously, given its location and climate CFS Bermuda was considered a 'plum' posting. The steady stream of visitors recorded in the *Annual Historical Reports* attest to the station's appeal. Some anecdotal accounts suggest that personnel wishing to be posted there had to do at least one hardship posting at CFS Alert on Ellesmere Island in the Arctic. But not everyone recalls such a policy, even those with multiple postings to Alert. The son of Lt.- Commander Doug Swan, who was Comptroller of the CFSRS, recalls that the Comptroller's staff were reluctant to travel to Alert to do the audits there, because it involved an arduous flight in a C-130 transport via Greenland to a very inhospitable locale. So that station was always behind on its audits. Swan later instituted a policy: that two trips to Alert would be rewarded by one trip to Bermuda.[39] That may explain the notion that there was an Alert/Bermuda posting link.

In addition to the various training and official ceremonies that are routine parts of any CF base, the reports show that the station's recreational activities benefited from ready access to the sea. Even so, being posted there was not without its challenges. Off-station housing was expensive. Ian Yeates, who was supply officer and second-in-command of the station (1986-88), explained first, that insects, especially cockroaches, were more plentiful than Canadians were accustomed to. Second, some children did not adapt well to the more advanced school system in Bermuda or to the 'culture shock' of living on an isolated island without familiar television programs. Third, families had to buy their groceries from the USN shop at the airbase, which was inconvenient, because it was an hour's drive away on a "nightmare" route of narrow roads and roundabouts. Moreover, consumer product prices were expensive, and the Canadians' foreign service allowances were based on the USN shop.[40] All of that not withstanding, the 1992 *AHR* notes that the station closure announcement was met "with sadness and regret…"[41]

Genesis of CFS Bermuda

So, how did this unique facility come to be? At first blush, creating the station there in 1963 seems to be an obvious response to the Cuban Missile Crisis of October 1962. After all, that crisis had arisen in part from the American failure to detect the delivery of ballistic missiles to Cuba via Soviet cargo ships traversing the North Atlantic.[42] Furthermore, during and after the crisis US and Canadian naval forces tracked heightened Soviet submarine activity off the North American coast.[43] Therefore, enhancing allied intelligence capacity in the region in the wake of the crisis, by adding an HF/DF station that sat astride the sea routes to Cuba, would make sense.

However, if this was a Canadian response to the crisis, it was one taken and emplaced with remarkable speed, something quite out of character for Canadian governments and their bureaucracies. Even less in character at that time, given Prime Minister John Diefenbaker's

nationalism, his personal animus toward US President John Kennedy, his reluctance to automatically follow the US policy toward Castro before and during the crisis, and widespread concern that the RCN operated in conjunction with the USN during the crisis without the government's consent.[44] The fact that Liberal Party formed a new government after the election in April 1963 is unlikely to have given sudden impetus for such an obscure project to be completed on such short notice. Work was probably well underway by that time.

In fact, as shown below, the decision to create the Bermuda station pre-dated the missile crisis by almost two years. At that time, American and Canadian attitudes toward Cuba's new regime were in flux. The new US administration under President Kennedy was wary of Castro's communist rhetoric, and suspicious of his emerging relationship with Soviet Russia. Kennedy had inherited from the Eisenhower administration a CIA plan to overthrow Castro, using a small force of Cuban exiles. Despite considerable reservations about the feasibility of the plan, Kennedy approved it. It went ahead – and failed disastrously – in April 1961.[45] Diefenbaker was also suspicious about the direction of the Castro regime in 1961, but as a staunch Canadian nationalist he was even more concerned about being bullied by the Kennedy administration into a uniformly hostile policy.[46] As Don Munton points out, through its embassy in Havana, Canada had the capacity to gather intelligence from inside Cuba, and to share it with its Five Eyes partners.[47] This is not to suggest that Cuba was irrelevant to the establishment of the Bermuda station. The missile crisis *may* have given some additional impetus to a project that had already been approved. However, the author has not seen any evidence to support that hypothesis.

Rather, the decision to place a Canadian sigint station in Bermuda appears to have been shaped by wider Canadian and Allied technical SIGINT requirements, in which Cuba did not figure, and over a longer time-frame. In fact, the history of CFS Bermuda is more complicated

than might be expected, because it is entangled with policies, requirements, technologies and actions of other organizations, of other nations, and of transitions among and within them. These included: the RCN and its mid-1960s successor the Canadian Armed Forces (CAF); the Communications Branch National Research Council (CBNRC), the SIGINT service which later became the Communications Security Establishment (CSE); the CFSRS, which ran the stations; the multi-national intelligence alliance, formally known as the "Y Group", but commonly referred to now as the "Five Eyes"; the USN and the Atlantic HF/DF network; and the Canadian, US, British, and Bermuda governments. Given these diverse relationships and interactions, and due to the paucity of sources noted earlier, this paper can only scratch the surface.

Canadian Signals Intelligence Developments from 1945 to 1975

So, where to begin? Suffice to say that the station did not emerge fully formed from nothing. By the end of the war in 1945 Canada had the elements needed to sustain a post-war SIGINT capacity: military and civilian personnel with cryptographic and cryptologic experience; a network of SIGINT stations run by the three services; a modicum of respect among key allies (US and UK) for its wartime SIGINT work; and consensus within the military and government that a SIGINT capability was useful and worth preserving. The upshot was that in 1946, after fierce debate, the government decided to retain a SIGINT and communications security service, to be named and housed in a new organization: the CBNRC, which retained it until 1975.[48]

But how to make the best use of that capability was the subject of considerable debate. There was push and pull between national intelligence requirements and those of the services. The RCN, in particular, was reluctant to subordinate its tactical DF stations and tasks to national strategic collection priorities.[49] Ironically, at this time Canada was being courted by the US and the UK to join bilateral or multilateral intelligence alliances, in which Canadian SIGINT

priorities and taskings might be steered toward meeting alliance rather than national needs. In the event, after lengthy negotiations Canada agreed to collaborate in intelligence-sharing with the US and UK (and later Australia and New Zealand) in the Five Eyes SIGINT alliance.[50]

In 1950, having successfully defended its DF priorities against national encroachment, the RCN agreed to join the USN in a bilateral Atlantic HF/DF network, whose mission would be to intercept and locate communications from Russian and Soviet Bloc ships and submarines. This would support RCN, USN and NATO SIGINT needs in peace and war – especially ASW – as well as Atlantic Basin SAR activities. The Canadian stations so assigned included: Gander, Newfoundland (alternate net control after Coverdale closed); Gloucester, Ontario; Frobisher Bay, Northwest Territories; Coverdale, New Brunswick; and Churchill, Manitoba. A similar net for the Pacific involved Masset and Aldergrove, British Columbia (alternate net control) and occasionally Aklavik, Yukon.[51] The Bermuda station would join the Atlantic net in 1963.

But the cross-currents of commitments did not end there. From the mid-1950s to the early 1960s, CBNRC was gradually integrated within the SIGINT structure of NATO. Just as in the Five Eyes, this entailed multilateral intelligence-sharing. As such, reaching agreement on this entailed prolonged negotiation.[52] However, long before CBNRC was admitted to 'the club', the RCN had already entered into a separate sharing arrangement with NATO's Supreme Allied Commander Atlantic (SACLANT).[53] This was a natural extension of Canada-US/NATO naval cooperation, and of the RCN's role in the Atlantic HF/DF network. So, from the mid-1950s to the mid-1960s, Canadian national/strategic and RCN tactical SIGINT commitments and developments were moving on parallel but separate tracks that were neither wholly contradictory nor necessarily mutually supporting. It took two major policy and administrative changes to

bring these two efforts into synch: the unification of the armed forces in 1966; and the transformation of the CBNRC into the CSE in 1975.

The Canadian Forces Supplementary Radio System

Unification of the Canadian Armed Forces abolished the separate service-based SIGINT operations and stations (12 at that time) and consolidated them within a single tri-service formation: the CFSRS. This was not a wholly new concept – it had been suggested in the mid-1950s. Their missions did not change: the stations still fulfilled CBNRC's top secret strategic (national and Five Eyes-related) SIGINT collection tasks, and also had to meet the operational and tactical Sigint needs of the armed forces themselves: operating and maintaining the forces' radio frequency DF facilities in support of ocean surveillance, SAR, and other programmes; and providing SIGINT, geolocation and electronic warfare support to military operations, including support to commanders in the field. What changed was that from this point on the SIGINT stations would be subject to central direction and administration from the Department of National Defence (DND) through Canadian Forces Headquarters (CFHQ) – later National Defence Headquarters (NDHQ). The Director General Intelligence (DGI) exercised authority over the CFSRS through the Director of Intelligence Operations (DIO). In common with the wider unification process, technological changes that improved collection capabilities also allowed DND to scale back the SIGINT effort and cut costs. Several stations were phased out and their equipment and personnel transferred to others (e.g., Coverdale was closed, with its personnel being moved to Gander). In 1976, command of the CFSRS was transferred from the Vice-Chief of the Defence Staff to the commander of CF Communications Command, and moved to the so-called "Green Box" at Tunney's Pasture, Ottawa. These arrangements remained in place until April 1998, when the CFSRS merged with Directorate of Information Technology

Security to form the Canadian Forces Information Operations Group,[54] which performs SIGINT tasks for the armed forces.

But, creating the CFSRS did not fully resolve the earlier contradictions. While DGI had administrative authority over the stations, being responsible for their staffing, logistics, maintenance, and most of their budget, CBNRC still dictated tasking for strategic intelligence collection. Yet, its Director of Communications Security had no authority over the military's SIGINT activities. For example, the new tri-service Maritime Command (MARCOM) had replaced the RCN, but – name aside – the navy's role had not changed, so its intelligence requirements – including tactical naval HF/DF – were unchanged. Several stations were still 'dual-hatted' – carrying out national collection and performing their HF/DF functions for the Atlantic network; 'triple-hatted' if support for SACLANT is included as a separate task. This division of responsibility (strategic versus tactical collection) created friction between DGI and CBNRC. The review of Canadian intelligence operations, carried out by Claude Isbister in 1970, concluded that the existing arrangement was unwieldy.[55] Swan's son claimed that the CFSRS as a whole suffered from benign neglect. It was chronically underfunded both by DND and CSE.[56]

The Communications Security Establishment

So, the second major change – converting the CBNRC into the CSE and moving it into DND – can be seen, at least in part, as an attempt to 'square the circle' of authority and responsibility for SIGINT. Moving it was first suggested in 1971 by Sir Leonard Hooper (the director of GCHQ), who had been told that the NRC wanted to divest itself of the SIGINT task. That view gained greater impetus in 1974, when the CBC broadcast an exposé on the CBNRC's SIGINT role. That prompted swift action by the federal cabinet. Its committee on security and intelligence proposed transferring CBNRC to DND, where it would be re-named the CSE. This

made sense for several reasons. First, DND administered and the CF operated the (then) five intercept stations (Alert, Bermuda, Gander, Leitrim, and Masset) within the CFSRS. Second, the CF provided most of the station personnel (about 1,000). Third, DND provided the bulk of the SIGINT budget. Yet, even once absorbed within DND, CSE was not integrated into the defence intelligence structure. It reported to the Minister of National Defence, but was treated as a 'stand-alone' formation that served a national strategic, as opposed to a purely military, purpose. Therefore, in 1977 the inter-departmental committee on security and intelligence assigned control of SIGINT in – once again – bifurcated form: the Intelligence Advisory Committee (IAC), which advised the Privy Council Office, would control national (non-military) SIGINT, while DND (tthrough the Deputy Chief of the Defence Staff) would control "tactical COMINT … and ELINT … for operational purposes."[57]

Taken together these major changes meant that DND now controlled and administered all of Canada's SIGINT assets and operations. But, as the foregoing shows, they were intimately tied into bilateral and multi-lateral agreements and alliances that transcended purely national interests and objectives. CFS Bermuda was a microcosm of this situation.

The creation of the Bermuda SIGINT station was a product of the convergence of naval intelligence requirements, a convenient accident of geography, and Cold War politics. In January 1961, Canada's Cabinet Defence Committee was advised that "The increase of Soviet submarine activity in the North Atlantic with improved communication techniques which utilized unconventional methods required the improvement of the effectiveness of HFDF coverage."[58]

According to S. A. Grey, "Due to Bermuda's excellent geographical location, it was believed that a HFDF facility built on her soil could fill a critical gap in the expanding RCN-USN HFDF Atlantic network."[59] Humes says that the gap that a Bermuda site was expected to

fill was in providing what was called a 'cut-off bearing': on the east-west 'Y' axis. When combined with the ample north-south ('X') bearings in the North Atlantic basin, it would allow a more accurate fix on the detected signal.[60] However, although he does not provide a source, Grey asserts that the Bermuda government was reluctant to allow the US military, which already had bases there, to acquire the additional land needed for a HF/DF station.[61] Instead, Canada was invited to fill the gap. It was, in effect, the compromise candidate – a not unfamiliar role for Canada during the Cold War.

The British and the Americans went to some lengths to make it an attractive proposition. The British were willing to lease the site of a former Royal Navy HF/DF station to Canada for only $6,000 per year. The USN indicated that it would lend Canada portable HF/DF equipment, and provide single housing for the Canadian contingent (originally set at one officer and fourteen other ranks). The Bermuda government would make married accommodation available. It would be up to the RCN to provide the personnel, and to cover the costs of site renovation, power, water, and ground levelling, estimated at a total of $10,000.[62] Even by the standards of the day, this was a bargain. The Minister of National Defence Douglas Harkness approved in principle the proposal that the RCN establish an HF/DF station in Bermuda. He also granted authority to negotiate the terms with the British Admiralty, the USN, and the Bermuda government, to be completed by an exchange of notes with the UK.[63]

Various steps had to be taken to create it. Since this involved establishing a Canadian base on foreign soil, the Minister would have had to seek Cabinet approval. The Department of External Affairs would have arranged the exchange of letters with the UK, US, and Bermuda governments. Since all of them already were in agreement, that process might have proceeded quickly, but we do not know what priority they accorded it. DND would have to create a budget

line for equipment, construction, transportation, and so on. If Cabinet acted quickly on the committee's proposal, the station might have been added to the 1961-62 DND budget request, but it is possible that it was not funded until the 1962-63 cycle. Once funding was approved, procurement and resourcing could begin to move ahead. In the meantime, the RCN had to identify appropriate personnel, and adjust its staffing plans to allow it to fill the Bermuda positions. Only after all of this was in place could it deploy the people and resources to build and activate the station. This probably explains why it did not open until the summer of 1963.

Not the Whole Story

What the foregoing offers is a rough outline, drawn from a handful of sources. Clearly, it is not the whole story. In fact, there are yawning gaps. As the previous paragraph indicates, the sources say nothing about how quickly the government's approval was translated into work on the ground in Bermuda. Did it move at a typical bureaucratic pace, or did the tempo increase after the Cuban Missile Crisis? Did the change of Canadian governments have an impact? Likewise, due to the secrecy that surrounds SIGINT, we know little about the station's operations. Without access to original documents, I have relied on the memories of several persons who served there. We can draw some inferences based on the historical record of naval and air activity in the North Atlantic during the station's tenure. The successful resolution of the missile crisis not with standing, in its aftermath American, Canadian and allied navies were devoting extra attention to all types of Soviet bloc shipping, naval and commercial. So, it seems logical to assume that the Bermuda station would have been very busy during its first year of operation. Likewise, it would have monitored any increase in Soviet maritime radio traffic in the Atlantic during other international crises, such as the 1967 and 1973 Middle East wars, the

Soviet bloc invasion of Czechoslovakia in 1968, and the conflicts in Nicaragua and El Salvador in the 1980s.

On the diplomatic front, east-west relations may have thawed slightly during the détente era of the early 1970s, but at the same time the Soviet Union had reached strategic nuclear parity with the United States, and was deploying a 'Blue Water' navy capable of operating world-wide. The threat from Soviet submarine-launched ballistic missiles was being augmented by shipborne and air-launched long-range cruise missiles. This raises several interesting questions: first, how secure were Soviet naval communications, and how good was their communications discipline?

Second, to what extent – if at all – were HF/DF operations aided by acoustic traces detected by the seabed-based Sound Surveillance System (SOSUS)? Did it provide general location data that would allow the shore-based systems to refine their searches? Extant sources do not allow us to answer those questions, which must be left to historians in the future with access to more data. So, this paper closes on an incomplete note. CFS Bermuda remains something of an enigma that merits further research.

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[1]**Notes**

F.H. Hinsley, et. al, *British Intelligence in the Second World War: Its Influence on Strategy and Operations, Volume One* (London: HMSO, 1979), p. 21 (and note).

[2] David Kahn, *The Codebreakers* (New York: Scribner, 1996), pp. 7-8.

[3] Michael Herman, *Intelligence Power in Peace and War* (Cambridge: Cambridge University Press, 1996), p. 299.

[4] "High Frequency Direction Finding", Wikipedia entry.

[5] "Early Direction Finding: From WWI Through the Cold War," Station HYPO [blog], www. StationHYPO.com.

[6] Marc Milner, *North Atlantic Run: The Royal Canadian Navy and the Battle for the Convoys* (Toronto: University of Toronto Press, 1985), pp. 112-13, 153-54, 181.

[7] Kahn, pp. 503-04.

[8] John Ferris, *Behind The Enigma: The Authorized History of GCHQ, Britain's Cyber-Intelligence Agency* (London: Bloomsbury Publishing, 2020), pp. 237, 242.

[9] Marc Milner, *Canada's Navy: The First Century* (Toronto: University of Toronto Press, 1999), pp. 169-70, 173, 199, 222-23, 228-29.

[10] Lt. (N) Les Lindstrom, "Bermuda Memories," in email to author, 14 April 2024.

[11] https://www.canada.ca/en/navy/services/history/ships-histories/bermuda.html . "Canadian Forces Station Bermuda," Wikipedia, suggests that there was an HF/DF station at Daniel's Head in 1961, but there is no other evidence to support that. All other sources show 1963 as the starting date.

[12] "Canadian Forces Station Bermuda," *Wikipedia*.

[13] Canadian Forces Station Bermuda, *Annual Historical Report [AHR] 1967*, 6 March 1968, pp. 1-2, DND, Directorate of History and Heritage (DHH).

[14] S. A. Grey, "Getting to the Roots of a 291er", 23 Jan 1993, pp. 40-41, CFSRS SIGINT Comms Research 291, CSE ATP A96/0837 (Kurt Jensen), Canadian Foreign Intelligence History project (CFIHP), online data base.

[15] CFS Bermuda, *AHR 1970*, 26 April 1971, pp. 5, 9, 11, 13-14, DHH; CFS Bermuda, *AHR 1971*, 28 February 1972, p. 1, DHH.

[16] CFS Bermuda, *AHR 1973*, 14 March 1974, p. 7, DHH.

[17] CFS Bermuda, *AHR 1976*, 29 March 1977, pp. 1-2, DHH.

[18] CFS Bermuda, *AHR 1977*, 10 April 1978, p. 5, DHH.

[19] Chief Warrant Officer (Ret.) Jim Humes, "CFS Bermuda Humes paper", based on personal recollections, copy to author, in email 6 November 2023.

[20] CFS Bermuda, *AHR 1980*, 7 April 1981, pp. 1, 3, DHH.

[21] CFS Bermuda, *AHR 1984*, 1 April 1985, cover letter, and *Annex A*, pp. 3-5, DHH.

[22] CFS Bermuda, *AHR 1985*, 27 March 1986, *Annex A*, p. 2, DHH.

[23] CFS Bermuda, *AHR 1992*, 26 February 1993, *Annex A*, p. 4, DHH.

[24] CFS Bermuda, *AHR 1977*, *Annex A*.

[25] CFS Bermuda, *AHR 1992, Annex A*, 26 February 1993.

[26] Humes, paper; https://www.canada.ca/en/navy/services/history/ships-histories/bermuda.html ; *CFSRS/USN HFDF Co-manning* [addendum to?] *Canadian Forces Supplementary Radio System*, cover pages indicate early 1990, CSE ATP A-96/0837 (Kurt Jensen), copy in CFIHP online data base.

[27] Lindstrom, "Bermuda Memories".

[28] Humes paper.

[29] Lindstrom says that the Bermuda station's direct link to the squadron's Ops Center provided instant bearing and fix results to their patrolling aircraft. However, he says that link was terminated following the Walker spy scandal in 1985. VP-5, based at NAS Jacksonville, Florida, was operating from NAS Bermuda in 1980 and 1986.

[30] Humes paper.

[31] CFS Bermuda, *AHR 1977*, p. 1. The various *AHR*s mention the NSA briefings, and also that the station sent personnel on course at an undisclosed location in "northwest Virginia".

[32] Lindstrom, "Bermuda Memories".

[33] Ian Yeates, email to author, 25 April 2024. Details on the sinking from Wikipedia. It was fictionalized in a novel and movie titled *Hostile Waters*, which posited a collision with a USN sub as the cause of the damage to the Soviet sub. The USN denied any involvement in the event. This denial is validated by the former captain of K-219, and by its Executive Officer who co-authored an article on it with a USN officer, published in the journal *Undersea Warfare*.

[34] *Canadian Forces Supplementary Radio System*, CSE ATP A-96/0837.

[35] Humes paper.

[36] CFS Bermuda, *AHR 1992, Annex A*, p. 4.

[37] In an interview with the author in November 2019, Dr. George Kolisnek, who had created the Canadian Submarine Analysis Group, pointed out that, ironically, the submarine threat actually increased after the end of the Cold War, as more countries deployed them.

[38] Wikipedia entry for CFS Bermuda.

[39] "Comptroller, Supplementary Radio System, 1971-1976," personal reminiscence, provided by the comptroller's son to the author, 4 October 2023.

[40] Yeates, email to author. On educational and housing issues, and prices, see CFS Bermuda, *AHR 1977, commander's report,* and *Annex B*; and *AHR 1980*, *commander's letter.*

[41] CFS Bermuda, *AHR 1992*, base commander's cover letter.

[42] Alexandr Fursenko and Timothy Naftali, *One Hell of a Gamble: The Secret History of the Cuban Missile Crisis* (New York: Norton, 1997), pp. 192-93, 196, 198, 213.

[43] Milner, *Canada's Navy*, pp. 234-35.

[44] Ibid, p. 235; Dennis Molinaro, "'Calculated Diplomacy': John Diefenbaker and the Origins of Canada's Cuba Policy," in Robert Wright and Lana Wylie, eds. *Our Place in the Sun: Canada and Cuba in the Castro Era* (Toronto: University of Toronto Press, 2009), pp. 86-90.

[45] Fursenko and Naftali, pp. 9-11, 14-15, 18-19, 34-35, 60-62, 65, 70-73, 82-85, 92-97.

[46] John M. Kirk and Peter McKenna, *Canada-Cuba Relations: The Other Good Neighbour Policy* (Gainesville, FL: University Press of Florida, 1997), pp. 33-40, 48-50, 56, 60-61.

[47] Don Munton, "Our Men in Havana: Canadian Foreign Intelligence Operations in Castro's Cuba," *International Journal*, vol. 70, no. 1 (2015), pp. 23-39.

[48] N. K. O'Neill and K. J. Hughes, *History of CBNRC* (Ottawa: Communications Security Establishment, 1987), vol. I, ch. 1, pp. 1-3, ch. 2, p. 2, ch. 5, pp. 1-2, and Vol. VII [Chronological Summary]; "Do Gentleman Read Each Other's Mail? The Debate Over a Post-war Canadian SIGINT Agency," in Wesley K. Wark and Privy Council Office, *A History of the Creation of Canada's Post-World War II Intelligence Community, 1945-1970* (Ottawa: Privy Council Office, 2000-2002), ch. 2; David A. Charters, *Canadian Military Intelligence: Operations and Evolution from the October Crisis to the War in Afghanistan* (Washington, DC: Georgetown University Press, 2022), pp. 30-31.

[49] O'Neill and Hughes, vol. 1, ch. 5, pp. 1, 4, 7-8, 9, 11, 14-15, 18-21;

[50] See Wesley K. Wark, "The Road to CANUSA: How Canadian Signals Intelligence Won its Independence and Helped Create the Five Eyes," *Intelligence and National Security*, vol. 35, no. 1 (2020), pp. 20-34.

[51] O'Neill and Hughes, vol. 1, ch. 5, pp. 23

[52] Ibid., Vol. III, pp. 28, 32, 34-35, 36.

[53] Ibid., Vol. III, pp. 29-30, 46, 48, 49.

[54] See brief outline of CFSRS in Archieon; Message, Commander P.J. Pratley, Director of Intelligence Operations, to Director, CBNRC, 11 August 1966, and SA Grey, "Getting to the Roots," p. 55, both from CSE ATP A-96/0837, CFIHP. See also: Brig.-Gen. Lloyd Everett Kenyon, interviews by Chris Bell, 1983-84, University of Victoria Oral History Program [notes

compiled from interview tapes by Alan Barnes]; DND, "SIGINT Box – Factual Statement on the Decision-Making Points Within the Canadian Intelligence Community," input to C.M. Isbister, *Intelligence Operations in the Canadian Government, Privy Council Office Report 70-11-09* (Ottawa: PCO, 1970), Library and Archives Canada [LAC], RG25, BAN 2017-00434-0, Box 21, file 1-1-1-1, part 1 [available online at the CFIHP].

[55] Charters, pp. 68-69 and note 3, citing the Isbister Report.

[56] "Comptroller, Supplementary Radio System".

[57] Charters, p. 69, and notes 4-8.

[58] Cabinet Defence Committee [CDC], 133rd meeting (Jan 19th and 23rd, 1961), para. 7, LAC, RG2 BAN 2000-01376-7 Box 24 D-1-6 [LAC ATIP A-2010-00608], PCO Central Registry Files

[59] Grey, "Getting to the Roots."

[60] Humes paper.

[61] Grey, "Getting to the Roots." Yeates notes that in the 1980s, the US had the air base on Bermuda, a NASA tracking station, and possibly a SOSUS facility.

[62] CDC, 133rd meeting, para. 10.

[63] Ibid.