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## THE CURRENT COMMAND AND CONTROL STRUCTURE FOR THE RCAF'S AERONAUTICAL SEARCH AND RESCUE: A PROPER ENABLER

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**JCSP 41**

***Exercise Solo Flight***

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*Although unavoidably complex, the SAR system command and control is operationally effective. The key element is the system of regional Rescue Coordination Centres...*

-CRS Report on the DND SAR Program, June 1992

## **INTRODUCTION**

How true this statement still is today but does the Search and Rescue (SAR) system command and control have to be “unavoidably” complex?

Canada offers some of the most majestic and challenging landscapes in the world. Keeping aviators safe in this vast area is the responsibility of the Royal Canadian Air Force (RCAF) search and rescue system. A leader in SAR, Canada has set the example in both aeronautical and maritime SAR operations. Canada’s influence and experience is evident in national SAR manuals throughout the world. The RCAF continually strives to improve and progress in conducting SAR operations but the command and control of Canada’s aeronautical SAR system has not managed to evolve.

The SAR system went largely unnoticed in the transformation of the Canadian Armed Forces. As a result, the command and control of aeronautical SAR remained relatively stagnant, sometimes to the detriment of the system. This essay will take into account the historical aspect of the RCAF’s involvement in SAR and examine the current SAR command system. It will show the system to be protracted and cumbersome and will determine areas that could be improved or if Canada should be looking at the system from a different view. By providing some alternate solutions, it will demonstrate that the command and control for SAR should be reviewed with both a practical and progressive approach.

## RCAF TAKES RESPONSIBILITY

When Canada's aviation pioneers were opening its remote areas especially its far northern regions, any semblance of an organized search and rescue system did not exist. A call for assistance was answered by whichever organization whether civilian or military, received it. This did not allow the most suitably equipped organization to respond.<sup>1</sup> It was during the Second World War that the recovery of personnel or Air-Sea Rescue began to be formally organized and structured.<sup>2</sup>

The SAR system that Canadians enjoy today can trace its beginnings to the closing days of World War II with the Chicago Conference of 1944. This international conference of allied nations would result in the formation of the International Civil Aviation Organization (ICAO).<sup>3</sup> The goal was to achieve standardization in air travel in order for an aircraft to travel from one state to the next and expect a certain level of commonality in procedures. These would include rules of the air, air traffic control, licensing to aeronautical charts and it included search and rescue.<sup>4</sup> The Chicago Conference originated 96 Articles on international aviation. Article 25 pertained to search and rescue:

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<sup>1</sup> Para Rescue Association of Canada, *That Others may Live: 50 Years of Para Rescue in Canada, 1944-1994* (Astra, ON: Para Rescue Association of Canada, 1994), 10.

<sup>2</sup> *Ibid.*, 12.

<sup>3</sup> David Clark MacKenzie, *ICAO: A History of the International Civil Aviation Organization* (Toronto ; Buffalo: University of Toronto Press, 2010), 24.

<sup>4</sup> *Ibid.*, 40.

### Article 25

#### *Aircraft in distress*

Each contracting State undertakes to provide such measures of assistance to aircraft in distress in its territory as it may find practicable, and to permit, subject to control by its own authorities, the owners of the aircraft or authorities of the State in which the aircraft is registered to provide such measures of assistance as may be necessitated by the circumstances. Each contracting State, when undertaking search for missing aircraft, will collaborate in coordinated measures which may be recommended from time to time pursuant to this Convention.<sup>5</sup>

Still in force today, this ICAO article provides the basis to establish a formal SAR system in Canada.<sup>6</sup> Canada became responsible for over 18 million square kilometers that stretch from the American border in the south to the North Pole and then out to the middle of the Atlantic Ocean.<sup>7</sup> The Canadian government formed an Interdepartmental Committee on Search and Rescue (ICSAR) chaired by the Royal Canadian Mounted Police (RCMP) to determine a solution for SAR in Canada. The Cabinet decided that National Defence using its existing resources was best suited to take on the role.<sup>8</sup> In June 1947, Cabinet Directive 18 officially made the RCAF responsible for the provision and coordination of SAR in Canada.<sup>9</sup> The reorganization of the RCAF for SAR included the creation of the Rescue Coordination Centres (RCC). Initially, they were generated in Halifax, Rockcliffe, Winnipeg, Edmonton and Vancouver and the existing RCAF squadrons took on the new search and rescue role.<sup>10</sup>

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<sup>5</sup> MacKenzie, *ICAO: A History of the International Civil Aviation Organization...*, 408.

<sup>6</sup> International Civil Aviation Organization. "Convention on International Civil Aviation - Doc 7300." Last accessed 27 April 2015. <http://www.icao.int/publications/Pages/doc7300.aspx>

<sup>7</sup> National Defence and the Canadian Armed Forces, "Search and Rescue Canada," Last accessed 27 April 2015, <http://www.forces.gc.ca/en/operations-canada-north-america-current/sar-canada.page>

<sup>8</sup> G. Y. Smith, *Seek and Save: The History of 103 Rescue Unit* (Erin, Ont.: Boston Mills Press, 1990), 11.

<sup>9</sup> National Search and Rescue Secretariat, *Canadian Forces Search and Rescue: 50 Years of Service to Canadians* (Ottawa: National Defence, 1997), 10.

<sup>10</sup> Smith, *Seek and Save: The History of 103 Rescue Unit...*, 12.

From the historical aspect, it appears that formal plans for a SAR organization were well underway. They may have been hastened by a SAR incident in Gander, Newfoundland. On the 18 of September 1946, a Belgian Sabena DC4 crashed on approach to Gander with 44 persons on board. The US Coast Guard (USCG) from Argentia NL was able to locate the crash from the air. The crash site was just 15 miles from the Gander airport but only a ground team on foot could access it. The team determined that of the 18 survivors, not all could be moved overland due to their injuries. Two USCG helicopters from Elizabeth City, NC were transported by US Army aircraft to Gander and reassembled to conduct the rescue and recovery of the survivors.<sup>11</sup> Although Newfoundland was not a province of Canada at the time, just as today's media coverage of a SAR incident will accelerate the government into action, this well publicized fatal crash of an international flight may have hastened the Canadian government's attention for an organized SAR program.

The RCAF with its post war resources was the obvious choice to take on the SAR mission. The RCAF also had the necessary experience from its pre-war role of forestry patrols, photography and transport operations in Canada's austere areas.<sup>12</sup> The RCAF

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<sup>11</sup> Tragedy and Rescue – Sabena Airlines Crash, Gander NL, 1946, “TRAGEDY AND RESCUE: Oscar Oscar - Charlie Baker George Sabena Airlines DC-4 Crash Near Gander Lake, Newfoundland September 1946,” Last accessed April 28, 2015 <http://www.zianet.com/tmorris/GanderRescue.html>

<sup>12</sup> Leslie Roberts, *There Shall be Wings: A History of the Royal Canadian Air Force* (London: George G. Harrap, 1960), 104.

had photographed approximately 470,000 square miles of Canada for mapping and annually patrolled 140,000 square miles of forests for fire detection.<sup>13</sup>

The RCAF today is still best suited to the role with eight aircraft dedicated to a 24/7 national SAR coverage. The mixtures of fixed and rotary wing aircraft are optimally located across the country to effectively respond to SAR incidents.<sup>14</sup> However, this distribution of the limited SAR resources results in the less capable CH146 Griffon helicopter to be reactive to over 10 million square kilometres of the Trenton Search and Rescue Region (SRR).<sup>15</sup> The 2013 SAR Posture Review, a Canadian Armed Forces directed and led review, indicated manning levels are at 100% but concedes these personnel levels have not been reviewed in decades.<sup>16</sup> This has led to human resources pressures on the SAR personnel (paternity leave, professional development, etc.) which can have a negative impact on proficiency and experience that was reflected in both the 2008 National Defence Study and the 2013 Auditor General report on SAR.<sup>17</sup> Although the RCAF is not as robust when it first took on SAR, the capability, experience and resources are still the main reasons for the RCAF to retain the mission. It must be recognized, these attributes are perishable requiring periodic maintenance.

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<sup>13</sup> E.P. Wood, 'The Story of the Work of the RCAF in Canada's Arctic and Sub-Arctic,' *The Roundel* 1 no. 1(Nov 1948): 28-32.

<sup>14</sup> Canada. Department of National Defence. *Canadian Armed Forces – Search and Rescue Posture Review 2013*. (Ottawa DND Canada, 2013) 4.

<sup>15</sup> National Defence and the Canadian Armed Forces, "Trenton Search and Rescue Region," Last accessed 7 May 2014, <http://www.forces.gc.ca/en/operations-canada-north-america-current/trenton-sar.page>

<sup>16</sup> Canada. Department of National Defence. *Canadian Armed Forces – Search and Rescue Posture Review 2013*. (Ottawa DND Canada, 2013) 9.

<sup>17</sup> Canada. Office of the Auditor General, "Report of the Auditor General of Canada to the House of Commons," (2013). Ch 7 10.

## **SAR COMMAND AND CONTROL**

As part of the National SAR Program, the Department of National Defence (DND) has the mandate to provide primary aeronautical SAR resources and the coordination of SAR response. Designated transport and rescue squadrons and the Joint Rescue Coordination Centres (JRCC) are the means of fulfilling this mandate. The responsibility for aeronautical SAR is simply put, to coordinate and search for missing aircraft. DND also has the responsibility for the effective operation of the coordinated aeronautical and maritime SAR system.<sup>18</sup> This entails the responsibility for the three Joint Rescue Coordination Centres at Victoria BC, Trenton ON and Halifax NS. There is also a Marine Rescue Sub Centre (MRSC) in Quebec City. Each of the three JRCCs is responsible for a Search and Rescue Region in Canada as shown in figure 1.

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<sup>18</sup> Department of National Defence/Canadian Coast Guard. B-GA-005-000/FP-004 – DFO 2204-23-4, CAMSAR Vol 1 1.06.





Figure 1 – Canada’s Search and Rescue Regions.  
 Source: *Canadian Aeronautical and Maritime SAR Manual*

The three JRCCs are staffed by aeronautical coordinators from the RCAF and maritime coordinators from the Canadian Coast Guard who complement each other in the prosecution a SAR incident.<sup>19</sup> The MRSC in Quebec City enables SAR coordination and is manned by Canadian Coast Guard (CCG) personnel reporting through the JRCC.<sup>20</sup> Manned 24 hours a day, every day, the JRCCs are the focal point of aeronautical and maritime SAR. Either by direct call or through SAR distress signals, the JRCC is alerted

<sup>19</sup> Canada. Department of National Defence. *Canadian Armed Forces – Search and Rescue Posture Review 2013*. (Ottawa DND Canada, 2013) 3.

<sup>20</sup> Canada. Department of National Defence/Canadian Coast Guard. B-GA-005-000/FP-004 – DFO 2204-23-4, CAMSAR Vol 1 2.06

to a SAR incident. The JRCC will then task the appropriate resource to execute the mission which could be a RCAF or CCG resource, volunteers or any federal, provincial/territorial or municipal government that is able and appropriate to assist. The Officer in Charge (OIC) of the JRCC, a RCAF major, has tactical command over assigned military SAR assets for SAR missions. The JRCC can call upon five primary SAR squadrons in Canada. Except for 103 Sqn, all the RCAF's SAR squadrons also have a transport role and 435 Sqn also has an air to air refueling role.

At the tactical level, the aeronautical SAR system is simple, direct and very effective. A request for assistance is received at the JRCC and it will task the appropriate resource to respond. The overall DND organization for SAR and the command structure is more complex. The Commander CJOC is responsible for the overall coordination, control and conduct of SAR operations in Canada's area of responsibility while the Commander RCAF is responsible for CAF SAR policy, unit allocation and liaison with the NSS through ICSAR. The Commander CJOC is also responsible for the liaison with other SAR agencies both nationally and internationally.<sup>21</sup> These duties are delegated to three Search and Rescue Region (SRR) Commanders. The three SRR Commanders are also Regional Joint Task Force (RJTF) Commander Atlantic, RJTF Commander Pacific and Commander 1 Canadian Air Division. It is through the JRCC that the SRR Commander exercises his responsibility in assigning air and other resources to a SAR incident and to coordinate the overall response in the region.

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<sup>21</sup> Department of National Defence/Canadian Coast Guard. B-GA-005-000/FP-004 – DFO 2204-23-4, CAMSAR Vol 1 1.06.

The division of Canada into SAR regions was initially established due to aircraft capability and communication but now assist the JRCC to establish initial responsibility for a SAR incident.<sup>22</sup> Canada is also divided into six standing regional Joint Task Force as shown in figure 2.<sup>23</sup> When overlaying these two maps of areas of responsibility

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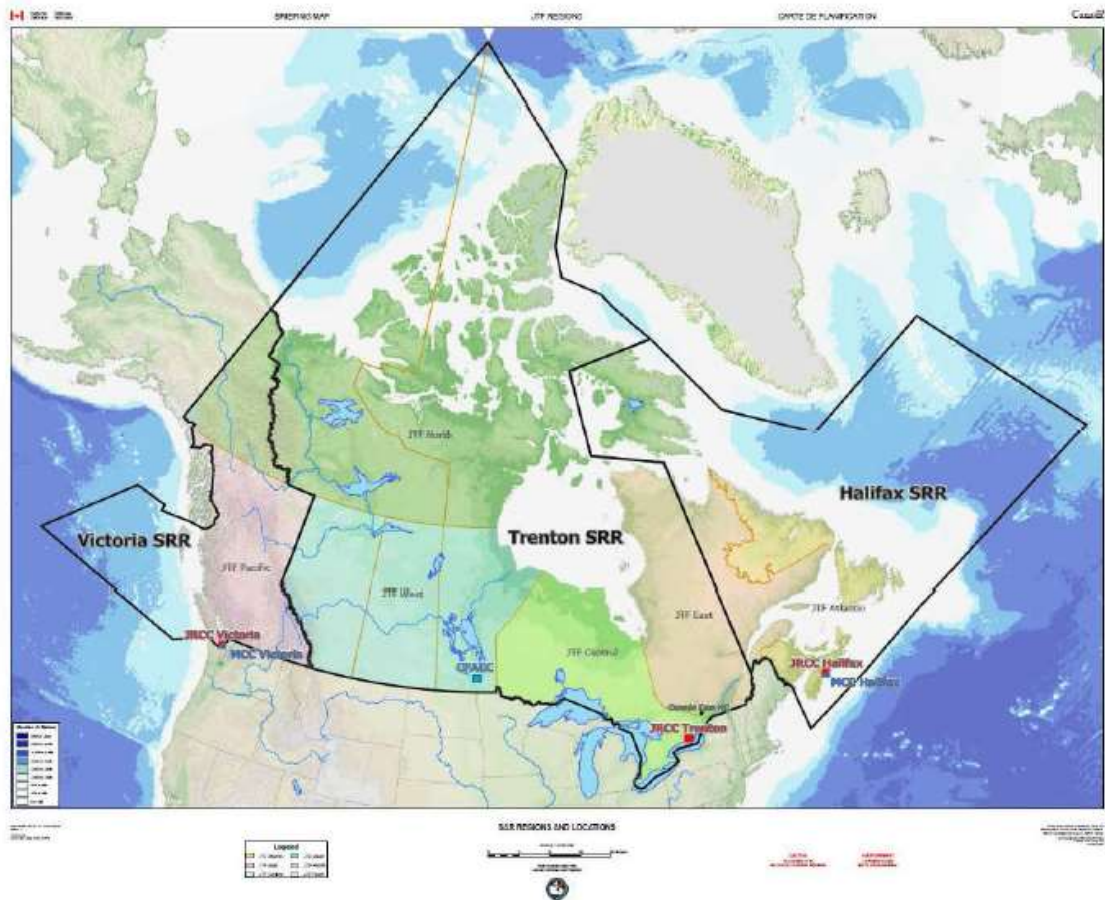


Figure 2 Regional Joint Task Force (colour coded regions)  
 Source: CJOC Standing Operating Order for Domestic Operations 2014

<sup>22</sup> S.R. Miller, "Search and Rescue in the RCAF," *The Roundel* 3 no. 2 (Jan 1951): 14-22.

<sup>23</sup> National Defence and the Canadian Armed Forces, "Search and Rescue Canada," Last accessed 27 April 2015, <http://www.forces.gc.ca/en/operations-canada-north-america-current/sar-canada.page>

(AOR) one can see that the SAR responsibility of the SRR commander extends into the AOR of the adjoining RJTF which results in some confusion at the staff level.

The Joint Forces Air Component Commander (JFACC) who is also the Comd 1 CAD, is responsible for providing the aircraft and crews for SAR as well as their training both operationally and academically. He also has the responsibility for the staffing and operational oversight of the JRCCs and the Canadian Mission Control Centre (CMCC).<sup>24</sup>

DND's management of SAR above the JRCCs exists in both the RCAF and CJOC. Unfortunately, there is not one person 'in charge' of SAR. This extended chain of command causes issues for the tactical JRCC level. The OIC of the JRCC has two headquarters and their staffs to content with, the RCAF for all training and support and CJOC for all operational issues. Requests for statistics and information invariably come from both headquarters increasing the workload of the JRCC. Quite often these requests overlap and ask for the same information effectively doubling the efforts of the JRCC to provide the information.

This command and control system needs to be streamlined. The JRCCs should become CJOC units that report to and are supported by CJOC. The reporting chain would be direct to the commander in charge of domestic operations. This would alleviate the demands of two headquarters on the JRCC and strengthen the JRCC's ability to

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<sup>24</sup> Department of National Defence/Canadian Coast Guard. B-GA-005-000/FP-004 – DFO 2204-23-4, CAMSAR Vol 1 1.06.

concentrate on the operation. This reorganization would eliminate the need for SRR Commanders as the Commander CJOC would take over that role.

This restructuring would eliminate the virtual boundaries between the SRRs. Since they do not match with the boundaries of the RJTF, the inconsistency has the potential to cause initial confusion as to who is in charge. The evacuation of persons in distress for forest fires or floods using ready SAR assets is a prime example of this as these incidents are outside the specific SAR mandate but they quite often require the immediacy the SAR system can provide. Fortunately the JRCCs work closely together, and are able to react under the SAR mandate to save lives and task resources quickly.

The Canadian Mission Control Centre in Trenton according to the C2 chart at figure 3 is responsible to the SRR Comd Trenton. The 2014 Federal SAR Operational Governance Committee report states that the CMCC is responsible to Comd 1 CAD.<sup>25</sup> Granted that the two commanders are the same person, this chain of command can cause confusion. The CMCC supports all of the JRCCs and should also be a unit of CJOC. Aligning the CMCC with the JRCCs under CJOC would rationalize the entire SAR system in one command.

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<sup>25</sup> Canada. Department of National Defence. *Federal Search and Rescue Operational Governance Committee Annual Report 2014*. (Ottawa: DND Canada, 2015), 2.

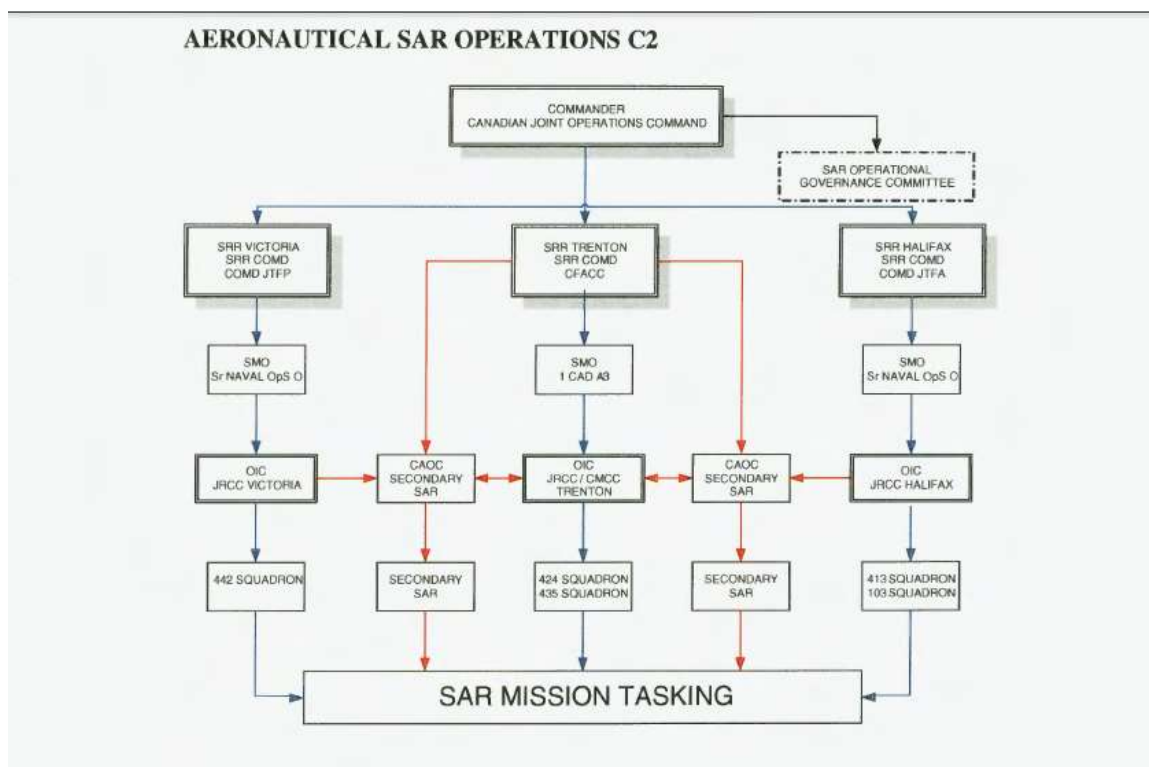


Figure 3 Aeronautical SAR Operations Command and Control  
 Source: Canadian Joint Operations Command SAR Directive 01-2015.

## SOLUTIONS

In 2012, the CCG closed the MRSC in St John's NL reasoning that the level of modern communications technology allowed the transfer of the positions to JRCC Halifax.<sup>26</sup> This same argument can be made for one amalgamating the three JRCC into one under the command of CJOC eliminating the protracted command and control.

Today's JRCC is a contemporary centre that can provide the country with emergency response and alerting for SAR with a full spectrum of SAR services. This model would

<sup>26</sup> Province of NL completed Access to information. File# PR-10-2013 "Records/Information that the NL government used or obtained to justify proposed expenditure and to substantiate their opinion that the MRSC St. John's provided a better level of service than the service that would be provided by JRCC Halifax." 19. [http://www.atipp.gov.nl.ca/info/completed/2013/pdf/pre\\_10\\_2013.pdf](http://www.atipp.gov.nl.ca/info/completed/2013/pdf/pre_10_2013.pdf)

be similar to the United States Air Force Rescue Coordination Center (AFRCC) however their resources are federal and state organizations that conduct the mission.<sup>27</sup>

By consolidating the JRCCs, it would eliminate the boundaries between the JRCCs. These boundaries only exist for the JRCC and are not recognized by the public as they see SAR as one system that supports Canadians. SAR missions in the far north illustrate this point as they can be both challenging and frustrating for a SAR coordinator as information is scarce and time is an adversary. The bulk of the Arctic is the responsibility of JRCC Trenton who would dispatch a CC130. However, the only primary rescue capability is a CH146 Griffon that does not have the endurance to fly to the far north with any expediency. A CH149 Cormorant would be required from Gander NL to any SAR incident in the Arctic. This poses a dilemma for the SRR Halifax Commander who now must decide if he can allow his resource out of the region. This decision process is conducted quickly and quite often. Having only one JRCC would eliminate any hesitation as the JRCC SAR coordinator would have a nationwide picture of SAR events and would be able to evaluate the risk of using a Halifax region SAR resource for a Trenton region SAR incident. The single JRCC would enable the tasking of the most appropriate resource in the minimum amount of time.

A single JRCC would ensure a commonality in procedures and reduce any ambiguity of what resources would be used for an incident. This has the potential to

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<sup>27</sup> CONR-IAF (AFNORTH) "Air Force Rescue Coordination Centre," Last Accessed 8 May 2015, <http://www.1af.acc.af.mil/units/afrc/>

reduce the number of SAR coordinators and put those experienced personnel back into the SAR squadrons.

There are two main counter arguments that can be made. The first is that public opinion and the loss of confidence that Canadians would perceive in our system would be extensive. The 2012 closure of the MRSC St John's caused an incredible outcry from the east coast of Canada. The same could be expected on both coasts should the JRCCs both be moved. The second counterpoint is that if this amalgamation did not include the RCAF's SAR partner, the CCG, the JRCC would be less capable. One of JRCC's greatest strengths is the close cooperation between the RCAF and the CCG and without the CCG alongside, an amalgamated JRCC would not be effective.

### **SAR SATELLITE AIDED TRACKING (SARSAT)**

Canada is part of the COSPAS-SARSAT that is designed to detect a distress alert and provide a location to search and rescue authorities. In the past, the system listened for and detected aircraft emergency locator beacons (ELT) on the international distress frequency of 121.5 VHF and 243.0 UHF. As of 1 February 2009, COSPAS-SARSAT ceased listening on those frequencies and now only detects and locates beacons on 406 MHZ.<sup>28</sup> In an aircraft, the beacon can be either manually triggered or can be automatically activated through the force of an impact of a crash.<sup>29</sup> Once activated, the 406 MHZ beacon will send a digital emergency signal through the COSPAS-SARSAT

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<sup>28</sup> COSPAS-SARSAT, "International Satellite System for Search and Rescue." Last Accessed 30 April 2015. <http://www.cospas-sarsat.int/en/system-overview/detailed-cospas-sarsat-system-description>

<sup>29</sup> National Defence, "Canadian Beacon Registry." Last Accessed 30 April 2015. [https://www.cbr-rcb.ca/cbr/presentation/other\\_autre/index.php](https://www.cbr-rcb.ca/cbr/presentation/other_autre/index.php)



system which in turn will alert SAR authorities. The signal can provide the SAR authorities with contact information as well as aircraft information and equipment.<sup>30</sup> This is a proven modern system that is used around the world and has the ability to take the search out of search and rescue. A 406 beacon with a GPS included will also pinpoint an exact location. This system will only work if the aircraft is carrying a 406 beacon.

Even though the automatic SAR satellite system has not monitored for 121.5 beacons since 2009, Transport Canada (TC) still allows aircraft in Canada to fly with only a 121.5 beacon onboard.<sup>31</sup> This is a characteristic failure in our system. Should an aircraft go missing with a 121.5 beacon activated, it will only be heard by another aircraft listening on that frequency. The Canadian Government has invested millions of dollars into the SRSAT system yet the support from the regulatory side of aviation, Transport Canada, has not been forthcoming.

The reason for Transport Canada's reluctance is perhaps political pressure from lobby groups. The Canadian Owners and Pilots Association (COPA) although not against ELTs are concerned with the financial burden of implementing mandatory requirements.<sup>32</sup> Since the SAR systems comes to the rescue at no cost to the user, the benefits of having a 406 beacon outweighs the cost. According to the Transport Canada

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<sup>30</sup> National Defence, "Canadian Beacon Registry." Last Accessed 30 April 2015.  
[https://www.cbr-rcb.ca/cbr/presentation/other\\_autre/index.php](https://www.cbr-rcb.ca/cbr/presentation/other_autre/index.php)

<sup>31</sup> Justice Laws Website "Canadian Aviation Regulations 605.38." Last Accessed 30 April 2015,  
<http://laws-lois.justice.gc.ca/eng/regulations/sor-96-433/page-249.html>

<sup>32</sup>Canadian Owners and Pilots Association (COPA), "COPA Responds to Biased CBC Report on Emergency Locator Transmitters," Last accessed 30 April 2015,  
<http://www.multibriefs.com/briefs/COPA/eFlightELT.pdf>

website, there are over 36000 aircraft registered in Canada. Some of these aircraft are not mandated to carry a beacon (gliders, ballons etc) which leaves an estimated 26000 aircraft that should be equipped with a beacon. In 2015, the number of 406 beacons registered with the Canadian Beacon Registry is only at 10,993.<sup>33</sup>

Is this a failure of the SAR system? A strong and unified SAR position is needed to work with TC. The Canadian SAR system is seen as a public service and can be described as the most constant military presence in the public eye. Yet our capabilities are knowingly allowed to be reduced.

## **CONCLUSION**

The complex command and control of the SAR system is less responsive to the needs of the SAR system. This paper has looked at the historical aspect of SAR and why the RCAF was initially given the mandate and concludes that it should still be the mandate of the RCAF. It has demonstrated that the enduring SAR mission has been taken for granted over the almost 70 years that the RCAF has been conducting SAR. It is important that the RCAF seriously looks at the SAR manning levels and our capabilities to ensure the future is not put in jeopardy. The command and control of SAR is spread over several commands and only one empowered SAR authority is required to better support the operators at the squadrons and JRCCs. This authority would be better situated to deal with the issue of 406 beacons and TC which when resolved, will strengthen Canada's aeronautical SAR system. Given that SAR is the most visible Canadian Armed

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<sup>33</sup> Ms A Cornish, Canadian Beacon Registry, Telephone Conversation with author, 30 April 2015.

Forces domestic operation that occurs on almost a daily basis, the most proficient organization should support it. Although the CAF may have the technology today to amalgamate the three JRCCs into one, this paper suggests it is not feasible to do so. This is primarily due to both the political aspect and the anticipated erosion of public confidence that the CCG faced in the closing of MRSC St John's.

What has been obvious throughout this research is that the men and women of the JRCC and the SAR squadrons make the SAR system work, regardless of its faults. There are some measures under way to address some of these issues identified but until then, Canada is still a country with vast areas only accessible by aircraft and the RCAF SAR system will be responsible to assist when called.

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