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CSC 29 / CCEM 29

EXERCISE/EXERCICE ...

**NEW HORIZONS**

**The CC130 Hercules is misemployed in the Search and Rescue role.**

By /par Maj Spurgeon Stewart

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**The CC130 Hercules is misemployed in the Search and Rescue role.**

ABSTRACT

This paper examines the use of the CC130 Hercules in the Search and Rescue (SAR) role and the requirement to replace it with a smaller twin-engine fixed wing aircraft. SAR has proven to be of a vital interest to Canadians and must be maintained at the current level to meet national and international agreements. The 1994 White Paper also emphasized that Canada maintain its air combat capabilities and participate in collective security efforts. Downsizing in aircraft types and personnel has put a heavy burden on our force structure. This has resulted in 10 Hercules aircraft being transferred from the combat support role to domestic SAR. The continuous use of this large combat support aircraft in the domestic SAR role is having adverse affects on our overall war-fighting capabilities. Increased operational tempo combined with aircraft maintenance problems have combined to reduce the aircraft available for training and upgrading of aircrew. This has led to shortages in combat capable crews and insufficient aircraft to support operations. To meet the combat capabilities required in the 1994 White Paper, the Hercules in the SAR role should be replaced by a twin engine fixed wing aircraft, thus freeing the CC130 Hercules for its primary combat support role.

*The Hercules is too large an aircraft for the SAR role and should be replaced by a smaller twin- engine aircraft.*

... Lieutenant General Lloyd Campbell, Chief of Air Staff<sup>1</sup>

In 1947, the Canadian federal cabinet officially tasked the Royal Canadian Air Force with the role of air search and rescue (SAR) in Canada. The Air Force still had some SAR experience from World War Two and was given authority to formally establish facilities and equipment to meet the International Civil Aviation Organization (ICAO) standards signed by Canada in 1944. In 1951, the cabinet directed that the Air Force take over the responsibility for coordination of all marine SAR with the Canadian Coast Guard (CCG) maintaining the primary water-level responsibility.<sup>2</sup> Over the years, SAR has saved hundreds of Canadian lives and has proven to be a vital national interest. This was recognized in 1976 when the Prime Minister appointed the Minister of National Defence as the lead minister for SAR. In 1986, the federal government improved SAR efficiency by forming the National Search and Rescue Secretariat. The Secretariat is responsible for the central management role of all air, sea and land search and rescue.<sup>3</sup> This was an important step as air and sea SAR is a Department of National Defence (DND) responsibility while land search and rescue is a provincial role.

Canada has been divided into three SAR regions of responsibility. Each of these regions, the Western Region in Esquimalt, the Central Region in Trenton and the Eastern

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<sup>1</sup> Lloyd Campbell, Lieutenant General, Chief of the Air Staff, Canadian Forces Command Staff Course 29 Air Symposium, 05 March 2003.

<sup>2</sup> Canada, Department of National Defence, National Search and Rescue Manual (Ottawa: Queen's Printer, 1985), 1-2.

<sup>3</sup> Ibid., 1-1.

Region in Halifax, includes a joint DND and Coast Guard Rescue Coordination Centre to coordinate maritime and aviation SAR. DND also provides support to the Civil Air Search and Rescue Association (CASARA), a volunteer organization that uses small private aircraft to support SAR operations. The Canadian Coast Guard, under the Department of Fisheries and Oceans, provides maritime SAR. As part of the central SAR region headquarters at Trenton, a Canadian Mission Control Centre was established in 1982 to support the international Search and Rescue Satellite Aided Tracking (SARSAT) system, and its Russian equivalent, which monitors emergency frequencies and pinpoints the location of activated distress beacons using space based assets.<sup>4</sup> All of these SAR initiatives together provide Canada with an excellent search and rescue organization. This has not been without a cost to the Air Force, as downsizing and reduction in aircraft types has put a heavy burden on our combat capability. In the early 1990's, the Eastern CC115 Buffalo aircraft were moved to Comox. The consolidation of all six aging Buffalo aircraft in one location was driven mainly by the need to centralize maintenance to keep the fleet up to SAR response standards. This resulted in the CC130 Hercules tactical transport aircraft having to backfill the SAR role on top of their already intensive operational tempo.<sup>5</sup> The ability of the Air Force to maintain core war-fighting capabilities will depend on the federal government's commitment to provide the SAR community with proper fixed wing aircraft.

This essay will argue that the CC130 Hercules tactical transport aircraft should be replaced in the SAR role by new smaller twin-engine fixed wing aircraft. While SAR is

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<sup>4</sup> National Defence, Canadian Forces Search and Rescue 50 Years of Service to Canadians (Ottawa: Queen's Printer, 1997), 37.

<sup>5</sup> Ibid., 51.

necessary for the protection of Canadians and to meet international agreements, the use of a large combat support aircraft, such as the CC130 Hercules, is degrading our overall military operational capability.

The Canadian Forces mandate to maintain a combat capable force, with core war-fighting capabilities, will be explored and the negative impact of using combat aircraft and personnel in non-combat roles will be analyzed. To explain the impact on current operations, the Hercules and Buffalo fleet structure will be reviewed. This will include a review of the tasks and roles of the Hercules and the effects it has on overall operations. With increased attention by politicians on the combat capability of our military, the removal of the Hercules from the SAR role will be feasible by purchasing a new smaller twin-engine fixed wing aircraft. The cost effectiveness and the increased military capabilities provided by the purchase of a new aircraft will demonstrate that the government should pursue this recommendation and continue to keep our civilians safe at home while maintaining an effective combat support capability for use both in Canada and abroad.

The 1994 White Paper was clear in determining that Canada cannot dispense with air combat capabilities. While the White Paper concluded that there is no direct threat to Canada, a military force must be maintained to respond to national sovereignty issues.

Canada must also continue to participate in the defence of North America. 11 3Tcii35 4eri11 w 118445.94001 3

areas and participating in multinational coalitions in the Gulf War and in the Balkans.<sup>7</sup> To this end, Canada must maintain multi-purpose, combat-capable forces to provide the flexibility for “defence of its interest and the projection of its values abroad”.<sup>8</sup> The Canadian Forces has undergone significant reductions in personnel, equipment, infrastructure and budgets, but it is important that we maintain basic core combat capabilities to respond immediately to a crisis while also providing the nucleus from which a larger force structure could be developed if time permits.

The Canadian Forces mandate to maintain a combat capable force with core war-fighting capabilities is degraded by using combat support aircraft and personnel for a non-combat domestic SAR role. While SAR plays a vital role to Canadians, the use of the CC130 Hercules for SAR severely reduces the number of aircraft available for support of deployment operations. The Special Committee of the Senate on National Defence in 1986 recommended that the CC130 Hercules fleet be increased from 32 to 45 aircraft by 1994.<sup>9</sup> This goal was never achieved. In 1996, a Joint Staff Strategic Movement Assessment was conducted to assess the structure of the transport aircraft fleet. The assessment concluded that Canada’s transport fleet was not properly balanced to meet deployment requirements as set out in the 1994 White Paper.<sup>10</sup>

The lack of a separate non-combat aircraft for SAR operations is affecting deployed operational capabilities. This was evident during the deployment and rotation,

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<sup>7</sup> Ibid., 32.

<sup>8</sup> Ibid., 13.

<sup>9</sup> Canada, Department of Supply and Services, Report on the Special Committee of the Senate on National Defence: Military Air Transport (Ottawa: DSS Canada, February 1986), 31.

<sup>10</sup> Canada, Department of National Defence, Joint Staff Strategic Movement Assessment (Ottawa: DND Printer, 31 July 1996), 39-42.

in 2002, of aircraft for Operation Apollo in Afghanistan. With domestic SAR as the highest priority, it was necessary to cancel or reduce other operational missions to meet the tasking for a detachment of 3 tactical Hercules aircraft for Operation Apollo. Missions such as army parachute training and local exercises, tactical training deployments, local tactical aircrew training and long-range trainer flights have all been adversely affected by the lack of aircraft. The impact of reduced training flights has also impacted the capability to produce trained aircrew.<sup>11</sup>

A shortage of deployable tactical Hercules crews is also degrading our operational capability. The Directorate of Defence Analysis *Military Assessment 2000* stated, "...there will be a need to respond more rapidly to forestall an opponent..."<sup>12</sup> With the reduction in flying hours due to a lack of aircraft, many aircrew members are not able to maintain flying currency requirements or to upgrade skills in a timely manner. In the past, 8 Wing Trenton's official mandate was to sustain 12 lines of tasking per day. Each aircraft that has been tasked to fulfill a mission, whether operational or training is considered a line of tasking. With 3 aircraft deployed to Op Apollo and a growing backlog of aircraft awaiting maintenance, the Wing is now able to sustain only 5 lines of tasking per day.<sup>13</sup> This has made it impossible to provide the required number of training flights to support the upgrading of our tactical crews. For example, a tactical CC130 pilot who returned from a tactical exchange posting in the United States in July 2002 has yet to complete the Canadian Forces tactical re-certification that should have

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<sup>11</sup> Tom Pilz, Major, A3 Operations, 8 Wing Operations Email (Trenton: DND Printer, 26 October 2001), 4.

<sup>12</sup> Scot Robertson, *Military Assessment 2000* (Ottawa: Queen's Printer, 2000), 37.

<sup>13</sup> Tom Pilz, Major, A3 Operations, 8 Wing Operations Email to Wing Commander (Trenton: DND Printer, 25 March 2002), 1.

been completed by November 2002.<sup>14</sup> The impact of slow upgrading and minimum training has degraded the Canadian Force's ability to maintain combat capable forces. While the SAR Hercules crews provide a necessary service within Canada, they are not employable in the combat role and draw heavily on the limited Hercules resources to maintain the required SAR posture within Canada. For SAR crews to become tactically qualified they require two 8 week tactical courses plus currency training that would further increase the demand on limited resources.

To assist in understanding the impact on missions and personnel by using the Hercules in the SAR role, it is necessary to review the Hercules and Buffalo fleet structure. Currently, there are 32 CC130 Hercules in the Air Force, located as follows: 14 Wing Greenwood - 4 aircraft, 8 Wing Trenton – 21 aircraft and 17 Wing Winnipeg - 7 aircraft. The CC130 SAR aircraft are tasked from a pool of aircraft at Trenton and Winnipeg while at Greenwood all 4 aircraft are in support of the SAR role. To fulfill SAR readiness, training and maintenance requirements the SAR role requires 10 of the 32 Hercules aircraft.<sup>15</sup> This is broken down at each location as follows: 3 aircraft in Greenwood, 4 in Trenton and 3 in Winnipeg. As these 10 aircraft are not available for combat operations, only 22 aircraft form the pool of combat support aircraft. This aircraft pool is further reduced by scheduled maintenance, unserviceabilites and aircraft configuration. Scheduled maintenance accounts for 2 aircraft in depot-level repair at the contractor plant in Edmonton and 3 aircraft in base-level maintenance at Trenton.<sup>16</sup> This

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<sup>14</sup> Ibid., 1.

<sup>15</sup> Robert Neske, Major, Director of Air Requirements, Briefing Note for Chief of Air Staff (Ottawa: DND Printer, 6 February 2003), 3.

<sup>16</sup> Mike Maheux, Warrant Officer, 8 Air Maintenance Section, 8 Air Maintenance Schedule November 2002 (Trenton: DND Printer, 2002), 1.

leaves 17 aircraft of which 4 are configured for air-to-air refueling (AAR) and 2 aircraft that are stretch models, aircraft that have 15 feet added to the length of the aircraft cargo area; none of these 6 aircraft can perform the tactical airdrop role. That leaves 11 aircraft to perform all tactical operational and training missions. Remembering that 3 aircraft have been deployed to the Persian Gulf area for an indefinite period, there are only 8 aircraft remaining in Trenton to conduct SAR, strategic and tactical taskings.<sup>17</sup> Based on these 8 aircraft, 8 Wing Trenton is capable of maintaining only 5 lines of tasking per day leaving only 1 or 2 aircraft available to conduct combat training. Normally combat training would account for up to 5 or 6 aircraft during operational training events. This lack of combat support aircraft severely impedes the training required to enable rapid deployment and operations in a theatre as part of a coalition force.

Fixed wing SAR at 19 Wing Comox is currently conducted by 6 CC115 Buffalo aircraft. The Buffalo is the primary SAR asset for the West Coast area and also has utility airlift capability to airlift up to 33 passengers or 14,000 pounds of cargo. The Buffalo aircraft has short field take off and landing capability (runways less than 1,500 feet in length) and is well suited for searches in mountainous regions.<sup>18</sup> In contrast, the Hercules is limited to airfields with runways over 2,500 feet in length and is not suited to low airspeed searches in mountainous areas. The Buffalo was scheduled to retire in 2003 and was to be replaced by 3 Hercules. Replacement of the Buffalo by the Hercules has proven to be problematic. The Hercules fleet is also ageing and is undergoing a time of

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<sup>17</sup> D. Higgins, Colonel, 8 Wing Commander, 8 Wing LOT Capability Forecast FY 03/04 (Trenton: DND Printer, 22 February 2003), 1.

<sup>18</sup> De Havilland, DHC-5D Buffalo: Maritime Reconnaissance Search and Rescue (Downsview: De Havilland, 1976), 19.

increased maintenance resulting in fewer aircraft for current tasking. The removal of another 3 Hercules for the SAR role at Comox would have a negative impact on operations and further limit our combat and core war-fighting capabilities. The current plan is to extend the life of the Buffalo until the year 2010 to assist in maintaining the Hercules' ability to perform its "normal" roles.<sup>19</sup>

The requirement to purchase a new smaller fixed wing aircraft for the SAR role is essential so that the Hercules can continue to conduct its three combat support roles. The first role is Tactical Air Transport (TAT) that involves transporting personnel and equipment within a theatre of operations. This includes airborne operations, air assault, air land, tactical air logistic support, special missions and tactical aero medical evacuation.<sup>20</sup> For example, the deployment of 3 Hercules on Operation Apollo since the spring of 2002 demonstrates Canada's commitment to maintain a combat capable force to assist coalition forces. The second role is Air-to-Air Refueling (AAR), which is a force multiplier as it has the capability to extend the "flexibility of suitably equipped aircraft."<sup>21</sup> AAR can be used in both a strategic and tactical role. During the Gulf War in 1990-91, the Canadian AAR component was an integral part of coalition tactical refueling operations. The third role, Strategic Airlift (STRAT), is vital to support operations "into and between theatres of operations."<sup>22</sup> The Hercules is not an ideal STRAT aircraft due to its slower speeds and resulting high maintenance cost based on

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<sup>19</sup> CDS/DM Letter, Continued Operation of CC115 Buffalo (Ottawa: DND Printer, 12 December 2002), 2.

<sup>20</sup> Canada, Commander of Air Command, Out of the Sun (Winnipeg: Craig Kelman, 1997), 101-103.

<sup>21</sup> Ibid., 107.

<sup>22</sup> Ibid., 101.

many long flying hours; however, the airlift role is essential to support deployed air, land and maritime forces. These three combat support roles have significant interoperability considerations for operations with our allies and must be given priority to ensure continued credibility in coalition operations. In contrast, the SAR Hercules aircraft are used in a domestic role and their crews do not require training for interoperability between nations or with coalition forces; however, SAR remains the number one priority for the Hercules and that alone has resulted in the canceling of operational and combat training missions.<sup>23</sup> The lack of Hercules for tactical training opportunities has a serious impact on our ability to maintain core war-fighting skills and interoperability with our allies.

The 32 Hercules aircraft are spread too thin for the current 4 roles. In 1995, Air Command Project 2020 highlighted that the transport fleet “has often suffered from limited and inappropriate capacity.”<sup>24</sup> With the reduction in the Buffalo fleet to 6 aircraft and basing only in Comox, the SAR role in Trenton and Greenwood was added to the already busy Hercules schedule. This also caused a significant reduction in available airlift for deployed operations as the Hercules providing SAR coverage could no longer be used on operations outside of Canada. The operational tempo in the early nineties was such that the CC130 fleet was able to sustain the impact of increased SAR tasks and reduced aircraft availability; however, the increased tasking had already started to influence the Hercules fleet. In 1996, the increase in operational tempo commenced and

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<sup>23</sup> D. Higgins, Colonel, 8 Wing Commander, Trenton Lines of Tasking Email (Trenton: DND Printer, 28 June 2002), 1.

<sup>24</sup> Canada, Department of National Defence, Air Command Project 2020 – Flight Plan for Change (Winnipeg: DND Printer, July 1995), 24.

it has increased over the last 6 years. As previously stated, only 11 Hercules aircraft are available to support deployments taking into account maintenance, AAR and stretch aircraft configurations. Occasionally, 1 or 2 SAR backup aircraft were spared to assist in deployments, but the loss of access to 8, and sometimes 10, aircraft to support SAR, was felt throughout the airlift community.<sup>25</sup>

In the nineties, the operational tempo was the highest it had been since the Second World War. With the retirement of the CC137 Boeing 707 in 1997, the Hercules STRAT workload increased, as it was the only Canadian Forces aircraft that could carry wheeled vehicles. This resulted in much higher rates of flying than anticipated and a shortage of airlift capability. To meet the airlift requirement, commercial aircraft were leased and missions of lesser priority were cancelled. One example of an operation that required the use of commercial aircraft was Operation Kinetic that operated into Macedonia in 1999 carrying humanitarian food and supplies. Continued flight cancellations for support missions had a negative impact on operations and training. For example, requests for Hercules support decreased as a lack of confidence in mission reliability grew.<sup>26</sup> Even with the cancellation of some normal events, such as long-range trainer flights, the availability of aircraft and crew proficiency continued to decline and flight safety became a critical issue. During a night formation flight in November 2000, a near miss between two of the formation aircraft was attributed to minimum personnel currency and poor proficiency from lack of training. Investigation revealed that lack of

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<sup>25</sup> Tom Pilz, Major, A3 Operations, 8 Wing Operations Email to Wing Commander (Trenton: DND Printer, 25 March 2002), 1.

<sup>26</sup> Tom Pilz, Major, A3 Operations, 8 Wing Operations Email (Trenton: DND Printer, 14 March 2003), 1.

aircraft and the inability of aircrews to meet minimum flight training hours and currency requirements was a major factor in this near miss.<sup>27</sup> Continued aircraft shortages and the resulting inability of tactical crews to maintain formation operations currency resulted in the cancellation of Hercules formation flying.<sup>28</sup> Loss of this core war-fighting capability and interoperability with our allies can be directly attributed to the lack of Hercules aircraft to support the TAT role. To regain this core skill, the 10 SAR Hercules assets would have to be transferred to the TAT role and the SAR assets replaced by another aircraft.

The most desirable solution to increase the number of Hercules for the combat support role is to purchase new Hercules aircraft; however, under current financial restrictions, this option is not feasible. A less expensive option is to purchase a smaller twin-engine aircraft to replace the Hercules in the SAR role. In addition, consolidating all of the Hercules in Trenton would also save money by eliminating the support costs in Winnipeg and Greenwood.<sup>29</sup> By removing the Hercules from the SAR role, 10 Hercules would be available to restructure the fleet, while maintaining or even improving the vital SAR role and strategic airlift within Canada. The new SAR aircraft would be split among 4 bases as follows: Greenwood, Trenton, Winnipeg and Comox. While the Hercules provides an excellent SAR platform in regards to speed and range, the new aircraft would meet these requirements and also be more suitable for SAR operations in mountainous regions and on short airfield runways that are more common in remote areas. Also, the addition of 15 new aircraft would enhance utility airlift within Canada,

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<sup>27</sup> Flight Safety Report, Aircraft Occurrence Report, 01 February 1999.

<sup>28</sup> 1 Canadian Air Division Headquarters Winnipeg, A3 Message 066, 27 November 2001.

<sup>29</sup> Robert Neske, 2.

thereby further decreasing the domestic strategic airlift burden for the Hercules. For example, SAR training missions could be tasked to conduct such missions as support to other government agencies and general administrative flights. These domestic missions are often cancelled due to a lack of Hercules aircraft or higher priority combat missions. This was readily apparent during the 2002-03 Command and Staff Course when the Hercules was not available to airlift the army students to Fort Bragg due to lack of aircraft.

New aircraft would greatly improve the mission ready rate due to the higher serviceability rate of modern technology. The oldest Hercules is the E model that was built in the 1960's and has a mission ready rate of approximately 48 percent.<sup>30</sup> The newer H models were built in the 1970's and have a slightly higher mission rate of approximately 55 percent.<sup>31</sup> Newer aircraft with state-of-the-art 1990's equipment have significantly lower maintenance requirements and provide mission ready rates in the range of 85 percent.<sup>32</sup> This is significant for SAR as "one aircraft must be mission ready at each Main Operating Base (MOB) 95 percent of the time and a second aircraft must be ready 75 percent of the time."<sup>33</sup> The general condition of the older CC130 Hercules requires 4 aircraft at each MOB to meet the SAR mission ready rate criteria. As stated, newer aircraft have a much better serviceability rate and can achieve the 95 and 75 percent criteria using only 3 aircraft. This would greatly improve the SAR response

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<sup>30</sup> Ibid., 4.

<sup>31</sup> Ibid., 4.

<sup>32</sup> Ibid., 4.

<sup>33</sup> Ibid., 4.

capability while maintaining a robust utility mission support capability to free the Hercules for its intended tasks.<sup>34</sup>

It has been argued in the SAR community that with the recent purchase of 15 Cormorant helicopters the military does not require fixed wing SAR aircraft. This is not supported considering Canada's vast size, remote operating environments and the Government mandate to support all Canadians no matter where they live. Although the Cormorant's range is considerably more than that of the Labrador that it is replacing, it cannot compete with the range and speed of medium fixed wing aircraft.<sup>35</sup> Fixed wing aircraft have been a proven part of the SAR community since 1947 and will continue to be a requirement for Canada. As such, we must estimate a cost for this fixed wing capability. As previously stated, the cost of purchasing new CC130 Hercules aircraft is prohibitive considering the current fiscal situation. Although the February 2003 budget announced an 800 million dollar a year increase in military spending, this money, if it could be spared for this purpose, would disappear quickly with the purchase of 10 Hercules at nearly 40 million dollars each.<sup>36</sup> The purchase of a more cost effective, smaller and reliable aircraft would solve the issue of using combat capable aircraft for a domestic role and still provide timely SAR response to all Canadians.

It is beyond the scope of this paper to select a replacement for the Buffalo; however, it is necessary to demonstrate that there are suitable aircraft available and that there are substantial savings over the purchase of new Hercules aircraft. Selecting a

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<sup>34</sup> Ibid., 3-5.

<sup>35</sup> Andrew Vallance, The Air Weapon: Doctrines of Air Power Strategy and Operational Art (New York: St. Martin's Press, 1996), 148.

<sup>36</sup> John Manley, Budget Speech 2003 Accessed 17 March 2003. Available from [www.fin.gc.ca/budget03/speech/speeche.htm](http://www.fin.gc.ca/budget03/speech/speeche.htm).

replacement for the Buffalo is a challenging task. There are several medium sized aircraft such as the United States Coast Guard HU-25A twin-engine Guardian, Italian C-27J twin engine Spartan and the Spanish 295 twin engine aircraft that would meet the requirement. Discussions with personnel from the SAR community have highlighted a number of desirable qualities for a new fixed wing aircraft. First, based on the excellent SAR performance of the Buffalo, the new SAR aircraft should be at least as capable or better in performance. The desired performance characteristics include: twin-engine, range greater than 1500 nautical miles, rear loading, payload greater than 15,000 pounds, speed greater than 220 knots, ability to operate on short airfield runways and in mountainous regions at slow airspeeds. Other factors considered were the ability to conduct utility missions and support other domestic operations.

During the Canadian Forces Command and Staff Course 29 Air Symposium, the Chief of the Air Staff commented that two possible aircraft to replace the Buffalo could be the Alenia/Lockheed Martin C-27J Spartan and the Construcciones Aeronauticas Spain 295 (CASA) that are both built to military specifications.<sup>37</sup> Based on this information and using the desired parameters set out above, the C-27J and CASA 295 were selected to demonstrate the increased capabilities and costs savings that could be provided by the purchase of a new fixed wing aircraft to replace the Hercules. The first option is the Italian/United States built C-27J Spartan that first flew in 2000 and has already been sold within Italy and to Greece.<sup>38</sup> This modern twin-engine aircraft has state-of-the-art avionics that are night vision goggle compatible and can deliver 80

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<sup>37</sup> Lloyd Campbell, Lieutenant General, Chief of the Air Staff, 05 March 2003.

<sup>38</sup> Janes: All the World's Aircraft (Bath: Bath Press), 279-280.

percent of the cargo of a Hercules at a lower cost per ton-mile. Performance capabilities of the C-27J Spartan exceed all aspects of the Buffalo as its range is greater than 2,400 nautical miles, it cruises at 250 knots, performs well in mountainous terrain and can operate on short runways. The engine, propeller and avionics are also compatible with the CC130J Hercules model, which is the newest model available to replace our older Hercules sometime in the future. The cost of each C-27J is 19 million dollars in United States funds, with the price declining as more aircraft are sold.<sup>39</sup>

The second option is the Spanish built CASA 295 that was first flown in 1998. It also has excellent performance capabilities and has been sold within Spain and also to Switzerland, United Arab Emirates and Poland.<sup>40</sup> This modern twin-engine aircraft also has state-of-the-art avionics and is compatible with night vision goggles, an excellent SAR capability. The aircraft has a range of more than 2,500 nautical miles, cruise speed of 256 knots, operates well in mountainous terrain and can operate on short runways. The CASA 295 also has the capability of refueling in flight that would extend its SAR range and response time within Canada. The cost of each CASA 295 is 26 million dollars in United States funds and this would also decline as more airframes are sold.<sup>41</sup>

Both the C-27J Spartan and the CASA 295 aircraft easily exceed the capabilities and desired performance criteria of the Buffalo. The cost savings of operating a twin-engine aircraft vice a four-engine aircraft is also a substantial factor. For example, the Hercules capital cost per flying hour, the cost of the aircraft over a 30-year period, is

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<sup>39</sup> Ibid., 279-281.

<sup>40</sup> Ibid., 433.

<sup>41</sup> Ibid., 433-435.

approximately 3,300 dollars; where the C-27J and CASA 295 have capital costs per flying hour of approximately 1,700 dollars.<sup>42</sup> The C-27J Spartan has a lower purchase cost per aircraft and also has some component compatibility features that may serve to offset future operating costs if CC130J models are purchased at a later date. Both aircraft are modern, have less maintenance requirements than the CC130 and provide higher mission ready rates that are ideally suited for SAR operations.<sup>43</sup> The SAR role would be enhanced by either of these aircraft due to night vision goggle compatibility and increased capacity for medical evacuation. The C-27J can be configured to hold 36 stretchers and 6 medical personnel, while the CASA 295 is able to hold 27 stretchers and 4 medical personnel.<sup>44</sup> As previously stated, it is beyond the scope of this paper to choose a replacement for the Buffalo; however, the C-27J Spartan would be a very capable SAR platform for the least amount of money of the two options presented. It would also provide a substantial savings compared to purchasing new CC130 Hercules aircraft at 40 million dollars each. No matter which aircraft option was selected to replace the Hercules, it would meet the aim of providing a suitable SAR platform while allowing the Hercules to concentrate on the combat support role, thereby increasing Canada's operational effectiveness.

In summary, SAR is a role that must be maintained to meet national and international agreements. The Air Force has been providing this service since 1947 and no change to this situation is anticipated. The 1994 White Paper maintains that Canada

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<sup>42</sup> Robert Neske, 6.

<sup>43</sup> Ibid., 4.

<sup>44</sup> Janes, 279-435.

must continue to provide multi-purpose, combat-capable forces and support national sovereignty issues such as SAR.<sup>45</sup> While the Air Force structure and resources have changed considerably over the past 50 years, the requirement to provide fixed wing SAR aircraft is still valid today. The reduction in aircraft resources has resulted in the CC130 Hercules taking on a major part of the fixed wing SAR role from the Buffalo. While initially this was a viable option, the changes in operational tempo have increased both the tactical and strategic workloads and have made this option problematic. For example, increased deployments have caused shortages in aircraft and the cancellation of many support flights. In addition, the lack of aircraft has also adversely impacted tactical and strategic training resulting in a reduction of qualified aircrew. Until recent years, 8 Wing Trenton could meet 12 lines of tasking per day. Currently, 8 Wing Trenton can meet only 5 lines of tasking per day. This has had a drastic impact on the ability of the Air Force to provide combat capable support aircraft and crew for deployed operations.<sup>46</sup>

Canada's use of the CC130 Hercules in the SAR role has resulted in a major impact to the availability of aircraft. The SAR role has number one priority and this often results in the cancellation of tactical training flights, further restricting the progression of aircrew training. To correct this shortcoming, the competition for aircraft between the SAR and combat support roles must be resolved. While SAR requires a fixed wing aircraft to provide a vast country like Canada with a timely SAR response, the use of a large combat support aircraft like the Hercules for this domestic peacetime role is inappropriate. This has been recognized by the Chief of the Air Staff and the problem

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<sup>45</sup> Canada, Department of National Defence, 1994 Defence White Paper (Ottawa: Canada Communication Group, 1994), 13.

<sup>46</sup> D. Higgins, Colonel, 8 Wing Commander, 22 February 2003.

needs to be addressed very soon if Canada is to maintain a robust combat capability. An immediate “fix” for the problem would be to purchase more Hercules; however, this does not solve the issue of misemploying a large combat capable aircraft in a domestic role. Another factor that precludes the purchase of more Hercules is the limited funds available for such an expensive aircraft. A second less expensive option is to purchase a smaller twin-engine aircraft to replace the Hercules in the SAR role.<sup>47</sup> Two aircraft were analyzed, both demonstrating the availability, suitability and cost effectiveness of a modern twin-engine aircraft. Selection and purchase of one of these aircraft types would solve the current problem of competition for Hercules aircraft between the domestic SAR role and the combat support roles.

This paper concludes that the combat capable CC130 Hercules is misemployed in the domestic SAR role and must be replaced by a smaller fixed wing twin-engine aircraft if Canada is to maintain core war-fighting capabilities.

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<sup>47</sup> Lloyd Campbell, Lieutenant General, Chief of the Air Staff, 05 March 2003.

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