Why Canada Needs a Humanitarian Assistance and Disaster Relief Ship

Kevin McCoy and Tom Tulloch

In recent years there have been many natural and man-made disasters, particularly in coastal areas where 80% of the world’s population resides (see Figure 1). Canada has responded to global catastrophes with billions of dollars in aid. The Canadian Armed Forces (CAF) have been sent to deliver assistance, alleviate suffering and rebuild infrastructure. This has involved deploying the Disaster Assistance Response Team (DART), airlifting food and stores, and employing naval vessels to sealift relief supplies and expertise. Nevertheless, Canada’s response to disasters has been often small scale and ad hoc in nature. Canada has never possessed a large-scale capability to undertake humanitarian assistance and disaster relief (HA/DR) or to conduct large-scale evacuation operations. There are options, however, for a maritime capability to improve significantly Canada’s ability to render assistance and evacuate citizens.

This article will examine the disaster relief challenge, review Canada’s contributions, assess its capacity and examine some options. While Canada is unlikely to be able to afford the full amphibious capacity that can deliver large amounts of aid effectively, there are commercial options to provide HA/DR capacity but which are also broadly utilitarian.

Increasing Disasters and Canadian Response
Numerous reports have linked ongoing climate change to an increase in the frequency and severity of storms and other extreme climate events worldwide. Many reports have concluded that human activity has “influenced specific extreme weather and climate events ... including tropical cyclones in the central Pacific, heavy rainfall in Europe, drought in East Africa, and stifling heat waves in Australia, Asia, and South America.” The trend is steadily increasing.

Further complicating the situation is the growing urbanization of the world’s population which creates massive metropolitan areas containing millions of people. Many of these megacities are located in regions where natural disasters are frequent, with most of them in coastal areas. As noted, Canada has responded to numerous disasters worldwide with billions of dollars in aid and by physical response and on-scene assistance. The DART was deployed to Sri Lanka to assist in the aftermath of the 2004 Indian Ocean tsunami along with $700M in aid. The response to Hurricane Katrina in the United States in 2005 was a combined RCN and Coast Guard task force of four ships with helicopters, divers, Canadian Red Cross, and urban search and rescue teams. The response to the 2010 earthquake in Haiti was over $1.2B in aid and over 2,000 CAF personnel deployed, including a frigate and a destroyer, six Griffon helicopters, the DART, a field hospital, an infantry battalion and a combat engineer squadron along with airlift capability. Canada’s response to Typhoon Haiyan in the Philippines in 2013 included $170M in aid, the DART, a Canadian Red Cross field hospital, airlift, helicopters and some 319 CAF personnel. Canada has also responded with CAF capabilities to numerous smaller scale HA/DR operations since 2000.

Events in recent years have illustrated the need to be able to evacuate Canadians from conflict and disaster regions. Today, over 2.8 million Canadian citizens live abroad. They all enjoy a right of return and will demand evacuation should disaster occur. Recently Canadians have required evacuation from troubled areas such as Haiti (2004), Côte d’Ivoire (2004), Lebanon (2006), Egypt (2011) and Libya (2011). These operations were accomplished by civilian and military airlift, and in the case of Lebanon by hastily contracted local sealift, with significant difficulty.

The 2016 Canadian Defence Policy Review Public Consultation Document notes that natural and man-made disasters have increased and that responding to these disasters is a priority for the government. It further poses the question “should more defence resources be devoted to disaster response capabilities?” We believe that the answer is yes, but not at the expense of existing capabilities and requirements; rather in addition to them.

HA/DR Capacity in Canada and Allies
Canada’s physical HA/DR response to date has taken many forms, however, each has its drawbacks. The DART is rapidly deployable and highly capable, but is lightly equipped and consists of just 200 personnel. Aircraft are useful for delivering relief supplies, and Canada possesses three primary strategic lift aircraft: the CC-177 Globemaster III; the CC-130 Hercules; and the CC-150 Polaris. Speed of response is such that they can be in theatre in a matter of hours of a disaster occurring. They are capable of reaching inland and can make many trips in a relatively short period of time.

There are, however, significant limitations in terms of the load capacity and costs when using aircraft for HA/DR missions. Even carrying 73 tonnes, a CC-177 Globemaster cannot compete with cargo ships capable of carrying
thousands of tonnes of supplies. Military aircraft are expensive to purchase and to operate – the RCAF’s CC-177s, for example, cost over $30K CAD per flying hour to operate.6 Further, with an RCAF fleet of just five CC-177s, it would be unlikely that more than two would be available at short notice for an HA/DR operation.

Additionally, the effective employment of aircraft for HA/DR depends on there being functioning airfields, and that they possess sufficient capacity to conduct loading, unloading and refueling. After the 2010 earthquake in Haiti, Port-au-Prince’s airport was capable of handling just 120 to 140 flights per day, which resulted in a backlog of relief supplies and inflicted considerable wear on the airport’s single runway. In many parts of the world the capacity of airports is already limited without taking additional damage into account.

If airlift is limited in its utility, what about supply ships? When the RCN’s Auxiliary Oiler Replenishment (AOR) vessels (HMCS Protecteur and Preserver) were available they were Canada’s go-to asset for large-scale humanitarian response. Despite being ill-suited to the task – with no roll-on/roll-off (Ro-Ro7) capability, and designed for at-sea replenishment rather than to transport cargo – they nevertheless performed admirably when called upon. From Hurricane Andrew relief in 1992 and Swissair 111 recovery operations in 1998, to East Timor security, reconstruction and sealift in 1999, the AORs were highly useful in this role. They were capable of carrying just over 1,000 tonnes of cargo, far more than could be moved by strategic airlift. They also provided a persistent presence and a skilled workforce.

Other states have approached maritime HA/DR differently. States with large militaries such as the USA, UK, France, China and Russia possess significant amphibious forces which are ideally suited for transporting relief equipment and supplies. Even mid-tier navies often have small numbers of amphibious ships that can readily perform HA/DR missions (see Table 1). In fact, other than Germany, Canada is the only G-8 state with no amphibious capability.

One of the most critical contributions from amphibious forces is their connectors – the landing craft and helicopters that allow them to move equipment onshore despite damaged infrastructure. The effectiveness of the response to the 2004 Indian Ocean tsunami was reduced by overloading the facilities at the region’s small airports with unsolicited shipments delivered by fixed-wing aircraft, which prevented more urgently needed equipment from getting through. However, US Navy helicopters were able to reach the most devastated remote areas with supplies by bypassing the airfields. A similar situation occurred in Haiti in 2010 where earthquake damage had reduced the capacity of port facilities. Helicopters therefore proved vital in getting supplies ashore.

It is unlikely that Canada’s defence budget will be increased to provide amphibious capability. In addition to the cost of purchase/construction, the personnel, operating and maintenance expenses of any major defence item are often twice the cost of the item itself.8 Given that the RCN does not have additional sailors to crew these vessels, the point is moot.

Nevertheless, the evidence points to Canada needing a
dedicated maritime capability to provide HA/DR on a scale and with a level of effectiveness heretofore unavailable to Canada. Correctly selected, such a ship could incorporate containerized field hospitals, generators, water treatment and desalination plants, and waste treatment facilities. A field engineering squadron with an infantry force for security could be sent to restore order and transportation infrastructure. Landing craft and a Mexelotestyle landing raft or modular causeway system plus helicopters would permit loading/unloading to take place regardless of the availability of port facilities. As well, a large volume of fresh water could be delivered ashore by hose while standing off shore.

If fitted with modular on-board accommodations, galleys and command centres, a ship could support governmental partners, local authorities and international organizations. This would serve as a safe, central coordinating facility for Canadian relief efforts – an on-site floating base and a physical manifestation of the whole-of-government approach. The command function would enhance Canada’s ability to take a leadership role internationally in HA/DR and cooperative civil-military operations.

In addition to helicopters, drones could be embarked to extend the assistance effort, and could be used to produce aerial imagery for crisis mapping. They could also conduct damage assessment and search and rescue, and assess the scale of displaced persons. Furthermore, they could serve as an emergency communications link.

Finally, the visible effect of sending a naval vessel (HMCS Canada?) as a symbol of a state’s resolve should not be underestimated. Such a presence off the coast of a stricken country sends the message that Canada has the capability and resolve to help. It would also satisfy the government’s pre-election promise to increase the RCN’s ability “to operate as a true blue-water maritime force.”

The primary HA/DR capability of such a vessel would, of course, not be required 365 days per year. With a large internal space, significant cargo capacity and flexible features, such a ship could fulfil a variety of roles when not responding to humanitarian requirements. The following illustrates the possible roles:

- an adjunct to the Joint Support Ship (JSS), providing fuel and stores to support naval forces at sea;
- evacuation of Canadians or as an afloat refugee/migrant processing centre incorporating medical support;
- support to UN operations such as maritime interdiction operations and counter-piracy operations;
- a secure, mobile, afloat operating base when sovereignty or security conditions dictate a minimum footprint ashore;
- on-site medical care for deployed CAF personnel and allies, or medical care to the local population;
- a source of assistance to build local maritime capacity and cooperation, combat illegal fishing, human smuggling, drug trafficking, resource theft and piracy;
- sea-based logistics and operating support to allied operations, or a command facility for a joint commander;
- a floating base for law enforcement and intelligence agencies during high-profile events in Canada in maritime locations (e.g., Vancouver 2010 Olympics);
- support to northern operations such as supplying fuel and supporting Arctic and Offshore Patrol Ship (AOPS) deployments to the Arctic; and
- aerial surveillance to watch over Canada’s maritime approaches, and sea-based surveillance of areas ashore, which could be used to counter migrant smuggling and counter-narcotics operations.

### Table 1. HA/DR Capable Vessels in Mid-Tier Navies

<table>
<thead>
<tr>
<th>Nation</th>
<th>Vessel</th>
<th>Displacement</th>
<th>Cargo Capacity</th>
<th>Helicopters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td><em>Endurance</em> Landing platform dock</td>
<td>6,500 tonnes</td>
<td>20 trucks Bulk cargo</td>
<td>2 medium lift or 1 heavy lift helicopter</td>
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<tr>
<td>Australia</td>
<td><em>Choules</em> Landing ship dock</td>
<td>16,190 tonnes</td>
<td>1,150 lane metres 150 light trucks or 700 troops</td>
<td>2 medium lift helicopters</td>
</tr>
<tr>
<td>Australia</td>
<td><em>Canberra</em> Landing helicopter dock</td>
<td>27,500 tonnes</td>
<td>110 vehicles 1,040 troops</td>
<td>Hangar space for 18 helicopters</td>
</tr>
<tr>
<td>Italy</td>
<td><em>San Giorgio</em> Amphibious transport dock</td>
<td>7,650 tonnes</td>
<td>350 troops with up to 36 vehicles</td>
<td>Up to 5 helicopters</td>
</tr>
<tr>
<td>Japan</td>
<td><em>Osumi</em> Tank landing ship</td>
<td>8,900 tonnes</td>
<td>2 vehicle decks 300 troops</td>
<td>Up to 8 helicopters</td>
</tr>
<tr>
<td>Japan</td>
<td><em>Izumo</em> Helicopter destroyer</td>
<td>27,000 tonnes</td>
<td>400 troops and 50 light trucks</td>
<td>Up to 28 aircraft</td>
</tr>
<tr>
<td>Korea</td>
<td><em>Dokdo</em> Landing platform</td>
<td>18,800 tonnes</td>
<td>720 troops or up to 200 vehicles</td>
<td>Up to 10 helicopters</td>
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Potential Canadian Solutions for Maritime-Based HA/DR

Some solutions to providing Canadian maritime-based HA/DR – such as buying new amphibious ships – could involve multibillion-dollar expenditures. The DND capital plan has over $55 billion in unmet demand and only $18 billion to invest. Options that call for high capital expenditures are thus unrealistic. Furthermore the same tight financial conditions suggest one must beware of solutions that also bring high crewing or maintenance costs, as these cut directly into the funding for capital equipment.

There are a number of potential solutions to Canada achieving an HA/DR capability. The first potential solution is to build more Joint Support Ships (JSS). The two Queenston-class JSS, scheduled to replace the decommissioned AORS after 2020, are intended as naval at-sea replenishment vessels like their predecessors. They, therefore, suffer similar drawbacks. The JSS will have somewhat less cargo capacity than the AORS they will replace, they will lack Ro-Ro capability and, as they will be dedicated to sustaining the fleet at sea, their availability for HA/DR purposes will be limited. As well, each additional JSS purchase for HA/DR would likely be extremely expensive, and would involve some 130 crew, which means additional personnel costs.

The second potential solution is to build more interim AORS. The interim AOR solution could be expanded to provide a further HA/DR ship, especially as its capital, personnel and maintenance costs are low because the vessel is leased and largely civilian. However, the interim AOR is based on a container ship which makes it ill-suited for effective HA/DR operations, as it has neither Ro-Ro capability to deploy emergency equipment, vehicles and supplies, nor a large reconfigurable internal volume that can be tailored to emergency needs. Furthermore, using the sole planned interim AOR for HA/DR missions would interrupt it from its primary purpose of supporting naval operations, the role that it was procured to fill.

The third potential solution is to purchase used amphibious ships. Other states have obtained such vessels with Ro-Ro, hospital and shore connector facilities (hangars, flight decks, well decks and landing craft) already in place. It is difficult, however, to identify many success stories as costs are high, and there have been some significant failures.

Britain’s naval downsizing in 2011 appeared to offer just such a solution, if the Canadian aversion to buying another secondhand British naval vessel could have been surmounted. Australia, however, seized this opportunity and for about $100M AUD purchased HMS Largs Bay, a 16,000 ton Landing Ship Dock capable of embarking up to 600 troops and 150 vehicles. Despite having a flight deck, however, it had no helicopter hangar and required modifications, including the replacement of both main propulsion modifications and repairs. The upgrades proved inadequate and both vessels suffered hull corrosion and engine defects until finally paid off in 2011. Buying used, therefore, is not automatically economical in the long term and involves significant risk.

The fourth potential solution is to arrange time charter conversion. This option involves taking a suitable civilian merchant vessel and configuring it to meet Canadian government, joint CAF and RCN requirements. A suitable vessel is key – unlike the interim AOR discussed earlier, inherent HA/DR capability already resides in existing Ro-Ro vessels with large internal volume. An arrangement could involve something similar to the model employed by the US Military Sealift Command, using a proven Ro-Ro vessel design requiring minimal modifications, and offering innovative financing and crewing options. This would significantly lower costs, reduce strain on RCN crewing and increase operational availability and effectiveness.

A workable concept for a dedicated HA/DR vessel – a Maritime Support Ship (MSS) – could involve the conversion of a recently built European twin-screw, twin-engine Ro-Ro vessel of 21,000 tonnes displacement, 193 metres length, 26 metres beam and 7 metres draft. The vessel’s design (as essentially a strong open box) means that conversion would require minimal changes and no major structural alteration. The conversion would maximize the vessel’s already impressive logistical support capability which includes: 8,000 cubic metres of internal deck space; 500 twenty-foot equivalent container
units (TEUs); 2,100 lane-metres (2.1 km) of vehicle space; 14,000 tonnes of cargo capacity; and 1,500 tonnes of fresh water. Added fuel tanks would extend the range of the vessel, enhancing its ability to operate independent of external support and in austere conditions worldwide.

Vehicles would be able to access all decks, including a flight deck, at sea via internal ramps. A total of 230 semi-trailers could be accommodated and a 17-metre wide stern ramp would allow access to the shore or use as a docking area for boats in calm water. Two 36-tonne cranes would provide self-unloading capability and the means to deploy landing craft.

The design also offers a helicopter hangar and large flight deck forward. The hangar area would allow for maintenance and storage of several helicopters, as well as a fuel bowser for on-deck and helicopter in-flight refueling. Additional utility to support fleet operations could be offered by fitting a basic replenishment-at-sea capability.

The MSS solution is not simply a concept on paper. An MSS has recently been converted for special operations for the US Navy, and the UK Ministry of Defence (MoD) has four similar Ro-Ro vessels on permanent contract to support its strategic joint rapid reaction force, with a further two at notice for MoD tasking. The French Navy’s SeaOwl contract employs two modified commercial vessels to service naval training and exercises. These successes of Canada’s allies would be fundamental in reducing the risk of a similar MSS approach for Canada.

Ideally Canada needs two of these proposed ships – one on each coast to provide for prompt HA/DR response, and to act as a backup replenishment-at-sea capability when the JSS is unavailable. Even one, however, would be a significant national asset.

The MSS concept assumes a Canadian registered and flagged ship with a Canadian civilian crew numbering approximately 37. Depending on the mission the crew could be augmented by an RCN/CAF contingent – around 40 additional
personnel. This capability would therefore have only minimal impact on RCN personnel, with small numbers augmented as required.

Preliminary estimates indicate that the vessel conversion cost and an associated five-year lease would be under $300M CAD. This would include the full cost of converting, operating, maintaining and crewing the vessel, except for government-furnished equipment such as communications equipment and cryptographic equipment, plus the cost of food, fuel and cargo.

Conclusion

Canada has regularly responded when disasters strike. The DART, airlift of relief supplies and the generosity of Canadians have consistently assuaged suffering. However Canada’s response has been limited by a lack of capacity.

A specialized naval vessel dedicated to HA/DR would offer an adaptable solution to address catastrophes worldwide. It would represent a visible symbol of Canada’s commitment to bringing stability to fragile states and helping societies recover in the aftermath of crisis. A recent report by the Canadian Global Affairs Institute argued that a dedicated HA/DR ship “would likely be among the most heavily utilized assets in the future CAF inventory.”

With options of acquiring amphibious vessels, additional JSSs or interim AORs assessed as too expensive, too risky and/or providing inadequate capability, converting a suitable civilian Ro-Ro vessel for naval use on a time charter basis is an effective solution. This would offer Canada significant HA/DR capability at a relatively low cost and low risk, and in a short time-frame. Possessing such a capability in addition to but separate from the JSS would ensure its availability whenever needed. Furthermore its flexibility would make it a useful asset for other applications when not being used for HA/DR. Having such a resource would give the Canadian government increased flexibility, offering a range of options to respond rapidly and with a capability commensurate with its determination to make a contribution to a peaceful world.

The government has vowed to support international peace operations with the United Nations, make capabilities available in responding to conflicts, strengthen the navy within a better-equipped military, and develop an agile force that can provide support during natural disasters and humanitarian missions. As the Defence Policy Review Public Consultation Document states, “disaster relief and humanitarian assistance remain a priority for the Government of Canada.”

The strategic flexibility inherent in a Maritime Support Ship offers the best possible means to do this and to further Canada’s leadership role in the world.

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