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A Short Primer on the Tribal Class Update and Modernization Project (TRUMP)

By Tony Thatcher

Adapted from an original article:
<https://www.cntha.ca/articles/trump.html>

The DDH-280 Tribal Class Update and Modernization Project (TRUMP) refits conducted during the early 1990s were considered to be the most ambitious Canadian warship conversion program in more than two decades. It was a brilliant undertaking, even though the project took 23 years from conception in 1977 to final completion in 2000, and came in considerably costlier than the government's preliminary 1983 'design-to-cost' estimate of \$650 million. This was due in part to the Navy's pressing need for an area air-defence capability, and when the last bills came in, the final cost to upgrade the four destroyers was estimated at \$1.4 billion (in 2005 dollars).

Originally there was concern in some quarters that TRUMP might have to be scaled back, possibly by converting fewer than four ships, or by adopting a less expensive update package (i.e. the older Standard 1 missile and Mk-13 launcher) for all four ships. Some cost-saving measures were to update the ships' existing torpedo handling equipment rather than install an entirely new system, and to retain the existing ASW fire-control system. It was decided to discontinue the competitive bidding process and "sole source" the implementation contract to Litton Systems Canada Limited of Toronto, partly on the basis of the urgent needs of the ship-building industry.

Following the major refits under TRUMP, the DDH-280s emerged as newly pegged *Iroquois*-class area air-defence destroyers. Among other changes, an integrated machinery control system and new gas-turbine engines were installed, and the twin "bunny ear" funnels were replaced with a single large funnel with an IR suppression system. New search and fire-control radars were added, the old 5-inch gun was replaced with a new super-rapid 76-mm, and a Mk-41 vertical launch missile system was



HMCS Algonquin pre-TRUMP

installed. Although hampered slightly by the lack of a 3-D radar (cut as a cost-saving measure), they were nonetheless very effective area air-defence destroyers with their Standard SM-2 (MR) missiles.

Implementation

The contract was awarded to Litton in July/August 1985. As prime contractor, Litton acted as Project Manager, and accepted total system responsibility to engineer, procure, construct and deliver the four converted vessels. Litton's team consisted of the following main subcontractors:

- MSEI: Drawings
- MIL-Davie: Shipyard
- Signaal (HSA): Radars, fire-control
- Martin Marietta: Vertical launch system
- Vitro Engineering: Weapons directions system
- General Dynamics: Phalanx CIWS
- OTO Melara: 76-mm super-rapid gun

Issues of Interest

Direct Sale vs. Foreign Military Sales: The original TRUMP project manager, **Capt(N) Robbie Preston**, was able to set up the agreement with the United States Navy (USN) for direct sale, industry to industry, through his experience with Canadian Defence Liaison Staff (Washington). This was unlike the Canadian Patrol Frigate (CPF) Project, which bought its equipment through Foreign Military Sales (FMS), the usual defence procurement export method. The USN agreed to a direct sale arrangement as long as Canada met certain conditions: first that it deal with Vitro Engineering Corporation for the weapons direction system; second, an FMS case was required to provide a mechanism to transfer

(Continues next page...)

documentation and for navy-to-navy liaison; and last, the USN required a Canadian naval liaison officer in Washington to work for the captain of anti-air warfare (AAW) at Naval Sea Systems Command (NAVSEA).

Command and Control System (CCS) Architecture: Litton did not want to run into the troubles the CPF project was having developing a truly distributed SHINPADS-based CCS. Litton designed a federated system, but still had difficulties getting the software to fit in the limited memory of the standard computers required by the Navy. The ability to handle more targets than fire-control channels, and to prioritize weapons handling, was accomplished by uniquely Canadian developed Threat Evaluation Weapon Assignment (TEWA) software.

Standard Missile Block 2 (SM2): This missile came in two versions, Tartar and Aegis, depending on the particular USN vessel and fire-control system. Since the Tartar version was expected to be taken out of service during the lifetime of the TRUMPed vessels, the USN recommended a unique Canadian version be assembled by the USN's Indian Head armament depot at Maryland, DC to account for the *Iroquois*-class fire-control equipment. However, Canada resisted this option, and wanted to be able to operate the Aegis version as it would be common with the USN for the entire lifetime of the ships. The problem was that nobody was sure the Aegis version of the missile could be controlled in the Tartar mode, i.e. discontinuous fire control after launch. The USN permitted Canada access to key naval and industry missile scientific and support personnel to resolve this issue.

Mk-41 Vertical Launch System (VLS): The missile vertical launch system had to be rotated 90 degrees from its orientation in USN ships to fit in the DDH-280 hull because of size constraints, so a change was made to the software in the VLS controller to accommodate this. However, the USN was critical of fitting the system in the 280s because of hull flexure, and felt that it would not work properly as a result. Overall, the USN's VLS project manager was very concerned that the Canadian Navy could not operate the entire Standard Missile system safely. He therefore put a certification program in place to prevent an accidental missile firing such as had occurred with the US and Danish navies with Harpoon missiles in the early 1980s.

Gun Debate: The Oto Melara 76-mm gun was the chosen upgrade over the Bofors 57-mm gun, that had been selected for the CPF Project. There was some criticism over this in the Navy. The TRUMP PMO and Litton researched and assessed the capabilities of the two guns as being fairly similar in their ability to destroy air targets. Essentially, the water-cooled 76-mm was a "small big gun," while the air-cooled Bofors was a "big small gun." However, Oto Melara also offered to buy back the original 5-inch guns, and therefore was able to offer better value competitively.

Conclusion

The Canadian Navy received state-of-the-art area air-defence ships as a result of TRUMP. The Block 2 Standard Missile system had not been exported to any other country at the time, but the US Government had good confidence in the Canadian industrial ability to integrate, trial and

operate this top-of-the-line suite, and allowed Canada to purchase the US equipment as a direct sale instead of through Foreign Military Sales (FMS). The upgraded *Iroquois*-class DDGs would go on to serve as flagships for Canadian fleet commanders for the next 20 years of service.

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Name	Pennant	Commission	TRUMP	Paid Off	Homeport
<i>Iroquois</i>	280	1972-07-29	1992-07-03	2015-05-01	Halifax
<i>Huron</i>	281	1972-12-16	1994-11-25	2005-03-31	Esquimalt
<i>Athabaskan</i>	282	1972-09-30	1994-06-04	2017-03-10	Halifax
<i>Algonquin</i>	283	1973-11-03	1991-10-11	2015-06-11	Esquimalt

Displacement:	5,100 tons full load
Dimensions:	128.92 x 15.24 x 4.42 metres
Propulsion:	2 shafts and variable-pitch propellers; 2 x 570 KF cruise gas turbines, 12,788 shp 2 x FT4A boost gas turbines, 51,000 shp; 29 knots
Crew:	285
Aviation:	Helicopter deck with hauldown system Two CH-124 Sea King helicopters
Command & Control System:	Federated SHINPADS bus system with standard computers AN/UJK-501 and displays
Radar:	AN/SPQ-501 (Signaal DA08) air/surface search AN/SPQ 502 (Signaal LW08) air search
Sonar:	SQS-510 hull SQA-502 VDS
Fire Control:	two AN/SPG 501 (Signaal STIR 1.8) one Lightweight Radar and Optronic Director
EW:	SLQ-501 intercept SLQ-503 jammer 4 x 6-barrelled Plessey SHIELD IR/chaff Nulka hovering decoy system SLQ-25 Nixie
Armament:	29-cell Mk-41 VLS (SM Block 11A) 76-mm/62 OTO Melara (Super Rapid) DP gun .50-calibre machine guns 20-mm Phalanx CIWS Mod 1B two triple Mk-32 12.75-inch torpedo tubes firing Mk-46 Mod 5 torpedoes.