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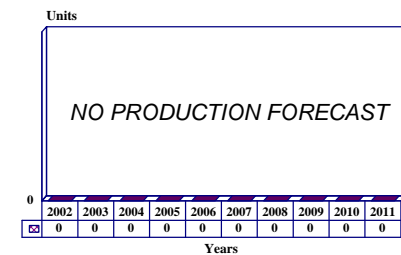
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SQR-501 CANTASS – ARCHIVE 02/2003

Outlook

- No future production or sales expected
- CANTASS Fleet Operational Readiness Capability Enhancement (FORCE) Project in progress
- Future activity likely to focus on upgrades
- This report will be archived in the near future

10 Year Unit Production Forecast
2002 - 2011



Orientation

Description. The SQR-501 CANTASS (Canadian Towed Array Sonar System) is a critical-angle surface-ship passive towed array sonar system.

Sponsor

Canadian Minister of Supply and Services
Place du Portage
Hull, Ontario
Canada

Contractors

General Dynamics Canada
Computing Devices Canada
3785 Richmond Road
Ottawa, Ontario
Canada K2H 5B7
Tel: +1 613 595 7000
Fax: +1 613 820 5081
Web site: <http://www.gdcanada.com>
Web site: <http://www.computingdevices.com>
(Prime Contractors Development/Production)

Lockheed Martin Corp

Naval Electronics & Surveillance Systems - Syracuse
Electronics Park
EP 7, MD31
Syracuse, New York (NY) 13221-4840

USA

Tel: +1 315 456 3505
Fax: +1 315 456 3515
Web site: <http://www.lockheedmartin.com/syracuse>
(Wet-end SQR-17 Towed Array)

Array Systems Computing Inc

1120 Finch Avenue West, 7th Floor
Toronto, Ontario
Canada M3J 3H7
Tel: +1 416 736 0900
Fax: +1 416 736 4715
Web site: <http://www.ns.array.ca>
Web site: <http://www.array.ca>
(Maintenance Support)

Status. In operational service with Canada. Production believed complete, no further orders expected.

Total Produced. A total of 15 units (14 for ships, one for land-based testing) are assumed to have been produced for the Canadian Maritime Command. Additionally, a training center with four student simulator terminals and two instructor terminals has been sold to Canada, as well as the CANTASS Post

Analysis Systems (PAS) system, which was procured by the Canadian Navy.

Application. SQR-501 CANTASS is used for long-angle passive detection and tracking of submarines and surface vessels. It is installed on the Halifax and Annapolis class frigates.

Price Range. The price per system was cost average estimated at C\$5.9 million (1989 rates), or about US\$4.5 million (last published US Department of Defense estimate).

Technical Data

Design Features. CANTASS is a passive, critical angle, towed array system employing a modular architecture produced by Computing Devices Canada (CDC, which is now part of General Dynamics Canada). To cut down on costs, most of the electronics are based on commercial off-the-shelf (COTS) processors, eliminating the need for expensive development of new equipment.

The “wet end” consists of the Lockheed Martin SQR-19 passive hydrophone towed array, towing cable, and Indal Technologies OK-410 deployment/recovery winch. The shipboard “dry end” (i.e., the signal and data processing equipment) relies heavily on commercial processors and existing components. The

acoustic processor is CDC’s UYS-501 signal processor, applying modular interfacing and data management electronics, also developed by CDC.

Some of the processing algorithm development work was carried out by the Canadian Navy Defense Research Establishment. The towed array is capable of detecting both narrow- and broad-band noise, and is expected to be particularly effective in low-frequency ranges. The SQR-501 is said to share an integrated ASW command and control system with the SQR-510 hull-mounted sonar on board Halifax class frigates. Additionally, it has been reported that the SQR-501 CANTASS can be modified for use on board a submarine.



HMCS Halifax F330, primary frigate class platform for the SQR-501 CANTASS Towed Array Sonar System

Source: Canadian Defence Forces



SQR-501 CANTASS



SQR-501 CANTASS surface ship
passivetowed array sonar made by
Computing Devices Canada
for the Canadian Navy

Source: Computing Devices Canada

Variants/Upgrades

CMS. The CANTASS Mission Simulator (CMS) is an advanced platform for the training of sonar operators on CANTASS-equipped ships. Used for land training, CMS was acquired through a 1996 contract. It is considered a separate version of the system, since it is built specifically for simulation purposes and thus differs slightly from real-world conditions. However, it does cover all operating areas and signals confronted in sea operations.

The CMS comprises four student and two instructor stations. The third main component of CMS is the Acoustic Signal Generator (ASG), which generates a stream of simulated towed array data in real time. The student stations replicate the functionality and performance of the SQR-502 ESS component of CANTASS. The two instructor stations stimulate the

student stations by producing up to four independent streams of raw data. The student versions have COTS versions of the SESS and a Debrief Recorder.

CANTASS PAS. CANTASS PAS (Canadian Towed Array Sonar System Post Analysis System) is an advanced post-mission analysis system that processes, stores, analyzes, and classifies sonar data collected by towed arrays; it randomly accesses up to 60 hours of processor sonar data and then processes the data in three times real time. The system is currently in service with the Canadian Navy at its Acoustic Data Analysis Centre (ADAC) in Halifax.

No variants or upgrades of the SQR-501 CANTASS itself are known to exist. As stated above, a submarine version reportedly could be available if needed.

Program Review

Background. The SQR-501 CANTASS (Canadian Towed Array Sonar System) is a modification of the US Navy's SQR-19 TACTASS (Tactical Towed Array Sonar System). The Canadian Navy issued the requirement for the SQR-501 CANTASS in 1980-81, when it began planning a new frigate class designed for ASW operations in the 1990s.

At that time, most of the Canadian Navy's ships were equipped with variable depth sonar (VDS), but the Canadians were privy to some of the US Navy's SQR-15 Towed Array Sonar System (TASS) data. The greater detection range and passive capabilities of the towed array convinced the Canadians to abandon plans to install a VDS system aboard the new frigates.

The Canadian Navy took two routes toward developing a towed array. First, it gave Control Data Canada (now Computing Devices Canada, which has become part of General Dynamics Canada) a contract to develop the new system. An early model system was tested on board the frigate HMCS *Nipigon* in 1983 and the destroyer *Iroquois* in 1984. This system featured relatively basic electronics and a half-size wet end. An improved full-scale towed array, designated ETASS, was tested on board the frigate HMCS *Fraser* from 1986 to 1988.

Second, the Canadian Navy held talks with the US Navy to procure SQR-19 towed arrays. In mid FY84, the US Navy gave Canada a Letter of Offer for the

purchase of six SQR-19 sonars with handling and stowage subsystems, support, and documentation for a cost of about US\$55 million. During discussions in 1985, Canada reportedly asked for eight subsystems for US\$68 million. These talks ended in 1987. Computing Devices held discussions with Lockheed Martin (then Gould), the manufacturer of the towed array portion of the SQR-19. The Canadian Navy held SQR-501 systems integration in 1988 and began operational tests of the system later that year.

The SQR-501 CANTASS entered service in 1992 with the commissioning of the frigate HMCS *Halifax*, the first ship of the City class, now more commonly called the Halifax class. The system is now installed on all 12 Halifax class ships and two Annapolis class frigates (the *Annapolis* and *Nipigon*). Another system is used for land-based testing. All CANTASS installations were completed by the end of 1997.

In December 1999, the Canadian Department of National Defence awarded Computing Devices Canada (now part of General Dynamics Canada) a C\$11.6

million (US\$7.62 million) contract for the CANTASS Fleet Operational Readiness Capability Enhancement (FORCE) Project. The FORCE contract reconfigures CANTASS to better meet current operational requirements and to support future system growth. The project establishes a roadmap for system growth and implements the change feasible within the available budget. Additionally, it will address enhancements to CANTASS signal processing, operator interface, and post-processing using commercial-off-the-shelf (COTS) software and hardware to the extent possible. High frequency (HF) processing, transient signal detection, and target motion analysis capabilities will be provided to CANTASS to meet the Canadian Navy's underwater passive detection and tracking needs. These enhancements are to be the basis for future growth potential to provide effectiveness for the next generation of passive towed sonar and signal processing.

No additional production or installation is expected. Any future activity regarding the SQR-501 CANTASS will likely involve upgrades and enhancements only.

Funding

This program was funded by the Canadian Minister of Supply and Services for the Canadian Maritime Command.

Recent Contracts

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Computing Devices Canada	USD77.3 (CAD89.1)	Aug 1990 – 15 SQR-501 systems to the Canadian Navy.
Array Systems Computing Inc	USD6.5 (CAD9.0)	Mar 1996 – A two-year contract to develop the CANTASS Mission Simulator (CMS), an advanced training platform for sonar operators.
Array Systems Computing Inc	USD2.4 (CAD3.65)	Feb 1999 – Two-year contract to provide repair and overhaul services for CANTASS Post Analysis Systems (PAS) installed at the Acoustic Data Analysis Centres on both the Atlantic and Pacific coasts. Contract was to be completed by February 2001. Also includes option to extend the period of performance and add maintenance support for the CANTASS Mission Simulator (CMS) which is currently being installed by Array Systems at the Warfare Training School in Halifax.
Computing Devices Canada	USD7.62 (CAD11.6)	Dec 1999 – Contract for the CANTASS Fleet Operational Readiness Capability Enhancement (FORCE) project to reconfigure CANTASS to better meet current operational requirements and to support future system growth.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1981	Canadian Navy issues requirement for towed array sonar
	1983	Contract to Computing Devices
	FY84	US Navy issues Canada Letter of Offer for SQR-19
	1987	Development model delivered
	1988	SQR-501 in preproduction tests
	1992	First Halifax class frigate with CANTASS enters operational service
May	1994	FFH-337 <i>Fredericton</i> commissioned
Jan	1995	FFH-338 <i>Winnipeg</i> commissioned
Jul	1995	FFH-339 <i>Charlottetown</i> commissioned
Dec	1995	SQR-501 production order completed
Mar	1996	FFH-340 <i>St John's</i> commissioned
Sep	1996	Last Halifax class ship, the FFH-341 <i>Ottawa</i> , commissioned
	1997	CMS training simulation system becomes operational
	1998	CANTASS PAS system in operation
Dec	1999	CANTASS Fleet Operational Readiness Capability Enhancement Project begins

Worldwide Distribution

Canada. At the present time, Canada is the only known country using the SQR-501 CANTASS sonar system: 12 have been produced for the Halifax class frigates, two for the two Annapolis class frigates, and one for the land-based test site. Additionally, the Canadian Department of National Defence has procured a mission simulator system, consisting of four student and two instructor terminals, for training purposes; and the Canadian Navy at ADAC has procured the CANTASS PAS system.

Forecast Rationale

Although there is no evidence suggesting further sales or production of the SQR-501 CANTASS Towed Array Sonar at this time, the system is currently undergoing major enhancements to meet current operational needs of the Canadian Navy. The CANTASS Fleet Operational Readiness Capability Enhancement (FORCE) Project reconfigures CANTASS to better meet current operational requirements and to support future system growth. The project establishes a roadmap for system growth and implements the change feasible within the available budget. Additionally, it will address enhancements to CANTASS signal processing, operator interface, and post-processing using commercial-off-the-shelf (COTS) software and hardware to the extent possible. High frequency (HF) processing, transient signal detection, and target motion analysis capabilities

will be provided to CANTASS to meet the Canadian Navy's underwater passive detection and tracking needs. These enhancements are to be the basis for future growth potential to provide effectiveness for the next generation of passive towed sonar and signal processing.

In addition to the shipborne systems and a simulator system that was procured for an on-land installation, these 15 systems are believed to be the only ones in existence, and no further production has been announced. Continuing upgrades and enhancements remain a viable proposition, and it has been reported that the SQR-501 CANTASS can be modified for use aboard submarines. Unfortunately, the chance of export sales appears nonexistent at this time.

Ten-Year Outlook

As no further production of SQR-501 CANTASS is expected, the forecast chart has been omitted. The system is currently operational, and funding has been allocated for maintenance and related operational repair services, in addition to the current Fleet Operational Readiness Capability Enhancement (FORCE) Project

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