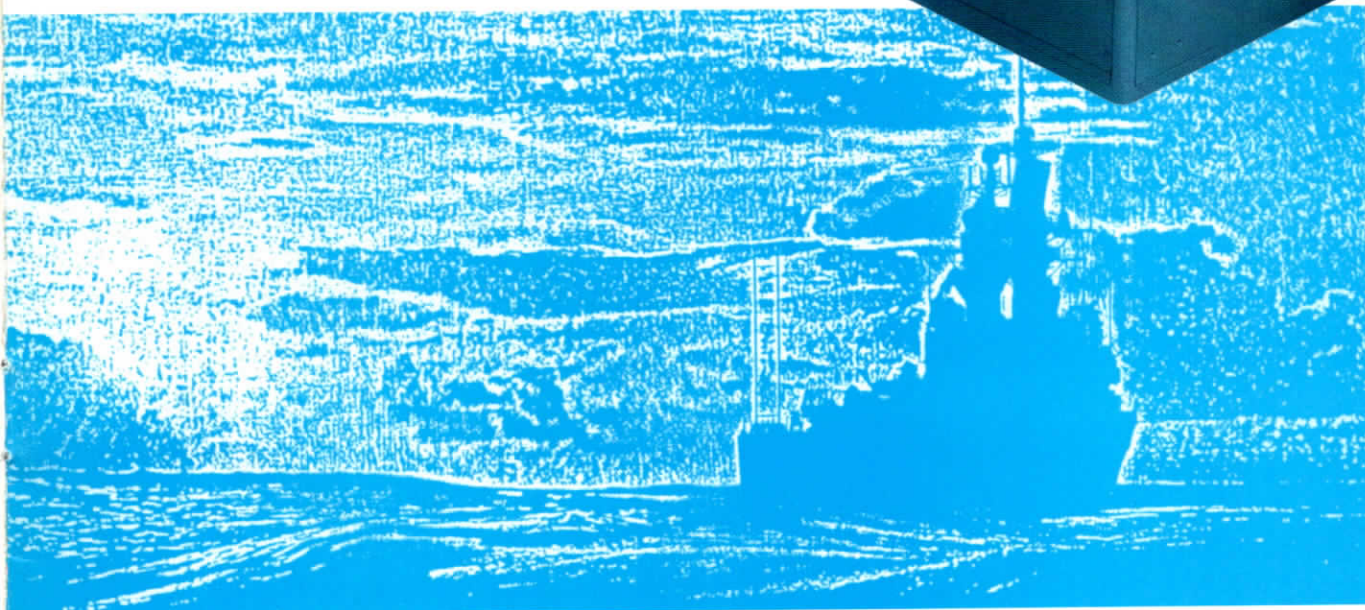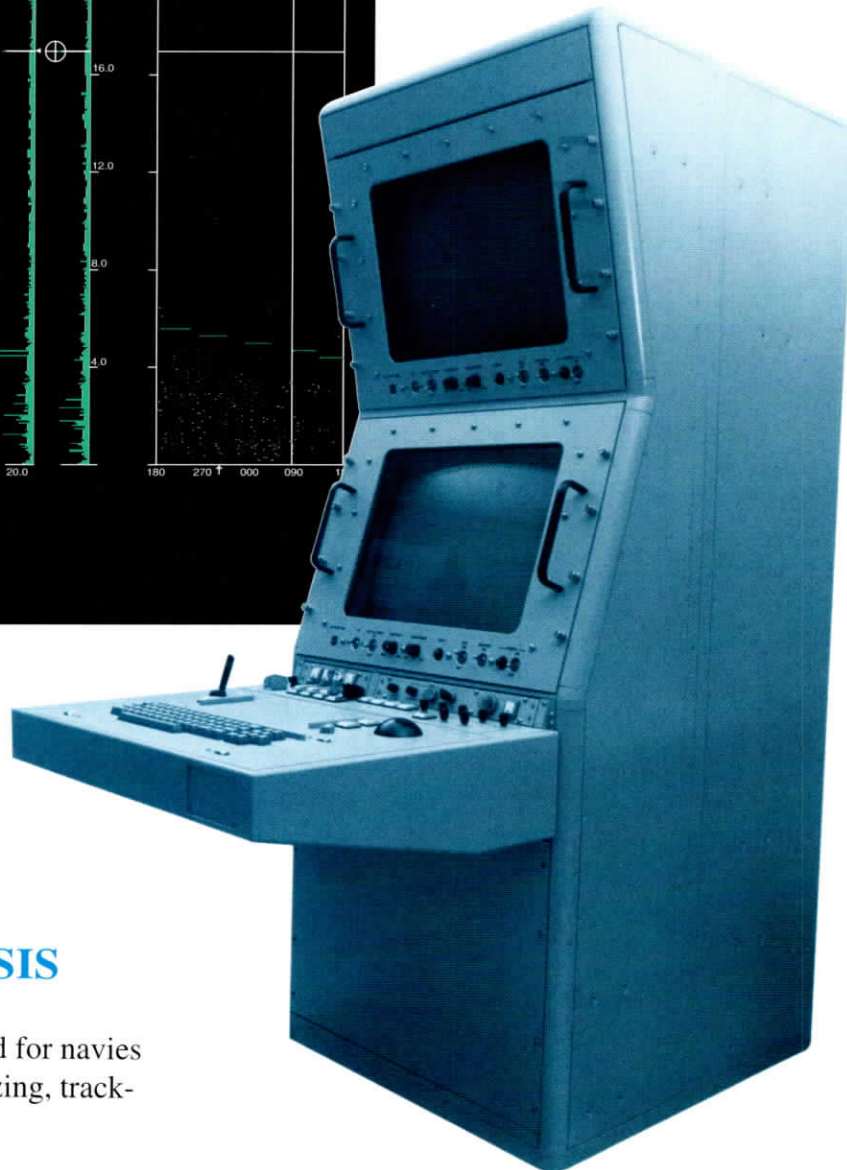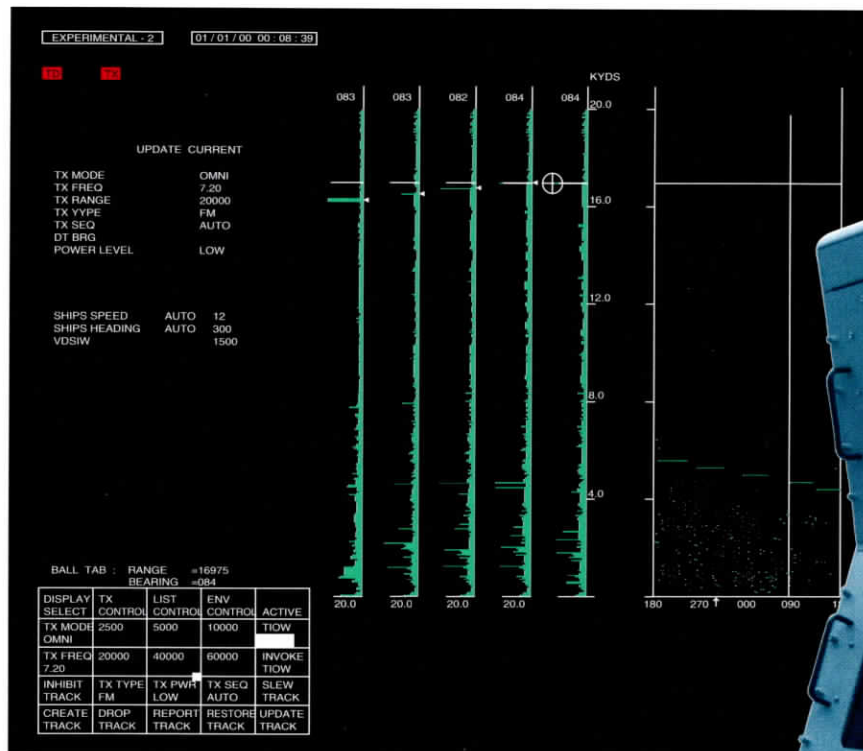# AN/SQS-510(V)
MEDIUM FREQUENCY SONAR

AN/SQS-510(V)
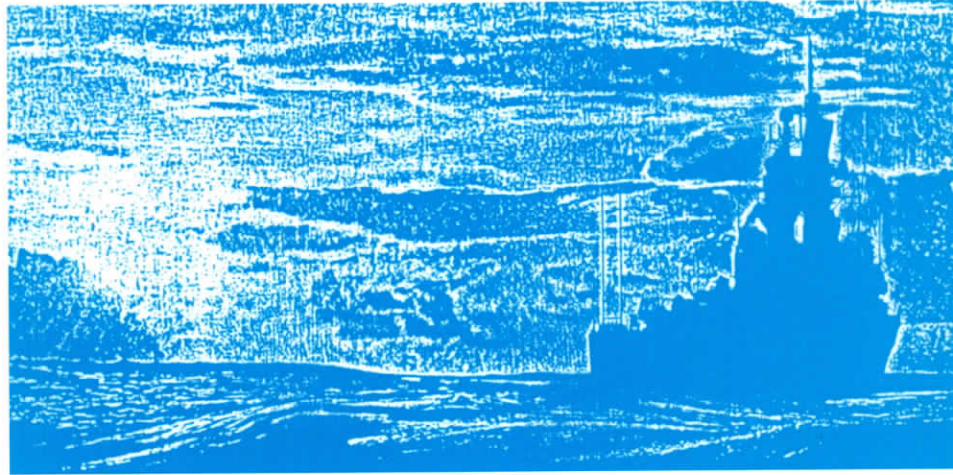## MEDIUM FREQUENCY SONAR

ASW ON A SOUND BASIS

The AN/SQS-510(V) sonar is designed for navies that are serious about detecting, localizing, tracking and attacking submarines.

Now in production for the Canadian Navy.

KEY FEATURES

☑ **Performance**
consistently outperformed all other Canadian active sonars during 3 years of trials

☑ **Operator**
use of digital colour display technology combined with sophisticated computer-aided detection and tracking algorithms substantially increase operator performance

☑ **Torpedo Detection**
automatic torpedo detection in active and passive modes

☑ **Adaptability**
pulse and transmission parameters can be adapted to allow the AN/SQS-510(V) to achieve optimum performance under a wide variety of environmental and operational conditions

☑ **Maintenance**
on-line and off-line diagnostics can identify at least 95% of hardware faults to line replaceable units (LRU)

☑ **Logistics**
common LRU used throughout the system minimize support infrastructure requirements

☑ **Future**
designed with reserve capacity to allow additional processors for future growth
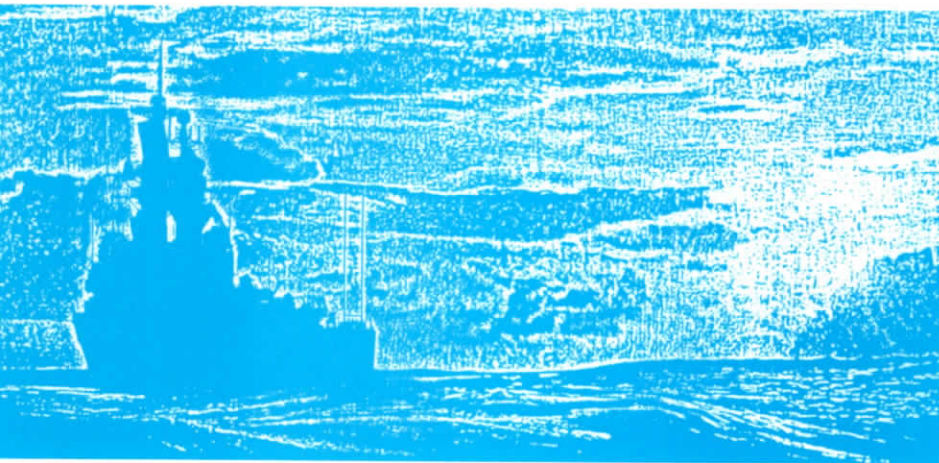
AN/SQS-510(V)
MEDIUM FREQUENCY SONAR

Computing Devices' AN/SQS-510(V) is a medium frequency active sonar designed for use in either a hull-mounted or a variable-depth configuration. The sonar uses the proven solid-state transmission components of the AN/SQS-505 sonar coupled to a new digital receiver and display group. A major component of the receiver is the AN/UYS-501, a programmable, 64-bit complex floating point digital signal processor capable of a sustained throughput of 320 MFLOPS per second.

The AN/SQS-510(V) sonar design emphasizes the maintenance of reserve capacity in all processors and program and data stores for maximum growth potential. If future threat processing requirements exceed reserve capacity, optional processors can be added.

The AN/SQS-510(V) can easily interface to virtually any Command and Control System; processing parameters can be changed to accommodate various transmitter and transducer configurations.

ACTIVE PROCESSING

Pulse Types
CW and LPM (Linear Period Modulation)

Pulse Duration
10 - 500 ms, CW defaults to 400 ms and LPM defaults to 320 ms

LPM Sweep AN/SQS-510(V)
100 - 750 Hz, defaults to 300 Hz at 320 ms

Frequencies
3 selectable frequencies can be preset to any frequency in 2 - 8 kHz range (5 - 8 kHz with present transmitter/transducer)

TX Modes
OMNI, DT-NARROW (10°) and DT-WIDE (30°)

Range Scales
2,000 to 60,000 yards in 6 selectable bands, plus and operator-selected range

Target Doppler
±50 knots

Bearing Resolution
<1°

Range Resolution
160 yards CW; 12.5 yards LPM

Doppler Resolution
<1 knot

Source Level

OMNI	226 dB re 1µPa @ 1m
DT-NARROW	235 dB re 1µPa @ 1m
DT-WIDE	230 dB re 1µPa @ 1m

Tracking
Automatic with optional manual update. Will track at least 100 active contacts in the Computer-Aided Detection and Tracking function.

Dynamic Range
138 dB

Beams
72 nominally 10°

PASSIVE PROCESSING

Passive Broadband
generated from 7 seconds of integration

Passive Bands
2.2 to 8.6 kHz (Listen)
2.2 to (min Tx freq - guard band)

Beams
36 nominally 10°

Bearing Resolution
<10°

DISPLAY FORMATS

These formats can be displayed in full or split screen format on either of the two monitors.

ASCAN
amplitude of OR'd beams versus range

BSCAN
range versus bearing

TSCAN
expanded BSCAN for tracking

DSCAN
range versus doppler

CSCAN
expanded high resolution ASCAN (per beam) as a classification aid

PSCAN
passive scan, Bearing Time Intensity type display

NFM
noise field monitor

ARPS
provides rayplot and velocity of sound profiles

MISCELLANEOUS

System Parameters (Adaptable)

- TX pulse width, duration, and centre frequency
- Doppler tolerance of LPM processing
- Thresholds and window constants for detection and tracking
- Passive filter bandwidth
- Video display mapping parameters for each display
- Audio presentation
- Colour table for graphic displays
- Hardware configuration

Training Mode

- Embedded training simulator can simulate a maximum of 4 targets with ambient noise

System Software

- Downloaded from PROM for fast startup
- Modular design, predominantly Ada

Interfaces

- Command and Control
- Ship's environmental sensors
- Sippican Mk 8/8A Bathy
- Underwater telephone blanking signals
- Maintenance Console (IBM PC type computer)
- Instructor's Console (same as maintenance console)
- Recorder/Reproducer of raw acoustic data
- Recorder for data capture during trials

Signal Processor

- AN/UYS-501 high speed digital signal processor. Computer word is complex floating point consisting of 32 bits real and 32 bits imaginary. This 320 MFLOP (sustained rate) processor can perform a 1024 complex FFT in 160 μs. Its 4M of 64-bit memory is expandable to 16M.

Display

- Dual colour screens mounted vertically. Each screen displays 1152 by 1536 pixels.

POWER REQUIREMENTS

440 V, 3 phase, 60 Hz, 7.2 kVA (90 kVA max)
115 V, 3 phase, 400 Hz, 1.3 kVA
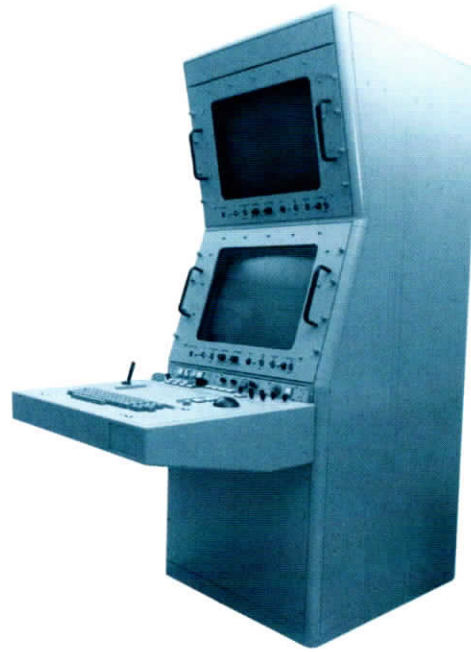115 V, 1 phase, 60 Hz, 7.1 kVA
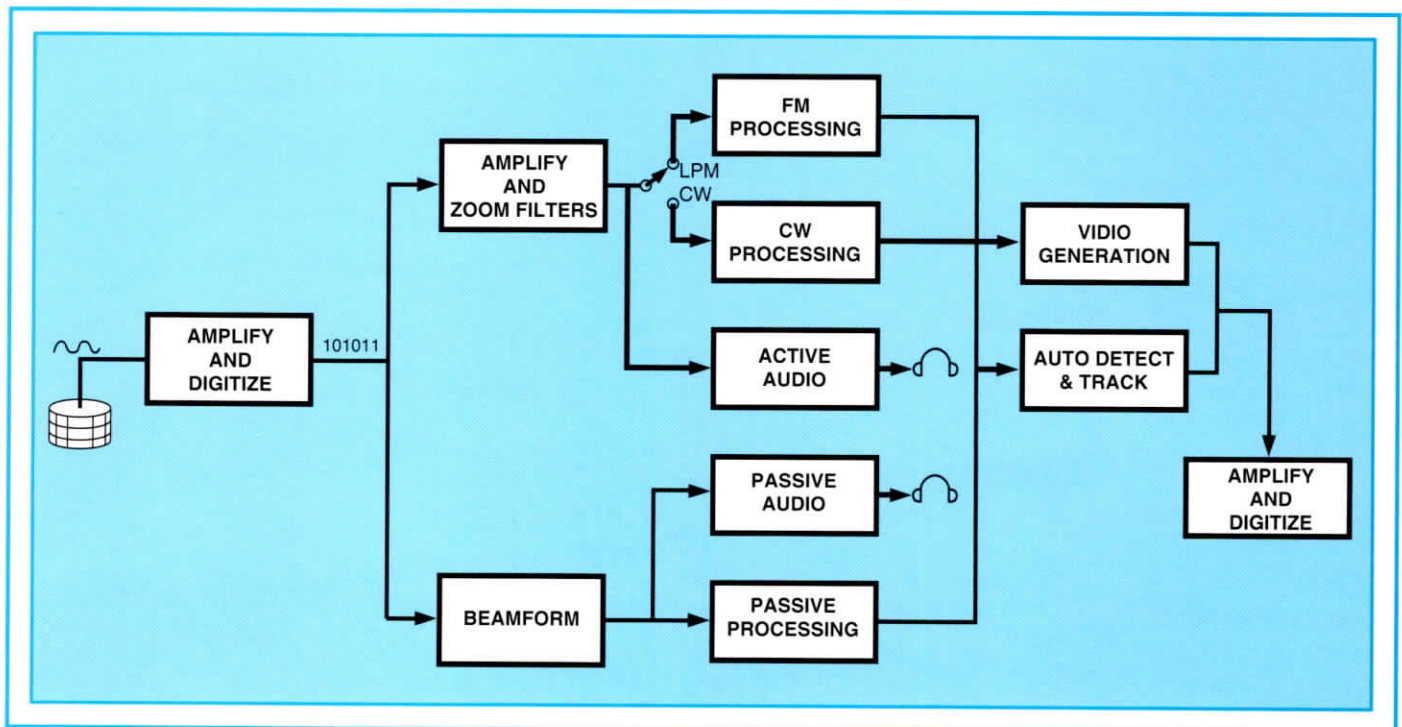
AN/SQS-510 SIGNAL FLOW

AN/SQS-510(V) SONAR

SONAR
CONTROL
CABINET

SIGNAL
PROCESSOR
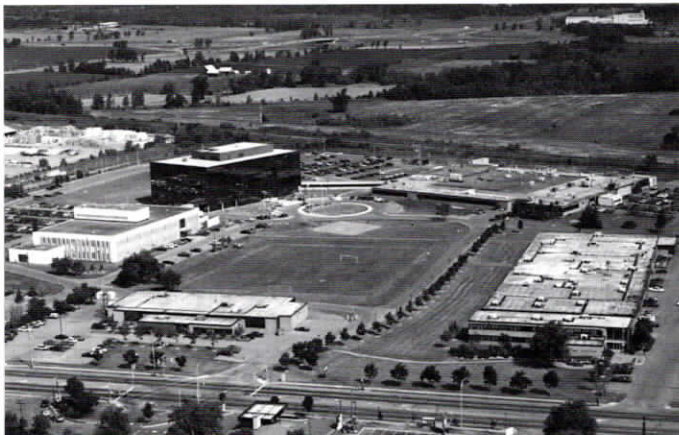(AN/UYS-501)

SONAR
OPERATOR'S
CONSOLE

WEIGHTS AND DIMENSIONS

Component	Weight (kg)	Width (cm)	Height (cm)	Depth (cm)
C5 Alternate Control Panel	9	25.4	33	12.9
C5 Hoist	2 350			
C5 Main Control Panel	25	50.8	61	23.5
Sonar Operator's Console	332	67.3	169.5	125.7
Dome Assembly	1 850			
Instructor's Console	3	29.9	25	22.0
Maintenance Console	3	29.9	25	22.0
Power Supply	595	63.5	173	63.5
Sonar Control Cabinet	240	67.3	165.1	68.8
Signal Processor (AN/UYS-501)	240	67.3	165.1	68.8
Switch	61	61	83.8	18.7
Transducer Assembly (cyl.)	2 700	120	120	120
Transmitter	500	63.5	173	63.5

Computing Devices' ASW division specializes in supplying anti-submarine warfare acoustic signal processing systems for fixed and rotary wing aircraft, shipborne and shore-based systems.

Occupying a site of 425,000 square feet, located on the outskirts of Ottawa, the Company's operations include dedicated research and development laboratories and comprehensive manufacturing facilities.

Founded in 1948 and employing some 1200 people, Computing Devices' other divisions include Ground Systems, Display, Communications and Contract Manufacturing.

Computing Devices Canada