

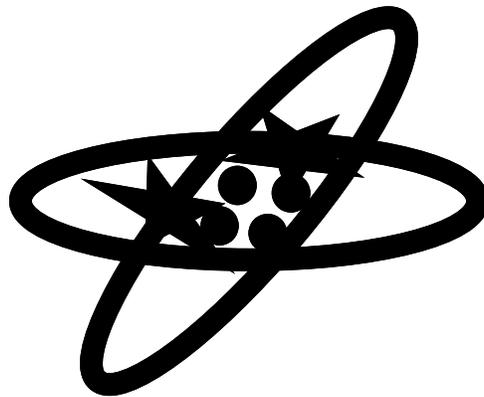
U.S. Department of  
Homeland Security

United States  
Coast Guard



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# ET2 UNIT 5: ELECTRONIC SYSTEMS PLANNED MAINTENANCE



U. S. Coast Guard  
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# ET2 UNIT 5: ELECTRONIC SYSTEMS PLANNED MAINTENANCE

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U. S. Coast Guard  
Training Center  
Petaluma, CA. 94952  
(707) 765-7129

QUESTIONS ABOUT THIS TEXT SHOULD BE  
ADDRESSED TO THE SUBJECT MATTER SPECIALIST  
FOR THE ET RATING



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## **Acknowledgments and References**

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### **Acknowledgments**

Material is included in this pamphlet through courtesy of the designated source. The Coast Guard appreciates permission of the source to use this material, which contributes greatly to the effectiveness of this course. No copies or reproductions of the material are authorized without permission of the appropriate source.

The Coast Guard wishes to thank the following individuals for their expertise and support in the development of this document

ETC Chris Meyer

ETCS Aaron Cordell

ETC Kevin Odom

ETC Dave Baker

ETC Joseph Balduenza

ETC Joshua Brown

ET1 Brandon Richey

ET1 James Galbraith

ET1 Erik Sears

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### **List of References**

This pamphlet contains original material developed at the U. S. Coast Guard Training Center, Petaluma, California, and excerpts from the following technical publications:

- Electronics Manual, COMDTINST M10550.25 (series)
  - Equipment Tag-Out Procedures, COMDTINST 9077.1 (series)
  - Navy Install and Maintenance Book, Test Methods and Practices, SE000-00-EIM-130
  - Manufacturer's Technical Manuals
-

## Notice to Students

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<b>Purpose</b>	This pamphlet serves as a training aid to provide you with a general knowledge of Electronic Systems Planned Maintenance tasks required of an ET2.
<b>Important Note</b>	This text has been compiled for TRAINING ONLY. It should NOT be used in place of official directives or publications. The test information is current according to the references listed. You should, however, remember that it is YOUR responsibility to keep up with the latest professional information available for your rating. Current information is available from the Enlisted Performance Qualifications version (03-2009).
<b>Course Content</b>	This course content is based on the requirements stated in the Enlisted Performance Qualifications version (03-2009).
<b>Record of Changes</b>	From time to time courses, after they are printed, have minor editorial changes made to them by the Subject Matter Specialist that do not require a new course. The student is responsible for any changes made to the course after printing and receipt from the Coast Guard Institute. The Coast Guard Institute will post on their web site a listing of current changes based on the course code and edition that should be downloaded in a <b>.pdf</b> format and entered in the current course material. The Coast Guard Institute will send an errata sheet out with each ordered course that list the required changes.
<b>Pamphlet Content</b>	This pamphlet contains three lessons: Lesson 1: How to Perform planned maintenance on a UHF transceiver Lesson 2: How to Perform planned maintenance on an Electronic Charting System Lesson 3: How to Perform planned maintenance on a Ships Surface Radar

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## Notice to Students

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### Learning Objectives

Read the learning objectives before you begin reading the text. The objectives will guide you through the text and help you answer the questions in the self-quiz at the end of each lesson.

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### Quizzes

Each lesson has a self-quiz and each pamphlet has a pamphlet review quiz. You will find the answers to each quiz on the pages following the quiz. Included are the reference pages for the answers.

These self-quizzes are meant to check your comprehension of the material you covered. If you are having problems understanding a section, go through it again or ask someone for help. The pamphlet review quiz questions are samples of the type of questions you will find on the end-of-course-test (EOCT).

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### SWE Study Suggestion

Servicewide exam questions for your rate and pay grade are based on the Professional and Military Requirements sections of the Enlisted Performance Qualifications version (03-2009).

If you use the references from this text and consult the Enlisted Performance Qualifications, you should have good information for review when you prepare for your Servicewide exam (SWE).

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## Lesson 1

# HOW TO PERFORM PLANNED MAINTENANCE ON A UHF TRANSCIEVER

### Overview

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#### Introduction

The AN/WSC-3 is a rugged, compact, versatile radio able to transmit and receive AM/FM signals in plain or secure voice. In this lesson you will learn how to maintain this piece of equipment.

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#### Objectives

Given a job aid, and technical manuals **PERFORM** planned maintenance on the AN/WSC-3 UHF transceiver IAW local unit PMS procedures.

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#### References

The following references were used for this lesson:

- Electronics Manual, COMDTINST M10550.25 (series)
  - Equipment Tag-out Procedures, COMDTINST 9077.1 (series)
  - Navy Electronics Installation and Maintenance Book, Test Methods and Practices SE000-00-EIM-130
  - Manufacturer's Technical Manual
-

## AN/WSC- 3 (V)

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### Introduction

The primary function of the transceiver is to take the plain or secure voice intelligence from the terminal equipment and transform it into electrical RF energy, which is then routed to the antenna.

### Technical Information

The following table contains the characteristics and specifications of the AN/WSC-3 UHF Radio Set:

Characteristic	Specification
Frequency Range	225.000 MHz to 399.975 MHz
Number of possible channels	7000
Channel Spacing	25 KHz
Preset Channels	20
Transmitter Output Power	FM - 1 to 100 Watts adjustable AM – 30 Watts
Types of emissions	AM plain and secure voice FM plain and secure voice
Sensitivity	AM – 3.5 microvolts FM – 3.0 microvolts

### Transceiver

Of the four AN/WSC-3 versions available for the Coast Guard to choose from, only versions six and seven are used for Line-of Sight (LOS) voice communications.

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Continued on next page

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**AN/WSC- 3 (V) (Continued)**

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**A25  
Interface  
Module**

There are three types of 1A1A25 Interface Modules. This module is the interface between the radio and terminal equipment for voice/audio signals going in, and out, of the transceiver:

- **Standard Interface** – this module provides an interface between incoming and outgoing AM/FM signals by using switching, amplification, and mode selection methods. The module is used in both transmit and receive. Standard Interface provides unbalanced inputs/outputs in the AM and FM secure voice modes, and 600ohm balanced inputs/outputs in the AM and FM plain voice modes. This module requires internal level adjustments to balance the output
- **SAS Interface:** The SAS interface functions the same as the standard interface module, with the exception that separate input lines are not used for secure and plain audio signals
- **Switchable Audio Interface:** The switchable audio interface is functionally identical to either Standard Interface or the SAS Interface. This module contains a ten-position dual in-line package (DIP) switch. Proper positioning of this switch at the time of installation, provides a SAS Interface or a Standard Interface configuration

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**System  
Functions**

There are five major functions performed by the Radio set. These functions are:

- Transmit
- Built-In-Test Equipment (BITE)
- Control
- Receive
- Power Distribution.

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**Transmit**

The transmit function converts plain voice and secure voice signals into modulated radio frequencies (RF) and applies them to the antenna for transmission. This function also provides a side-tone signal which allows the audio information to be monitored through the receive function. You can hear yourself talk in the headset.

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Continued on next page

**AN/WSC- 3 (V) (Continued)**

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**BITE**

The BITE function enables selected signals, which turn on various components of the other modules. The results of each BITE select signal appear on the BITE meter as a visual means of determining proper operation. The BITE function also provides a malfunction lamp indicator and external alarm signal outputs.

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**Control**

The control function contains all the front panel switches for operating the radio set locally, and the circuits for providing remote operation. The control function provides the output signals to determine which frequency is selected for transmit and receive operation, and which mode of modulation is selected. When the radio set is appropriately configured, the control function can select remote or local control.

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**Receive**

The receive function selects for reception of RF signals in the radio frequency range, and converts them for detection of plain and secure voice. Audio is provided for local or remote use. The receive function also provides blanking indication and signal present values.

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## Planned Maintenance

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### PMS Schedule

Planned maintenance for the WSC-3 has four time intervals associated with it. They are:

- Weekly (W)
- Monthly (M)
- Semiannually (S)
- As specified (R)

**Note:** Due to the overwhelming size of the PMS procedures, a link to the manual at ELC's website has been provided below. Use this manual in conjunction with the following table to perform the procedures.

[http://10.38.68.50/xData/projects/CombatSys/Elex/spawar/wsc3/an-wsc-3\\_technical\\_manual.pdf](http://10.38.68.50/xData/projects/CombatSys/Elex/spawar/wsc3/an-wsc-3_technical_manual.pdf)

Periodicity	Maintenance Action	Reference
WR1	Check overall operation of Radio set	Table 4-3
M1	Exterior cleaning	Table 4-2
M2	Air Filter cleaning	Table 4-2
M3	Check internal frequency standard of RT unit	Table 4-4
M4	Check VCXO A1A22 (SATCOM only)	Table 4-4
M5	Check VCXO A1A22 or TCXO A1A22 (LOS only)	Table 4-4
M6	Check RT unit main IF level	Table 4-4
M7	Check data IF level (SATCOM only)	Table 4-4
M8	Check detected PSK data level (SATCOM only)	Table 4-4
M9	Check detected FSK data level (SATCOM only)	Table 4-4
M10	Check VSWR level	Table 4-4
M11	Check RT Unit power supply level	Table 4-4
S1	Inspection	Table 4-2
S2	Check receiver AM sensitivity	Table 4-5
S3	Check receiver FM sensitivity	Table 4-5
S4	Check transmitter AM output	Table 4-5
S5	Check transmitter FM output	Table 4-5
S6	Check BITE meter test voltage	Table 4-5

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## Review Quiz

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**Questions**

1. What is the main function of the WSC-3 transceiver?

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2. Which of the following versions of the WSC-3 are used for LOS communications?

- A. Version 2
- B. Version 4
- C. Version 6
- D. Version 8

3. Name the five system functions performed by the WSC-3?

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## Review Quiz Answers

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**Answers**

<b>Question</b>	<b>Answer</b>	<b>Reference</b>
1.	The primary function of the transceiver is to take the plain or secure voice intelligence from the terminal equipment and transform it into electrical RF energy, which is then routed to the antenna.	1-2
2.	C	1-2
3.	Transmit, Receive, Built-In-Test Equipment (BITE), Control, and Power Distribution	1-3

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## Lesson 2

# HOW TO PERFORM PLANNED MAINTENANCE ON ELECTRONIC CHARTING SYSTEMS

### Overview

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#### Introduction

In this lesson you will learn about Electronic Charting Systems (ECS) and how to maintain them. The ECS was developed to provide tools for safe navigation and execution of CG missions

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#### Objectives

Given the authority and using a job aid, **PERFORM** planned maintenance on one of the following Electronic Charting Systems:

- SCCS
  - COMDAC
  - ECPINS
  - Transas
- 

#### References

The following references were used for this lesson:

- Electronics Manual, COMDTINST M10550.25 (series)
  - Equipment Tag-Out Procedures, COMDTINST 9077.1 (series)
  - Manufacturer's Technical Manuals
-

## SCCS System Overview

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### Introduction

SCCS is designed to automate tactical information management and enhance tactical decision making. It integrates sensors, displays, communications, and advanced computing technology into a contemporary Combat Systems Center architecture. SCCS provides for the rapid processing, fusion, and information dissemination of tactical data obtained from organic sensors and over the horizon data links.

SCCS operates on Sun Microsystems computers, running the Common Operating Environment (COE) and the Solaris operating system and incorporates Coast Guard specific sensor interfaces. These interfaces include LOnG RAnge Navigation (LORAN), Gyro compasses, speed log, Officer in Tactical Command Information eXchange System (OTCIXS), Secure Internet Protocol Routing NETwork (SIPRNET), AN/SPS-73 radar, and Link 11.

The Coast Guard's requirements for an integrated navigation system resulted in the development of the COMmand Display And Control Integrated Navigation System (COMDAC). COMDAC INS is a fully integrated C2 navigation system, and is included as part of SCCS Version 2.

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### Associated Equipment

SCCS as a whole incorporates numerous multiple systems to perform its missions. These systems include:

- Server and Workstation Computers
  - Network Attached Storage (NAS)
  - Video
  - Input/Output devices
  - Tactical Equipment
  - Sensor Equipment
-

## System Equipment

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### Server and Workstation Equipment

There is one Concorde Server located in Combat Information Center (CIC) on the SCCS-270' and 378' cutters. It is connected to the LANs and is accessed from the maintenance position console. It provides password management and administrative system control. It is also the Redundant Array of Inexpensive Disk (RAID) failover host.

On 210' and 110' cutters the computer is a Gulfcoast Sparcstar/Sunfire V210 Workstation. This computer will act as the server in place of the Concorde on bigger cutters. It provides password management and administrative system control. It is also the RAID failover host.

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### Networked Attached Storage (NAS)

Every SCCS configuration uses one RAIDTEC SNAZ E6 Networked Attached Storage (NAS) device. The NAS uses three active hard drives and one hot spare. It contains data, such as chart and image information required by all workstations.

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### Video

SCCS video sources include:

- Workstations and Server
  - SPA-25G Radar Indicator
  - CAP'N program
  - Maritime Forward Looking Infrared (MARFLIR)
  - Flight Deck Video System (FDVS)
  - Optical Surveillance System (OSS)
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Continued on next page

## System Equipment (Continued)

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### Input/Output Devices

Each SCCS platform requires at least one 16 - port Terminal Server and Panel Interface. The Terminal Server receives inputs, via the Interface Panel, from the system's sensors and transmits the data to the LANs. It has 16 ports, each connected to a port on the Interface Panel via individual DB25 to RJ45 adapter cables. Serial Data passes through the TS-16 and is distributed to the LAN by way of an Ethernet connection to the LAN switch. The equipment that uses the Terminal Server are listed below:

- NDIU
- DCU
- NMEA Expander
- Cisco Network Switches
- KVM Switches
- USB Peripheral Devices
- Printers
- Uninterruptible Power Supplies (UPS)

---

### Tactical Equipment

LINK-11 is a subsystem that provides tactical data to the SCCS-378 configuration via a serial communication channel. The LINK-11 software resides on a standalone Tactical Advance Computer (TAC-3). The TAC-3 provides data processing and display functions necessary to view and manipulate track information. Track data can then be broadcast to the main SCCS system via the established communication channel.

---

### Sensory Equipment

SCCS incorporates a number of different sensory equipment to perform its missions. These systems are listed below:

- GPS/DGPS receivers
  - LORAN (RAYNAV-750) receiver
  - Radar (AN/SPS-73 and MK-92))
  - Depth sounder (EchoTrac or V850)
  - Speed logs/Doppler (SRD 500, SRD-331, or DSN-450) platform dependent
  - Analog Navigation Sensor Inputs (NDIU or DCU) platform dependent
  - AIS
-

## Planned Maintenance

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### Planned Maintenance

As of this writing no CGPMS procedures have been developed for SCCS. Units are encouraged to develop local PMS until CGPMS has been updated. Local PMS should revolve around the following procedures:

- Weekly full functional tests on all software and peripherals
- Weekly cleaning of all external devices (this includes **CAREFULLY** pulling equipment out of racks to clean)
- Monthly cleaning of all air filters

For more information visit the following link:

[http://cgweb.lant.uscg.mil/c2cen/Files/SystemManual\(SM\)v2.3.3Rev02July08.pdf](http://cgweb.lant.uscg.mil/c2cen/Files/SystemManual(SM)v2.3.3Rev02July08.pdf)

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## COMDAC

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### Introduction

The Command Display And Control Integrated Navigation Segment, or COMDAC INS, is the Coast Guard's Electronic Charting and Integrated Navigation System (ECINS) software of choice. In short, it is a software application used for shipboard navigation and collision avoidance. It is designed to run on the Common Operating Environment (COE) developed by DISA.

COMDAC INS is built to meet Coast Guard requirements and International, NATO and U.S. Navy Standards. It can perform any function that can be done on a paper chart. However, COMDAC INS is not just a one-for-one substitute for conventional paper navigation. COMDAC INS uses a variety of sensor inputs to aid in safe navigation. Some of these sensors include Differential Global Positioning System (DGPS) receivers, LORAN receivers, radar lines of positioning (LOPs), visual LOPs, speed logs, depth sounders and wind sensors. It also includes dynamic tide and current vectors, continuously updated turn points, radar overlay for both navigation and collision avoidance, and the fusion of Command and Control and Navigation information. Large amounts of information are integrated into one real-time picture. Using this system, ship drivers know where they are right now, as opposed to where they were several minutes ago.

### COMDAC Chart Formats

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COMDAC INS uses a variety of different electronic chart formats, including the National Oceanographic and Atmospheric Agency's (NOAA) Electronic Navigational Charts (ENC), Raster Nautical Charts (RNC), and the National Geospatial-Intelligence Agency's (NGA) Digital Nautical Charts (DNC®). While available as a standalone system, ship's capabilities are enhanced when COMDAC INS is integrated with a Command and Control system such as the Coast Guard's SCCS and the U.S. Navy's NAVSS. This fusion allows bridge and Command Information Center (CIC) members to see and work from the same picture.

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## COMDAC (Continued)

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### Availability

COMDAC INS is currently fielded on more than 50 USCG cutters, including WHECs, WMECs, and WPBs. COMDAC INS is also fielded on 117 USN vessels including Guided Missile Cruisers, Anti-Submarine/Surface Warfare Destroyers, Amphibious Assault Landing Ships, Dock Landing Ships, Aircraft Carriers, Nuclear Powered Aircraft Carriers, Guided Missile Destroyers, Amphibious Assault Command & Control Landing Ships, Amphibious Transport Docks, Fast Combat Support Ships, Guided Missile Frigates, and Fast-Attack Submarines (nuclear propulsion).

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### Planned Maintenance

As of this writing no CGPMS procedures have been developed for COMDAC. Units are encouraged to develop local PMS until CGPMS has been updated. Local PMS should revolve around the following procedures:

- Weekly full functional tests on all software and peripherals
  - Weekly cleaning of all external devices (this includes **CAREFULLY** pulling equipment out of racks to clean)
  - Monthly cleaning of all air filters
-

## ECPINS System Overview

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### Introduction

The Electronic Chart Precise Integrated Navigation System (ECPINS) is the Electronic Charting System used on WLB and WLM buoy tenders. It is also the preferred system on 399' WAGB Polar Ice Breakers.

---

### System Equipment

ECPINS incorporates the following systems in order to perform all of its missions:

- Operator Control Panel (OCP)
  - 5200 NG Computer
  - Keyboard, Video and Trackball Switch
  - Video Interface
  - Flat Panel Display Monitor
- 

### Operator Control Panel (OCP)

The OCP allows interaction between the operator and the ECPINS software. Each OCP has a flush mounted, backlit, membrane keyboard and a flush mounted rectangular trackball assembly, but is considered a desktop model. One OCP is installed as part of each ECPINS configuration.

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### 5200 Personal Computer

The 5200 personal computer (PC) is the navigational computer for ECPINS. A single 5200 PC is located in a 19 inch rack mountable chassis. On the WLB, the 5200 PC is located in the rack with a LAN Interface Unit (LIU) #6. On the WLM, the 5200 PC is located in the radio rack in the chart room.

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Continued on next page

## ECPINS System Overview (Continued)

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### KVT Switch

The Keyboard, Video, and Trackball switch replaced the Video Trackball switch in the first upgrade. Two KVTs are installed on each WLB and WLM to provide functionality to the keyboard and trackballs at the Port Ship's Control System (SCS), Starboard SCS, and Main Ship's Control Control (MSCC). The KVT routes keyboard, video and trackball information to the different conning station displays, OCPs, and Remote Control Units (RCUs). The primary KVT routes the Route Monitoring information and video to all conning stations and the ECPINS station. If the primary route monitoring computer fails, a manual toggle switch on the primary KVT panel can be activated to enable the ECPINS back up computer. The secondary KVT routes the Route Planning information to all conning stations. The secondary KVT is not connected to the ECPINS. On the WLB, the KVTs are located within the Navigator Console. On the WLM the KVTs are located in the radio rack in the chart room.

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### Video Interface

The video interface routes the video of the ECPINS to the KVT switch. One video interface is installed as part of each ECPINS configuration. The video interface is a universal, analog computer-video interface.

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### Display Monitor

The monitor displays the information of the ECS and the interaction between the operator and the ECPINS software. One monitor is installed as part of each ECPINS configuration. The monitor is a desktop flat panel with a viewable 18.1" display.

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### Planned Maintenance

At the time of this writing no CGPMS has been developed for ECPINS. Units are encouraged to develop local PMS until CGPMS has been updated. Local PMS should revolve around the following procedures:

- Weekly full functional tests on all software and peripherals
  - Weekly cleaning of all external devices (this includes **CAREFULLY** pulling equipment out of racks to clean)
  - Monthly cleaning of all air filters
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Continued on next page

## Transas System Overview

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### Introduction

Transas is the preferred Electronic Charting and Integrated Navigation Systems (ECINS) used on 87' and 110' WPBs. The systems operate using commercial software produced by Transas called NaviSailor 3000 ECDIS-I (NS3000).

As installed on the 87' patrol boat fleet, Transas NS3000 is a combination of hardware and software used for shipboard navigation and collision avoidance that meets international and Coast Guard standards to navigate without paper charts. The system interfaces with a variety of sensors to give the operator a real time understanding of the ship's situational picture. These sensors include:

- Differential Global Positioning System (DGPS) receivers,
- Radar
- VHF radio
- Speed log
- Wind monitor
- Depth sounder
- Gyrocompass
- Automated Identification System (AIS)

PATFORSWA 110' WPBs utilize Transas NS3000, in combination with GPS and AIS sensors, as a situational awareness and command and control tool.

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### System Information

The Transas NS3000-I-CG System consists of the RS4 navigational computer, the JH19T01 19" flat panel display, the ES4 flush-mount keyboard and trackball assembly, the X1000 portable computer and an ethernet switch. Navigational sensors and external devices connect directly to the primary navigational computer, the RS4.

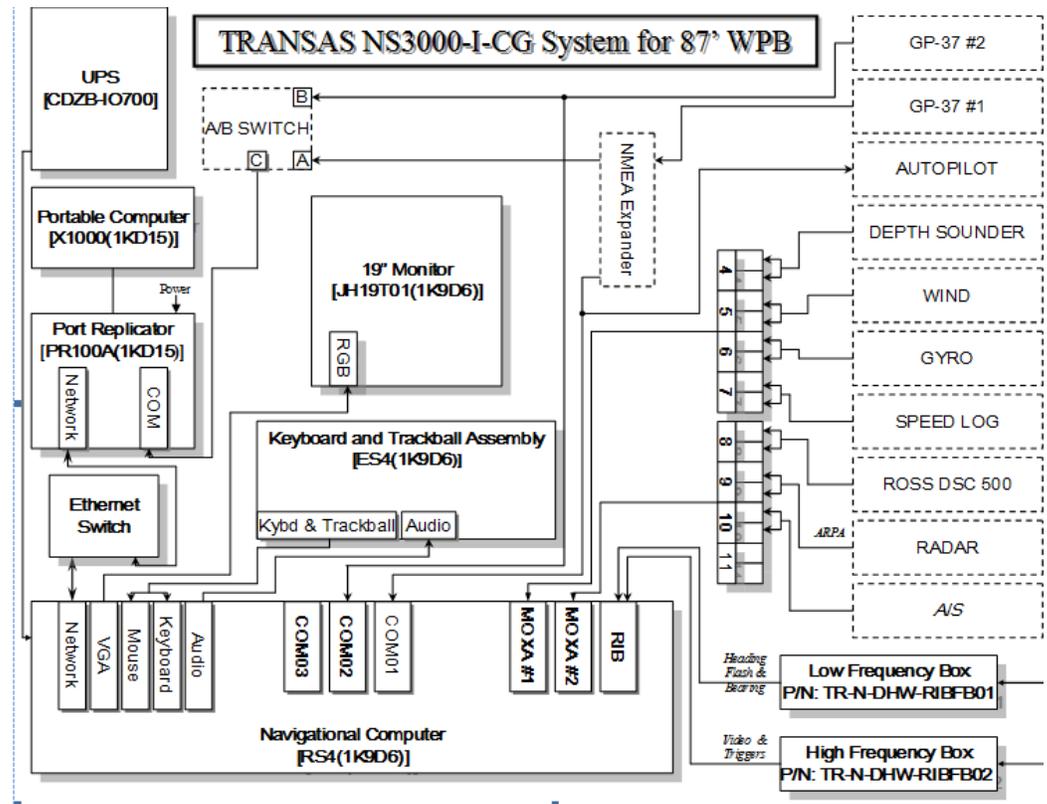
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## Transas System Overview

### Block Diagram

Below is a block diagram of the Transas system on an 87' WPB:



### Planned Maintenance

At the time of this writing no CGPMS has been developed for ECPINS. Units are encouraged to develop local PMS until CGPMS has been updated. Local PMS should revolve around the following procedures:

- Weekly full functional tests on all software and peripherals
- Weekly cleaning of all external devices (this includes **CAREFULLY** pulling equipment out of racks to clean)
- Monthly cleaning of all air filters

## Review Quiz

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### Questions

1. Which radar does SCCS integrate into its functionality?
  - A. AN/SPS-73
  - B. AN/SPS-78
  - C. AN/SPS-69
  - D. AN/SPS-64
  
2. Which of the following platforms is the Concorde server used on?
  - A. WLB 225'
  - B. WHEC 378'
  - C. WMEC 210'
  - D. WPB 110'
  
3. Which of the following platforms uses a 16 - point terminal server?  
Circle all that apply.
  - A. WHEC 378'
  - B. WMEC 210'
  - C. WMEC 270'
  - D. WLB 225'
  
4. In regards to ECPINS, what does KVT stand for?  

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## Review Quiz Answers

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<b>Answers</b>	<b>Question</b>	<b>Answer</b>	<b>Reference</b>
	1.	A	2-2
	2.	B	2-3
	3.	A, B, and C. Not D, WLBs do not use SCCS	2-4
	4.	Keyboard, Video and Trackball	2-9

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## Lesson 3

# HOW TO PERFORM PLANNED MAINTENANCE ON SHIPS SURFACE RADAR

### Overview

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#### Introduction

The AN/SPS-73 radar replaces the AN/SPS-64 across the fleet and is the most widely used radar on major cutters. The SINS (which replaces the AN/SPS-69 radar) is the most common radar set to be used on most small boat applications. In this lesson you will learn about these system configurations and how to perform planned maintenance on them.

---

#### Objectives

Upon completion of this lesson you will be able to:

- Identify an AN/SPS-73 SSR
  - Identify a Scaleable Integrated Navigation System (SINS) SSR
  - Identify a Bridgemaster E Series SSR
  - Perform planned maintenance on an AN/SPS-73 SSR set
  - Perform planned maintenance on an SINS SSR set
  - Perform planned maintenance on a Bridgemaster E Series SSR
- 

#### References

The following references were used in the creation of this lesson:

- CGPMS
  - Electronics Manual, COMDTINST 10550.25 (series)
  - Equipment Tag-out procedures, COMDTINST 9077.1 (series)
  - Manufacturer's Tech manuals
-

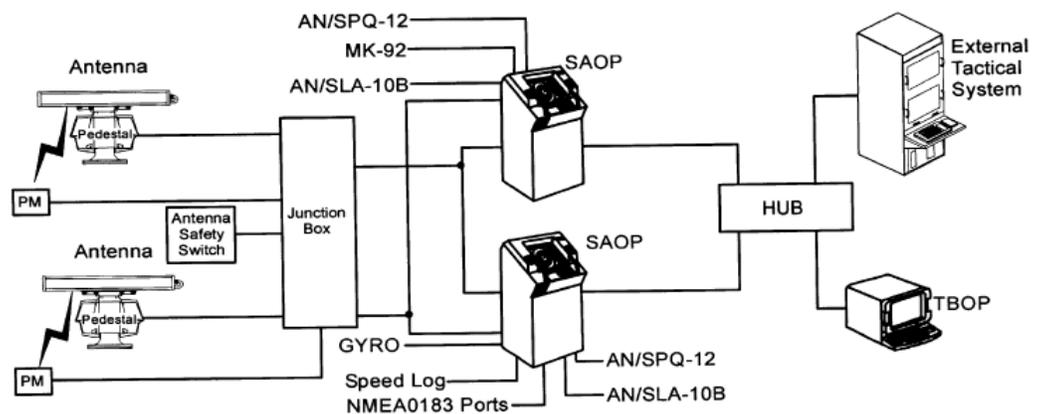
## AN/SPS-73 SSR Set

### Introduction

The AN/SPS-73(V) Surface Search Radar (SSR) is designed for both large and small cutter applications and has been at sea since April 1997. The SSR provides operators with an advanced navigational and surveillance system that enhances situational awareness of the maritime environment. The AN/SPS-73(V) system is comprised of a Furuno radar and a Raytheon designed Stand-Alone Operator Position (SAOP). The radar portion of the SSR includes the antenna, pedestal, receiver/transmitter, and performance monitor and is available in 25kw X-Band and 30kw S-Band. The SAOP combines the use of processor cards, video monitor, trackball, and keyboard to provide complete control of the radar system. All WAGB, WHEC, WMEC and WIX cutters are configured for dual radars and SAOPS. All other SSR equipped cutters are configured for a single X-band radar and SAOP.

### Configurations

In its simplest configuration, the AN/SPS-73 radar set would contain a radar set and a single display communicating over a 100Base-T LAN. A more typical configuration is depicted below:



Continued on next page

## AN/SPS-73 SSR Set (Continued)

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### System Components

A typical AN/SPS-73 Radar set consists of a combination of the following basic components:

- Radar
  - Operator Position (OP)
  - Interconnect Equipment
- 

### Radar Portion

The radar portion of the SSR includes the following items:

- Antenna
  - Pedestal
  - Receiver/Transmitter
  - Performance Monitor
  - Antenna Safety Switch
- 

### Antenna

The antenna element is a Commercial Off-The-Shelf (COTS) unit manufactured by Furuno Electric Co. Ltd. The antenna unit consists of a horizontal polarized antenna mounted on top of a pedestal.

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### Pedestal

The pedestal contains a motor and bearing signal generator. Both X-band and S-band antenna pedestals are used in the SSR system.

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### Antenna Safety Switch

The antenna safety switch is manufactured by Raytheon and is used to keep the radar transmitter from being activated when personnel are working on or near the antenna. It disables the antenna rotation as well as the transmit trigger by keeping the R/T in a stand-by mode.

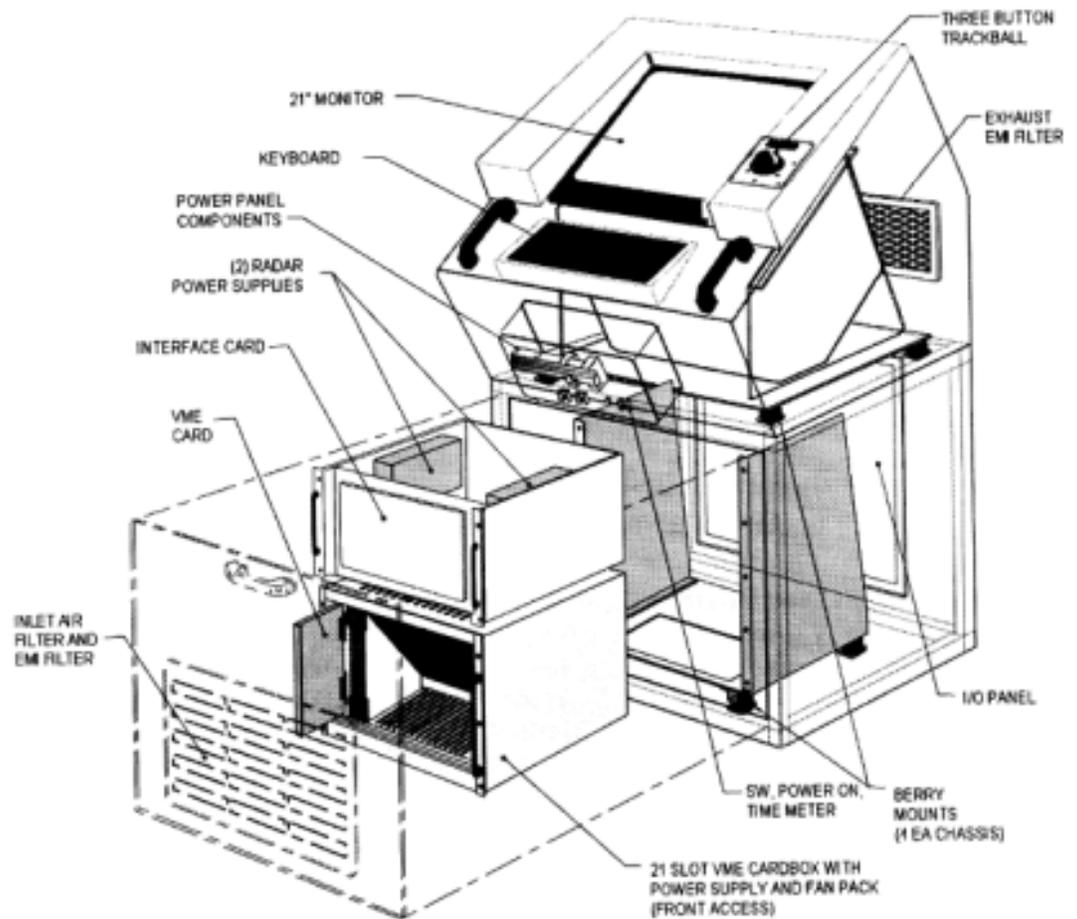
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## AN/SPS-73 SSR Set (Continued)

### Stand-Alone Operator Position (SAOP)

The SAOP is a Raytheon designed unit consisting of COTS assemblies. The SAOP combined the Radar Processor (RP) and OP functions to provide complete control of the radar. The RP and OP Circuit Card Assemblies (CCA) are housed in a 21-slot Versabus Module Eurocard (VME) chassis. The SAOP also includes a 21-inch color Cathode Ray Tube (CRT) monitor, keyboard, and trackball. The display window on the monitor is divided into a control panel and radar image area for improved system-user interface. Power supplies and power distribution panels supply the correct voltage and current levels required by the SAOP. The SAOP is connected to an R/T and may also support multiple TBOPs, additional SAOPs, or RRP's and external tactical equipment through the 100Base-T LAN. The SAOP is depicted below:

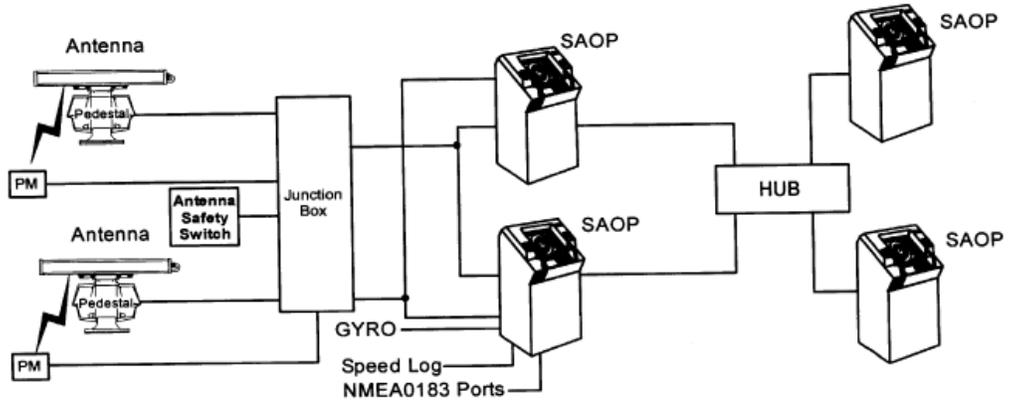


## System Configurations

### AN/SPS-73 SSR (V1)

The WAGB-400 Polar Ice Breaker configuration is made up of the following components:

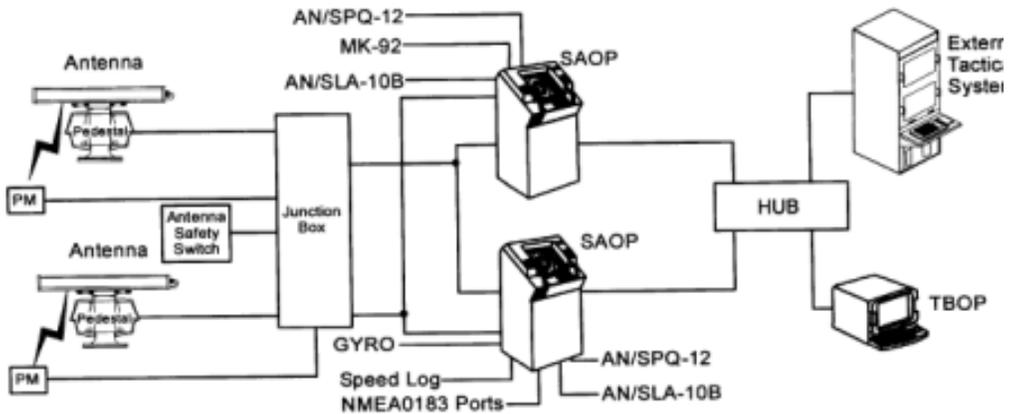
- Two SAOPs containing both RP and OP card sets
- Two SAOPs containing OP card set only
- Two 25kW X-up radar with R/T built into the pedestal



### AN/SPS-73 SSR (V2)

The WHEC-378 High Endurance Cutters configuration is made up of the following components:

- Two SAOPs
- One TBOP
- One 25kW X-up radar with R/T built into the pedestal
- One 30kW S-up radar with R/T built into the pedestal



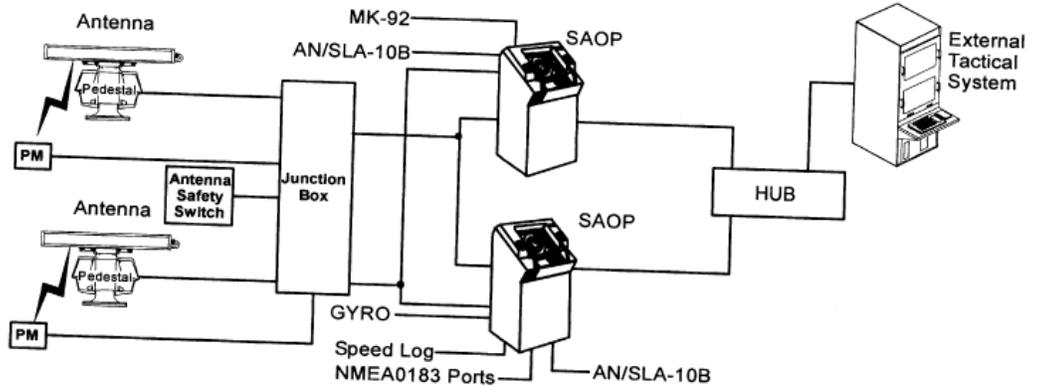
Continued on next page

## System Configurations (Continued)

### AN/SPS-73 SSR (V4)

The WMEC-270 Medium Endurance Cutter configuration contains:

- Two SAOPs
- One 25kW X-up radar with R/T built into the pedestal
- One 30kW S-up radar with R/T built into the pedestal
- Junction Box

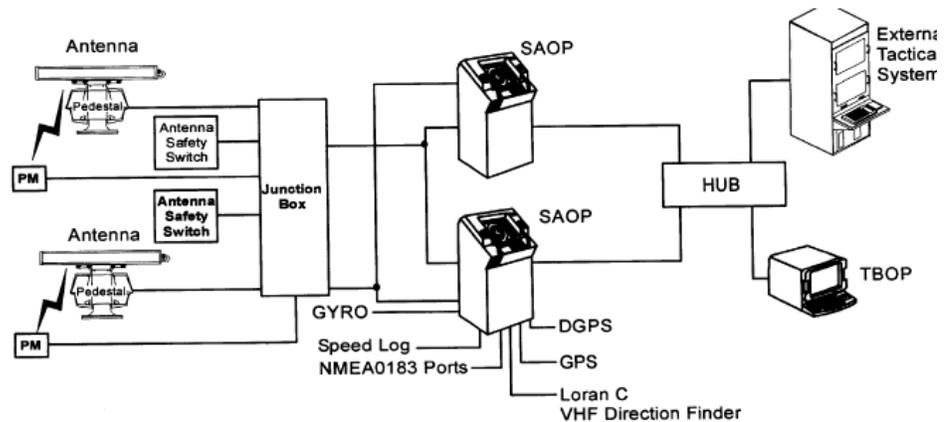


### AN/SPS-73 SSR (V6)

The WMEC-210 Medium Endurance Cutter configuration contains:

- Two SAOPs
- Two 25kW-X up radar with R/T built into the pedestal
- Junction Box

*Note:* The TBOP in this configuration was taken out in order to make room for the WMEC-210 SCCS installation on all applications.



Continued on next page

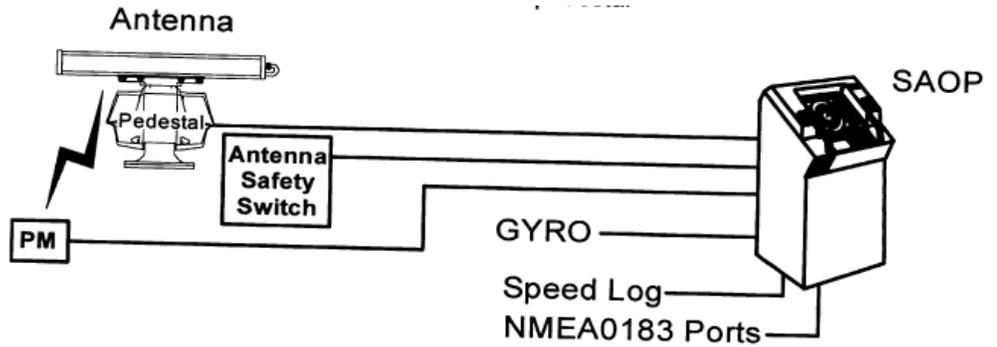
## System Configurations (Continued)

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### AN/SPS-73 SSR (V11)

The WPB-110 and the WPB-87 Patrol Boat configuration contain:

- One SAOP
- One 25kW X-up radar with R/T built into the pedestal



*Note:* You can see that there are several versions of the AN/SPS-73 SSR set that aren't covered in this lesson. Due to modernization, those versions have either changed or the platform has been discontinued.

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# Planned Maintenance

## Introduction

Commandant (G-SCE) has developed a Coast Guard Planned Maintenance System for the AN/SPS-73 SSR set. The following pages will take you through the MPC cards associated with the appropriate version installed on your vessel.

### AN/SPS-73 (V1) MPC Card Page 1 of 5

DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5456		 <b>MAINTENANCE PROCEDURE CARD (MPC)</b>		DATE 28 MAY 02	PAGE <u>1</u> OF <u>6</u>	MPC SERIAL NUMBER 45173/AAAA 01			
EQUIP GROUP Surface Search Radar	SYSTEM AN/SPS-73(V1)	SUBSYSTEM		SKILL LEVEL 1 Technician	MAN HOURS 4.0	FREQ CODE Q-1			
<b>PROCEDURE SUMMARY</b> 1. Clean and Inspect Antenna Assembly 2. Clean and Inspect Stand Alone Operator Position (SAOP) 3. Clean and Inspect Radar Transceiver/Receiver									
<b>SAFETY PRECAUTIONS</b> 1. Comply with U.S. Coast Guard Safety Precautions, Commandant Instruction M10550.25A, Chapter 4.1. 2. Comply with unit regulations for completion of work aloft. 3. High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe. 4. Ensure that all power external to the SAOP is removed prior to maintenance. This includes Gyrocompass and Speed Log synchro interfaces that provide 115 VAC directly to the SAOP. 5. Items contaminated with hazardous material should be disposed of using the disposal method listed for that hazardous material on the CGPMS Hazardous Materials Card.									
<b>TOOLS, PARTS, MATERIALS, TEST EQUIPMENT</b> <table border="0" style="width:100%"> <tr> <td style="width:33%"> <b>TOOLS</b>                              1. Socket Set, metric, 4 - 19 mm                              2. [1187] Screwdriver, flat tip, 1/8" tip                              3. [1198] Screwdriver, flat tip, 6"                              4. [3104] Screwdriver, flat tip, 8"                              5. [3434] Screwdriver, cross tip, #2, 6"                              6. [3879] Screwdriver, cross tip, #2, 8"                              7. [3861] Driver, nut, 3/16"                         </td> <td style="width:33%"> <b>MATERIALS</b>                              1. [0294] Cloth, cleaning                              2. [1144] Tag, safety                              3. [0055] Antiseize compound                              CGPMS Hazardous Materials Handling Guide (HMHG) Group 8, Disposal Method 1                              4. [1254] Silicone compound                              CGPMS Hazardous Materials Handling Guide (HMHG) Group 11, Disposal Method 1                              5. [0365] Detergent                              6. [2376] Water                         </td> <td style="width:33%"> <b>MISCELLANEOUS</b>                              1. [0268] Vacuum Cleaner, portable with nonmetallic nozzle                              2. [1608] Brush, sash and trim, 2"                              3. [1064] Probe, safety shorting                              4. CGPMS Hazardous Materials Card                         </td> </tr> </table>							<b>TOOLS</b> 1. Socket Set, metric, 4 - 19 mm 2. [1187] Screwdriver, flat tip, 1/8" tip 3. [1198] Screwdriver, flat tip, 6" 4. [3104] Screwdriver, flat tip, 8" 5. [3434] Screwdriver, cross tip, #2, 6" 6. [3879] Screwdriver, cross tip, #2, 8" 7. [3861] Driver, nut, 3/16"	<b>MATERIALS</b> 1. [0294] Cloth, cleaning 2. [1144] Tag, safety 3. [0055] Antiseize compound CGPMS Hazardous Materials Handling Guide (HMHG) Group 8, Disposal Method 1 4. [1254] Silicone compound CGPMS Hazardous Materials Handling Guide (HMHG) Group 11, Disposal Method 1 5. [0365] Detergent 6. [2376] Water	<b>MISCELLANEOUS</b> 1. [0268] Vacuum Cleaner, portable with nonmetallic nozzle 2. [1608] Brush, sash and trim, 2" 3. [1064] Probe, safety shorting 4. CGPMS Hazardous Materials Card
<b>TOOLS</b> 1. Socket Set, metric, 4 - 19 mm 2. [1187] Screwdriver, flat tip, 1/8" tip 3. [1198] Screwdriver, flat tip, 6" 4. [3104] Screwdriver, flat tip, 8" 5. [3434] Screwdriver, cross tip, #2, 6" 6. [3879] Screwdriver, cross tip, #2, 8" 7. [3861] Driver, nut, 3/16"	<b>MATERIALS</b> 1. [0294] Cloth, cleaning 2. [1144] Tag, safety 3. [0055] Antiseize compound CGPMS Hazardous Materials Handling Guide (HMHG) Group 8, Disposal Method 1 4. [1254] Silicone compound CGPMS Hazardous Materials Handling Guide (HMHG) Group 11, Disposal Method 1 5. [0365] Detergent 6. [2376] Water	<b>MISCELLANEOUS</b> 1. [0268] Vacuum Cleaner, portable with nonmetallic nozzle 2. [1608] Brush, sash and trim, 2" 3. [1064] Probe, safety shorting 4. CGPMS Hazardous Materials Card							

### AN/SPS-73 (V1) MPC Card Page 2 of 5

DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5456		 <b>MAINTENANCE PROCEDURE CARD (MPC)</b>		DATE 28 MAY 02	PAGE <u>2</u> OF <u>6</u>	MPC SERIAL NUMBER 45173/AAAA 01			
<b>TOOLS, PARTS, MATERIALS, TEST EQUIPMENT (Continued)</b> <table border="0" style="width:100%"> <tr> <td style="width:33%"> <b>TOOLS</b> </td> <td style="width:33%"> <b>MATERIALS</b>                              7. [0038] Denatured Alcohol                              CGPMS Hazardous Materials Handling Guide (HMHG) Group 15, Disposal Method 3                         </td> <td style="width:33%"> <b>MISCELLANEOUS</b> </td> </tr> </table>							<b>TOOLS</b>	<b>MATERIALS</b> 7. [0038] Denatured Alcohol CGPMS Hazardous Materials Handling Guide (HMHG) Group 15, Disposal Method 3	<b>MISCELLANEOUS</b>
<b>TOOLS</b>	<b>MATERIALS</b> 7. [0038] Denatured Alcohol CGPMS Hazardous Materials Handling Guide (HMHG) Group 15, Disposal Method 3	<b>MISCELLANEOUS</b>							
<b>NOTE:</b> Numbers in brackets can be referenced to Coast Guard Standard PMS Material Identification Guide (CGSPMIG) for stock number identification.									
<b>PROCEDURE</b> <b>Preliminary:</b> a. Set system power to OFF. b. De-energize and tag associated circuit breaker(s) at primary power distribution panel(s). c. De-energize and tag Gyrocompass and Speed Log synchro interfaces that provide 115 VAC directly to the SAOP.									
1. Clean and Inspect Antenna Assembly a. Remove Antenna Pedestal cover being careful not to damage gasket.									
<b>WARNING:</b> High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe.									
b. Discharge high voltage, high capacitance components to ground using shorting probe. c. Wipe accessible surfaces with clean, lint free cloth. d. Remove dust and dirt using vacuum cleaner and brush. e. Inspect interior of antenna looking for: (1) Evidence of excessive heat. (2) Damaged components. (3) Loose connections. (4) Cracked or frayed insulation. (5) Worn or damaged gears.									

Continued on next page

## Planned Maintenance (Continued)

### AN/SPS-73 (V1) MPC Card Page 3 of 5

DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5456		MAINTENANCE PROCEDURE CARD (MPC)	DATE	28 MAY 02	PAGE	3	OF	6	MPC SERIAL NUMBER	45173/AAAA 01
			PROCEDURE CONTINUED							

(6) Presence of foreign matter.  
(7) Corrosion.  
(8) Other damage.

f. Inspect pedestal cover rubber sealing gasket for:  
(1) Deterioration.  
(2) Rips, tears and deformities.  
(3) Replace as needed.

g. Apply light coat of silicone compound to pedestal cover gasket surfaces.

h. Reinstall pedestal cover ensuring gasket forms a watertight seal.

i. Inspect exterior of pedestal looking for:  
(1) Evidence of corrosion.  
(2) Presence of foreign matter.  
(3) Loose or missing hardware.  
(4) Inadequate or deteriorated preservative covering cables at entrance to pedestal stuffing tubes.

j. If pedestal mounting bolts or hardware shows signs of corrosion, remove, clean, apply antiseize compound and reinstall.

k. Clean surface of Antenna Pedestal and Antenna Array using a clean cloth dampened with a solution of fresh water and detergent.

l. Repeat steps 1.a. through 1.k. for second installed Antenna Assembly.

**2. Clean and Inspect Stand Alone Operator Positions (SAOP)**

a. Remove front and back bottom and rear top console covers from Main SAOP.

**WARNING:** High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe.

b. Discharge high voltage, high capacitance components to ground using shorting probe.  
c. Wipe accessible surfaces with a clean, lint free cloth.  
d. Remove dust and dirt from SAOP using vacuum cleaner and brush. Ensure each CCA is removed from VME Card Cage, cleaned and inspected, then replaced in its correct slot.  
e. Inspect interior and subassemblies of main SAOP looking for:

### AN/SPS-73 (V1) MPC Card Page 4 of 5

DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5456		MAINTENANCE PROCEDURE CARD (MPC)	DATE	28 MAY 02	PAGE	4	OF	6	MPC SERIAL NUMBER	45173/AAAA 01
			PROCEDURE CONTINUED							

(1) Evidence of excessive heat.  
(2) Damaged components.  
(3) Loose connections.  
(4) Cracked or frayed insulation.  
(5) Presence of foreign matter.  
(6) Corrosion.  
(7) Other damage.

f. Remove spacer cards from slots two, nine and twenty of VME Card Cage.

g. Remove tag(s) and re-energize associated circuit breaker(s) at primary power distribution panel and apply power to SAOP.

h. Observe proper operation of fan assemblies located in base of VME card basket. If one or more fans are inoperative, repair or replace as necessary.

i. Remove power from SAOP, de-energize and tag associated circuit breaker(s) at primary power distribution panel.

j. Replace spacer cards in slots two, nine and twenty of VME Card Cage.

k. Remove dust and dirt from keyboard using vacuum cleaner and brush.

l. Clean track ball.  
(1) Remove eight external mounting screws and three screws holding ball in place.  
(2) Carefully remove assembly and turn it over, being careful not to damage interconnecting cables

**NOTE 1:** In the following steps, do not remove screws on the bottom of the assembly. They are attached to printed circuit boards inside box.

(3) Disconnect plug on face plate and set face plate aside.  
(4) Remove screws holding ball cover. Set ball cover aside and remove Teflon cover. Wipe Teflon cover clean and set aside.  
(5) Remove ball. Clean rollers with Q-tips or clean rag and alcohol. Remove internal dust and debris.  
(6) Reassemble track ball assembly in reverse order.

m. Perform visual inspection of air filter(s) and display screen. If air filter(s) and display screen require cleaning, perform MPC R-1.

n. Reinstall front and back bottom and rear top console covers on Main SAOP.

o. Repeat steps 2.a. through 2.n. for remaining SAOPs.

Continued on next page

# Planned Maintenance (Continued)

## AN/SPS-73 (V1) MPC Card Page 5 of 5

DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5436	 <b>MAINTENANCE PROCEDURE CARD (MPC)</b>	DATE	28 MAY 02		MPC SERIAL NUMBER	45173/AAAA 01
		PAGE	5	OF	6	
PROCEDURE CONTINUED						
<b>3. Clean and Inspect Radar Transmitter/Receiver</b>						
a. Remove T/R assembly access covers.						
<b>WARNING:</b> High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe.						
b. Discharge high voltage, high capacitance components to ground using shorting probe.						
<b>NOTE 2:</b> Do not wear or use magnetic materials when cleaning and inspecting interior of Radar Transceiver/Receiver. Magnetron damage can result if touched by magnetic materials.						
c. Wipe accessible surfaces with a clean, lint free cloth.						
d. Remove dust and dirt using vacuum cleaner and brush.						
e. Inspect interior and subassemblies looking for:						
(1) Evidence of excessive heat.						
(2) Damaged components.						
(3) Loose connections.						
(4) Cracked or frayed insulation.						
(5) Loose or missing hardware.						
(6) Corrosion.						
(7) Presence of foreign matter.						
(8) Other damage.						
f. Reinstall T/R assembly access covers.						
g. Repeat steps 3.a. through 3.f. for remaining Radar Transmitter/Receiver.						
h. Remove tag(s) and re-energize associated circuit breaker(s) at primary power distribution panel.						
i. Return equipment to current readiness condition.						
j. Comply with own ship/station procedures for handling disposal of contaminated towels, absorbents, containers, and clothing, if applicable.						

## AN/SPS-73 (V2) MPC Card Page 1 of 5

DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5436	 <b>MAINTENANCE PROCEDURE CARD (MPC)</b>	DATE	28 MAY 02		MPC SERIAL NUMBER	45173/ABAA 01
		PAGE	1	OF	6	
EQUIP GROUP	SYSTEM	SUB SYSTEM	SKILL LEVEL	MAN HOURS	REQ CODE	
Surface Search Radar	AN/SPS-73(V)2		1 Technician	4.5	Q-1	
<b>PROCEDURE SUMMARY</b>						
1. Clean and Inspect Antenna Assembly						
2. Clean and Inspect Stand Alone Operator Position (SAOP)						
3. Clean and Inspect Tabletop/Bulkhead Mounted Operator Position (TBOP)						
<b>SAFETY PRECAUTIONS</b>						
1. Comply with U.S. Coast Guard Safety Precautions, Commandant Instruction M10550.25A, Chapter 4.1.						
2. Comply with unit regulations for completion of work aloft.						
3. High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe.						
4. Ensure all power external to the SAOP/TBOP is removed prior to maintenance. This includes Gyrocompass and Speed Log synchro interfaces that provide 115 VAC directly to the SAOP/TBOP.						
5. Items contaminated with hazardous material should be disposed of using the disposal method listed for that hazardous material on the CGPMS Hazardous Materials Card.						
<b>TOOLS, PARTS, MATERIALS, TEST EQUIPMENT</b>						
<b>TOOLS</b>		<b>MATERIALS</b>		<b>MISCELLANEOUS</b>		
1. Socket Set, metric, 4 - 19 mm		1. [0294] Cloth, cleaning		1. [0268] Vacuum Cleaner, portable with nonmetallic nozzle		
2. [1187] Screwdriver, flat tip, 1/8" tip		2. [1144] Tag, safety		2. [1608] Brush, sash and trim, 2"		
3. [1198] Screwdriver, flat tip, 6"		3. [0055] Antiseize compound CGPMS Hazardous Materials Handling Guide (HMHG) Group 8, Disposal Method 1		3. [1064] Probe, safety shorting		
4. [3104] Screwdriver, flat tip, 8"		4. [1254] Silicone compound CGPMS Hazardous Materials Handling Guide (HMHG) Group 11, Disposal Method 1		4. CGPMS Hazardous Materials Card		
5. [3434] Screwdriver, cross tip, #2, 6"		5. [0365] Detergent				
6. [3879] Screwdriver, cross tip, #2, 8"		6. [2376] Water				
7. [3861] Driver, nut, 3/16"		7. [0038] Denatured alcohol CGPMS Hazardous Materials Handling Guide (HMHG) Group 15, Disposal Method 3				

# Planned Maintenance (Continued)

**AN/SPS-73 (V2)  
MPC Card Page  
2 of 5**

<small>DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5426</small>		<b>MAINTENANCE PROCEDURE CARD (MPC)</b>	DATE	PAGE	OF	MPC SERIAL NUMBER
			28 MAY 02	2	6	45173/ABAA 01

TOOLS, PARTS, MATERIALS, TEST EQUIPMENT (Continued)

**NOTE:** Numbers in brackets can be referenced to Coast Guard Standard PMS Material Identification Guide (CGSPMIG) for stock number identification.

**PROCEDURE**

**Preliminary:**

- Set system power to OFF.
- De-energize and tag associated circuit breaker(s) at primary power distribution panel(s).
- De-energize and tag Gyrocompass and Speed Log synchro interfaces that provide 115 VAC directly to the SAOP/TBOP.

**NOTE 1:** Do not wear or use magnetic materials when cleaning and inspecting interior of Antenna Pedestal. Magnetron damage can result if touched by magnetic materials.

**1. Clean and Inspect Antenna Assembly**

- Remove Antenna Pedestal cover being careful not to damage gasket.

**WARNING:** High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe.

- Discharge high voltage, high capacitance components to ground using shorting probe.
- Wipe accessible surfaces with clean, lint free cloth.
- Remove dust and dirt using vacuum cleaner and brush.
- Inspect interior of antenna looking for:
  - Evidence of excessive heat.
  - Damaged components.
  - Loose connections.
  - Cracked or frayed insulation.
  - Worn or damaged gears.
  - Presence of foreign matter

**AN/SPS-73 (V2)  
MPC Card Page  
3 of 5**

<small>DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5426</small>		<b>MAINTENANCE PROCEDURE CARD (MPC)</b>	DATE	PAGE	OF	MPC SERIAL NUMBER
			28 MAY 02	3	6	45173/ABAA 01

**PROCEDURE CONTINUED**

- Corrosion.
- Other damage.

f. Inspect pedestal cover rubber sealing gasket for:

- Deterioration.
- Rips, tears and deformities.
- Replace as needed.

g. Apply light coat of silicone compound to pedestal cover gasket surfaces.

h. Reinstall pedestal cover ensuring gasket forms a watertight seal.

i. Inspect exterior of pedestal looking for:

- Evidence of corrosion.
- Presence of foreign matter.
- Loose or missing hardware.
- Inadequate or deteriorated preservative covering cables at entrance to pedestal stuffing tubes.

j. If pedestal mounting bolts or hardware shows signs of corrosion, remove, clean, apply antiseize compound and reinstall.

k. Clean surface of Antenna Pedestal and Antenna Array using a clean cloth dampened with a solution of fresh water and detergent.

l. Repeat steps 1.a. through 1.i. for second installed Antenna Assembly.

**2. Clean and Inspect Stand Alone Operator Position (SAOP)**

- Remove front and back bottom and rear top console covers from Main SAOP.

**WARNING:** High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe.

- Discharge high voltage, high capacitance components to ground using shorting probe.
- Wipe accessible surfaces with a clean, lint free cloth.
- Remove dust and dirt from SAOP using vacuum cleaner and brush. Ensure each CCA is removed from VME Card Cage, cleaned and inspected, then replaced in its correct slot.
- Inspect interior and subassemblies of main SAOP looking for:
  - Evidence of excessive heat.
  - Damaged components.
  - Loose connections.

Continued on next page

## Planned Maintenance (Continued)

**AN/SPS-73 (V2)**  
**MPC Page**  
**4 of 5**

<small>DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-3426</small>	 <b>MAINTENANCE PROCEDURE CARD (MPC)</b>	DATE	28 MAY 02	MPC SERIAL NUMBER	45173/ABAA 01
		PAGE	4	OF	6

**PROCEDURE CONTINUED**

- (4) Cracked or frayed insulation.
- (5) Presence of foreign matter
- (6) Corrosion.
- (7) Other damage.

- f. Remove spacer cards from slots two, nine and twenty of VME Card Cage.
- g. Remove tag(s) and re-energize associated circuit breaker(s) at primary power distribution panel and apply power to SAOP.
- h. Observe proper operation of fan assemblies located in base of VME card basket. If one or more fans are inoperative, repair or replace as necessary.
- i. Remove power from SAOP, de-energize and tag associated circuit breaker(s) at primary power distribution panel.
- j. Replace spacer cards in slots two, nine and twenty of VME Card Cage.
- k. Remove dust and dirt from keyboard using vacuum cleaner and brush.
- l. Clean track ball.
  - (1) Remove eight external mounting screws and the three screws holding the ball in place.
  - (2) Carefully remove the assemble and turn it over, being careful not to damage the interconnecting cables

**NOTE 2:** In the following steps, do not remove screws on the bottom of the assembly. They are attached to printed circuit boards inside box.

- (3) Disconnect plug on face plate and set face plate aside.
- (4) Remove screws holding ball cover. Set ball cover aside and remove Teflon cover. Wipe Teflon cover clean and set aside.
- (5) Remove ball. Clean rollers with Q-tips or clean rag and alcohol. Remove internal dust and debris.
- (6) Reassemble mount in reverse order.

- m. Perform visual inspection of air filter(s) and display screen. If air filter(s) and display screen require cleaning, perform MPC R-1
- n. Reinstall front and back bottom and rear top console covers on Main SAOP.
- o. Repeat steps 2.a. through 2.i. for remaining SAOPs.

**3. Clean and Inspect Tabletop/Bulkhead Mounted Operator Position (TBOP)**

- a. Remove TBOP assembly access covers.

**WARNING:** High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe.

**AN/SPS-73 (V2)**  
**MPC Page**  
**5 of 5**

<small>DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-3426</small>	 <b>MAINTENANCE PROCEDURE CARD (MPC)</b>	DATE	28 MAY 02	MPC SERIAL NUMBER	45173/ABAA 01
		PAGE	5	OF	6

**PROCEDURE CONTINUED**

- b. Discharge high voltage, high capacitance components to ground using shorting probe.
- c. Wipe accessible surfaces with a clean, lint free cloth.
- d. Remove dust and dirt using vacuum cleaner and brush.
- e. Inspect interior and subassemblies of TBOP looking for:
  - (1) Evidence of excessive heat.
  - (2) Damaged components.
  - (3) Loose connections.
  - (4) Cracked or frayed insulation.
  - (5) Presence of foreign matter
  - (6) Corrosion.
  - (7) Other damage.
- f. Remove dust and dirt from keyboard using vacuum cleaner and brush.
- g. Reinstall TBOP assembly access covers.
- h. Remove tag(s) and re-energize associated circuit breaker(s) at primary power distribution panel.
- i. Return equipment to current readiness condition.
- j. Comply with own ship/station procedures for handling disposal of contaminated towels, absorbents, containers, and clothing, if applicable.

Continued on next page

# Planned Maintenance (Continued)

**AN/SPS-73 (V4)**  
**MPC Page**  
**1 of 4**

<small>DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5436</small>		 <b>MAINTENANCE PROCEDURE CARD (MPC)</b>		DATE 28 MAY 02	PAGE <u>1</u> OF <u>4</u>	MPC SERIAL NUMBER 45173/ADAA 01
EQUIP GROUP Surface Search Radar	SYSTEM AN/SPS-73(V)4 & 5	SUB SYSTEM	SKILL LEVEL 1 Technician	MAN HOURS 4.0	FREQ. CODE Q-1	
PROCEDURE SUMMARY 1. Clean and Inspect Antenna Assembly 2. Clean and Inspect Stand Alone Operator Position (SAOP)						
SAFETY PRECAUTIONS 1. Comply with U.S. Coast Guard Safety Precautions, Commandant Instruction M10550.25A, Chapter 4.1. 2. Comply with unit regulations for completion of work aloft. 3. High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe. 4. Ensure all power external to the SAOP is removed prior to maintenance. This includes Gyrocompass and Speed Log synchro interfaces that provide 115 VAC directly to the SAOP. 5. Items contaminated with hazardous material should be disposed of using the disposal method listed for that hazardous material on the CGPMS Hazardous Materials Card.						
TOOLS, PARTS, MATERIALS, TEST EQUIPMENT						
<b>TOOLS</b> 1. Socket Set, metric, 4 - 19 mm 2. [1187] Screwdriver, flat tip, 1/8" tip 3. [1198] Screwdriver, flat tip, 6" 4. [3104] Screwdriver, flat tip, 8" 5. [3434] Screwdriver, cross tip, #2, 6" 6. [3879] Screwdriver, cross tip, #2, 8" 7. [3861] Driver, nut, 3/16"		<b>MATERIALS</b> 1. [0294] Cloth, cleaning 2. [1144] Tag, safety 3. [0055] Antiseize compound CGPMS Hazardous Materials Handling Guide (HMHG) Group 8, Disposal Method 1 4. [1254] Silicone compound CGPMS Hazardous Materials Handling Guide (HMHG) Group 11, Disposal Method 1 5. [0365] Detergent 6. [2376] Water 7. [0038] Denatured Alcohol CGPMS Hazardous Materials Handling Guide (HMHG) Group 15, Disposal Method 3			<b>MISCELLANEOUS</b> 1. [0268] Vacuum Cleaner, portable with nonmetallic nozzle 2. [1608] Brush, sash and trim, 2" 3. [1064] Probe, safety shorting 4. CGPMS Hazardous Materials Card	

**AN/SPS-73 (V4)**  
**MPC Page**  
**2 of 4**

<small>DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5436</small>		 <b>MAINTENANCE PROCEDURE CARD (MPC)</b>		DATE 28 MAY 02	PAGE <u>2</u> OF <u>4</u>	MPC SERIAL NUMBER 45173/ADAA 01
TOOLS, PARTS, MATERIALS, TEST EQUIPMENT (Continued) <b>NOTE:</b> Numbers in brackets can be referenced to Coast Guard Standard PMS Material Identification Guide (CGSPMIG) for stock number identification.						
<b>PROCEDURE</b> <b>Preliminary:</b> a. Set system power to OFF. b. De-energize and tag associated circuit breaker(s) at primary power distribution panel(s). c. De-energize and tag Gyrocompass and Speed Log synchro interfaces that provide 115 VAC directly to the SAOP.						
<b>NOTE 1:</b> Do not wear or use magnetic materials when cleaning and inspecting interior of Antenna Pedestal. Magnetron damage can result if touched by magnetic materials.						
1. <b>Clean and Inspect Antenna Assembly</b> a. Remove Antenna Pedestal cover being careful not to damage gasket.						
<b>WARNING:</b> High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe.						
b. Discharge high voltage, high capacitance components to ground using shorting probe. c. Wipe accessible surfaces with clean, lint free cloth. d. Remove dust and dirt using vacuum cleaner and brush. e. Inspect interior of antenna looking for: (1) Evidence of excessive heat. (2) Damaged components. (3) Loose connections. (4) Cracked or frayed insulation. (5) Worn or damaged gears. (6) Presence of foreign matter						

Continued on next page

## Planned Maintenance (Continued)

### AN/SPS-73 (V4) MPC Page 3 of 4

DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5406		MAINTENANCE PROCEDURE CARD (MPC)	DATE	PAGE <u>3</u> OF <u>4</u>	MPC SERIAL NUMBER 45173/ADAA 01
			28 MAY 02		

PROCEDURE CONTINUED

- (7) Corrosion.
- (8) Other damage.
- f. Inspect pedestal cover rubber sealing gasket for:
  - (1) Deterioration.
  - (2) Rips, tears and deformities.
  - (3) Replace as needed.
- g. Apply light coat of silicone compound to pedestal cover gasket surfaces.
- h. Reinstall pedestal cover ensuring gasket forms a watertight seal.
- i. Inspect exterior of pedestal looking for:
  - (1) Evidence of corrosion.
  - (2) Presence of foreign matter.
  - (3) Loose or missing hardware.
  - (4) Inadequate or deteriorated preservative covering cables at entrance to pedestal stuffing tubes.
- j. If pedestal mounting bolts or hardware shows signs of corrosion, remove, clean, apply antiseize compound and reinstall.
- k. Clean surface of Antenna Pedestal and Antenna Array using a clean cloth dampened with a solution of fresh water and detergent.
- l. Repeat steps 1 a. through 1.i. for second installed Antenna Assembly.

**2. Clean and Inspect Stand Alone Operator Position (SAOP)**

- a. Remove front and back bottom and rear top console covers from Main SAOP.

**WARNING:** High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe.

- b. Discharge high voltage, high capacitance components to ground using shorting probe.
- c. Wipe accessible surfaces with a clean, lint free cloth.
- d. Remove dust and dirt from SAOP using vacuum cleaner and brush. Ensure each CCA is removed from VME Card Cage, cleaned and inspected, then replaced in its correct slot.
- e. Inspect interior and subassemblies of main SAOP looking for:
  - (1) Evidence of excessive heat.

### AN/SPS-73 (V4) MPC Page 4 of 4

DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5406		MAINTENANCE PROCEDURE CARD (MPC)	DATE	PAGE <u>4</u> OF <u>4</u>	MPC SERIAL NUMBER 45173/ADAA 01
			28 MAY 02		

PROCEDURE CONTINUED

- (2) Damaged components.
- (3) Loose connections.
- (4) Cracked or frayed insulation.
- (5) Presence of foreign matter
- (6) Corrosion.
- (7) Other damage.
- f. Remove spacer cards from slots two, nine and twenty of VME Card Cage.
- g. Remove tag(s) and re-energize associated circuit breaker(s) at primary power distribution panel and apply power to SAOP.
- h. Observe proper operation of fan assemblies located in base of VME card basket. If one or more fans are inoperative, repair or replace as necessary.
- i. Remove power from SAOP, de-energize and tag associated circuit breaker(s) at primary power distribution panel.
- j. Replace spacer cards in slots two, nine and twenty of VME Card Cage.
- k. Remove dust and dirt from keyboard using vacuum cleaner and brush.
- l. Clean track ball.
  - (1) Remove eight external mounting screws and the three screws holding the ball in place.
  - (2) Carefully remove the assemble and turn it over, being careful not to damage the interconnecting cables

**NOTE 2:** In the following steps, do not remove screws on the bottom of the assembly. They are attached to printed circuit boards inside box.

- (3) Disconnect plug on face plate and set face plate aside.
- (4) Remove screws holding ball cover. Set ball cover aside and remove Teflon cover. Wipe Teflon cover clean and set aside.
- (5) Remove ball. Clean rollers with Q-tips or clean rag and alcohol. Remove internal dust and debris.
- (6) Reassemble mount in reverse order.
- m. Perform visual inspection of air filter(s) and display screen. If air filter(s) and display screen require cleaning, perform MPC R-1.
- n. Reinstall front and back bottom and rear top console covers on Main SAOP.
- o. Repeat steps 2. a. through 2. n. for remaining SAOPs.
- p. Remove tag(s) and re-energize associated circuit breaker(s) at primary power distribution panel.
- q. Return equipment to current readiness condition.
- r. Comply with own ship/station procedures for handling disposal of contaminated towels, absorbents, containers, and clothing, if applicable.

Continued on next page

## Planned Maintenance (Continued)

**AN/SPS-73 (V6)**  
**MPC Page**  
**1 of 4**

<small>DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5456</small>		 <b>MAINTENANCE PROCEDURE CARD (MPC)</b>		DATE 28 MAY 02	PAGE <u>1</u> OF <u>4</u>	MPC SERIAL NUMBER 45173/AFAA 01		
EQUIP GROUP Surface Search Radar		SYSTEM AN/SPS-73(V)8		SUB SYSTEM		SKILL LEVEL 1 Technician	MAN HOURS 2.0	FREQ. CODE Q-1
PROCEDURE SUMMARY 1. Clean and Inspect Antenna Assembly 2. Clean and Inspect Stand Alone Operator Position (SAOP)								
SAFETY PRECAUTIONS 1. Comply with U.S. Coast Guard Safety Precautions, Commandant Instruction M10550.25A, Chapter 4.1. 2. Comply with unit regulations for completion of work aloft. 3. High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe. 4. Ensure all power external to the SAOP is removed prior to maintenance. This includes Gyrocompass and Speed Log synchro interfaces that provide 115 VAC directly to the SAOP. 5. Items contaminated with hazardous material should be disposed of using the disposal method listed for that hazardous material on the CGPMS Hazardous Materials Card.								
TOOLS, PARTS, MATERIALS, TEST EQUIPMENT								
<b>TOOLS</b> 1. Socket Set, metric, 4 - 19 mm 2. [1187] Screwdriver, flat tip, 1/8 " tip 3. [1198] Screwdriver, flat tip, 6" 4. [3104] Screwdriver, flat tip, 8" 5. [3434] Screwdriver, cross tip, #2, 6" 6. [3879] Screwdriver, cross tip, #2, 8" 7. [3861] Driver, nut, 3/16"			<b>MATERIALS</b> 1. [0294] Cloth, cleaning 2. [1144] Tag, safety 3. [0055] Antiseize compound CGPMS Hazardous Materials Handling Guide (HMHG) Group 8, Disposal Method 1 4. [1254] Silicone compound CGPMS Hazardous Materials Handling Guide (HMHG) Group 11, Disposal Method 1 5. [0365] Detergent 6. [2376] Water 7. [0038] Denatured Alcohol CGPMS Hazardous Materials Handling Guide (HMHG) Group 15, Disposal Method 3			<b>MISCELLANEOUS</b> 1. [0268] Vacuum Cleaner, portable with nonmetallic nozzle 2. [1808] Brush, sash and trim, 2" 3. [1064] Probe, safety shorting 4. CGPMS Hazardous Materials Card		

**AN/SPS-73 (V6)**  
**MPC Page**  
**2 of 4**

<small>DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5456</small>		 <b>MAINTENANCE PROCEDURE CARD (MPC)</b>		DATE 28 MAY 02	PAGE <u>2</u> OF <u>4</u>	MPC SERIAL NUMBER 45173/AFAA 01
TOOLS, PARTS, MATERIALS, TEST EQUIPMENT (Continued)						
<b>NOTE:</b> Numbers in brackets can be referenced to Coast Guard Standard PMS Material Identification Guide (CGSPMIG) for stock number identification.						
PROCEDURE <b>Preliminary:</b> a. Set system power to OFF. b. De-energize and tag associated circuit breaker(s) at primary power distribution panel(s). c. De-energize and tag Gyrocompass and Speed Log synchro interfaces that provide 115 VAC directly to the SAOP.						
<b>NOTE 1:</b> Do not wear or use magnetic materials when cleaning and inspecting interior of Antenna Pedestal. Magnetron damage can result if touched by magnetic materials.						
1. <b>Clean and Inspect Antenna Assembly</b> a. Remove Antenna Pedestal cover being careful not to damage gasket.						
<b>WARNING:</b> High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe.						
b. Discharge high voltage, high capacitance components to ground using shorting probe. c. Wipe accessible surfaces with clean, lint free cloth. d. Remove dust and dirt using vacuum cleaner and brush. e. Inspect interior of antenna looking for: (1) Evidence of excessive heat. (2) Damaged components. (3) Loose connections. (4) Cracked or frayed insulation. (5) Worn or damaged gears. (6) Presence of foreign matter.						

Continued on next page

# Planned Maintenance (Continued)

**AN/SPS-73 (V6)**  
**MPC Page**  
**3 of 4**

DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5436	<b>MAINTENANCE PROCEDURE CARD (MPC)</b>	DATE 28 MAY 02	PAGE <u>3</u> OF <u>4</u>	MPC SERIAL NUMBER 45173/AFAA 01
<p><b>PROCEDURE CONTINUED</b></p> <p>(7) Corrosion.                  (8) Other damage.</p> <p>f. Inspect pedestal cover rubber sealing gasket for:                  (1) Deterioration.                  (2) Rips, tears and deformities.                  (3) Replace as needed.</p> <p>g. Apply light coat of silicone compound to pedestal cover gasket surfaces.h.Reinstall pedestal cover ensuring gasket forms a watertight seal.</p> <p>i. Inspect exterior of pedestal looking for:                  (1) Evidence of corrosion.                  (2) Presence of foreign matter.                  (3) Loose or missing hardware.                  (4) Inadequate or deteriorated preservative covering cables at entrance to pedestal stuffing tubes.</p> <p>j. If pedestal mounting bolts or hardware shows signs of corrosion, remove, clean, apply antiseize compound and reinstall.</p> <p>k. Clean surface of Antenna Pedestal and Antenna Array using a clean cloth dampened with a solution of fresh water and detergent.</p> <p><b>2. Clean and Inspect Stand Alone Operator Position (SAOP)</b></p> <p>a. Remove front and back bottom and rear top console covers from SAOP.</p> <p><b>WARNING:</b> High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe.</p> <p>b. Discharge high voltage, high capacitance components to ground using shorting probe.                  c. Wipe accessible surfaces with a clean, lint free cloth.                  d. Remove dust and dirt from SAOP using vacuum cleaner and brush. Ensure each CCA is removed from VME Card Cage, cleaned and inspected, then replaced in its correct slot.                  e. Inspect interior and subassemblies of SAOP looking for:                  (1) Evidence of excessive heat.                  (2) Damaged components.</p>				

**AN/SPS-73 (V6)**  
**MPC Page**  
**4 of 4**

DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5436	<b>MAINTENANCE PROCEDURE CARD (MPC)</b>	DATE 28 MAY 02	PAGE <u>4</u> OF <u>4</u>	MPC SERIAL NUMBER 45173/AFAA 01
<p><b>PROCEDURE CONTINUED</b></p> <p>(3) Loose connections.                  (4) Cracked or frayed insulation.                  (5) Presence of foreign matter                  (6) Corrosion.                  (7) Other damage.</p> <p>f. Remove spacer cards from slots two, nine and twenty of VME Card Cage.</p> <p>g. Remove tag(s) and re-energize associated circuit breaker(s) at primary power distribution panel and apply power to SAOP.</p> <p>h. Observe proper operation of fan assemblies located in base of VME card basket. If one or more fans are inoperative, repair or replace as necessary.</p> <p>i. Remove power from SAOP, de-energize and tag associated circuit breaker(s) at primary power distribution panel.</p> <p>j. Replace spacer cards in slots two, nine and twenty of VME Card Cage.</p> <p>k. Remove dust and dirt from keyboard using vacuum cleaner and brush.</p> <p>l. Clean track ball.                  (1) Remove eight external mounting screws and the three screws holding the ball in place.                  (2) Carefully remove the assemble and turn it over, being careful not to damage the interconnecting cables</p> <p><b>NOTE 2:</b> In the following steps, do not remove screws on the bottom of the assembly. They are attached to printed circuit boards inside box.</p> <p>(3) Disconnect plug on face plate and set face plate aside.                  (4) Remove screws holding ball cover. Set ball cover aside and remove Teflon cover. Wipe Teflon cover clean and set aside.                  (5) Remove ball. Clean rollers with Q-tips or clean rag and alcohol. Remove internal dust and debris.                  (6) Reassemble mount in reverse order.</p> <p>m. Perform visual inspection of air filter(s) and display screen. If air filter(s) and display screen require cleaning, perform MPC R-1.</p> <p>n. Reinstall front and back bottom and rear top console covers on SAOP.</p> <p>o. Remove tag(s) and re-energize associated circuit breaker(s) at primary power distribution panel.</p> <p>p. Return equipment to current readiness condition.</p> <p>q. Comply with own ship/station procedures for handling disposal of contaminated towels, absorbents, containers, and clothing, if applicable.</p>				

Continued on next page

# Planned Maintenance (Continued)

## AN/SPS-73 (V11) MPC Page 1 of 4

<small>DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5456</small>		 <b>MAINTENANCE PROCEDURE CARD (MPC)</b>		DATE 28 MAY 02	PAGE <u>1</u> OF <u>4</u>	MPC SERIAL NUMBER 45173/AHAA 02
EQUIP GROUP Surface Search Radar	SYSTEM AN/SPS-73(V)10 & 11	SUB SYSTEM	SKILL LEVEL 1 Technician	MAN HOURS 2.0	FREQ CODE Q-1	
PROCEDURE SUMMARY 1. Clean and Inspect Antenna Assembly. 2. Clean and Inspect Stand Alone Operator Position (SAOP).						
SAFETY PRECAUTIONS 1. Comply with U.S. Coast Guard Safety Precautions, Commandant Instruction M10550.25A, Chapter 4.1. 2. Comply with unit regulations for completion of work aloft. 3. High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe. 4. Ensure all power external to the SAOP is removed prior to maintenance. This includes Gyrocompass and Speed Log synchro interfaces that provide 115 VAC directly to the SAOP. 5. Items contaminated with hazardous material should be disposed of using the disposal method listed for that hazardous material on the CGPMS Hazardous Materials Card.						
TOOLS, PARTS, MATERIALS, TEST EQUIPMENT						
<b>TOOLS</b> 1. Socket Set, metric, 4 - 19 mm 2. [1187] Screwdriver, flat tip, 1/8" tip 3. [1198] Screwdriver, flat tip, 6" 4. [3104] Screwdriver, flat tip, 8" 5. [3434] Screwdriver, cross tip, #2, 6" 6. [3879] Screwdriver, cross tip, #2, 8" 7. [3861] Driver, nut, 3/16"		<b>MATERIALS</b> 1. [0294] Cloth, cleaning 2. [1144] Tag, safety 3. [0055] Antiseize compound CGPMS Hazardous Materials Handling Guide (HMHG) Group 8, Disposal Method 1 4. [1254] Silicone compound CGPMS Hazardous Materials Handling Guide (HMHG) Group 11, Disposal Method 1 5. [0365] Detergent 6. [2376] Water 7. [0038] Denatured Alcohol CGPMS Hazardous Materials Handling Guide (HMHG) Group 15, Disposal Method 3		<b>MISCELLANEOUS</b> 1. [0268] Vacuum Cleaner, portable with nonmetallic nozzle 2. [1608] Brush, sash and trim, 2" 3. [1064] Probe, safety shorting 4. CGPMS Hazardous Materials Card		

## AN/SPS-73 (V11) MPC Page 2 of 4

<small>DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5456</small>		 <b>MAINTENANCE PROCEDURE CARD (MPC)</b>		DATE 28 MAY 02	PAGE <u>2</u> OF <u>4</u>	MPC SERIAL NUMBER 45173/AHAA 02
<b>TOOLS, PARTS, MATERIALS, TEST EQUIPMENT (Continued)</b>						
<b>NOTE:</b> Numbers in brackets can be referenced to Coast Guard Standard PMS Material Identification Guide (CGSPMIG) for stock number identification.						
<b>PROCEDURE</b> <b>Preliminary:</b> a. Set system power to OFF. b. De-energize and tag associated circuit breaker(s) at primary power distribution panel(s). c. De-energize and tag Gyrocompass and Speed Log synchro interfaces that provide 115 VAC directly to the SAOP.						
<b>NOTE 1:</b> Do not wear or use magnetic materials when cleaning and inspecting interior of Antenna Pedestal. Magnetron damage can result if touched by magnetic materials.						
1. <b>Clean and Inspect Antenna Assembly</b> a. Remove Antenna Pedestal cover being careful not to damage gasket.						
<b>WARNING:</b> High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe.						
b. Discharge high voltage, high capacitance components to ground using shorting probe. c. Wipe accessible surfaces with clean, lint free cloth. d. Remove dust and dirt using vacuum cleaner and brush. e. Inspect interior of antenna looking for: (1) Evidence of excessive heat. (2) Damaged components. (3) Loose connections. (4) Cracked or frayed insulation. (5) Worn or damaged gears. (6) Presence of foreign matter.						

Continued on next page

## Planned Maintenance (Continued)

### AN/SPS-73 (V11) MPC Page 3 of 4

DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5456		MAINTENANCE PROCEDURE CARD (MPC)	DATE 28 MAY 02	PAGE <u>3</u> OF <u>4</u>	MPC SERIAL NUMBER 45173/AHAA 02
<p>PROCEDURE CONTINUED</p> <p>(7) Corrosion. (8) Other damage.</p> <p>f. Inspect pedestal cover rubber sealing gasket for: (1) Deterioration. (2) Rips, tears and deformities.</p> <p>g. Apply light coat of silicone compound to pedestal cover gasket surfaces.</p> <p>h. Reinstall pedestal cover ensuring gasket forms a watertight seal.</p> <p>i. Inspect exterior of pedestal looking for: (1) Evidence of corrosion. (2) Presence of foreign matter. (3) Loose or missing hardware. (4) Inadequate or deteriorated preservative covering cables at entrance to pedestal stuffing tubes.</p> <p>j. If pedestal mounting bolts or hardware shows signs of corrosion, remove, clean, apply antiseize compound and reinstall.</p> <p>k. Clean surface of Antenna Pedestal and Antenna Array using a clean cloth dampened with a solution of fresh water and detergent.</p> <p><b>2. Clean and Inspect Stand Alone Operator Position (SAOP)</b></p> <p>a. Remove front and back bottom and rear top console covers from Main SAOP.</p> <p><b>WARNING:</b> High voltage, high capacitance components may contain voltages dangerous to life. Discharge high voltage, high capacitance components to ground using shorting probe.</p> <p>b. Discharge high voltage, high capacitance components to ground using shorting probe.</p> <p>c. Wipe accessible surfaces with a clean, lint free cloth.</p> <p>d. Remove dust and dirt from SAOP using vacuum cleaner and brush. Ensure each CCA is removed from VME Card Cage, cleaned and inspected, then replaced in its correct slot.</p> <p>e. Inspect interior and subassemblies of main SAOP looking for: (1) Evidence of excessive heat. (2) Damaged components. (3) Loose connections.</p>					

### AN/SPS-73 (V11) MPC Page 4 of 4

DEPARTMENT OF TRANSPORTATION U.S. COAST GUARD CG-5456		MAINTENANCE PROCEDURE CARD (MPC)	DATE 28 MAY 02	PAGE <u>4</u> OF <u>4</u>	MPC SERIAL NUMBER 45173/AHAA 02
<p>PROCEDURE CONTINUED</p> <p>(4) Cracked or frayed insulation. (5) Presence of foreign matter (6) Corrosion. (7) Other damage.</p> <p>f. Remove spacer cards from slots two, nine and twenty of VME Card Cage.</p> <p>g. Remove tag(s) and re-energize associated circuit breaker(s) at primary power distribution panel and apply power to SAOP.</p> <p>h. Observe proper operation of fan assemblies located in base of VME card basket. If one or more fans are inoperative, repair or replace as necessary.</p> <p>i. Remove power from SAOP, de-energize and tag associated circuit breaker(s) at primary power distribution panel.</p> <p>j. Replace spacer cards in slots two, nine and twenty of VME Card Cage.</p> <p>k. Remove dust and dirt from keyboard using vacuum cleaner and brush.</p> <p>l. Clean track ball. (1) Remove eight external mounting screws and the three screws holding the ball in place. (2) Carefully remove the assemble and turn it over, being careful not to damage the interconnecting cables</p> <p><b>NOTE 2</b> In the following steps, do not remove screws on the bottom of the assembly. They are attached to printed circuit boards inside box.</p> <p>(3) Disconnect plug on face plate and set face plate aside. (4) Remove screws holding ball cover. Set ball cover aside and remove Teflon cover. Wipe Teflon cover clean and set aside. (5) Remove ball. Clean rollers with Q-tips or clean rag and alcohol. Remove internal dust and debris. (6) Reassemble mount in reverse order.</p> <p>m. Perform visual inspection of air filter(s) and display screen. If air filter(s) and display screen require cleaning, perform MPC R-1.</p> <p>n. Reinstall front and back bottom and rear top console covers on Main SAOP.</p> <p>o. Remove tag(s) and re-energize associated circuit breaker(s) at primary power distribution panel.</p> <p>p. Return equipment to current readiness condition.</p> <p>q. Comply with own ship/station procedures for handling disposal of contaminated towels, absorbents, containers, and clothing, if applicable.</p>					

## Scaleable Integrated Navigation System (SINS)

### Introduction

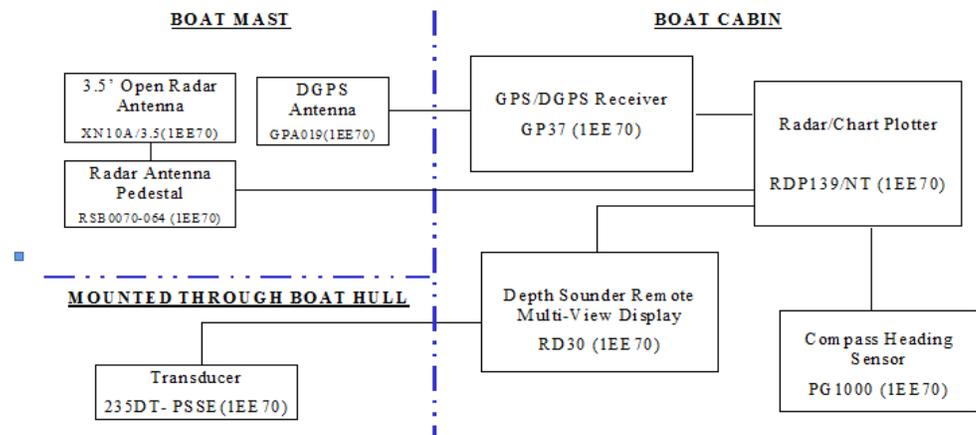
The Scaleable Integrated Navigation System (SINS) is the replacement for the AN/SPS-69(V) radar system, the CMX-MX-200 GPS/LORAN receiver, and the ST-50 Depth Sounder on the small boat fleet. The SINS is a Commercial-Off-The-Shelf (COTS) integrated system intended to meet the requirements as set forth in Chapter Two of the Objective Architecture and Transition Plan (OATP). The SINS is designed to be installed on all standardized small boats in the fleet.

### Planned Life Cycle

Since the SINS is a COTS System it is expected to have a service life of eight years, per current industry standards. The system was spared at 30% of the total number installed.

### System Description

The basic SINS system (V)1 on 41' UTB's, consist of a radar (4KW power) with a combination radar display/chart plotter, a Differential Global Positioning System (DGPS) receiver, a depth sounder and a compass heading sensor. Different platforms will use the same base nomenclature for SINS, but will be designated as a separate version of SINS [e.g., 1SG38-SINS(V)2] for 47' MLBs and will be described in future updates to this EILSP (Equipment Integrated Logistics Support Plan).



41' UTB SINS (V)1 Block Diagram

**Note:** At the time of this writing the only EILSP on the SINS system is limited to Version 1 used on the 41' UTB. The block diagrams of other versions will be similar to this. This lesson will be updated as new information becomes available.

Continued on next page

## **Scaleable Integrated Navigation System (SINS) (Continued)**

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### **Maintenance Support**

The maintenance philosophy for SINS is that each piece of SINS equipment is a Lowest Repairable/Replaceable Unit (LRU) (i.e., the GPS/DGPS Receiver, the Compass Heading Sensor, etc.). The servicing ESD is considered the organizational level of maintenance for the unit. There is no intermediate or depot level support and C2CEN is the SMEF for the SINS.

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### **CGPMS (CG Planned Maintenance)**

SINS has been added to the Candidate Equipment List for CGPMS to determine if PMS will be developed. The SMEF will work with the CGPMS Contractor. In the interim, technicians are directed to use the interim PMS procedures contained in the technical manual. Corrective maintenance will be to the lowest repairable unit.

*Note:* At the time of this writing there is no known fleet wide CGPMS for the SINS. Local PMS schedules should be developed by the servicing ESD or ESU.

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## Bridgemaster E Series

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### Background

Each WLB/WLM Buoy Tender is equipped with two Bridgemaster Radar systems. The primary radar system is located forward on the bridge and secondary radar system is located in the chart room. The Bridgemaster Radar has a low predicted failure rate and is easy to maintain.

The ships have two X-band scanner units (rather than normally configured X-Band and S-Band unit). A two X-Band system setup was installed because there wasn't sufficient room on the mast for an S-Band scanner antenna. Both of the X-Band scanner units are located on the mast of the ship.

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### Master Control

The display unit can only be connected to one scanner at a time, and only the master display has full control of the scanner. The controls, which are available at a master display but NOT at a slave display, are as follows,

- Switching the transceiver between standby and transmit mode
  - Selection of transmission pulse-length
  - Tuning the transceiver
  - Selecting Manual or AFC mode for tuning
  - Tuning the performance monitor
- 

### Planned Maintenance

Maintenance consists primarily of replacing Printed Circuit Boards (PCB's) and cables. It takes an average of 40 minutes to access, remove and replace most PCB's. The most difficult part is opening up and closing the scanner unit on the mast.

*Note:* CGPMS has not yet been developed for the Bridgemaster E Series Radar. Current PMS procedures have been provided by SYSCOM. Due to the length and number of PMS cards, a link will be provided in the near future.

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## Review Quiz

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### Questions

1. Which radar does the AN/SPS-73 replace?
    - A. AN/SPS-72
    - B. AN/SPS-71
    - C. AN/SPS-65
    - D. AN/SPS-64
  
  2. Who is the manufacturer of the 73 radar antenna safety switch?
    - A. Raytheon
    - B. Sperry
    - C. Foruno
    - D. Motorola
  
  3. Which antenna configuration is used by the AN/SPS-73 radar (V)1?
    - A. One S band and one X band
    - B. Two X band
    - C. Two S band
    - D. One S band
  
  4. Which radar system does the SINS replace?
    - A. AN/SPS-73
    - B. AN/SPS-71
    - C. AN/SPS-64
    - D. AN/SPS-69
-

## Review Quiz Answers

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<b>Answers</b>	<b>Question</b>	<b>Answer</b>	<b>Reference</b>
	1.	D	3-1
	2.	A	3-3
	3.	B	3-5
	4.	D	3-19

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## Appendix A

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### Questions

1. When setting the FM frequency on the WSC-3 transceiver, what is the recommended sensitivity level?
    - A. 2.0 microvolts
    - B. 2.5 microvolts
    - C. 3.0 microvolts
    - D. 3.5 microvolts
  2. Which of the following 1A1A25 Interface modules uses a ten-position dual in-line package (DIP) switch?
    - A. SAS Interface
    - B. Switchable Audio Interface
    - C. Standard Interface
    - D. None of the above
  3. On what platform is the Gulfcoast Sparcstar/Sunfire Workstation used on?
    - A. 378'
    - B. 270'
    - C. 210'
    - D. 87'
  4. Which of the following systems is not used as an SCCS sensory equipment device?
    - A. GPS receiver
    - B. AIS
    - C. Radar (SINS)
    - D. Depth Sounder (Echotrach or V850)
  5. Which of the following Electronic Charting Systems (ECS) uses the 5200 CPU?
    - A. SCCS
    - B. ECPINS
    - C. COMDAC
    - D. Transas
  6. Which version of the AN/SPS-73 radar is used on the 210' WMEC Cutter?
    - A. (V)6
    - B. (V)2
    - C. (V)1
    - D. (V)11
-

**Appendix B**

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**Answers**

<b>Question</b>	<b>Answer</b>	<b>Reference</b>
1.	C	1-2
2.	B	1-3
3.	C	2-3
4.	C	2-4
5.	B	2-8
6.	A	3-6

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## Request for Feedback – Electronics Technician 2<sup>nd</sup> Class

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**Suggestions and Corrections**

Please note your suggestions, corrections, and comments below.

Page	Location on Page	What Correction is Needed

**Your Comments**

If you were writing this pamphlet, what improvements would you make? What was good about it? What did you not like about it? Please be specific in your comments/suggestions.

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 Training Center Petaluma  
 599 Tomales Rd.

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