United States Mission Control Center

Operating Instructions

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USMCC OPERATING INSTRUCTIONS

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United States Mission Control Center Operating Instructions Manual

SECTION 1 – OVERVIEW

INTRODUCTION

The United States Mission Control Center (USMCC) is operated on behalf of the Department of Commerce, National Oceanographic and Atmospheric Administration (NOAA). Its primary purpose is to distribute satellite alert data to United States Rescue Coordination Centers (RCCs) for distress beacons. These distress beacons are termed “Emergency Locator Transmitters”, or ELTs, when used onboard aircraft, as “Emergency Position Indicating Radio Beacons, or EPIRBs, when used by vessels. A few “Personal Locator Beacons”, or PLBs, have been authorized by some nations for individual use. The USMCC also plays a pivotal role as a communications node within a larger, global network known as Cospas-Sarsat.

The USMCC operates in accordance with guidance that is set by the Cospas-Sarsat Parties. Sarsat is the acronym for “Search and Rescue Satellite Aided Tracking”. The Sarsat Parties consist of the United States, Canada and France who provide the space segment components. Cospas is the Russian equivalent acronym for Sarsat and Russia is the fourth Party providing space segment components. Several nations, referred to as “Ground Segment Providers” operate Local User Terminals (LUTs) to track the satellites. They also participate as an integral part of the Cospas-Sarsat network and operate Mission Control Centers (MCCs).

Cospas-Sarsat operates within rules and regulations set down by the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO). As such, it is a part of the Global Maritime Distress and Safety System (GMDSS). In order to provide a global alerting capability, arrangements have been made by the various Cospas-Sarsat nations to provide an alerting service to other nations that do not operate LUTs. Within Cospas-Sarsat, these other nations are referred to as Search and Rescue Points of Contact, or SPOCs.

The USMCC controls 14 LUTs spread across the northern hemisphere from the Carribean to the western Pacific Ocean. Information received from USA LUTs, or other MCCs, undergoes further processing at the USMCC before being forwarded to RCCs, SPOCs, or other MCCs. The operation is highly automated and

runs 24 hours a day, year round. Duty Controllers monitor the operation, initiate response to problems and provide assistance, as required, to RCCs, SPOCs, or other MCCs.

SCOPE

This document provides operating instructions that are needed by the Duty Controller to perform his/her duties. It is limited to the Operator Interface Screens. Information that is provided in other documentation retained by NOAA is not repeated here unless it is critical to understanding the functionality behind the screen. Readers will find related background material in the documentation listed below.

References:

16. Cospas-Sarsat Data Distribution Plan, C/S A.001. This document describes the ground system network and policy for the distribution of Alert data amongst MCCs and SPOCs.

17. Cospas-Sarsat Standard Interface Document, C/S A.002. This document presents the message formats that are used to exchange information between MCCs and SPOCs.

18. NOAA RCC Messages Document. This document describes the message formats that are used by the USMCC to send data to USA RCCs.

19. NOAA Functional Requirements Document. This document describes the design requirements for the USMCC.

20. NOAA Functional Description Document. This document provides an overview of the hardware and software used by the different USMCC processors.

21. NOAA Standard Operating Procedures (SOPs), Volumes 1 and 2. These volumes contain SOPs for a variety of operating scenarios. Volume 1 covers issues involving senior staff and Volume 2 covers procedures used by Duty Controllers.

22. NOAA Data Structures Document. This document describes the database table structure for data that is stored on the USMCC.

23. Data Transfer Specification (DTS). This document describes the format used for data exchange between the USA LUTs and the USMCC.

NOAA documentation is stored in electronic form on the Local Area Network (LAN) under \\mccnet\documentation\ ..name ..\ in WordPerfect format. Documentation that is not labelled as a ‘NOAA document’ is available from senior staff at the USMCC.

USMCC OVERVIEW

The USMCC is a distributed processing system. The various processes are concurrently active on different personal computers. The Operator Interface provides the interface between user and 1) the processes and 2) the data collected and stored in the USMCC. It is a means for viewing data and for controlling or altering USMCC processes. The interface was developed using a 'Windows NT' environment that permits several windows to be active, and permits data to be transferred (copied/pasted) between applications that are running in separate windows.

Significant processes, besides the Operator Interface, include Communications, Alert, System Data, System Monitoring, Backup and Archive, and Mapping/Geosort. Messages are passed from these processes to the Operator Interface for viewing. These '***Operator Messages'*** are triggered by various processing activities within the USMCC. The messages are also used to draw the attention of the Duty Controller to items requiring action. At the same time, the Duty Controller maintains a daily log (text file) of significant activity that happened during their shift at work. The Controller's workstation is capable of supporting several active windows.

The Operator Interface Screens provided to the Duty Controller consist of independent programs with their own desktop icon and start menu entry. Except for the Scroll program that displays Operator Messages, all screens can be minimized or reduced to a desktop icon. These screens are used to query and display data and to modify some processing parameters. They are:

- Alert Site Query queries locations (sites) where distress beacons were detected.
- Communication Site Display shows/alters the status of communication paths.
- The Scroll and Operator Query programs display and query Operator Messages.
- Support Messages assist the Controller in sending narrative messages.
- Lut Interface commands/controls the US LUTs and Display Processors at the USMCC
- Message Query is used to view incoming/outgoing messages and to re-transmit outgoing messages
- Mbrief is used to prepare the Morning Briefing
- Pass Schedule is used to monitor LUT satellite tracking activity
- LLE software supports location error analysis

Processed data and configuration parameters used by the operator

interface are stored in Microsoft SQL database tables.

Wherever possible, standard Microsoft Windows conventions have been retained in the design. Window frames can be re-sized using click and drag action to change their width and/or height. Scroll bars are provided if needed to view data within a pane. Windows can be overlaid for display. However, serious alarms (high priority operator messages) shall always cause a pop-up box to appear 'On Top' of any other active windows and shall be forced to remain 'On Top' until the message is read and acknowledged by the controller. In some instances, innovative shortcuts have been developed to improve the flexibility and functionality of operator screens. These will be described under the specific screens.

Terminology and General Design Concepts

The Generic Window, shown in Figure 1, depicts many of the features that are used in the operator interface screens. They are described here to facilitate understanding of operating instructions used in this publication. The top portion of this window (blue bar) is called the ***Title Bar***. It displays the name of the application that is being run inside the window. The Icon on the left hand side of the Title Bar contains the standard minimize, resize, and close functions that are included in the three command buttons on the right hand side of the Title Bar. This Icon may offer some additional functionality for specific applications. As will be demonstrated later, these applications may be connected to different databases. The name of the database that is presently being used will also be displayed on the Title Bar.

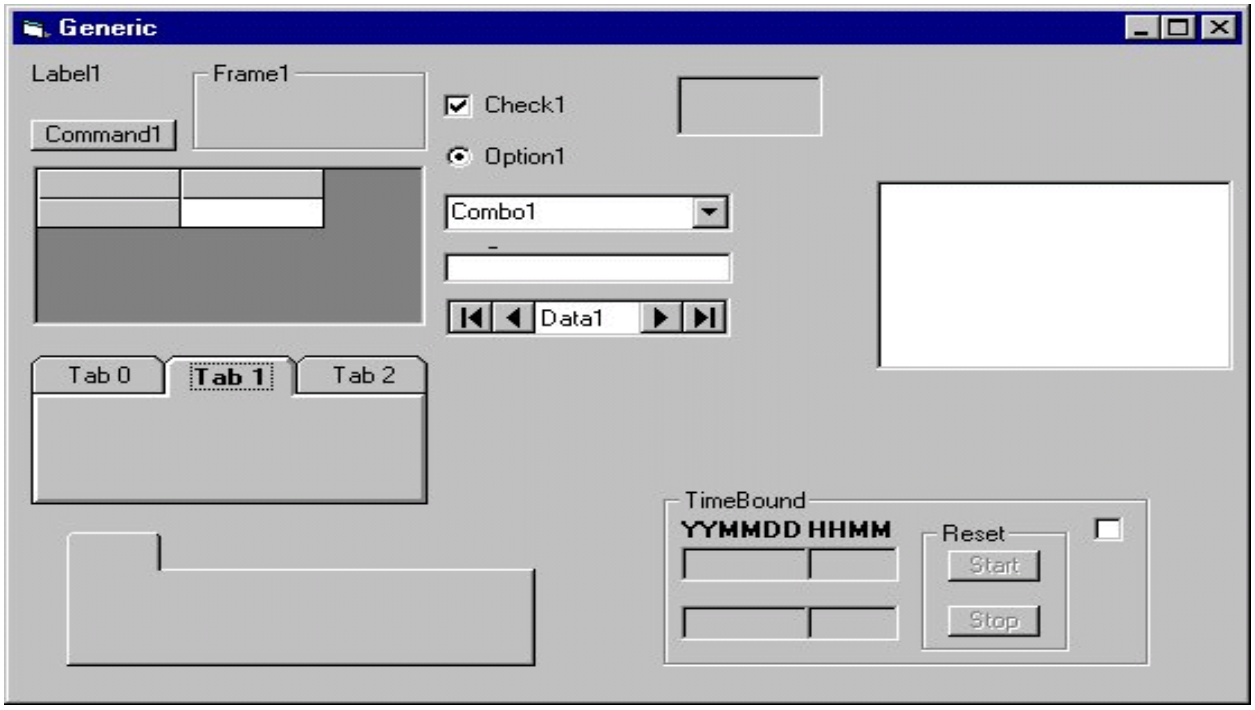

Figure 1-1 – Generic Window

A 'Menu Bar" is normally included directly below each title bar. This does not appear on the generic screen, but will be demonstrated later. Inside the screen, "Labels" are used to describe the functionality or information applicable to that portion of the form. "Frame Labels" are used to label what is pertinent to the frame (light grey rectangular line joined to the frame label). Command buttons cause actions to be performed, and are labelled with the name of the function they cause to start, i.e. "Search". Radio Buttons (small circles) and Check boxes (small rectangles) are used to select different options for processing. Radio buttons allow one of several selections whereas, multiple selections may be permitted with check boxes.

Combination boxes are used to further confine queries. They sometimes, but not always, contain a default setting. Clicking on the "down arrow" on the right hand side of the combination box will cause a drop down list to appear from which an alternative selection can be made or changed for another query. The small box beneath the "Combo1" box is called a text box. It is used by the operator to enter specific data. Usually a label will be placed adjacent to the box to identify the parameter to be entered into the box. The large, white box to the right is also called a text box, but is normally used to display data output that resulted from the query.
Text boxes may also be "greyed out" if they are not applicable to the selection made by the operator (examples: to the right of the check box, and the Timebound Frame). They can be activated when

the appropriate combination of data is entered. In the latter case, this frame would be activated by clicking on the checkbox in the upper right hand corner of the frame.

Much of the data presented to the operator is in the form of records and database fields obtained from the Structured Query Language (SQL, pronounced see-kwell) database tables. Data is presented in a grid format, and the operator is normally permitted to move both the vertical and horizontal grid lines to make the results more readable. Both vertical and horizontal scroll bars will be added inside this frame if the volume of data returned exceeds the size of the viewing space (not shown on generic example).

Lastly, the generic screen depicts “Tab Boxes”. These boxes are used where different, but related, functionality is provided on the same screen. Emphasis (the light dotted line) is used to identify the tab that is currently selected. Emphasis is also used to indicate active controls on the screen. The operator may either “Tab” between controls and panes within the window using the keyboard, or directly access an area using point and click techniques.

USMCC personal computers are all synchronized to UTC (Universal Time Coordinated, formerly known as Greenwich time or Zulu time). A 24 hour time clock is used. Operator screens were designed to require all four time digits, using leading zeros, with no colon separator. The software does appropriate conversions. Other workstations on the NOAA LAN may run the Operator Interface screens if the appropriate executable software is installed on their PC. However, certain functionality involving operator messages is reserved for the Duty Controller workstations.

Location information is stored in the USMCC as positive or negative values that represent degrees and decimal degrees. Operator Interface screens use the operational standard of degrees, minutes and decimal minutes to enter or display latitude and longitude. Hemisphere may be indicated either by plus/minus signs or by N/S/E/W identifiers.

Validation is performed on most data that is entered on the operator interface screens. Where there is a risk that default values could cause an excessive amount of data to be retrieved and displayed, appropriate cautions boxes will be provided in the operating instructions.

The screen shown in Figure 1-2, below, demonstrates some features that are common to the USMCC interface, but unique as a Windows application. The Title Bar indicates that the Window is for Support Messages. It currently is using the Operational database on the USMCC, and this program executable is version 0.52 dated February 17, 2000.

The “Connect” selection on the menu will cause a drop down list to appear that identify which database the user wants to use (normal selections are operational, test, or development databases; the archive database is a future enhancement). The “Print” function differs from the normal Windows menu selection. In this case, it causes an image to be captured of the client area within the active window (client area excludes the title and menu bars). The captured image is then printed on the default printer as it appears on the users PC. Different screens may present other menu options, such as the “Tools” menu item shown in Fig. 1-2 below.

Figure 1-2 – Title and Menu bars

GENERAL DOCUMENT NOTES

When a section in this document describes a user interaction with the interface screen, the name of the label or control is included inside double quotes. For example, to send the message, click on "Send". The second occurrence of the word “Send” refers to a command button on the interface screen.

Most sections begin with an Overview, followed by Functions Provided, a description of the Initial Screen, then specific descriptions. The overview is included only if it contributes to the understanding of relationship between the form and the whole system, from the perspective of a new user. Sections 2, 3 and 6 were fairly simple and do not include an overview section.

Within each section, major divisions (headings) are capitalized in bold type. Sub-functions are indented, in lower case bold type, and underlined. In order to draw the user's attention to a label on the screen when a topic is first introduced, the labels may appear in bold type.

Important points are framed inside a box (such as this section).

DOCUMENT CONSTRAINTS

Several support processes were used by previous generations of USMCC and are carried over as ‘off line processes’ into the new system. They are briefly described in Section 14, “Other/Offline Processes”. For the most part, they do not have an “Windows based” operator interface. These programs are monitored and create operator messages. Controller SOPs provide instructions regarding interface with these activities.

Critical operating parameters involve software settings that are subject to configuration management. Presently, these are changed using software development tools such as Microsoft Enterprise Manager, and Developer Studio (when code needs to be modified). An interface screen is under development to assist configuration management in monitoring and tracking changes. Archive, backup, retrieval interfaces are also being enhanced.

A number of software enhancements have been proposed and are under review. This document only describes software that has been implemented. Footnotes are used to describe significant changes that may be implemented prior to publication/update of this document.

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SECTION 2 – SUPPORT MESSAGES

FUNCTIONS PROVIDED

The "Support Messages" Operator Interface screen is used by controllers to create and transmit narrative messages. The USMCC sends four different kinds of narrative messages:

33. SIT 915 Narrative Messages [NARR (915)]. This format is the Cospas-Sarsat standard for user created narrative messages that are exchanged amongst MCCs. The structure for the narrative message is described in C/S A.002.

34. SIT 925 Registration Database Messages [406 RDB]. This message is used to send information from the USMCC 406 Registration database to other MCCs, RCCs and SPOCs. This message format is also described in C/S A.002 and is slightly more structured than the narrative message in order to permit some automated message processing at the receiving MCC. Foreign MCCs also use this format to send registration information to the USMCC. (*Note: data retrieved from the RDB is actually sent in a SIT 915 format, pending software changes to implement new message formats.*)

35. System Messages [Sys Narr (605)]. System Messages are exchanged amongst MCCs only. They are used to inform other MCCs of significant changes that have happened to elements of the ground system. The significant change may result in a degradation of service or a service enhancement. Thus, they may require one or more MCCs to make software configuration changes within their MCCs (for example, disconnect a communication path, or select an alternate routing for messages). Although they are also narrative messages, they have been assigned a separate SIT number in order to permit automatic routing of messages and operator alarming. The format for this message is also described in C/S A.002.

36. Next Visibility Prediction Messages [Next Vis]. This form allows the Duty Controller to send a visibility prediction to a US RCC. For example, an RCC has received a report of an overdue a fishing vessel. The RCC asks the USMCC when Cospas-Sarsat satellites will be passing over the area where the vessel is fishing. The controller uses the information provided by the RCC to create a message that contains

predicted times when the various satellites would see the EPIRB. This program performs that necessary computations and formats the results into a narrative message for RCCs. The format for this message is described in the NOAA RCC Message Document.

INITIAL SCREEN

When the Support Messages program is executed, the initial screen that appears is shown in Fig. 2-1, below. The default **Tab** is the SIT 915 narrative message, labelled "**NARR (915)**". At this point, the user shall:

- Check the title bar to confirm that the desired database has been selected. If not, select "Connect" on the menu and click on the entry for the desired database.

> Connection to the Test or Development databases will not transmit the messages unless appropriate communication paths are modified to permit transmission. Future message queries will require similar database selections in order to retrieve the message.

- Select the appropriate line length. Some MCCs and SPOCs use Telex as a primary or secondary means of communication which has a limit of 69 characters per line. Select "Tools" on the menu and click on "69 Char Wrap" (or press F4) **and** click on "To Upper Case".

SIT 915 NARRATIVE MESSAGE

NARR (915), narrative message, is the default tab setting , as shown in Figure 3. The screen contains a text box and three frames:

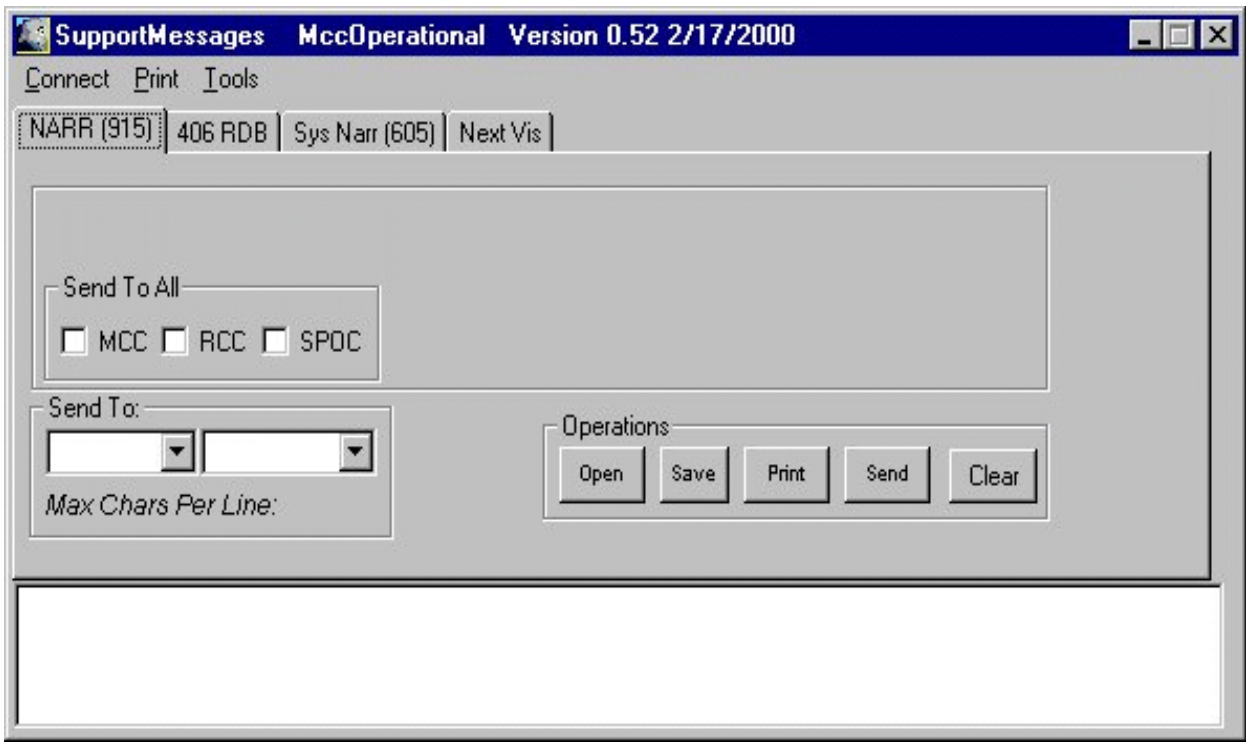

Figure 2-1 Support Message Initial Screen

- The **Send To All** frame is used when it is necessary to send the same message to all addresses within one Communication Site Type (i.e., all RCCs, all MCCs, all SPOCs, but only to sites that are configured to receive SIT 915 messages in the ComSiteCfg Table). This selection is mainly used to expedite emergency communications.
- The **Send To:** is the most commonly used frame.
- The **Operations** frame contains various command buttons.

Send To. Normally, a message is only sent to one RCC, MCC or SPOC. Ignore the upper frame and click on the down arrow contained in the left text box (underneath the label "Send To:"). This will present the user with a selection of the different types of destinations. Options include MCC, RCC and SPOC. After the type of destination has been selected, the software will access the database and read all currently active destinations of that type. The list of specific destinations can be read by clicking on the down arrow in the right text box within this same frame. Fig. 2-2 shows an example where the type of destination is MCC (left text box), and a partial list of MCC destinations

shown in the right text box. A scroll bar is provided on the right side of the drop down list so that other entries on the list can be viewed/selected.

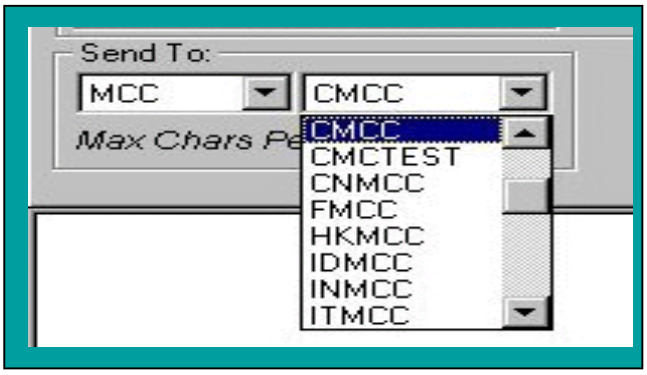

Figure 2-2 -- Send To Frame Selections

Once appropriate *Tools* and *Send To:* selections have been made, the user simply types the desired text into the text box on the bottom portion of the Window. Basic keyboard functions can be used to create the message (insert, delete, backspace and paste-ing another text document). When finished, click on the "Send" command button in the Operations frame.

Send will reject messages with incorrect word wrap settings

Send To All. Clicking on more or more of the check boxes within this frame will cause the text message to be sent to all currently active destinations for the type(s) selected. This is capability is provided to expedite message transmission to multiple destinations. For example, if the fire alarms go off at the USMCC and it is necessary to evacuate the premises, an emergency evacuation message can be rapidly retrieved and sent to all destinations. Examples of such messages, and supporting Macro routines, are documented in Controller SOPs (Volume 2).

Only US RCCs accept long line lengths. For MCC and SPOC destinations, select "Char 69 Wrap" and "To Upper Case" from "Tools". Check the desired types of destinations by clicking the appropriate check box(es). Next, enter the desired text in the lower portion of the window. The message is transmitted by clicking the "Send" command button in the "Operations" frame.

Operations. It was recognized that a Duty Controller may be

interrupted by other higher priority activities whilst composing a message for transmission. Similarly, common occurrences introduce unwanted repetition. A variety of Command buttons are provided:

- The ***Open*** command button brings up the Windows File Open box so that the user can select previously formatted messages, or partially completed text. Only files in text format (*.txt file extent) are displayed. A file is selected from the Windows File Open box by highlighting the file then clicking on the Open button within the File Open window. This will cause the file contents to be automatically transferred to message construction text box at the bottom of the support message window.
- The ***Save*** command button brings up the Windows File Save box so that a user can save text that is being composed, but work is incomplete.
- The ***Print*** command button within the operations frame will print all text that is inside the text box that is used for message composition. Printing uses the Windows settings (default printer) at the PC where the interface program is being run.
- The ***Send*** command button validates the character set and word wrap. If correct, the message is then passed to the communication process for transmission.
- The ***Clear*** command button will remove all text in the message composition text box.

> The default directory used by Windows File Open/File Save varies, and is dependant upon the settings for the PC in use.

> To print a complete copy of the message that shows the destination, message number and time of transmission, the Message Query must be used after the message is successfully transmitted.

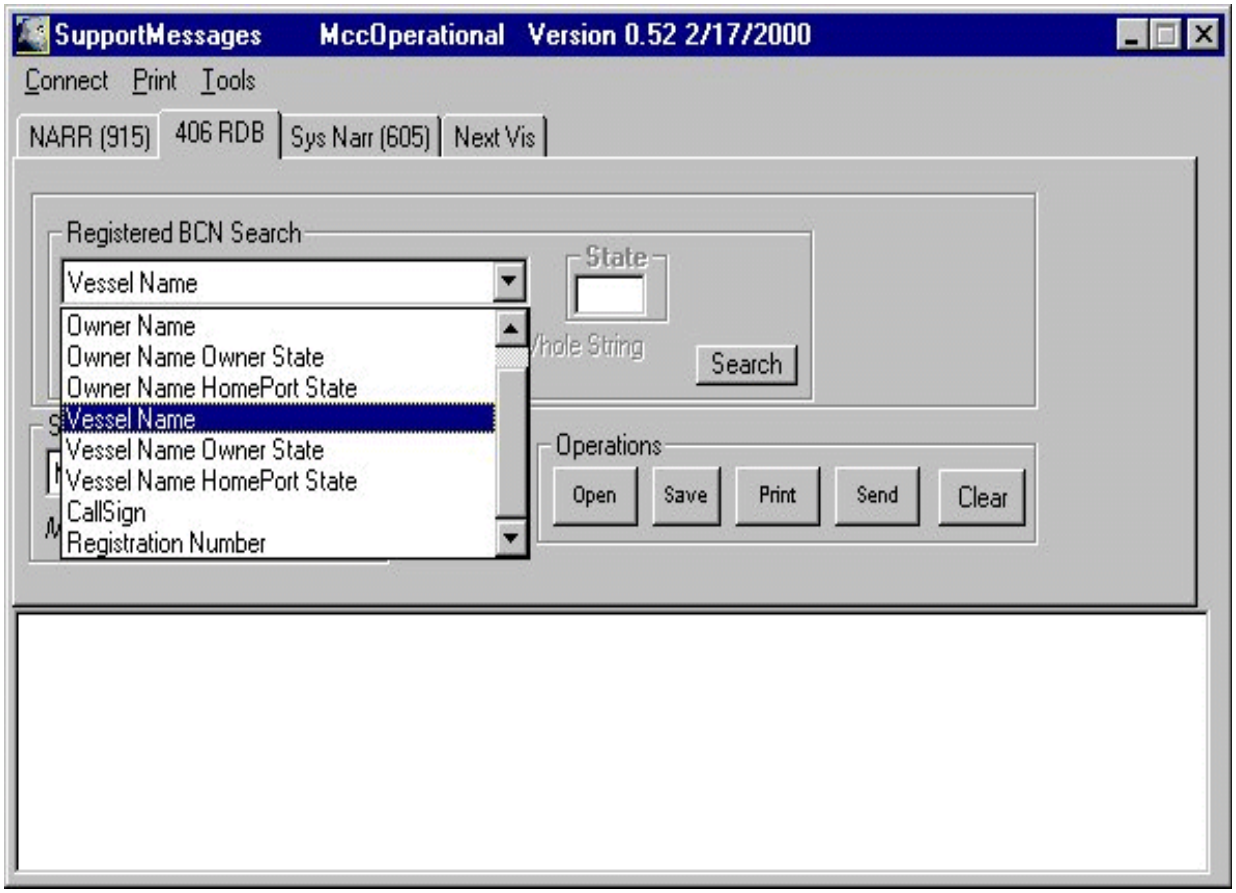

Figure 2-3 – 406 RDB Screen

SIT 925 REGISTRATION DATABASE MESSAGE

Click on the **406 RDB** tab to select this message format (Fig 2-3). Normally, this information is only sent to one destination. Therefore, only the "Send To:" and "Operation" frames are visible. The selection of destination and the functions provided by the command buttons operate exactly as described under SIT 915 messages (previous pages).

A new frame appears in this tab box that is labelled "Registered BCN Search". Clicking on the Down arrow in the text box just below this label will produce a drop down list of search options. Beacon ID is the most commonly used search criteria, particularly for messages that are sent to other MCCs or SPOCs. Select Beacon ID from the drop down list, then type in (or copy and paste) the 15 hexadecimal beacon identification code into the next text box (located below the drop down list). Next, click on the "Search" command button. This causes the software to search the 406 Registration Database for a beacon having this same identification code. When the software finds a database record that contains the same identification code, registration information will be copied into the message text box at the

bottom of support messages window.

If a distress beacon has been activated and detected by the Cospas-Sarsat system within the US Area of Operational Responsibility (AOR), registration information is automatically included in the messages sent to RCCs. RCC database queries are more likely to be based on information that they receive when a vessel or aircraft is reported to be overdue or missing. Therefore, other search options are provided to assist RCCs including owner name,vessel name, state, etc. An example of these options is shown in Figure 2-3 above.

The State text box allows the owner/vessel state to be used in the search. Use the two letter abbreviation for the State. Caution is urged when using options other than beacon identification because there may be, for example, many hundreds of owners with the name “Smith”. Provide as much information as possible to reduce the size of the search. The whole string “check box”, if checked, will look for an exact match for the phrase that was entered into the text box that is to the left of it.

Controller SOPs include MACROs that assist the creation of this message when the 15 hexadecimal beacon identication code is known.

SIT 605 SYSTEM STATUS MESSAGE

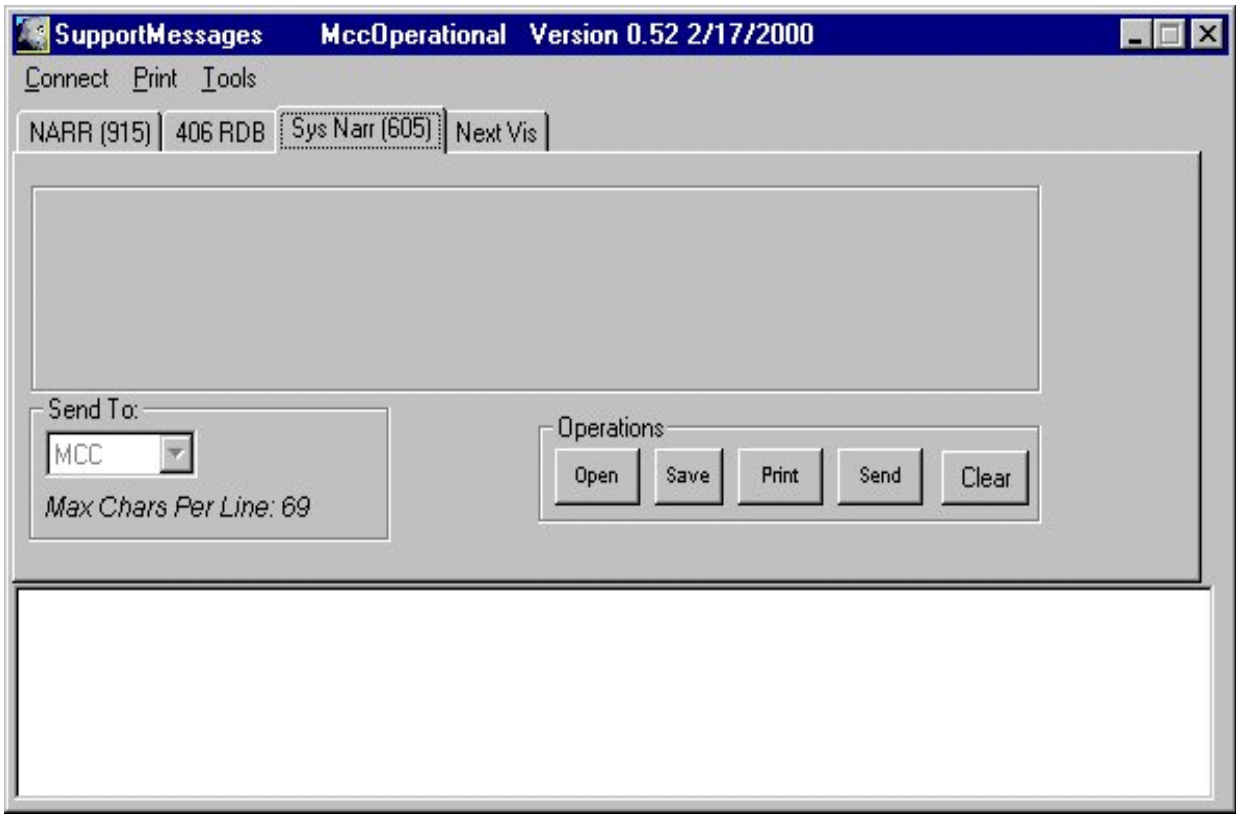

Figure 2-4 – System Status Message screen

Clicking on the **Sys Narr (605)** tab will bring up the screen for system status messages (Fig 2-4). Only the "Send To" option is shown. The MCC selection is shown, but inactive. This message is only sent to other MCCs. Routing of this message is automatically determined by software settings, in accordance with C/S A.001. This message generally works as per SIT 915 instructions. Enter the desired message text, then click on the "Send" command button in the Operation frame.

NEXT VISIBILITY MESSAGES

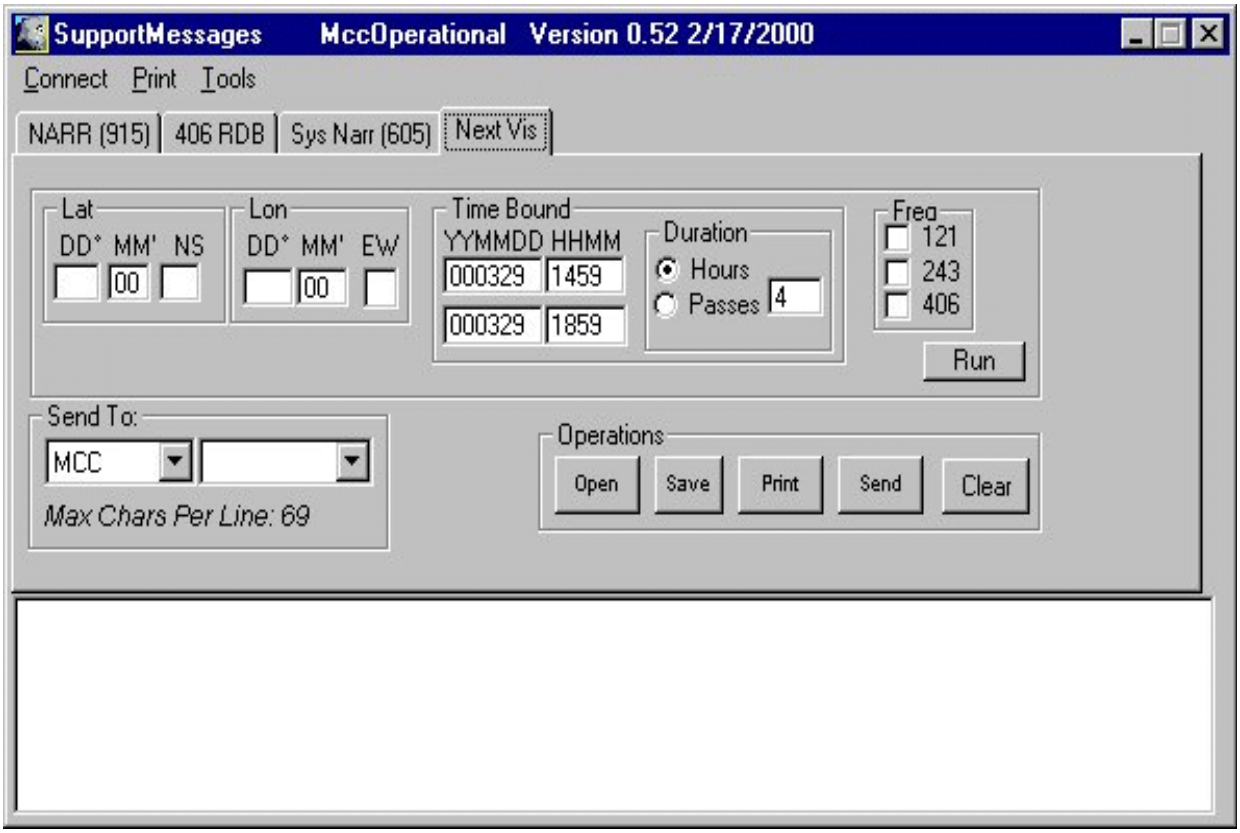

Figure 2-5 – Next Visibility Message: initial screen

Clicking on the **Next Vis** tab will bring up the screen shown in Fig. 2-5. This form has a new frame at the top with sub-frames to enter location, time constraints and frequency criteria. For the purposes of further discussion, this frame will be referred to as the "Next Pass Visibility parameters" frame. The ***Send To:*** and ***Operations*** frames are identical to those used in the SIT 915 Narrative messages, except that the word wrap has been automatically set to 69 characters per line. Otherwise, the functionality is the same. Next pass visibility predictions will normally be requested by a specific RCC, SPOC or MCC. Therefore, there is no requirement for a "Send to All" frame.

The visibility prediction software produces a list of satellite identifiers and times at which a distress beacon at the specified location should be visible. The software uses a number of built in parameters, or minimum criteria, that ensures a high probability of detection – provided that the beacon is active and functioning properly. The user does not need to enter these parameters. Only one location entry is provided, but results should be accurate for an area within a few hundred kilometres of that location. The person requesting the visibility prediction should be asked to provide a representative location(s). If the query involves a larger area or long transit path, for example

New York to Bermuda, it is recommended that the program be run more than once using different locations at the start, end of the transit path, and/or intermediate points.

The first entry needed is the representative location of the distress beacon. Location is entered first as latitude ("Lat"), then as longitude ("Lon"). Both latitude and longitude are entered in 1) degrees, 2) minutes and 3) hemisphere. Most queries will be in the northern and western hemispheres. The software will perform some validation checks:

- latitude is between 0 and 90 degrees
- latitude hemisphere is either N (north) or S (south)
- longitude is between 0 and 180 degrees
- longitude hemisphere is either E (east) or W (west)
- minutes are between 0 and 59

> Take care that coordinates are entered properly. A USA location where the latitude and longitude degrees were reversed (i.e. 38N 76W entered as 76N 38W) would result in predictions valid in Greenland, not Washington!

Minute values are defaulted to zero value because this level of precision is not normally needed.

In many instances, the RCCs may have received a radio report of a vessel in trouble that is unsure of its location. Since its distress beacon has not yet been activated, they need to know when it will be visible if activated. Consequently, the most common query is one that looks ahead. Therefore, the "TimeBound frame"defaults the search criteria to values that start at the current time (set when the screen is first brought up) and ends four hours later.

The user may change the start time and/or start date. Some caveats apply:

- < The prediction software uses the USMCC master schedule to perform the predictions. This schedule is available online for the past 30 days, the current day and the following day (maximum prediction ahead is 24-48 hours).
- < The predictions are based upon realtime, mutual visibility between a USA LUT, the beacon and the satellite. The beacon location must be within viewing range of a USA LUT.
- < The software does not perform global mode predictions (when the satellite would see the beacon, independant

of LUT locations)

< Only currently active LUTs and satellites are used for the prediction. If the prediction is for a previous date, ensure that the same LUTs and satellites were active on that date.

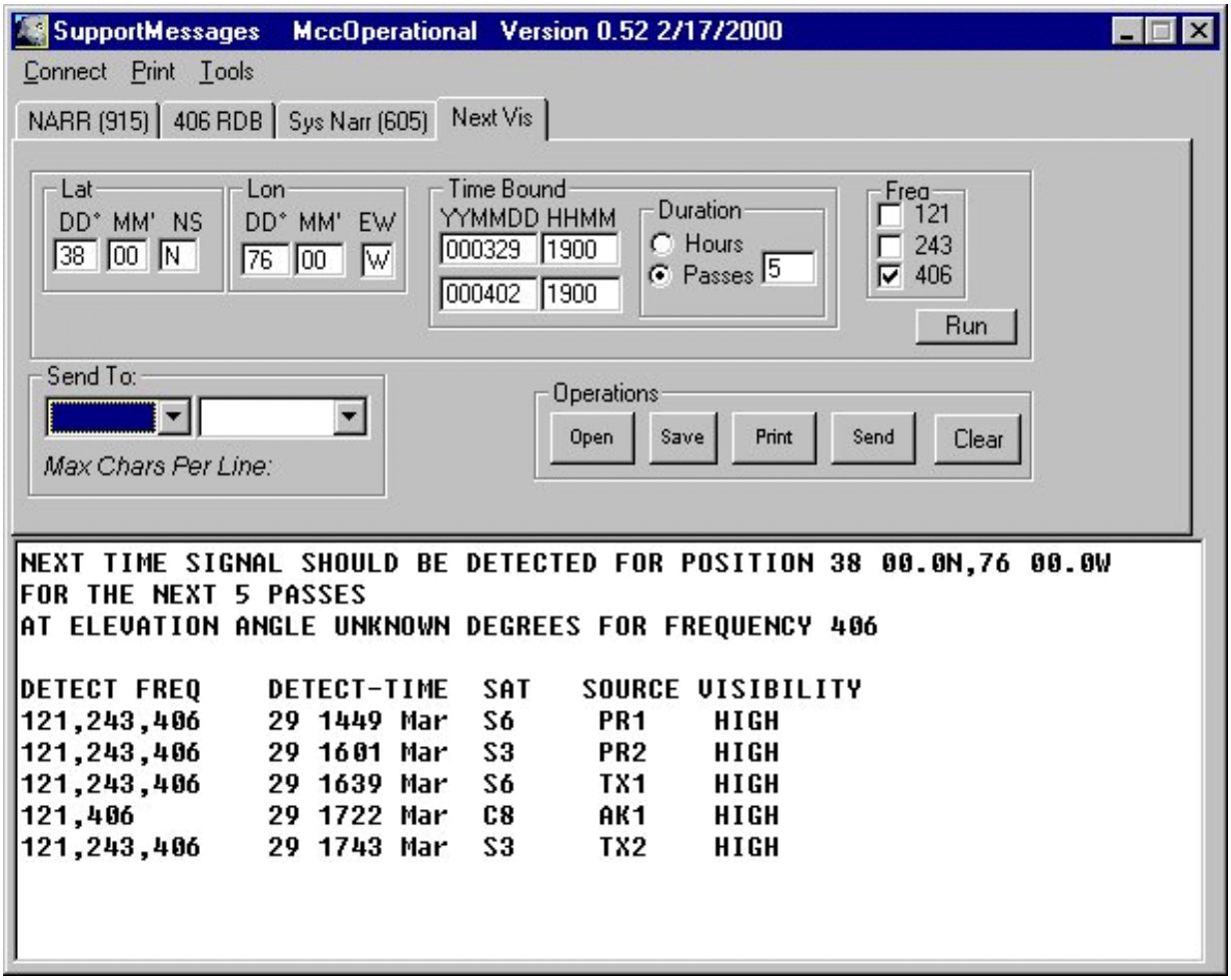

Figure 2-6 – Results from a Next Visibility prediction

At high latitudes (Alaska) a beacon will be seen on every orbit over the North Pole. A four hour prediction period could produce a rather lengthy message. Conversely, at equatorial latitudes, the intervals at which mutual visibility occurs is less frequent. In both these cases, it may be desirable to select the radio button “Passes” and enter the desired number of passes to be reported (default is 4 passes). The default search time will be altered to 48 hours, but only the next four passes will be posted to the message. The number of passes may be altered by clicking on the box to the right and changing the number in it to the desired value.

Both Cospas and Sarsat satellites carry 121 MHz and 406 MHz equipment. However, only Sarsat satellite carry 243 MHz equipment. Only western military forces use this equipment. If a check mark is placed in the 243 MHz “Freq” box, only Sarsat satellites will be used for the next visibility prediction. For normal operations, check the 121 and 406 MHz frequency boxes.

Click on the “Run” command button to start the next visibility prediction. This button will be inactive (greyed out) while the software is performing the necessary calculations. Results of the query should appear in the message text area within two minutes of depressing the run button. Emphasis shifts to the “Send To:” text box to select a destination. Results may also be saved, without being transmitted, and printed for manual fax transmission. Note that the search criteria that was used for the next visibility prediction is recorded at the top of the message in narrative format. Figure 2-6 shows the results of a visibility prediction.

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SECTION 3 – PASS SCHEDULE

FUNCTIONS PROVIDED

The Pass Schedule operator interface screen provides important information that is used to monitor performance of the USA ground segment. It links the USMCC Master Schedule with Pass Completion Reports from the USA LUTs. It also performs an analysis of LUT pass results.

At each USA LUT, every time that a Cospas-Sarsat satellite passes above the horizon (is visible at the LUT), it becomes a candidate orbit for the LUT tracking schedule. Because several Cospas-Sarsat satellites are available, some overlapping visibility occurs. Satellite tracking algorithms are used to select the best passes that each LUT should track, taking into consideration activity at adjacent/co-located US LUTs. The USMCC generates a Master Schedule that contains all available satellite passes. Each pass, for each LUT, is designated as being "SCHEDULED" for tracking, or "SUPPRESSED" from being tracked. Towards the end of each day, a new schedule is sent to each LUT that covers the next two days (48 hours) UTC. A Master Schedule that contains the complete schedule for all USA LUTs is retained at the USMCC.

The Pass Schedule screen provides the following functionality:

- View the complete USMCC Master Schedule from a period of 30 days prior to current time up to a 24-48 hours in the future
- View selected portions of the schedule by timebounds
- View the schedule for all LUTs or one specific LUT
- View all passes, only schedule passes, or passes where the analysis software reported potential problems
- To sort the results by Time (default), LUT, satellite or pass result

The analysis software compares the number of calculated locations that the LUT has reported with a count of actual solutions received. Discrepancies are reported under results. Unusual

results are also reported and guidelines for interpetation will be presented later.

When the program is activated, the screen shown in Figure 3-1 appears.

When the Pass Schedule interface program is started, default values are set to look for all LUTs, all satellites (SAT), but only scheduled passes. The default times are set to a “Start” time that is two hours prior to current time and a “Stop” time that is two hours ahead of current time. This provides an excellent quick look at recent results and future activity. To produce results, only two actions are required:

a. Check the title bar to confirm that the correct database has been selected. If not, click on the “Connect” menu item and select the database to use.
b. Click on the “SRCH” command button.

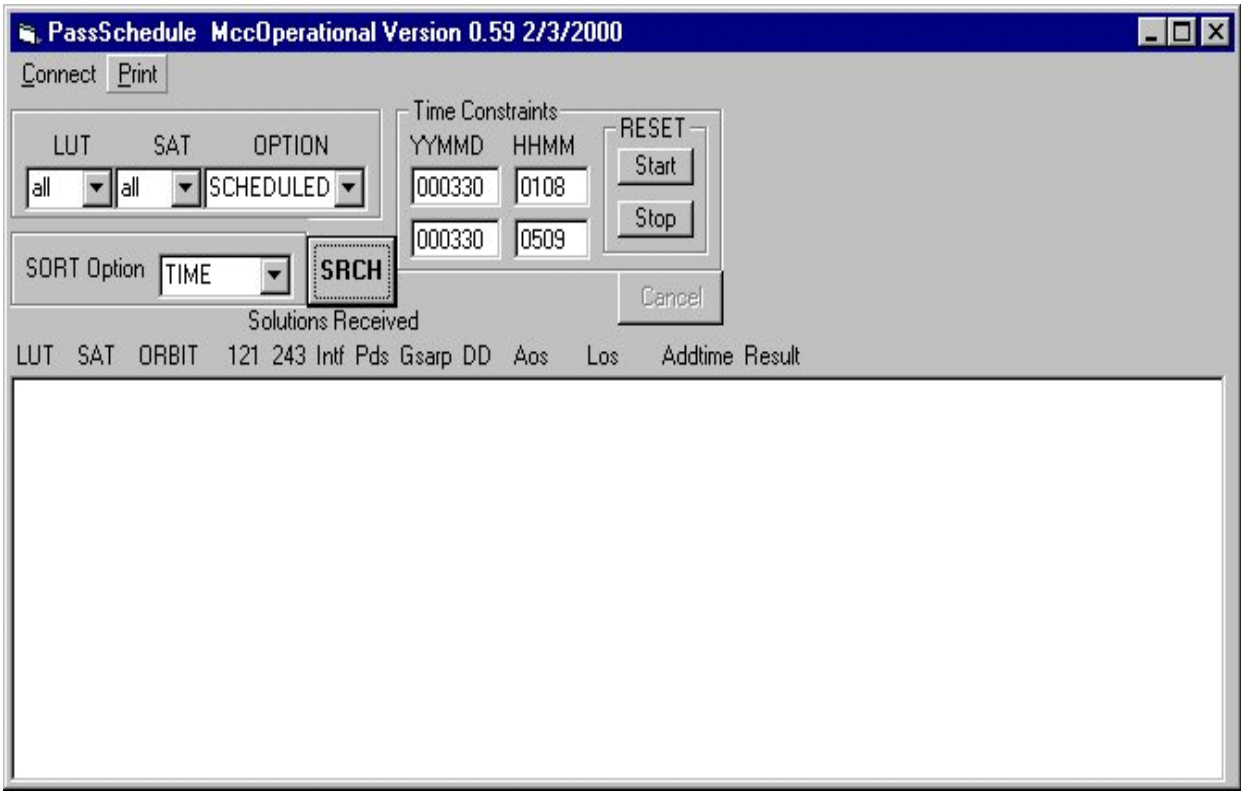

Figure 3-1 – Pass Schedule Initial Screen

Figure 3-2 shows the results of a Pass Schedule search where the Result option was changed from the default value of “SCHEDULED” to “all”. A vertical scroll bar has been placed on the right side of the text box where results are displayed. The display was scrolled down to a point where current time appears

in the centre of the screen (0308 UTC). Note that numerous passes are shown as being suppressed. The relative position of the scroll bar correctly implies that numerous entries precede and follow what appears on the screen. Also note that the "TIME" "SORT Option" presents the result in increasing, chronological order. The oldest passes appear at the top of the screen, and the newest passes at the bottom.

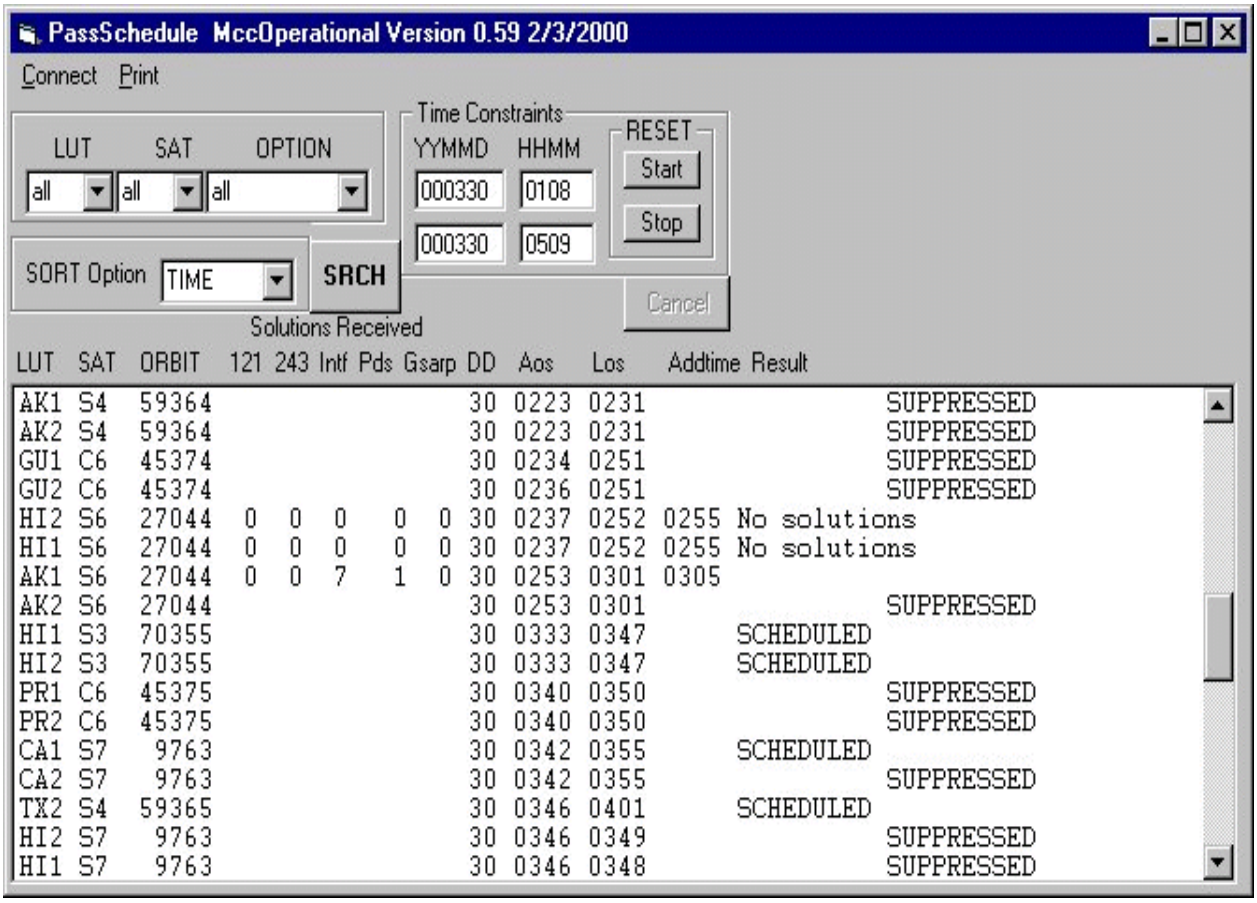

Figure 3-2 – Pass Schedule Results, all results selected

The Pass Schedule display (output) can be interpreted as follows:

- LUT This is the 3 character identifier for US LUTs. AK1 at the top of the screen is the Alaska 1 LUT and AK2 is Alaska 2 LUT (see Section 15 for complete LUT listing).
- SAT is the two letter satellite designator. "C" is for Cospas and "S" is for Sarsat. The number represents the vintage, i.e. S3 is the third Sarsat satellite that was launched.
- Orbit number is primarily used by the LUTs to distinguish between various passes for the same satellite on the same date. Orbit number is used for national purposes only.
- Solutions Received contains an actual count of solutions

that were sent to the USMCC by the LUT for the named orbit. These solutions are subdivided by processor:

< 121 = 121 MHz
< 243 = 243 MHz
< Intf = 406 MHz Interference Processor (Sarsat only)
< PDS = 406 MHz beacon solutions (406 memory/global data)
< Gsarp = 406 repeater-not used; results included in PDS count

- DD is calendar date of the pass (UTC)
- Aos means 'Acquisition Of Signal' and represents the time (UTC) that the LUT began tracking the satellite.
- Los means 'Loss of Signal', time (UTC) that the LUT stopped tracking the satellite.
- Addtime is the time (UTC) that data for this pass was received at the USMCC
- Results show whether or not the pass is scheduled to be tracked. If the pass has already been tracked, any unusual results will be shown here. No entry is shown under results if results are normal (for example AK1 S6 Addtime 0305).

Time fields default values are only updated when this program is started. Check and reset the Time Constraints before running another search

The Pass Schedule "RESET" buttons in the Time Constraints frame operate as follows:

< Clicking the "Start" button will reset this time to current time minus 2 hours.
< Clicking the "Stop" button will reset this time to current time plus 2 hours.

Various combinations of LUT and SAT are used to fulfill different requirements. For example, if it is desirable to perform a regional beacon test, one would want to examine satellites that do not work in global mode (i.e. S3). Similarly, one may wish to look at the schedule for a specific LUT for the same reason. In order to select an appropriate pass, the "all" option may be selected so that one can see both scheduled and suppressed passes. This will help to assess the overall operating environment. For example, if the test involves the S3 and the OSE LUT, a display of all passes may show that this satellite pass was suppressed due to some overlap with a different satellite. In this case, the information reported by Pass Schedule is used to support other actions. (Note: the LUT Interface screen is used to make the actual schedule changes)

Figure 3-3 demonstrates another commonly used selection.

The LUTs are continuously checked to ensure that they are performing correctly and that data is being received from scheduled passes. The Pass Schedule tool plays a useful role. In this example, the selection was made to view only passes where the reported results included problems. The analysis software assumes that 406 beacons will be detected and reported on every satellite orbit. The rationale is that both the Arctic and Antarctic contain orbitography (reference) beacons that will be detected every time that a satellite passes through the polar regions. Therefore, when a LUT tracks the satellite, some 406 solutions are expected. However, in this example, it was not a problem because the global portion of S6 was inoperative. Supervisors will often use this screen with specific satellite selections to identify possible LUT or space segment problems. Times may be reset to view results for an entire day. This is done by manually clicking on the date and time text boxes, using the delete key to remove current entries, then type in the desired entry. When the "SRCH" command button is clicked, the search will use these newly entered dates and times.

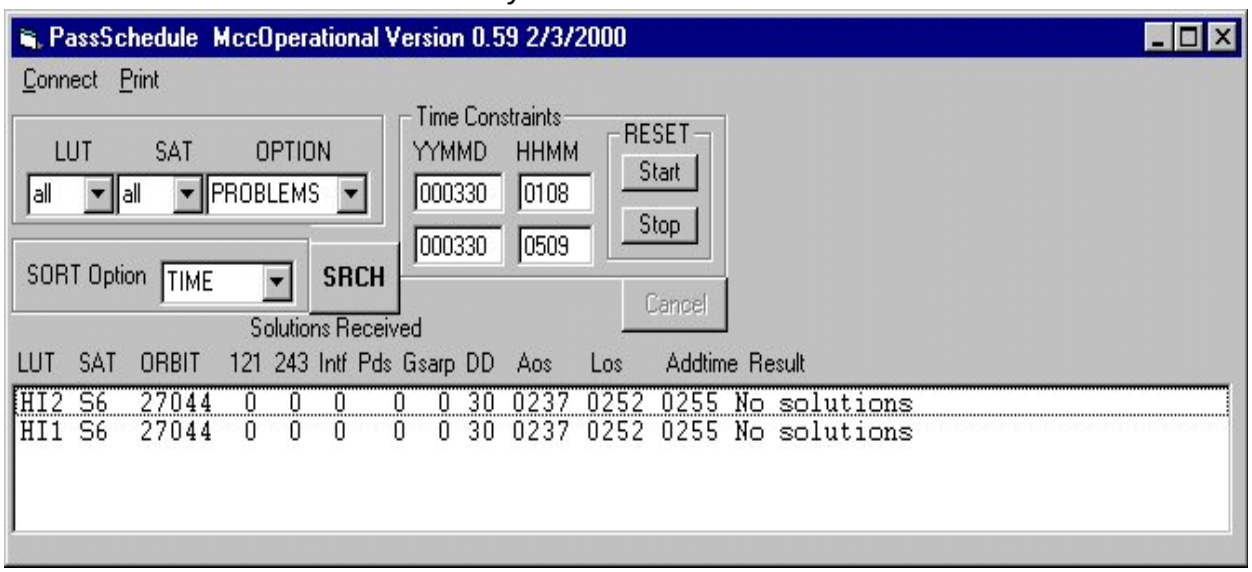

Figure 3-3 -- Pass Schedule Results using Problem Option

The Pass Schedule search uses currently available LUTs and satellites. These values are read from the database when the program is executed. If a particular LUT or satellite is declared down (inoperative) today, a query of past data will exclude this satellite from the search. If indeed the LUT or satellite was active at the time specified for the search, it will not appear in the results when the "All" selection is used. There are two methods of obtaining the missing data: 1) use a special offline query or 2) type the identification of the missing LUT or satellite directly into the combo box. to extract information under these conditions. If problems are encountered during the query, or it is taking too long, click the "Cancel" command button to stop the search.

As a final note, reported results can be sorted in time sequence, by LUT, by satellite or by result. Sorting data by satellite is used to see if other LUTs are reporting similar problems with the same satellite. Sorting by LUT helps to identify LUT problems, i.e. no 121 data for several hours on all satellites might indicate a LUT 121 processor problem. An example of data sorted by results is presented in Figure 3-4 (next page).

If communications are disrupted while data is being transferred between a LUT and the USMCC, a discrepancy between actual and expected results will be reported. Once communications is re-established, and data downloaded, the USMCC input table for that pass will include redundant data from the previous attempt to communicate (partial data was received and added to the table). This occurs because the LUT will re-send the entire pass data file where communications were interrupted. Each attempt to communicate will appear on the Pass Schedule as a separate entry for the same LUT, satellite and orbit number. However, if header files are reported missing, this could indicate a LUT processor failure. Controller SOPs provide further guidance on monitoring LUT performance.

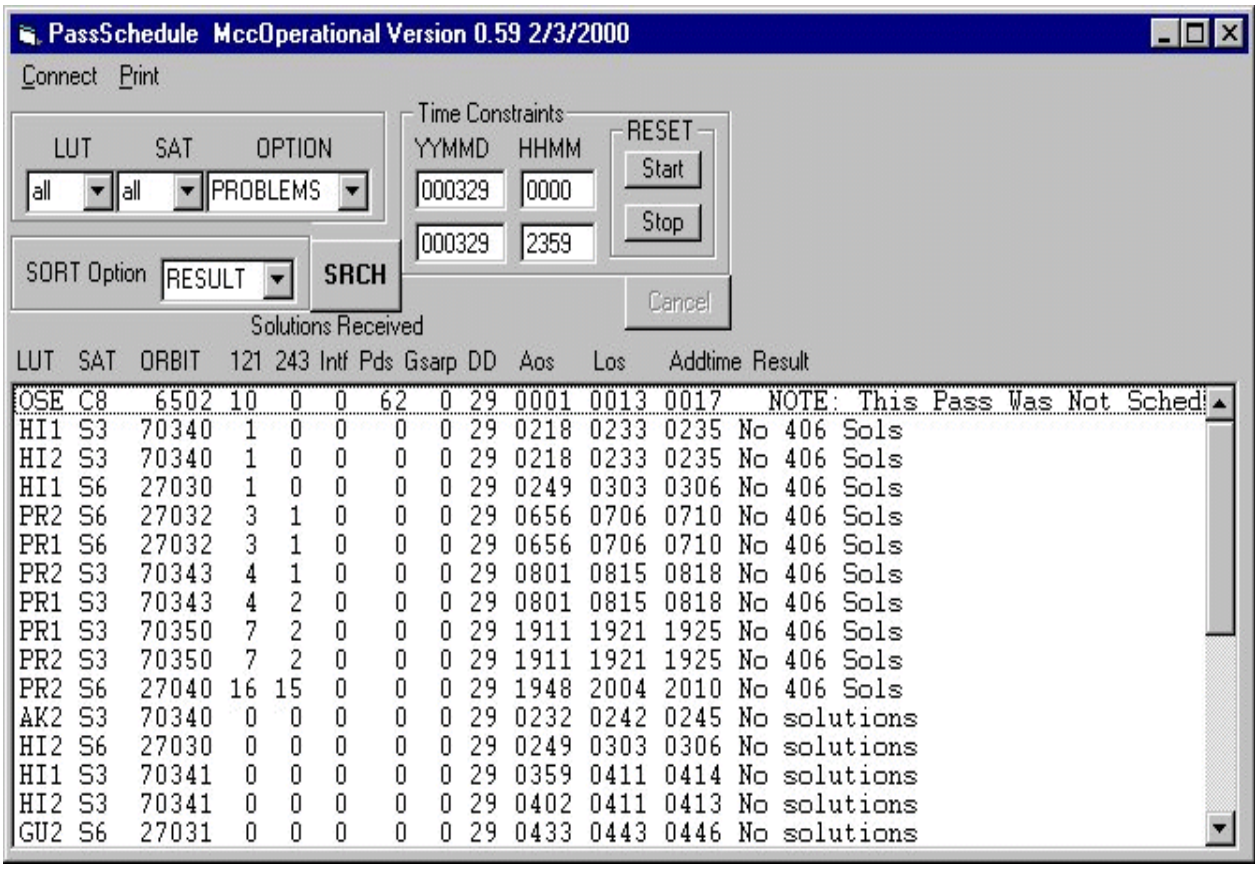

Figure 3-4 – Pass Schedule Problems sorted by Results

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SECTION 4 – MESSAGE QUERY

OVERVIEW

The Message Query operator interface screen is a multipurpose program that gives the user access to most incoming and outgoing message traffic. There are basically four different types of messages that are used by the USMCC:

< All messages exchanged between MCCs, RCCs and SPOCs follow a specific structure that is designed to allow automatic processing of the data contained in the messages. There are a variety of different types of messages, each of which serves a unique purpose. Each different type of message is assigned a unique Subject Identifier Type (SIT) code. SIT code message definitions are contained in C/S A.002 for MCC and SPOC messages, and in the NOAA RCC Message document for messages exchanged with US RCCs.

< Binary formatted messages are used between the USMCC and USA LUTs. Function codes within the message header determine the type and format of message being exchanged. LUT message formats are defined in the LUT Data Transfer Specification. For message query purposes, the function codes are treated the same as SIT codes.

< CEMSCS messages are unique, internal messages that are used between the USMCC and the NOAA Spacecraft Operations Center. Telemetry information that is used by the Sarsat space segment providers is received at the USMCC in this format. Negative SIT code numbers are assigned for messages used internally within NOAA/USMCC. CEMSCS data formats are defined in the USMCC/CEMSCS Interface Control Document.

6. All other messages are classified as “Unformatted” messages. These mainly consist of information exchanged between communication vendors and the USMCC. An example is a message from the communication vendor confirming that a computer generated fax message was correctly received at its destination.

Each LUT and SIT formatted message is assigned a unique message

number and a time of transmission. Thus, SIT code, Message Number, and time of transmission become key parameters for message queries. The last parameter is the originator (incoming messages) or destination (outgoing messages) who are termed as “ComSiteName”.

FUNCTIONS PROVIDED

The Message Query interface allows the user to view message traffic:

1. by Type of Site – MCC, RCC, SPOC, LUT, CEMSCS, or Unknown
2. as Formatted Incoming messages, Unformatted Incoming messages, or Output messages (all output messages are formatted).
3. from All Com Sites of the selected type, or from a selected Com Site
4. for All message types (i.e. SITs), or view a selected type of message
5. for a selected time period in which the message exchange occurred

Message Query also provides the capability to:

6. re-transmit a copy of the message to the original destination
7. send the message to a different destination
8. display the contents of one or more messages
9. print the entire message
10. view information concerning processing times and send dispositions

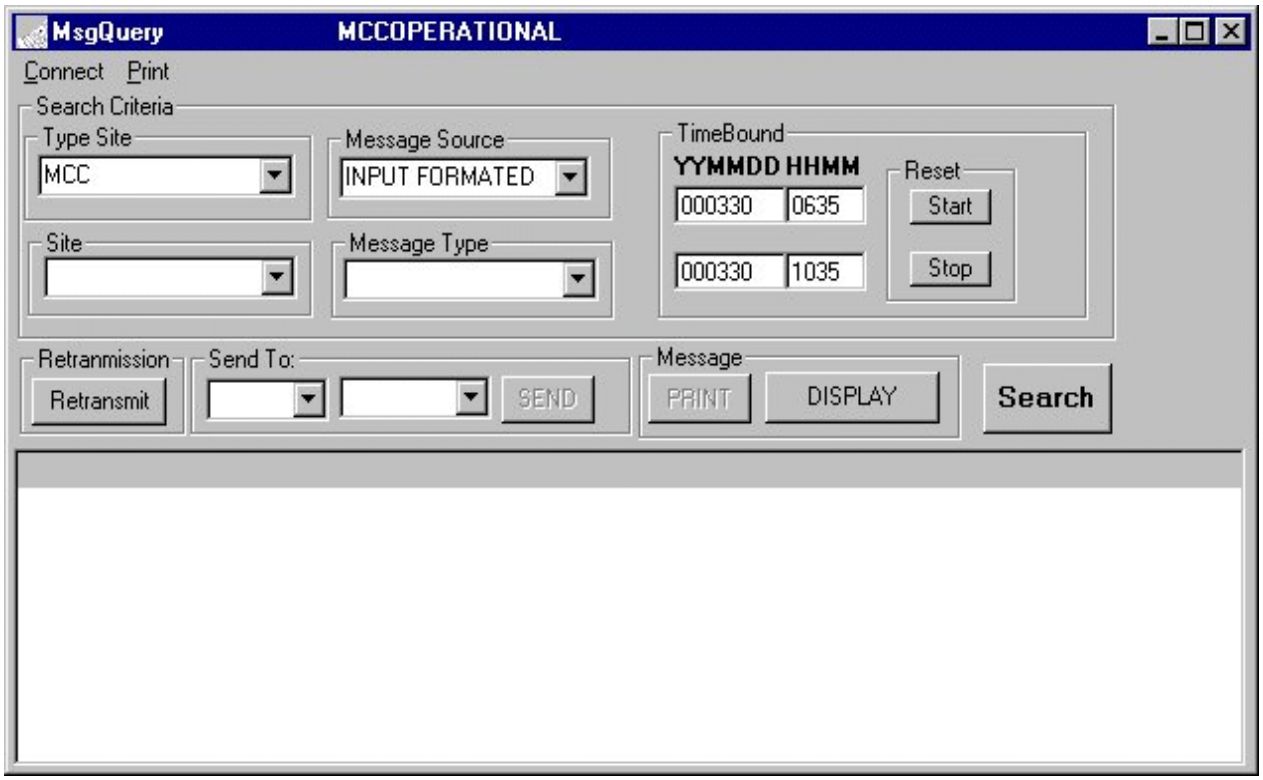


Figure 4-1 – Message Query, Initial Screen

INITIAL SCREEN

When the Message Query program is started, the screen shown in Figure 4-1 appears. The database that the program is using is shown on the Title bar. If this is not the desired database, click on the connect menu item and select the desired database.

On startup, the menu sets the default TimeBound to start four hours prior to the time that the window was opened and to end at the time that the window was opened. A five step process will produce a list of all incoming messages in the past four hours:

1. Click on the “Type of Site” combo box and select the desired type from the drop down list that appears (default = MCC)
2. Click on the “Message Source” combo box and select the desired format (default value = “INPUT FORMATTED”)
3. click on the Site combo box and select “All” from the drop down list.
4. click on the ”Message Type” and select “All” from the list of SITs
5. Click the “SEARCH” command button (right hand side of

screen).

A list of messages that meet the search criteria will appear in the text box at the bottom of this window. While the software is searching for entries, the “MsgQuery” name in the title bar will flicker. This is normal and will cease when the search is completed.

If a different time period is desired, change the time bounds before clicking “SEARCH”. To do this, click in the window for the desired date and time. Use the delete keys on the keyboard to remove the current entry, then type in the desired values. If the Message Query window has been open for a while on the desktop, default time settings can be updated based on current time by clicking on the “Start” and “Stop” command buttons inside the frame labelled “Reset”.

The Type of Site is set to the default value MCC, and Message Source is set to the default value Input Formatted. The USMCC has communication links to a multitude of sites. When a setting is selected under “Type of Site”, a list of sites that match that category is loaded into the combo box labelled “Site” (directly below Type of Site combo box). At the same time, a list of the types of message formats used for the selected “Type of Site” and “Message Source” is loaded into the combo box labelled “Message Type”. An error box will pop up to notify the user when incompatible selections are made.

> It is important that the user follow the five step process in the sequence shown so that the software has a chance to load the correct data into the “Site” and “Message Source” boxes.

It was previously mentioned that the USMCC uses four different types of message formats. The “Type of Site” drop down list shows six different types (Fig. 4-2a). MCCs, RCCs, and SPOCs all use formatted SITs. Splitting the SIT “Type of Site” messages into three categories makes the drop down lists more manageable and more consistent with user queries. For example, if MCC is selected as the Type of Site, then only MCC names will be loaded in the “Site” combo box (Fig. 4-2b). If RCC is loaded into the Type of Site box, then only SITs that are used in messages sent to RCCs will be loaded into the “Message Type” box (Fig. 4-2c)

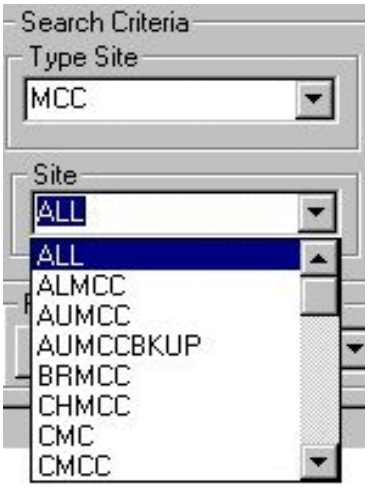


Figure 4-2b - MCC Sites

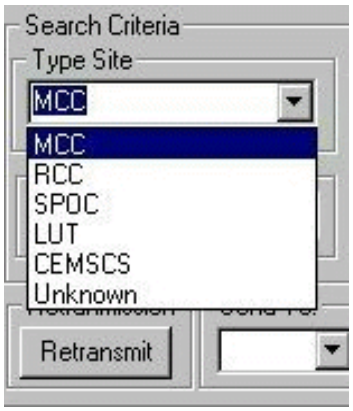


Figure 4-2a - Type of Site

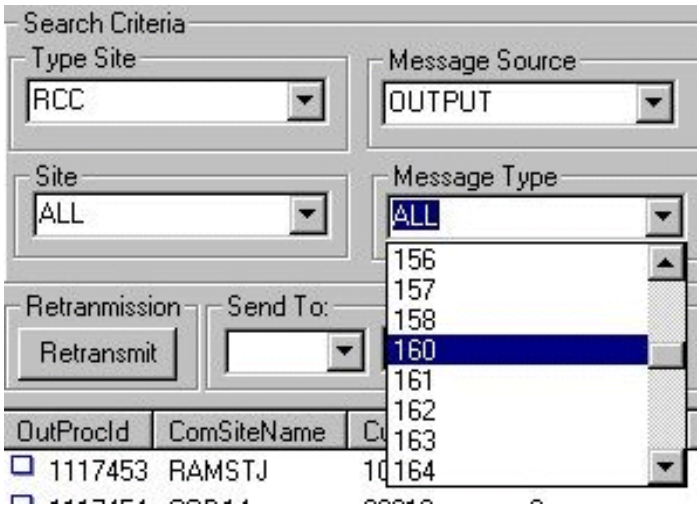


Figure 4-2c - RCC Message Types (SIT codes)

A sample output for a query using default settings with "All" selected under Sites and "All" selected for message types is shown in Figure 4-2c. A list of messages is displayed that have a check box in the left hand column. The user can display any of these messages by:

- Click on the check box(es) for the message(s) beside the desired message.
- Click "Display" command button in the "Message" frame to the left of the search command button.

Each message that the user has selected will be appended to one

continuous, temporary file for viewing. All the messages will appear in sequence as one continuous display.

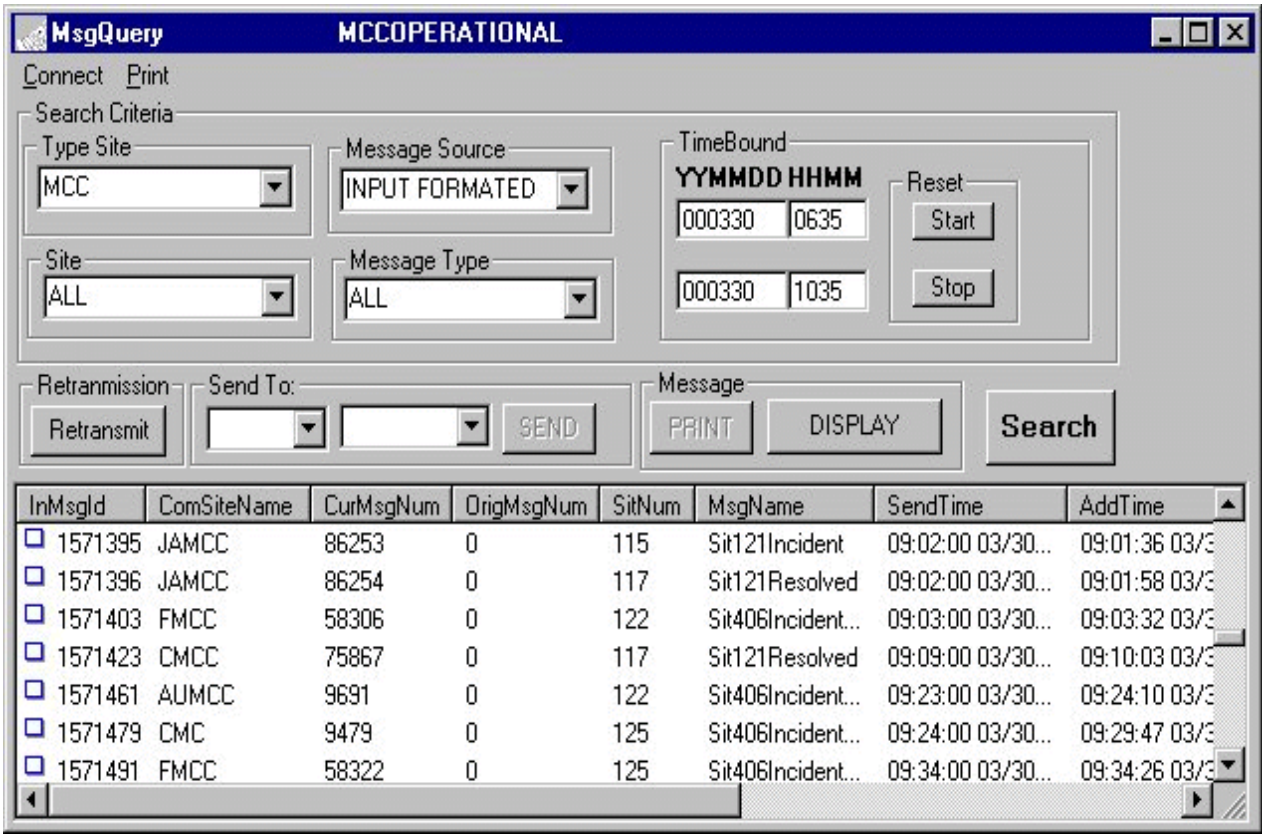


Figure 4-3a – Message Query output

Output List Format – Incoming Formatted Messages

The listing of incoming messages (Fig. 4-3a) has headings which are explained as follows:

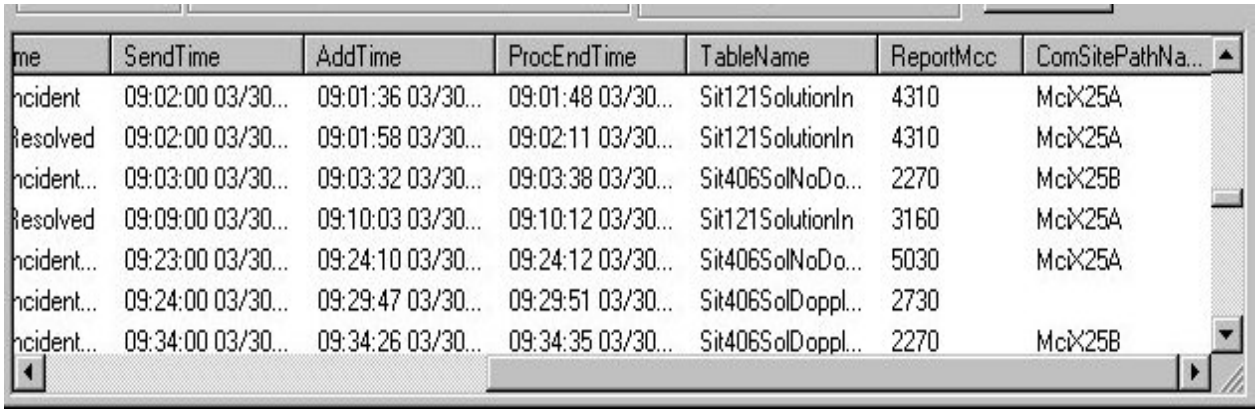
- InMsgId is a sequential numeric identifier that the system assigns to each incoming message. It is used by the computer to search for the messages.
- ComSiteName is the name of the originator for incoming messages or destination for outgoing messages.
- CurMsgNum is the Current Message Number that was assigned by the message originator. This reference number is used for correspondence with the message originator.
- OrigMsgNum is the original message number that was assigned to this message, if the message is a re-transmission of a previous message.
- SitNum is the SIT numeric code that identifies the type of SIT message.
- MsgName is a plain language name that the USMCC assigns

to identify what type of SIT message was received/sent.

> Note: in Fig 4-3a, some of the message names have been truncated; to correct this, click on the separator bar at the top of the field name and drag the bar so that the full name is visible. Double clicking on the column separator expands the column to full width to match the size of the displayed text.

- SendTime is the time that the originator transmitted the message. Note that these times are only reported to the nearest minute.
- AddTime is the time that the USMCC received the message and added to its input table for processing. Note that these times are displayed to the nearest second.

Note: The remaining field names are visible by scrolling to the right with the horizontal scroll bar situated at the bottom of the text box containing the query output. (See Fig. 4-3b)



me	SendTime	AddTime	ProcEndTime	TableName	ReportMcc	ComSitePathNa...
ncident	09:02:00 03/30...	09:01:36 03/30...	09:01:48 03/30...	Sit121SolutionIn	4310	McX25A
Resolved	09:02:00 03/30...	09:01:58 03/30...	09:02:11 03/30...	Sit121SolutionIn	4310	McX25A
ncident...	09:03:00 03/30...	09:03:32 03/30...	09:03:38 03/30...	Sit406SolNoDo...	2270	McX25B
Resolved	09:09:00 03/30...	09:10:03 03/30...	09:10:12 03/30...	Sit121SolutionIn	3160	McX25A
ncident...	09:23:00 03/30...	09:24:10 03/30...	09:24:12 03/30...	Sit406SolNoDo...	5030	McX25A
ncident...	09:24:00 03/30...	09:29:47 03/30...	09:29:51 03/30...	Sit406SolDoppl...	2730	
ncident...	09:34:00 03/30...	09:34:26 03/30...	09:34:35 03/30...	Sit406SolDoppl...	2270	McX25B

Figure 4-3b – Message Query Output, continued

- ProcEndTime is the time that the USMCC processed the incoming message.
- TableName is the name of the SQL table that was used to store the contents of the processed, incoming message.
- ReportMcc is a four digit code that identifies the message originator (see Cospas-Sarsat documentation for more information).
- ComSitePathName identifies the communications path that was used to receive the message.

Output List Format – Output Formatted Messages

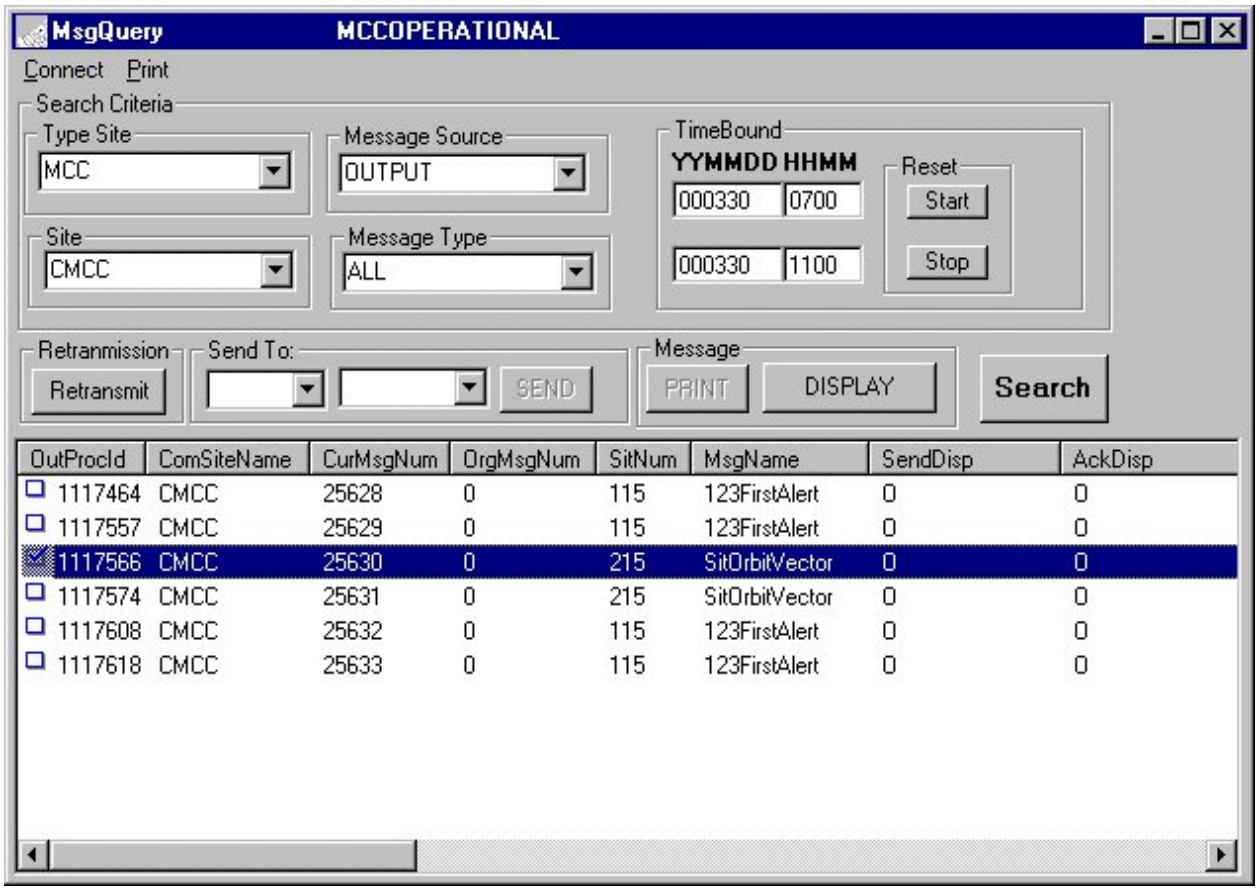


Figure 4-4a – Output Message Query Listing

When the query is made for outgoing messages, the format of the listing is different than for incoming messages. Headings for an output message listing (Fig. 4-4a) are:

- OutProcId is a system assigned sequence number that is used internally by the USMCC to track outgoing messages.
- ComSiteName is the message destination (addressee).
- CurMsgNum is the message number that the USMCC assigned to this message. It is used as reference for correspondence with the recipient.
- OrgMsgNum is the original message number, if this message was re-transmitted.
- SendDisp is a character code to indicate that the message has been transmitted. In this example, the letter "O" stands for OK. A complete listing of all possible codes is given in the Data Structures Document.
- SendDispAck is a character code to indicate whether or not the transmitted message has been acknowledged as received by the recipient. A complete listing of all

possible codes is given in the Data Structures Document.

Note: Several time stamps for the communication process are recorded, but not shown in the example. These included AddTime, ComBegTm, SendTm, ComEndTm, AckTm and ComSitePath name. See Figure 4-4b for the remaining header fields.

Figure 4-4b – Output listing, other headers

- OutMsgId is a computer generated sequence number that is used to keep track of outgoing messages.
- SitNumType define the format within a given type of SIT. It is normally used in SPOC messages where the SIT 185 message has different versions depending upon the beacon type and site status.
- TableName is the source of the information used to create the output message.
- Sat is the satellite that provided the data that was used (alert messages only).
- Des.. is a shortened version the word destination. This is a alphanumeric identifier of the message destination. A list these of identifiers is included in the technical attachment.
- Ite.. is a shortened version of the word ItemNum. It represents the number of Items (eg., Doppler alert solutions) in the Sit message: range 0 to 99.
- IncRpt indicates whether or not an incident history report form has been sent. These reports are used to capture feedback on distress beacon incidents and apply to RCC messages only. Y means “Yes”, N means “No”.

DISPLAY AND PRINT MESSAGE CONTENTS

To display the contents of a message, click the check box on the left hand side of the listing for the message(s) to be viewed. See Figure 4-5a for an example. Next click on the “Display” command button (next to the search button). This will cause a new text box to pop up that contains the message contents. See Figure 4-5b for an example.

To print out a copy of the message, click on the ‘PRINT”

command button in the lower right hand corner of the new text box window that contains the message contents.

To display a different set of messages:

- close the message text box
- click on the messages you previously displayed in order to remove them from the new display
- if the messages are already in the list from your previous search, select the new messages you want to view from the existing list
- if they are not on the list, enter a new query to obtain a new listing

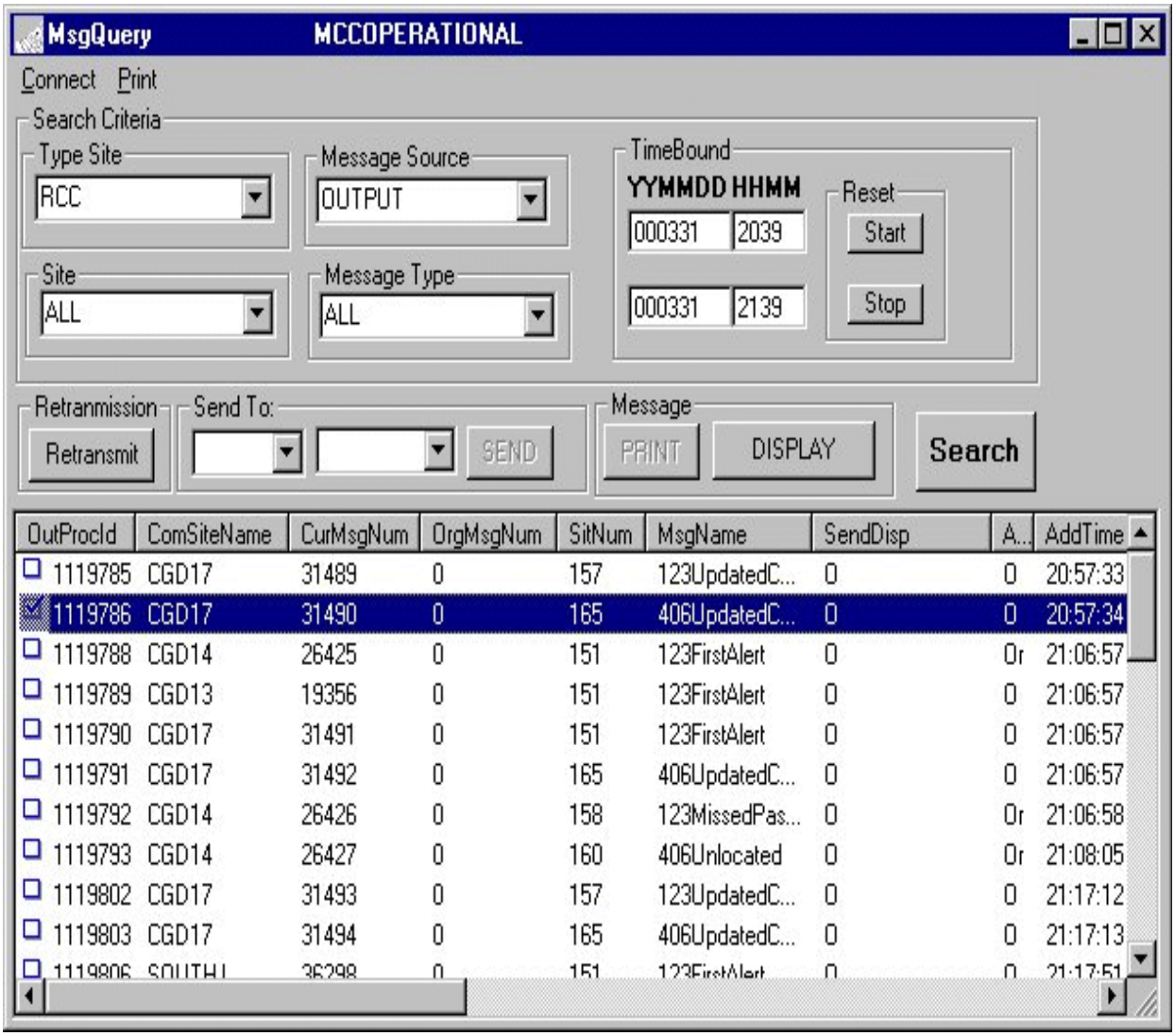


Figure 4-5a – Selecting a message for Display

In this case, it is desired to look at the 406 Updated Composite solution that was sent to Coast Guard District 17 (CGD17) at 20:57 UTC. The message is selected by placing a check mark in

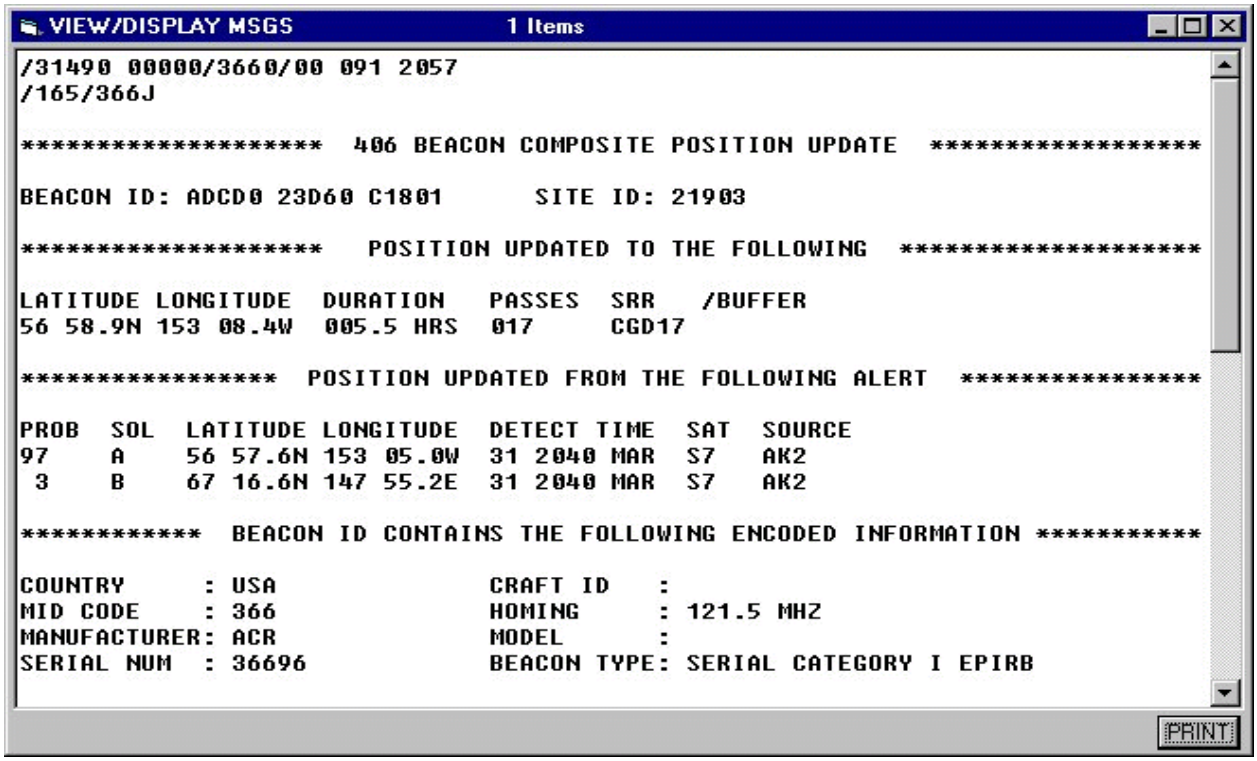


Figure 4-5b – Display Window showing message contents

the check box to the left (beside OutProcId number 1119786) . If it was desired to view several messages at the same time, several selections could be made at this point. When done, click the Display command button that appears above the output listing. This will cause a new window to appear that contains the contents of the selected message(s). The result of the selection made in Figure 4-5a is shown in Figure 4-5b.

Note that the title bar of the VIEW/DISPLAY MSGS window indicates the number of messages contained in the window (1 Items). All messages contained in this window, whether visible or not, will be printed as one continuous printout when the PRINT command button is used. If several messages were selected for viewing, but only one message needs to be printed:

- note the message number of the message to be printed (in the example in Figure 17a, the message number appears after the first slash mark (31490)
- close the view/display window and return to the main screen
- deselect all messages (remove check mark in check box)

- click on the check box on the line where the desired message number appears under the column “CurMsgNo” (31490, see Fig 4-5a).
- click the Display command button to return to this window then click PRINT

MESSAGES TO/FROM USA LUTS

Messages sent to or received from USA LUTs cannot be displayed. They are stored in binary format and are not decoded by this program. Nevertheless, the list of messages provides useful information to the user by demonstrating that data is being exchanged between the LUTs and the USMCC such as the transmission of orbit vectors to the LUTs.

INPUT UNFORMATTED MESSAGES

Incoming unformatted messages may be viewed by selecting:

- Message Source = Input Unformatted
- Type Site = MCC or RCC or SPOC (the output list is the same regardless of the selection, but does not apply to CEMSCS or UNKNOWN)
- SITE = ALL
- Message Type = ALL
- set the desired time bound then click SEARCH.

A sample output is shown in Figures 4-6a and 4-6b below.

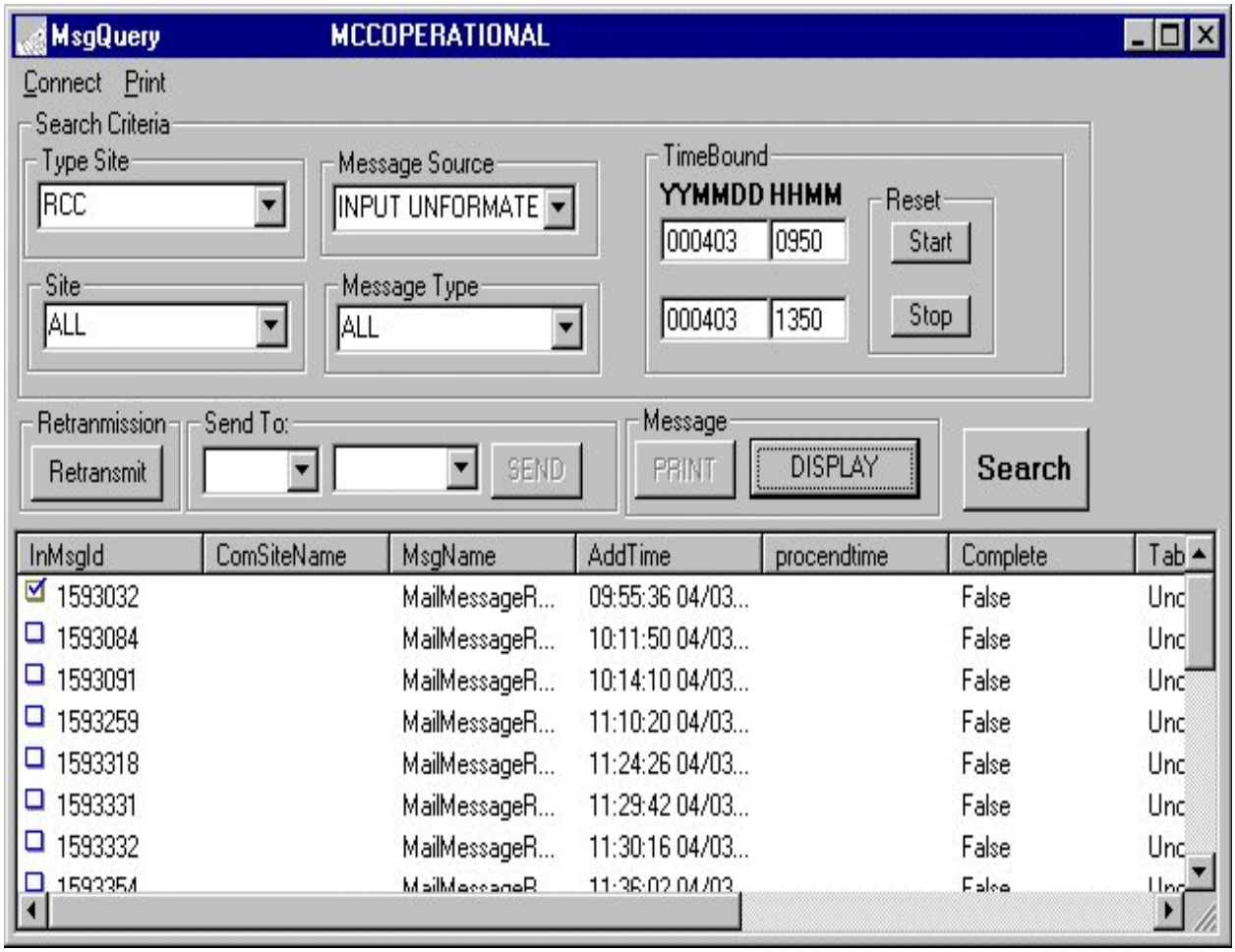


Figure 4-6a – List of Input Unformatted Messages

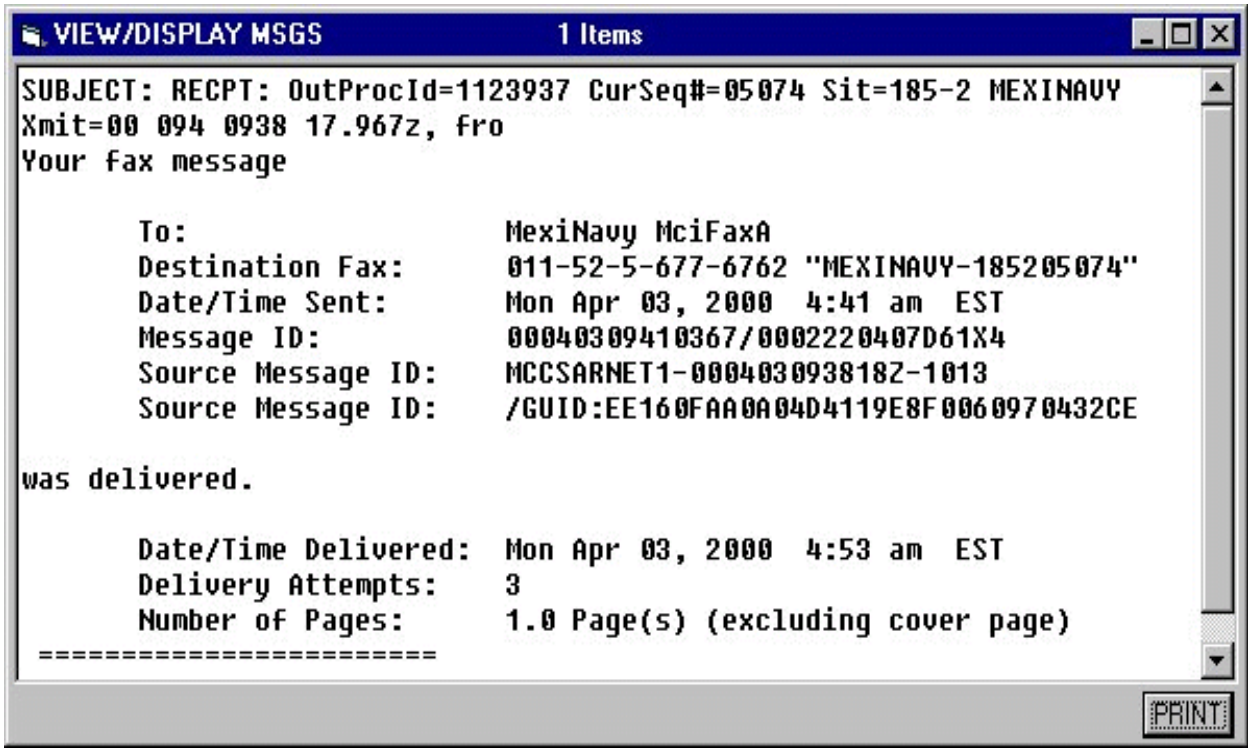


Figure 4-6b – Message Contents, Input Unformatted Message

CEMSCS/UNKNOWN

Not available; to be added in a future release. Use the 'Input Unformatted' message query as described above for unknown messages.

Notes: (1) A proposal for new SITs to identify internally generated narrative messages is under consideration.
(2) DispProc may appear on some interface screens as a type of site. It stands for "Display Processor" and is a destination for LUT graphics. The graphic terminals are assigned a "Site" ID of DP1 and DP2. A third display processor may be added as a future enhancement.

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SECTION 5 – LUT INTERFACE

OVERVIEW

The LUT Interface screen is a multi-functional screen that is used to send and receive data from the LUTs. Although the majority of communication between the US LUTs and the USMCC is handled automatically, situations arise that require the user to initiate communications with the LUT. The actions essentially command a LUT to send data to the USMCC, send data from the USMCC to a LUT to update the information used to track satellites, or to command a LUT to change its processing configuration. Depending upon the action(s) that the user selects, the frames on this screen will be modified and change in appearance. Specific functionality is described below.

FUNCTIONS PROVIDED

The LUT Interface performs five basis functions. Within each function, there may be several sub-functions. These functions and sub-functions are:

- Request Action. This function requests the LUT to send specific information to the USMCC. The user selects one of the following request actions
  --request a Status report from the LUT
  --request the LUT to send data for a specific satellite pass
  --request the LUT send its current schedule to the USMCC

43. Send Action. This function is used to send data to a LUT. Possible actions are:
  –send a Status message from the USMCC to a LUT
  –send Orbit Vectors to a LUT
  –send Time Calibration (TCAL) to a LUT
  –send a new tracking schedule(s)
  –Test Communications with a LUT

44. Change an existing LUT schedule.

45. Alter the alert process to exclude specific LUT pass information from use in the next pass visibility predictions and missed pass calculations.

46. Command a LUT to send graphics data for interference monitoring

INITIAL SCREEN

When this program is started, the interface screen shown in Figure 5-1 appears. The user must select either one of the four radio buttons at the top of the screen, or a radio button in the "Display Graphics" frame. Each button corresponds to the functionality mentioned above. As with other screens, check the title bar to confirm that the desired database is being used.

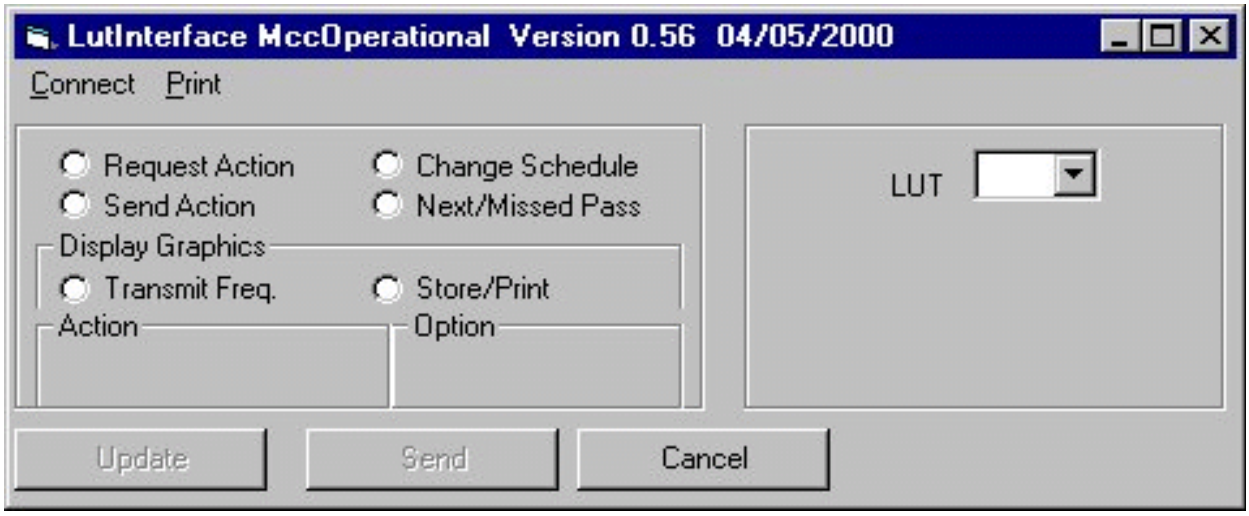


Figure 5-1 – LUT Interface Initial Screen

REQUEST ACTIONS

Clicking on the "Request Action" radio button causes a combo box to appear in the Action frame, and loads three choices into the combo box (See Figure 5-2). The choices are 1) LUT Status, 2) LUT Schedule and 3) LUT Pass Dat. The basic screen remains the same for LUT Status requests and LUT Schedule requests.

LUT Status. Select "Lut Status" from the drop down list (Lut Status, Lut Schedule, or Pass Data). Next, select a specific LUT, or "All" LUTs, from the drop down list in the LUT combo box (upper right corner). The "SEND" command button is now active; 'Click' it to send the request to the selected LUT(s).

> ***Note**: When the database selection is established, the program will read a file to determine which LUTs are configured as online with the Operational Database, versus the Test or other databases. Only those LUTs that are connected to the database in use will be available as listings in the LUT combo box.*

LUT Schedule. In order to obtain a copy of the schedule that a LUT is using, select "Lut Schedule" in the Action menu, then the desired LUT from the LUT combo box. Click on "Send" to transmit the request to the LUT. *Note: Only one LUT may be selected at a time.*

Pass Data. When the "Pass Data" action is selected, additional data entry boxes appear on the screen (Fig 5-2) . The LUT combo box provides a list of active LUTs (for the database that was selected). Select a "LUT" from this list. Next, select a satellite from the "SAT" combo box. Lastly, an orbit number must be entered into the text box labelled "ORBIT". Clicking the "Send" command button will send a request to the selected LUT to forward the specified pass data to the USMCC.

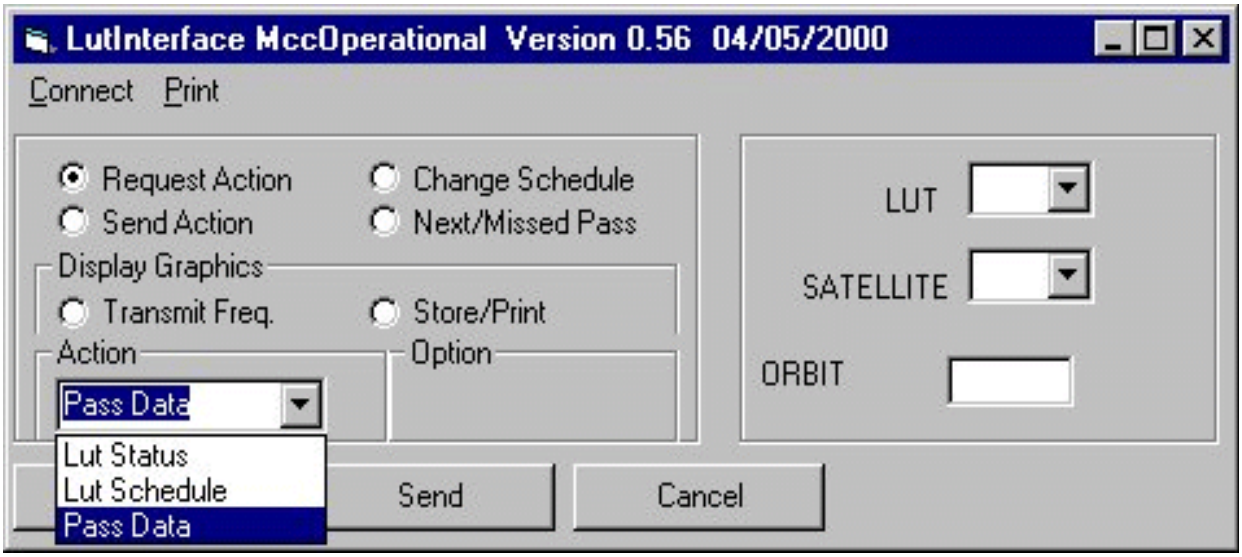


Figure 5-2 – LUT Request Action, Pass Data

SEND ACTIONS

Send actions are very similar to the request action screen. Figure 5-3 shows an example of this screen when the "Send Action" radio button is clicked. The next step is to select a specific send action from the "Action" drop down list. The choices are "MCC Status", "Orbit Vectors", "LUT Schedule", "TCAL" and "Test Communications". Each action is discussed below.

MCC Status. Select the desired "LUT". Clicking the "Send" command button will cause the MCC status to be transmitted to the selected LUT.

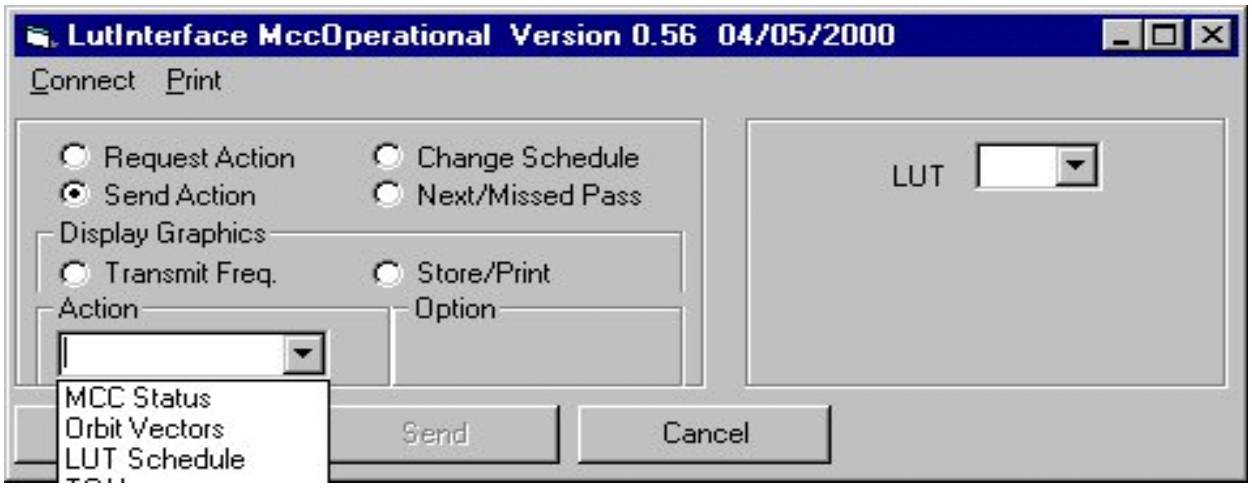


Figure 5-3 – LUT Interface, Send Action initial screen

LUT Schedule. If LUTs get out of synchronization with the USMCC, they will operate on their own schedule. This situation may arise, for example, following maintenance work performed on the LUT. In order to get the LUT to begin operating on the USMCC Master Schedule, a copy of the schedule, as it applies to the selected LUT, must be transmitted to the LUT. This screen performs that function. Select the "LUT" then click "Send".

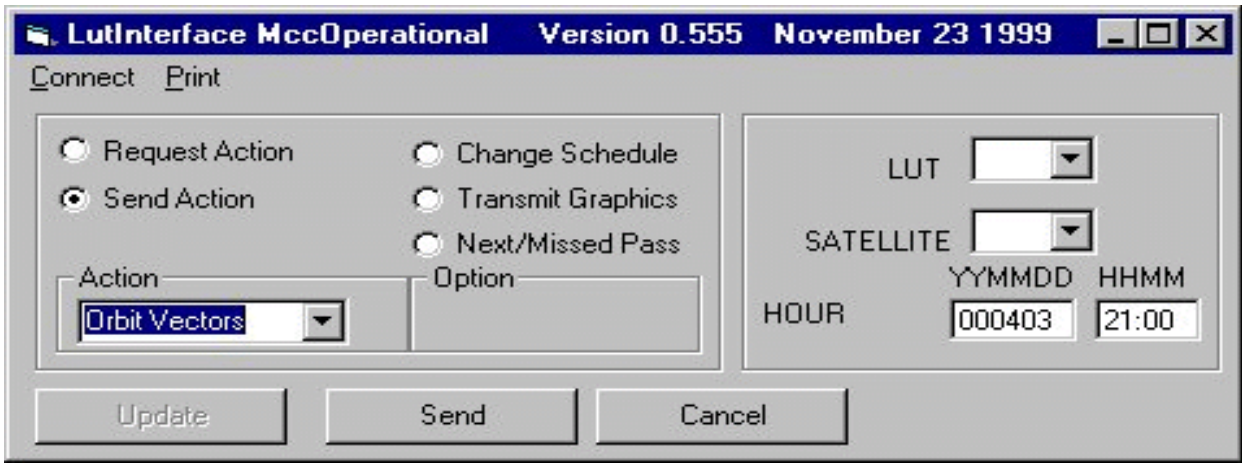


Figure 5-4a – LUT Interface, Send Orbit Vectors screen

Orbit Vectors. The "Orbit Vector" selection causes three data entry boxes to appear. The users must select 1) one LUT from the LUT combo box, 2) either a specific satellite ID or "All" in the "SATELLITE" combo box, and 3) the date and time boxes for the orbit vector epoch (valid time – default value is the upcoming hour). Click "Send" to transmit. (Fig. 5-4a)

Time Calibration. Selecting TCAL produces a drop down satellite list box that shows all currently active satellites for which the LUTs require TCAL. It only applies to Sarsat satellites that have a functioning SARP instrument. There is no epoch time selection for this action. (Fig 5-4b). Select the desired LUT(s) and SATELLITE, then click "Send" to transmit.

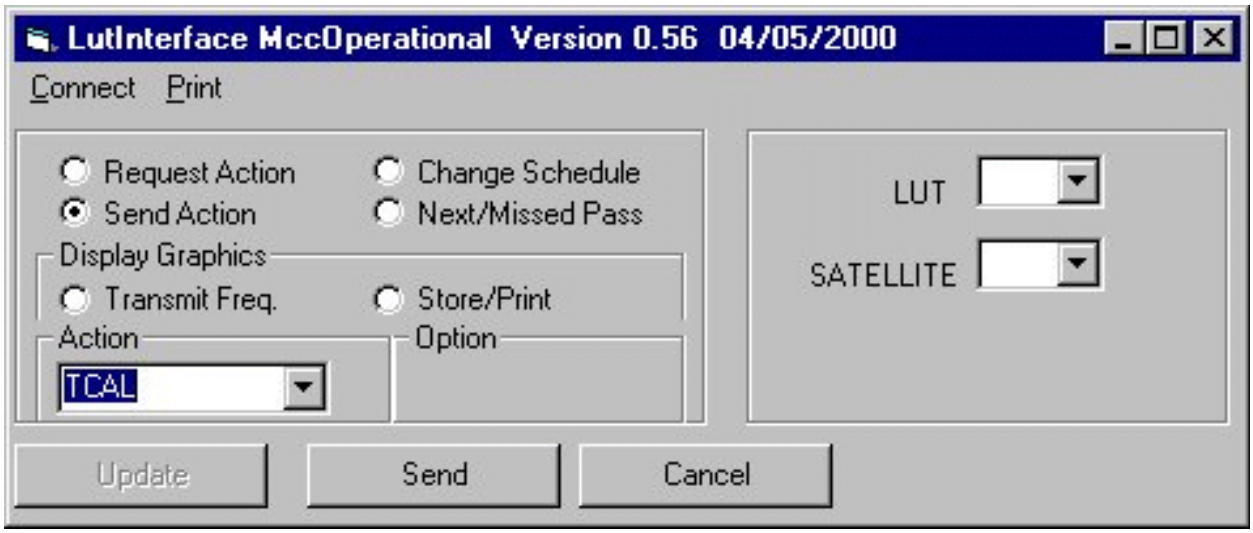


Figure 5-4b – LUT Interface, Send TCAL screen

Test Communications. This selection causes an automated communications circuit test sequence to start at the selected LUT. A detailed description of the actions that are invoked by this command is provided in SOPs Volume 2. Selecting "Send" starts the test. (Fig 5-4c) (***Note**: after this selection is made, the full command is not visible in the text box due to length*)

Figure 5-4c – LUT Interface, Test Communications

CHANGE SCHEDULE

This screen allows the user to modify the LUT pass schedule to track or suppress individual satellite passes. Schedule changes are permitted at only one LUT at a time. To change a pass within a LUT schedule: (see Fig 5-5)

- click the "Change Schedule" radio button
- select the desired LUT from the "LUT" combo box
- select the desired satellite from "SATELLITE" combo box
- enter the orbit number of the pass you want to change in the text box labelled "ORBIT". (*Note: use the Pass Schedule module to identify the passes that need to be altered*)
- Click the "VIEW" command button. This will display the current option for the LUT-Satellite-Orbit combination that you have entered. True means "track the pass", False means "suppress the pass". Choose the desired option, then click the "Update" command button in the lower left corner of the screen.
- Enter any further changes you have for this LUT. When finished, click the "Send" command button.

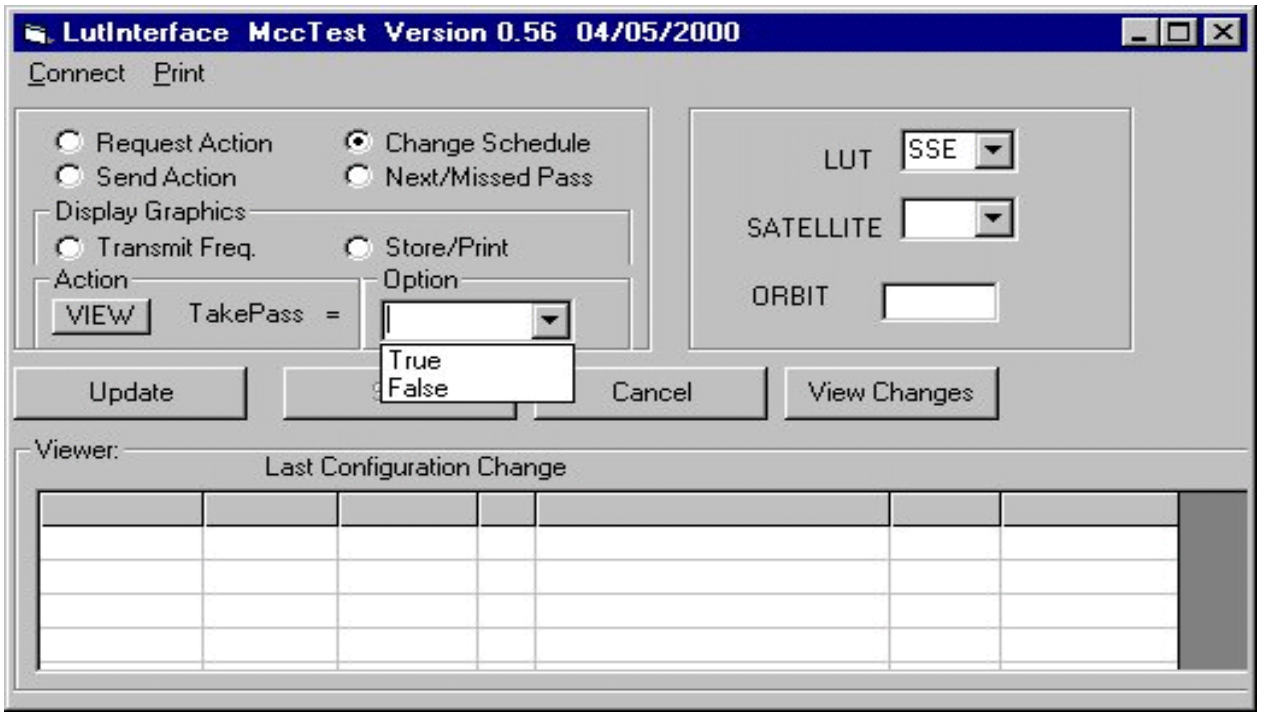


Figure 5-5 – LUT Interface, Change Schedule screen

TRANSMIT GRAPHICS

Some of the Cospas-Sarsat satellite equipment consists of repeaters that receive information on one frequency and relay it to the LUTs on a different frequency. In these cases, all signal processing is carried out by the LUT. The LUTs scan the frequency band looking for signals that are later processed. The information they collect is also stored in files that can be used for graphical display. The USMCC must tell each LUT whether or not to send graphic data and which frequency bands to send. The "Transmit Graphics" screen is used for this purpose.

To receive graphic data from a LUT: (Fig. 5-6)

- click on the "Transmit Freq" radio button
- select the desired LUT from the "LUT" combo box
- from the "Action" combo box, select the desired frequency band
- click the "Send" button to transmit this command to the LUT

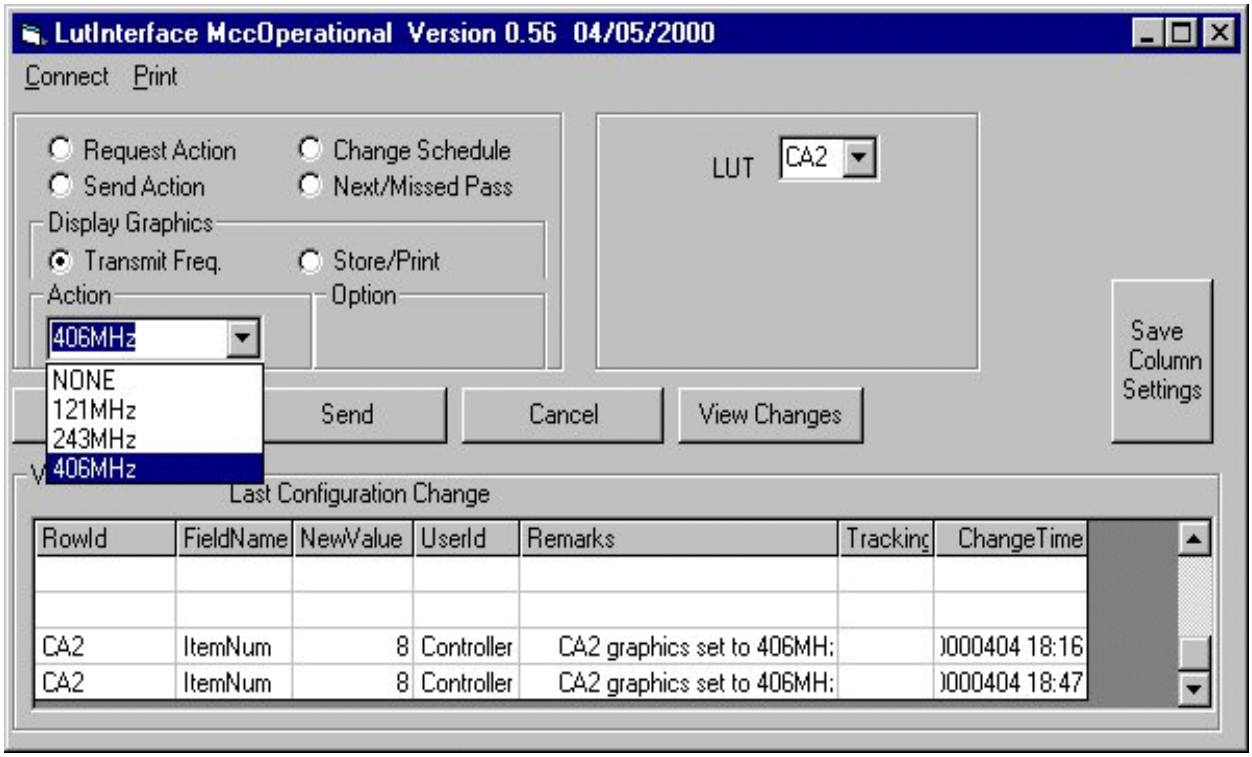


Figure 5-6 – LUT Interface, Transmit Graphic

The "View Changes" command button causes a list of recent graphic changes for the selected LUT to appear in the text box at the bottom of the screen.

Store/Print Graphics. This radio button is used to command the USMCC on how to process incoming LUT graphic data. Options are to store data, store and print data, or to do neither. The store command is sent to the selected LUT and Display Processor. Print options further include none, black and white, color or both and are selected using the spin buttons on the combo box located right side of the screen (appears when the print option is selected--Fig 5-7).
The print command is only sent to the appropriate Display Processor. Select the desired "LUT", "SATELLITE", "Action" and "PRINT OPTION", then click the "Send" command button.

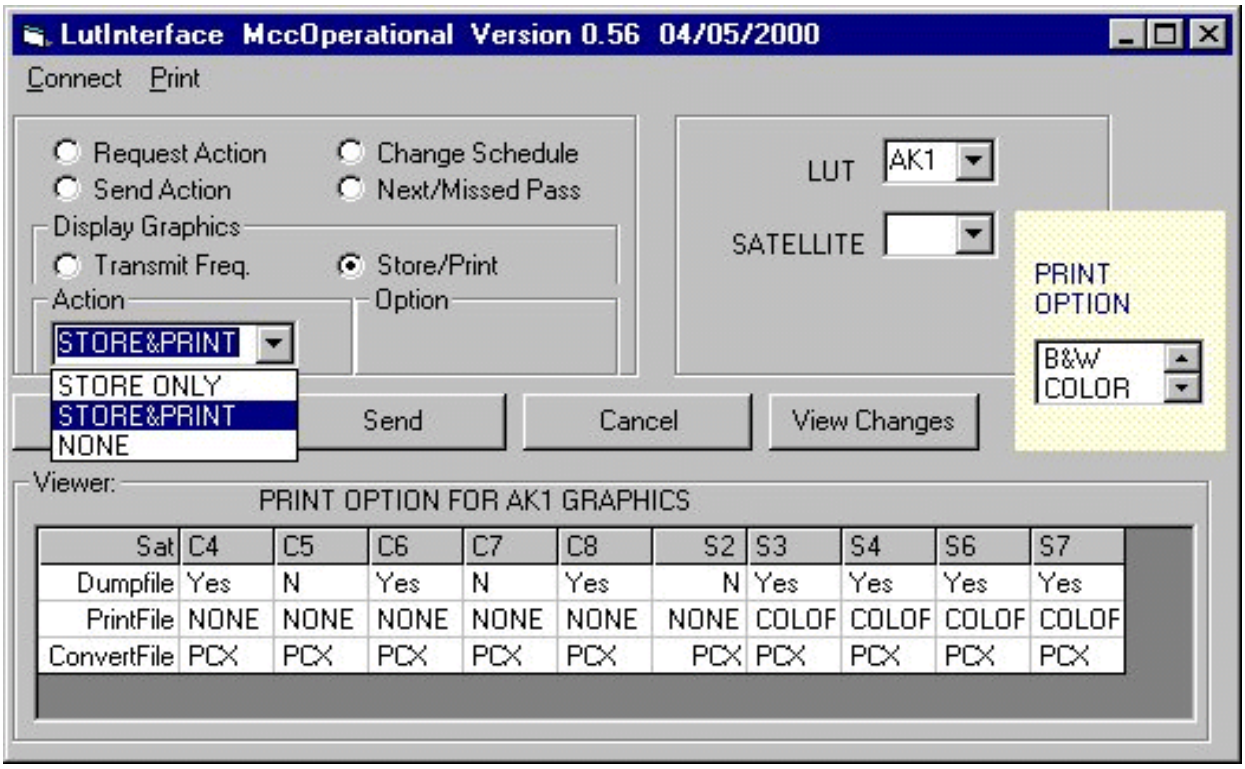


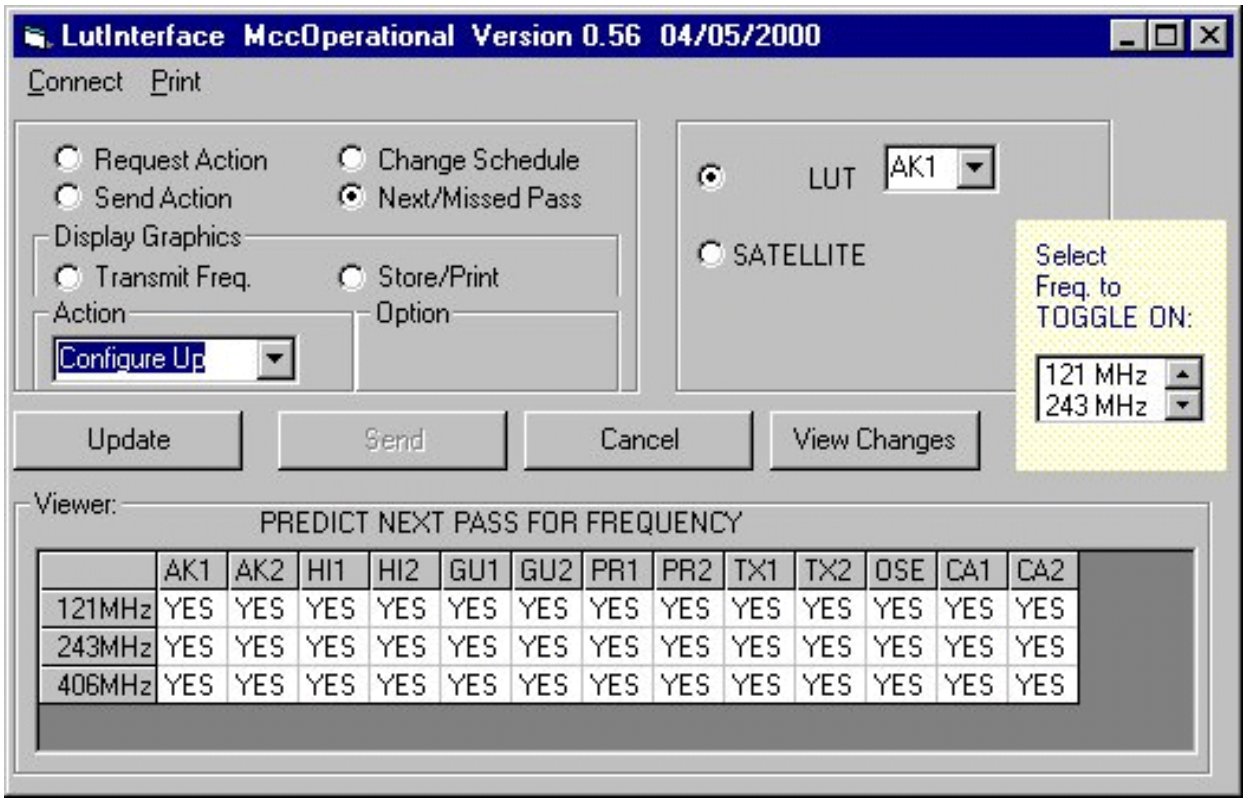
Figure 5-7 – LUT Interface, Store/Print Graphics screen

NEXT PASS/MISSED PASS

Next pass visibility prediction was discussed briefly under Support Messages. Each LUT and satellite uses different equipment to process each of the three distress bands (121 MHz, 243 MHz and 406 MHz). If all equipment is working satisfactorily, next pass predictions will be made each time that a LUT tracks a given satellite. If there are problems, the user can tell the software to not use a particular LUT/satellite combination for next pass predictions. The USMCC software also uses this information to declare a 'next pass' as a 'missed pass'

if solution data was expected but not received for a scheduled LUT pass. Although technically a USMCC function, the screens to change the parameters that are used for next pass calculations were included on the LUT Interface menu. Changes are made separately for each LUT and satellite.

Click on the "Next/Missed Pass" radio button to change these parameters. The user will see two radio buttons appear on the right side of the screen, one for LUTs and one for satellites. Changes are entered and applied separately for each. When the "LUT" radio button is selected, the user is presented with a screen as shown in Figure 5-8. A grid box appears at the bottom of the screen that shows the current status. In this example, all equipment is working correctly at each of the LUTs. (The SSE LUT is missing from this screen because it is connected to the Test database.) The user may select the frequency to change by using the combo box on the right side of the screen to toggle through the frequency bands. Next, the user selects the desired configuration from the combo box labelled "Action". Choices are "Configure Up" or "Configure Down". Click the "Update" command button to process this change. A second change may now be entered. When all changes are complete, click the "Send" command button. The "Save Column Settings" applies to the viewer grid which can be adjusted in size with click and drag action.



	AK1	AK2	HI1	HI2	GU1	GU2	PR1	PR2	TX1	TX2	OSE	CA1	CA2
121MHz	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
243MHz	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
406MHz	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Figure 5-8 – LUT Interface, Next/Missed Pass LUT screen

The user may wish to review past configuration changes that were made. This is accomplished by clicking on the "View Changes" command button. Results will be reported as in Figure 5-9 when 'Changes' are displayed correctly. Presently, this screen returns changes related to Display Graphics.

Changes to settings for Next/Missed Pass satellite parameters are made in a similar manner to the LUTs: (see Fig. 5-9)

- click the "Next/Missed Pass" radio button
- click the "Satellite" radio button; view the current configuration in the viewer box
- select the desired satellite from the satellite combo box
- select the desired frequency from the frequency toggle box
- select the desired action from the "Action" combo box (configure up/down)
- click the "Update" command button
- make additional changes if needed by repeating the above steps
- click the "Send" command button to complete the change

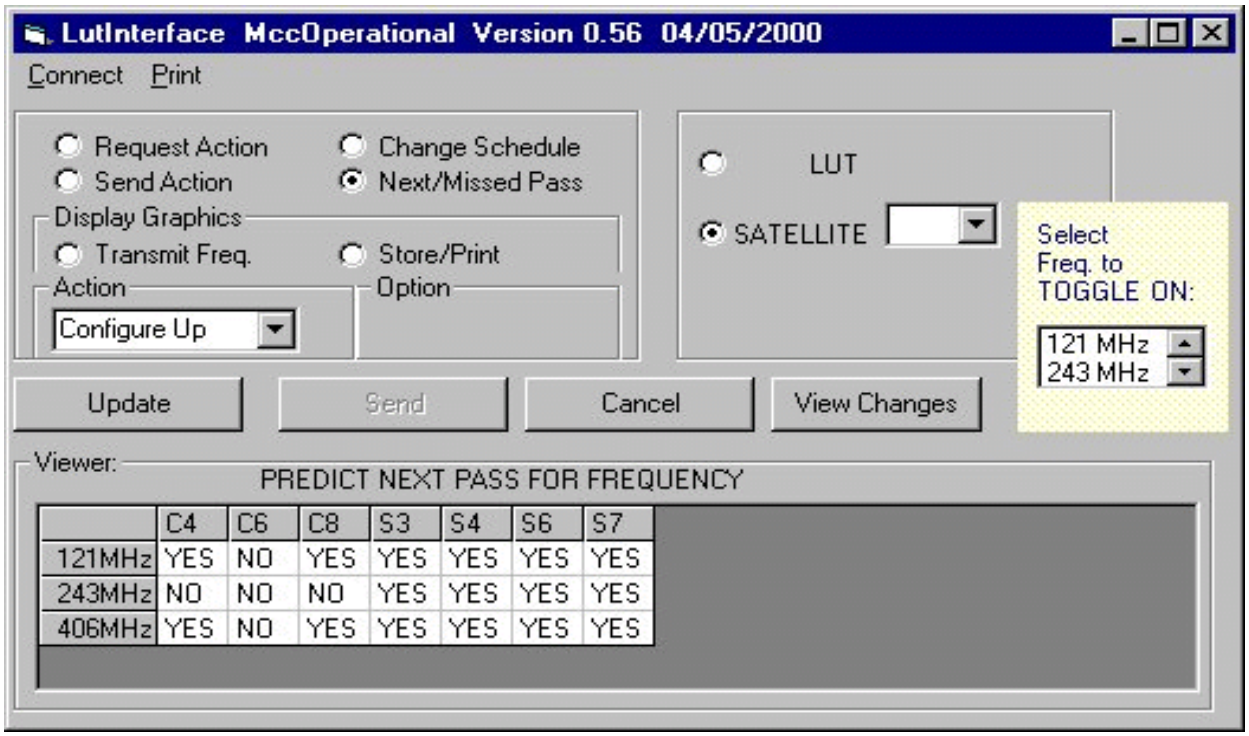


Figure 5-9 – LUT Interface, Next/Missed Pass Satellite screen

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SECTION 6 – COMMUNICATION SITE DISPLAY

FUNCTIONS PROVIDED

The ComSiteDisplay program performs two functions:

- It provides the user a view of the status of communications paths that currently are being used for every destination that is used by the USMCC, and
- It allows the user to make some modifications to specific paths.

Although the functionality is simple in description, the detail is somewhat more complex. The program undertakes some basic analysis and uses color coding to assist in the identification of anomalous conditions.

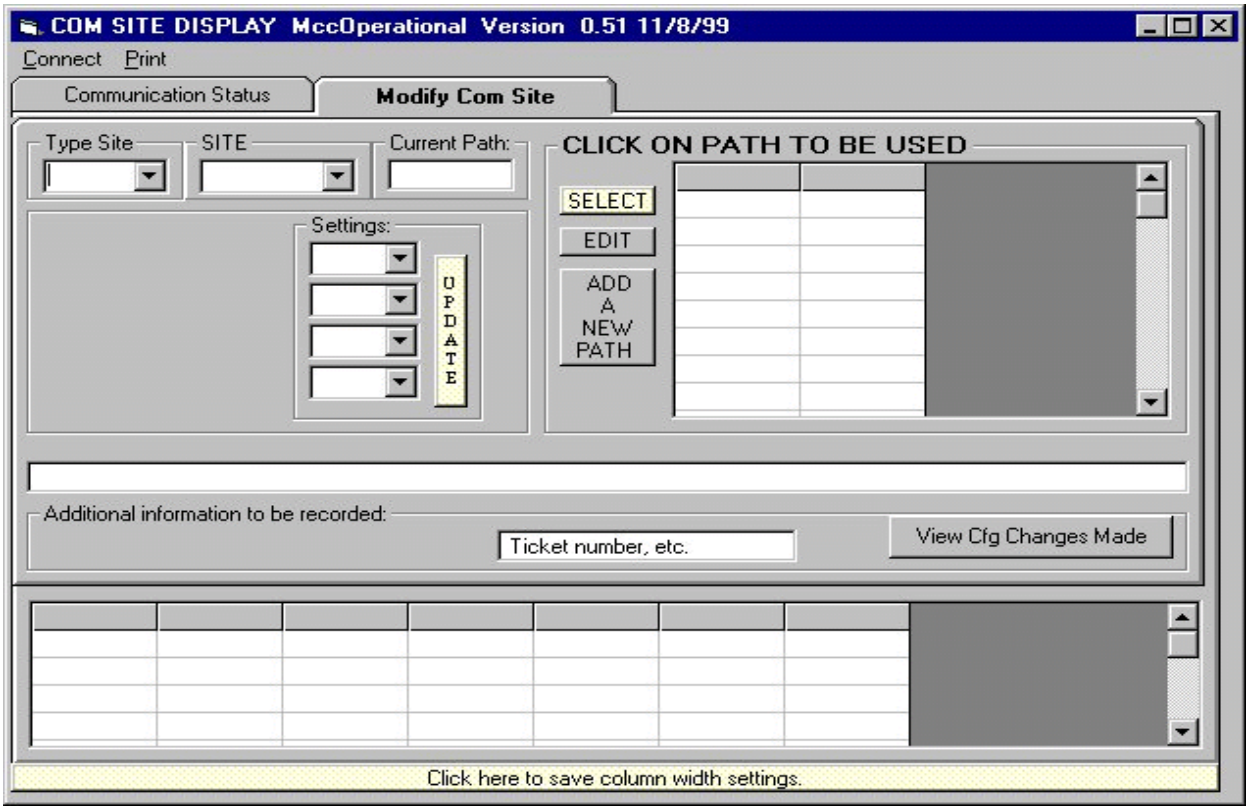


Figure 6-1 – ComSiteDisplay Initial Screen

When the program is started, a blank screen appears as shown in Figure 6-1. The interface shows two tab boxes. The default value on start up is the “Modify Com Site” function. The user must check the title bar to verify that the correct database is being used. No information is displayed until data is entered into both the "Type Site" and "Site" boxes. When using these two screens, the user ID is visible in a box in the upper right hand corner when the screens are maximized. This ID is used to record any changes made by the user and to save settings. Note also the "Click here to save column width settings" command button at the bottom of the screen. If the user adjusts the grid column widths, this command saves the new settings for that PC..

MODIFY COM SITE

The screen allows the user to alter certain parameters for a specific communications site:

- to select the communication path that will be the active channel that is used to communicate with the selected communication site
- to hold output messages that are addressed to the selected site
- to hold input messages that are received from the selected site
- to add a communication address
- to add a path to a ComSite (future implementation)
- to make the circuit available for communication, and
- to record information about why the change was made.

To display information, entries must be made in both the “Type Site” and “Site” combo boxes. “Type Site” produces a drop down list box with options "Rcc, Lut, Mcc, SPOC, DispProc, Cemscs or Unknown". These entries are read from the database and, except for DispProc, are the same entries used for Message Query. When a TypeSite is selected, the program obtains a list of site names from the database. An appropriate set of entries is entered into the “Site” combo box. This process will take a several seconds. Once the site has been selected, current communication configuration information will be loaded into the form. This action also takes a few seconds. Figure 6-2 provides an example of this screen for Type Site = SPOC and Site = Mexico SPOC.

The Modify Com Site screen consists of four frames:

CLICK ON PATH TO BE USED. This frame lists all available

communication paths that are available for use with the selected Site. The first site on the list is the preferred, or primary communication path. The current, active path is highlighted in yellow. The user is provided three command buttons. The SELECT button allows a different current path to be selected. The EDIT button is used to modify path settings, for example the communication address. The ADD A NEW PATH allows a new communication path to be entered (future enhancement).

***Note**: DispProc is the Graphics Display processor. "Site" abbreviations are DP1 and DP2.*

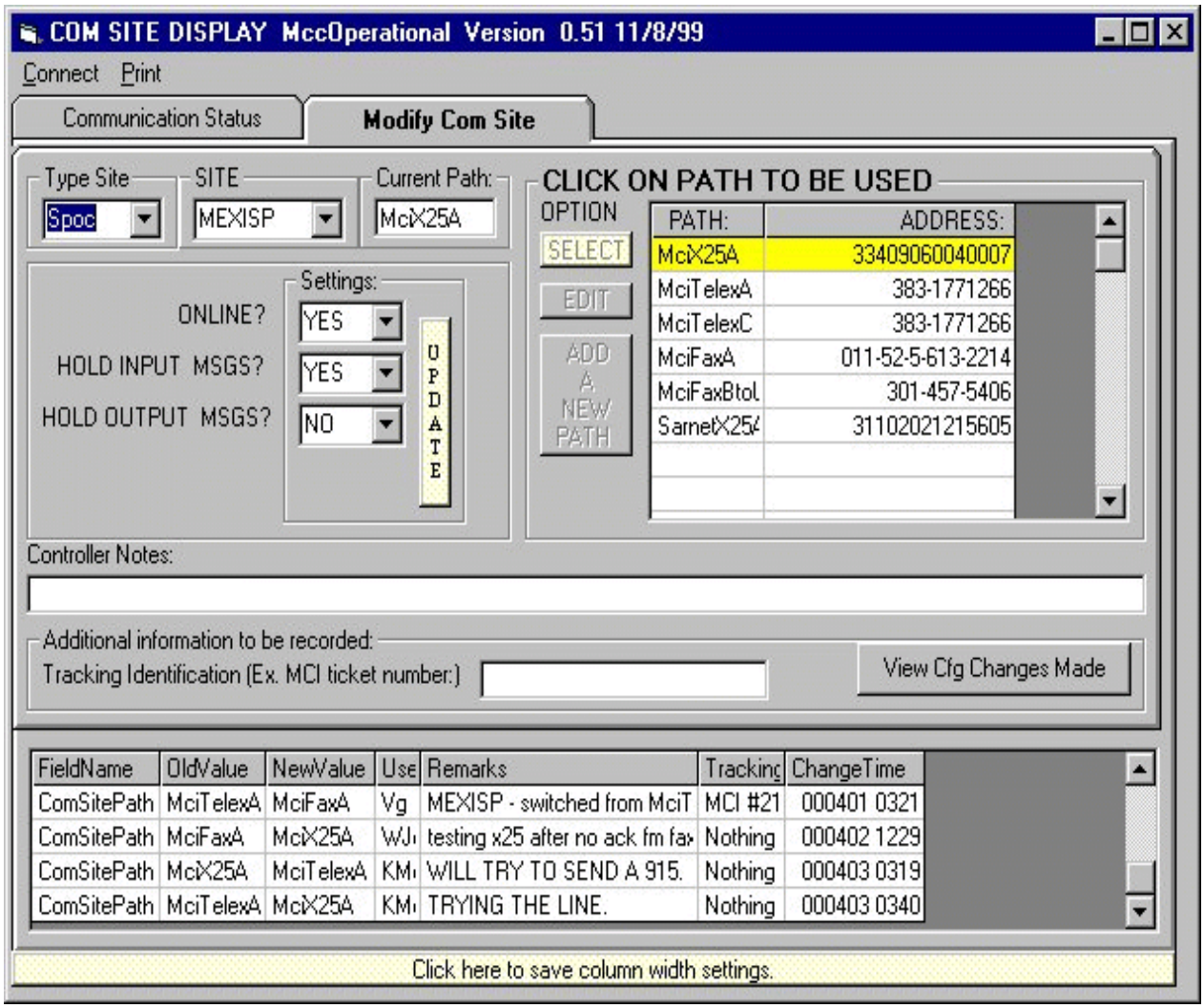


Figure 6-2 -- ComSiteDisplay, Modify ComSite screen

(Continued on next page ..)

Settings. In this frame, the user can change settings using drop down yes/no list boxes to make a circuit ONLINE, to HOLD INPUT MSGS, and/or to HOLD OUTPUT MSGS. A 'YES' under ONLINE makes the circuit available for communications. A 'NO' under HOLD .. MSGS allows incoming and outgoing messages to process normally. Once the desired setting is made, click the UPDATE command button in order for the change to take effect.

Controller Notes: ***The user must enter text notes under "Controller Notes:" before the change will be executed.*** The notes should indicate a brief reason for the change. This will provide a continuity when problems continue beyond the current USMCC shift. Entries made under this section are visible to other users under the column heading "Remarks"(in the bottom frame).

View Cfg Changes Made. When this command button is selected, a list of recent changes to this communication site will appear in the text box window at the bottom of the screen. Note that the initials of the user who made the change is recorded in the fourth column from the left. This information is obtained automatically from the user log on. The time of the change is also automatically recorded.

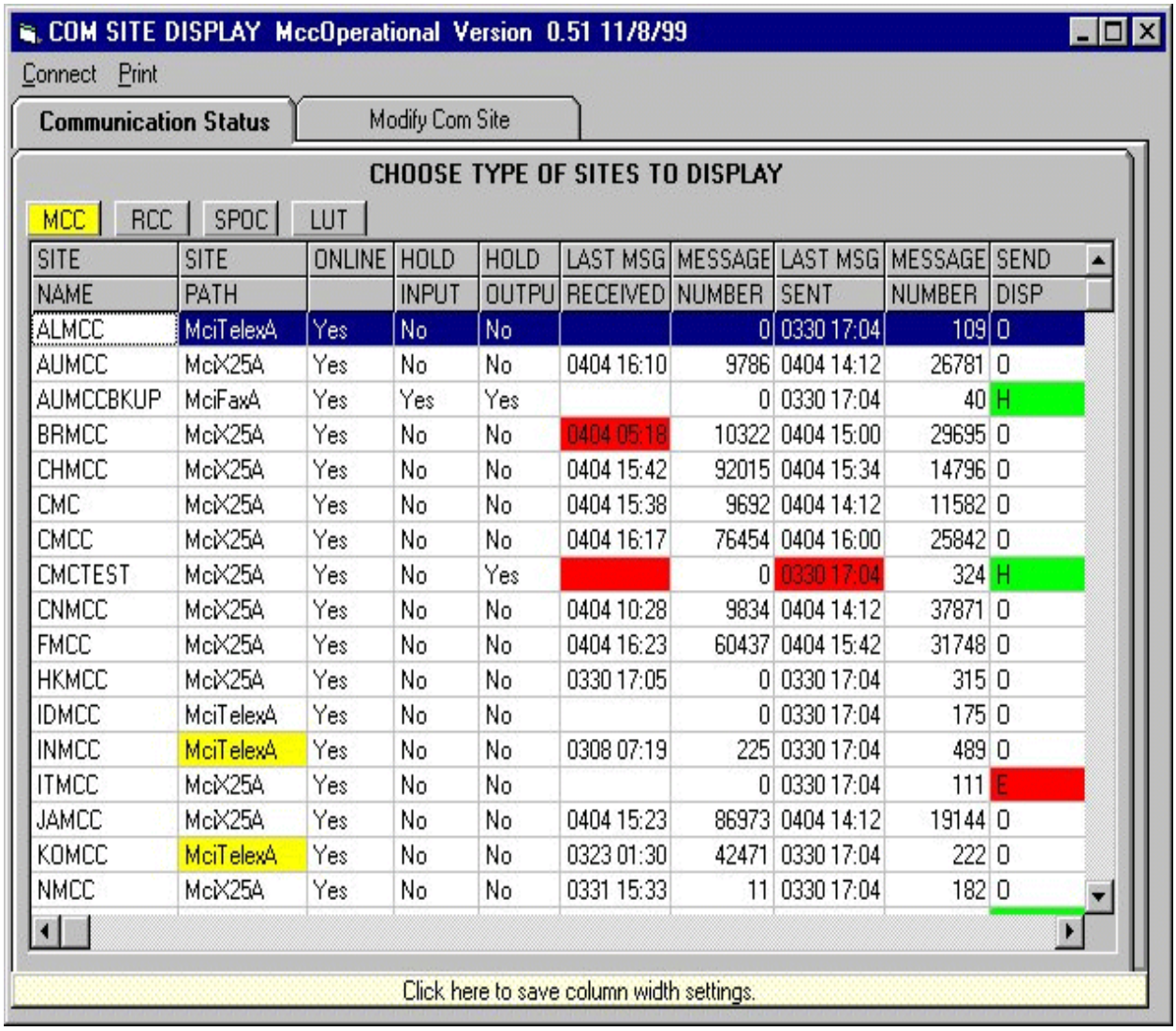
COMMUNICATION STATUS

When the communication status tab is selected, the user is presented with an empty screen. The user must select one of the four sub-tabs on the screen in order to view more details. These tabs are MCC, RCC, SPOC and LUT. Once selected, this screen shows a summary of the status of all Sites for the Type of Site that was selected. The process will take a few minutes while the program reads the various communication database tables and performs some rudimentary analysis of the status of each circuit. An hour glass shows up on the screen while the program is filling the screen with data.

Color is used extensively in these screens. Figure 6-3a shows MCC status. Circuits on Hold are highlighted in green. Yellow under the "SITE PATH" indicates that the secondary circuit is in use. Red colors under "LAST MSG RECEIVED" and "LAST MSG SENT" represent the 8 hour check where messages have not been received (only for those MCCs to which the 8 hour check applies). A Red under "SEND DISP" indicates a communication error/problem.

Figure 6-3b show the LUT tab. A salmon color is used to indicate the active Luts. SSE is white because it is not being used (connected to the Test database).

Column widths may be adjusted by click and drag techniques.

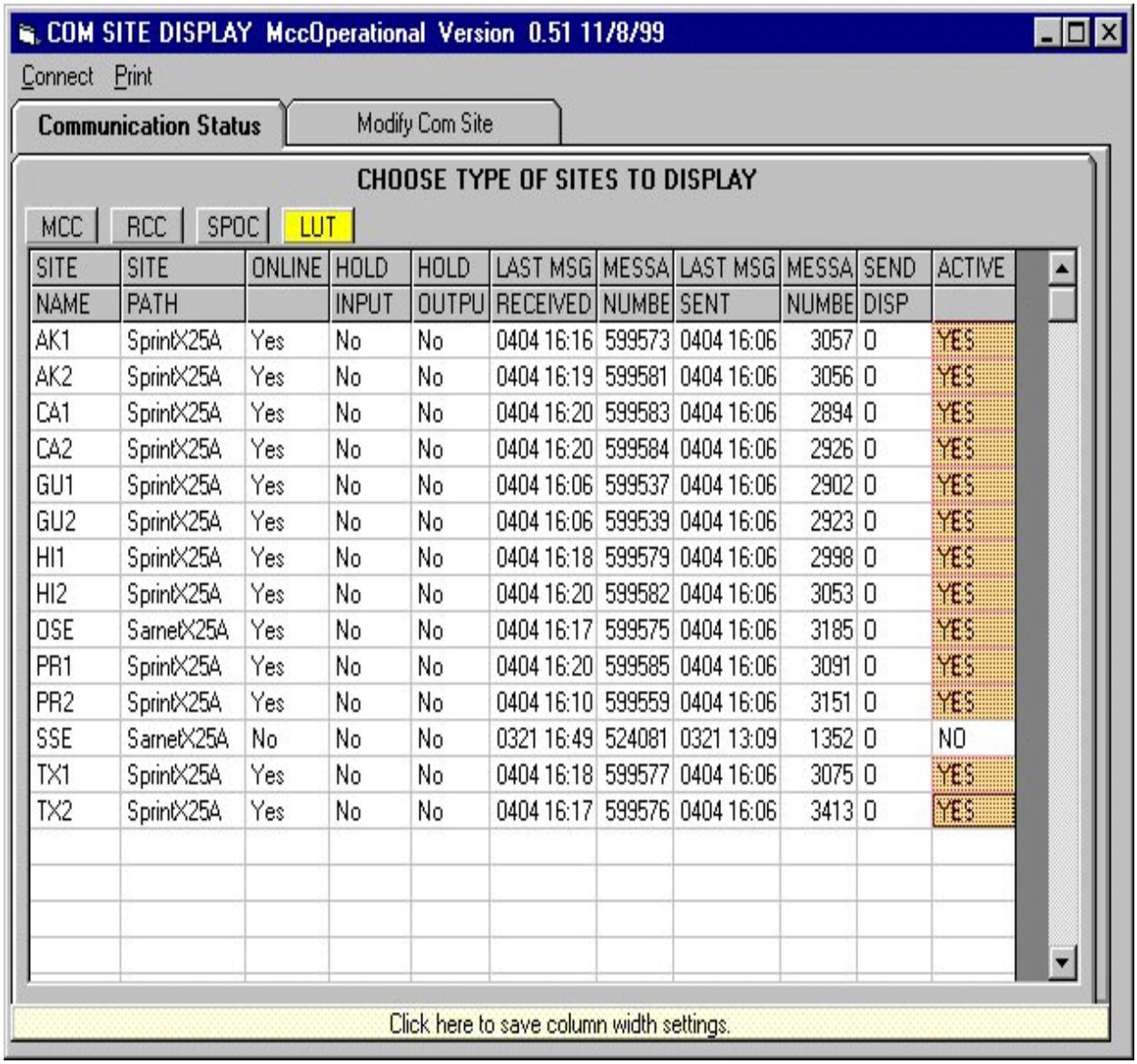


SITE NAME	SITE PATH	ONLINE	HOLD INPUT	HOLD OUTPU	LAST MSG RECEIVED	MESSAGE NUMBER	LAST MSG SENT	MESSAGE NUMBER	SEND DISP
ALMCC	MciTelexA	Yes	No	No		0	0330 17:04	109	0
AUMCC	MciX25A	Yes	No	No	0404 16:10	9786	0404 14:12	26781	0
AUMCCBKUP	MciFaxA	Yes	Yes	Yes		0	0330 17:04	40	H
BRMCC	MciX25A	Yes	No	No	0404 05:18	10322	0404 15:00	29695	0
CHMCC	MciX25A	Yes	No	No	0404 15:42	92015	0404 15:34	14796	0
CMC	MciX25A	Yes	No	No	0404 15:38	9692	0404 14:12	11582	0
CMCC	MciX25A	Yes	No	No	0404 16:17	76454	0404 16:00	25842	0
CMCTEST	MciX25A	Yes	No	Yes		0	0330 17:04	324	H
CNMCC	MciX25A	Yes	No	No	0404 10:28	9834	0404 14:12	37871	0
FMCC	MciX25A	Yes	No	No	0404 16:23	60437	0404 15:42	31748	0
HKMCC	MciX25A	Yes	No	No	0330 17:05	0	0330 17:04	315	0
IDMCC	MciTelexA	Yes	No	No		0	0330 17:04	175	0
INMCC	MciTelexA	Yes	No	No	0308 07:19	225	0330 17:04	489	0
ITMCC	MciX25A	Yes	No	No		0	0330 17:04	111	E
JAMCC	MciX25A	Yes	No	No	0404 15:23	86973	0404 14:12	19144	0
KOMCC	MciTelexA	Yes	No	No	0323 01:30	42471	0330 17:04	222	0
NMCC	MciX25A	Yes	No	No	0331 15:33	11	0330 17:04	182	0

Figure 6-3a – ComSiteDisplay, MCC Status screen

> ***Note**: Tabs for other Type Sites (i.e. DispProc) will be added as a future enhancement*

(Continued on next page . .)



SITE NAME	SITE PATH	ONLINE	HOLD INPUT	HOLD OUTPU	LAST MSG RECEIVED	MESSA NUMBE	LAST MSG SENT	MESSA NUMBE	SEND DISP	ACTIVE
AK1	SprintX25A	Yes	No	No	0404 16:16	599573	0404 16:06	3057	0	YES
AK2	SprintX25A	Yes	No	No	0404 16:19	599581	0404 16:06	3056	0	YES
CA1	SprintX25A	Yes	No	No	0404 16:20	599583	0404 16:06	2894	0	YES
CA2	SprintX25A	Yes	No	No	0404 16:20	599584	0404 16:06	2926	0	YES
GU1	SprintX25A	Yes	No	No	0404 16:06	599537	0404 16:06	2902	0	YES
GU2	SprintX25A	Yes	No	No	0404 16:06	599539	0404 16:06	2923	0	YES
HI1	SprintX25A	Yes	No	No	0404 16:18	599579	0404 16:06	2998	0	YES
HI2	SprintX25A	Yes	No	No	0404 16:20	599582	0404 16:06	3053	0	YES
OSE	SarnetX25A	Yes	No	No	0404 16:17	599575	0404 16:06	3185	0	YES
PR1	SprintX25A	Yes	No	No	0404 16:20	599585	0404 16:06	3091	0	YES
PR2	SprintX25A	Yes	No	No	0404 16:10	599559	0404 16:06	3151	0	YES
SSE	SarnetX25A	No	No	No	0321 16:49	524081	0321 13:09	1352	0	NO
TX1	SprintX25A	Yes	No	No	0404 16:18	599577	0404 16:06	3075	0	YES
TX2	SprintX25A	Yes	No	No	0404 16:17	599576	0404 16:06	3413	0	YES

Figure 6-3b – ComSiteDisplay, LUT Status screen

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SECTION 7 – ALERT SITE QUERY

OVERVIEW

Two types of satellites are used within Cospas-Sarsat. Low Earth Orbit (LEO) satellites circle the earth in a near polar orbit. When they detect a distress beacon, their orbit adds Doppler information to the signal. Doppler information is extracted by the LUTs and used to calculate location. The second type of satellite is in a Geosynchronous Earth Orbit (GEO). This instrument does not provide Doppler information. However, each instrument continuously views a large area of the earth's surface. This means that earlier alerting is possible.

Essentially, there are two different types of distress beacons being used. At 121 MHz and 243 MHz, these devices emit a continuous, swept tone. These beacons, introduced in the late 1950's were designed to emit a distinct, audible tone that would be noticed by overflying aircraft. They do not have any identification code. The newer generation beacons operate at 406 MHZ and were designed for satellite detection; each beacon is assigned a distinct identification code. Some recent 406 MHz beacons have the ability to store and transmit an encoded location within the beacon identification code.

When the LUTs extract the Doppler information from either type of beacon, the shape of the Doppler curve determines the distance away from the satellite of the transmitting beacon. Since the location of the satellite is known, the location of the distress transmitter can be calculated. However, ambiguity is introduced because the LUT does not know whether the beacon is located to the left or right of the satellite's path. Thus, every Doppler location has two possible solutions.

The USMCC gathers data from a variety of sources and compares the results. If new information is obtained (from a different satellite orbit), the ambiguity can be resolved. This action takes place in the USMCC match/merge process. An "Alert Site" is created for each signal that is detected. Each "Alert Site" is assigned a numeric site identifier. Once ambiguity is resolved, the Alert Site is labelled a "Composite" site. Sites that ***are not*** classified as "Composite Sites" either consist of

two location pairs, or are a 406 MHz unlocated beacon Alert Site.

The USMCC uses location and distress beacon frequency to form Alert Sites at 121/243 MHz. At 406 MHz, the distress beacon identification code is used to form Alert Sites. Once an Alert Site is Opened (created), it is deemed to be an "Active Site". The Alert Site status is changed from Open to Closed 1) if no reports have been received from the beacon for a pre-determined time period, or 2) three consecutive non-detections occurred. (*Note: both time and missed pass count are configurable software processing parameters*).

Part of the Alert Site process involves a geographical sorting of the Alert Site locations. This process is known as "Geosort" and its objective is to identify the responsible Search and Rescue authority for the reported location. To do this, the world is defined as a series of Search and Rescue Regions, or SRRs. Each location is assigned a primary, and possibly a secondary, SRR. (*Note: A special offline process that is described in software documentation is used to build these region definitions*.)

FUNCTIONS PROVIDED

The Alert Site Query screen provides the user with the following functionality:

- to view Alert Site status according to a variety of parameters:
  –composite, non-composite sites, or both
  –open sites, closed sites or both
  –selection by frequency band(s)
  –various time bounds (previous 30 days available online)

- To view all activity within a defined geographical area:
  –as a rectangle defined by North, South, East and West boundaries or corner points
  –defined by a point and radius
  –defined as a track with offset (to be implemented)

- To alter certain Alert Site parameters:
  –close a site
  –change the primary/secondary SRRs
  –to continue to send messages to foreign destinations

- To view incoming and outgoing messages related to an Alert Site, and

- To examine Alert Site information in greater detail and to format and send this information to RCCs or other destinations.

ALERT SITE QUERY MAIN SCREEN

When the Alert Site Query program is started, the user sees the screen shown in Figure 7-1a. The use should check that the correct database is selected. This screen uses a number of default settings that provide the user with a quick picture of current Alert Site activity. The screen is set to query all open Alert Sites on all frequency bands. There are no time or position limits. The Title bar shows the database that is being used for the query. To carry out this query, the user simply needs to click the "Search" command button on the right side of the screen. (***Note:*** *Fig 7-1 includes Search results*)

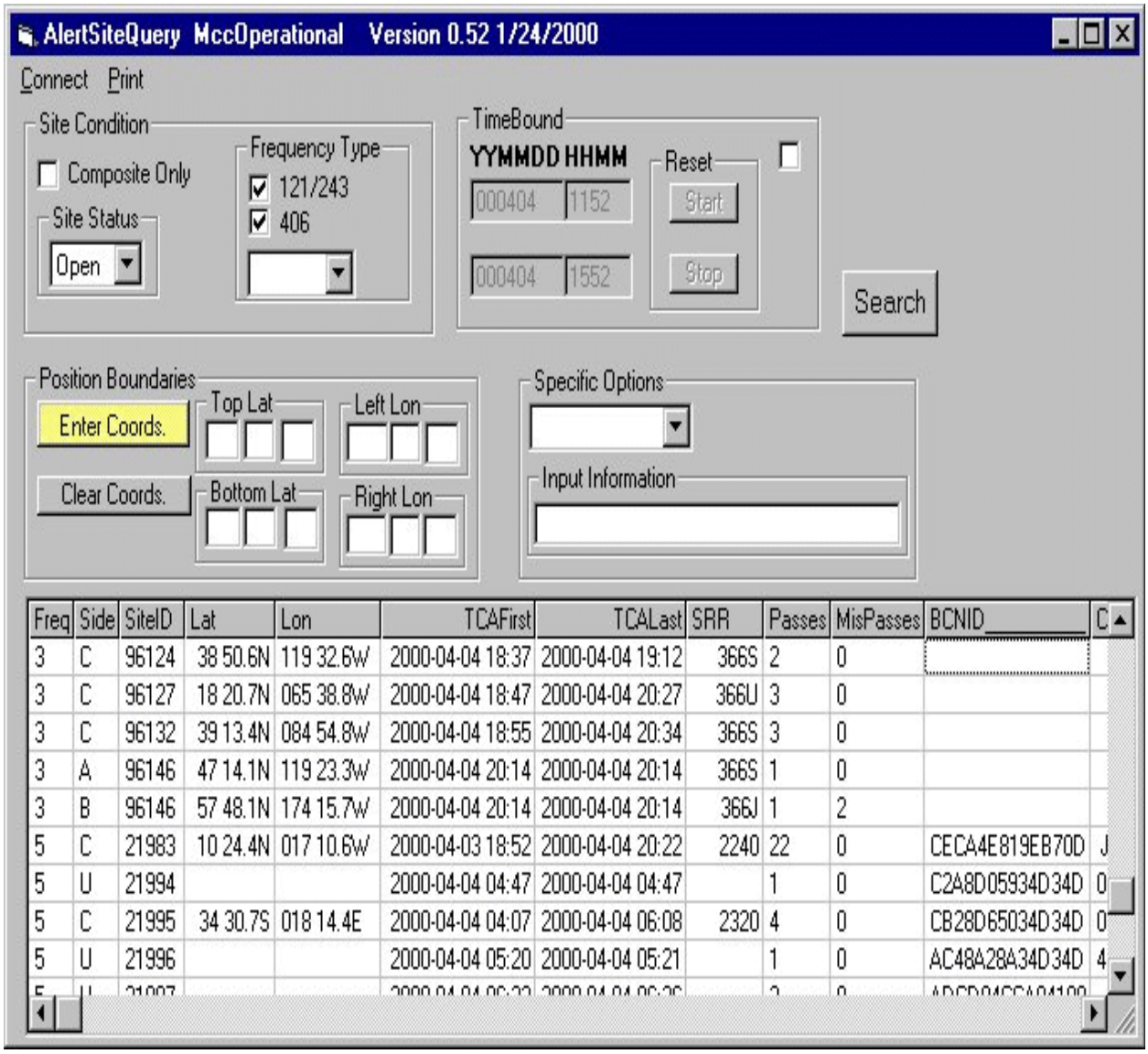


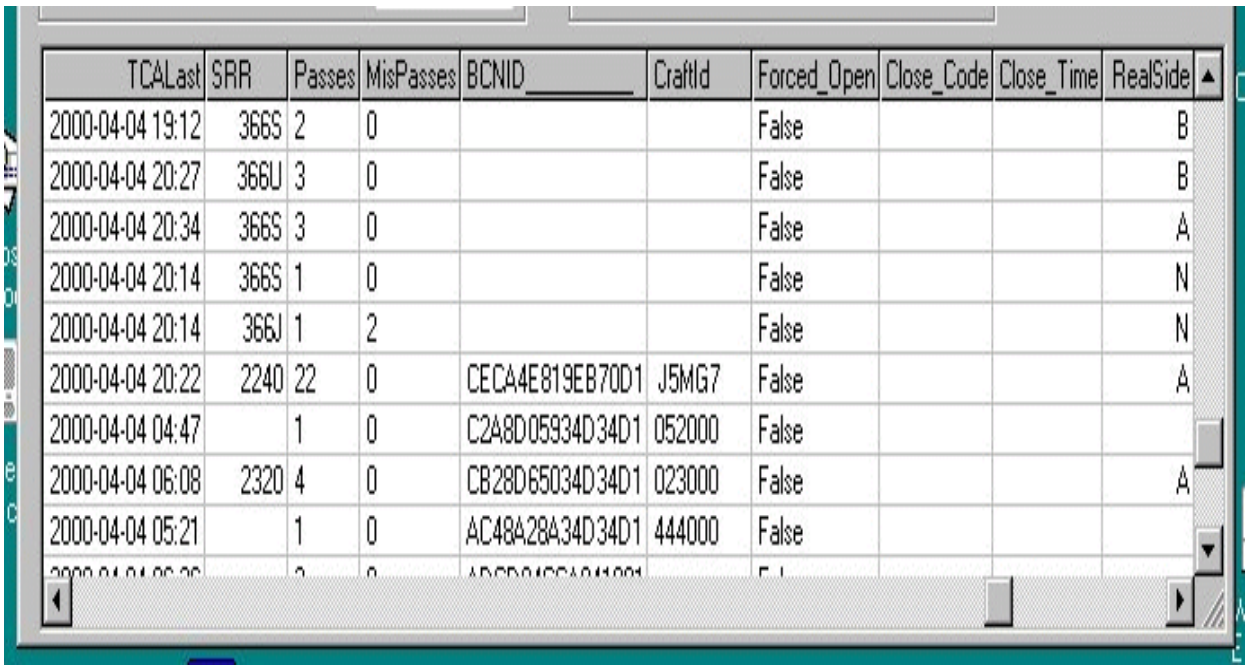
Figure 7-1a – Alert Site Query, main screen (default settings)

Results of the search are reported in the text box at the bottom of the form. Columns may be interpreted as follows:

- Freq is the beacon frequency, 1=121, 2=243, 3=121+243, 5 = 406 Doppler
- Side C=Composite, A&B is a pair of non composite locations, U=unlocated, E=encoded
- SiteID is the computer assigned Alert Site identification number
- Lat = Latitude; Long = Longitude (location coordinates)
- TCA (Time of Closest Approach) is the time that the satellite passed by the beacon. TCAFirst is the first

occurrence for this Alert Site and TCALast is the latest occurrence.

- SRR identifies the responsible Search and Rescue Region for this location.
- Passes represents the number of unique satellite reports for this location. (Note: GeoSar reports are counted only once per satellite).
- Missed Passes represent the number of predicted satellite passes for which no data was received. An Alert Site status is changed to closed after 3 missed passes.
- BCNID is a 15 hexadecimal character string representing that portion of a 406 beacon code which contains the unique encoded identification information. A complete description of beacon codes can be found in document C/S T.001.
-



TCALast	SRR	Passes	MisPasses	BCNID	CraftId	Forced_Open	Close_Code	Close_Time	RealSide
2000-04-04 19:12	366S	2	0			False			B
2000-04-04 20:27	366U	3	0			False			B
2000-04-04 20:34	366S	3	0			False			A
2000-04-04 20:14	366S	1	0			False			N
2000-04-04 20:14	366J	1	2			False			N
2000-04-04 20:22	2240	22	0	CECA4E819EB70D1	J5MG7	False			A
2000-04-04 04:47		1	0	C2A8D05934D34D1	052000	False			
2000-04-04 06:08	2320	4	0	CB28D65034D34D1	023000	False			A
2000-04-04 05:21		1	0	AC48A28A34D34D1	444000	False			

Figure 7-1b – Alert Alert Site Query, continuation of reported results

Figure 7-1b is a continuation of Figure 7-1a, showing results in the remaining fields. The horizontal tab bar is used to scroll the report and make these fields visible. The column widths may also be adjusted using click and drag techniques.

- Craft ID applies only to 406 beacons and provides a basic vessel identification number or callsign (varies depending upon the protocol used by vessel's national policy).
- Forced Open indicates that the Duty Controller has forced an Alert Site to stay open. This action requires the Alert

Site to be manually (Forced) closed.

- Closed_Code is a code to determine why an Alert Site was closed. Normal values are “M” for missed pass, or “T” for time (no updates after a defined period of time). Both these settings are software configurable. “F” means the user forced the Alert Site closed.
- Close_Time is the time that the USMCC computer or Controller closed the Alert Site.
- RealSide indicates which side of the first alert was correct when ambiguity was resolved. An “N” means that ambiguity is not resolved. A “blank” means that this Alert Site consists of a 406 detection that does not have a corresponding Doppler location. The detection could be made either 1) by a GeoSar satellite, or 2) by a LeoSar satellite in which too few points were received to determine the beacon location.

Alert Site Query –Main Screen Notes:
(1) Right Clicking in the display (results) portion of AlertSiteQuery will bring up the screen containing options for input/output messages or for Summary/Intermediate report.
(2) Double clicking on one of the rows containing site results (display results portion of AlertSiteQuery) is the only method to access Site Status actions or the form containing the three tab options.
(3) Column widths in the display results portion of AlertSiteQuery can be adjusted by clicking and

Time Bound Frame. By checking the (empty) box in the upper right corner of the "TimeBound" portion of the screen, user can place a time limit on a query. The computer loads default settings into the form that set the stop time to the current time and the start time to four hours prior to current time. If the screen has been displayed unused for several minutes, these setting can be updated by clicking on the appropriate "Reset" button. By clicking (or tabbing to) one of the time boxes, the date and time can be altered to produce a longer or shorter search periods. Alert Site data is available online for 30 days. Figure 7-2 shows a time bound query.

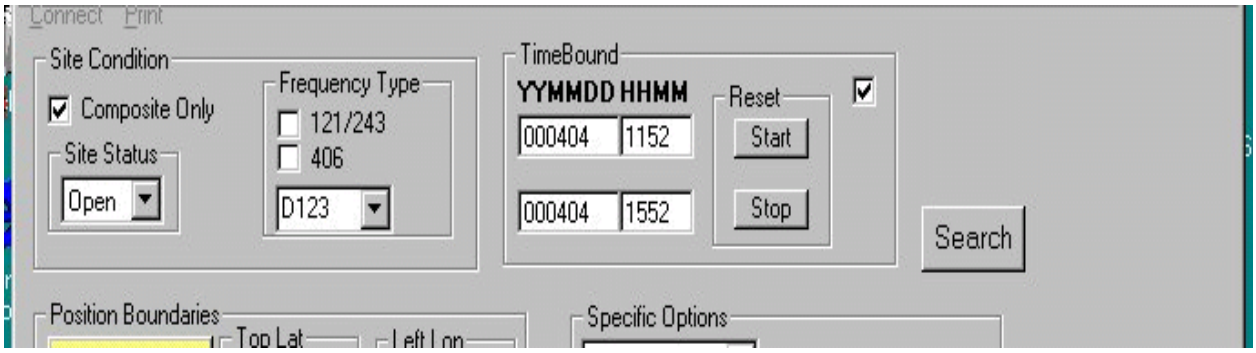


Figure 7-2 – Alert Query, TimeBound option

Site Condition Frame. Alert Site condition can be altered to show "Open", "Closed" or "Both" (open and closed) sites. One or more frequency bands may be selected (except for 406 interference). In the example shown in Figure 31, only "OPEN" are sites selected for dual frequency beacons (D123= 121 + 243 MHz). This will cause only those Alert Sites with a Freq = "3" to be displayed. Checking the "Composite Only" box will display only those Alert Sites where ambiguity has been resolved. Otherwise, both composite and non-composite Alert Sites are displayed.

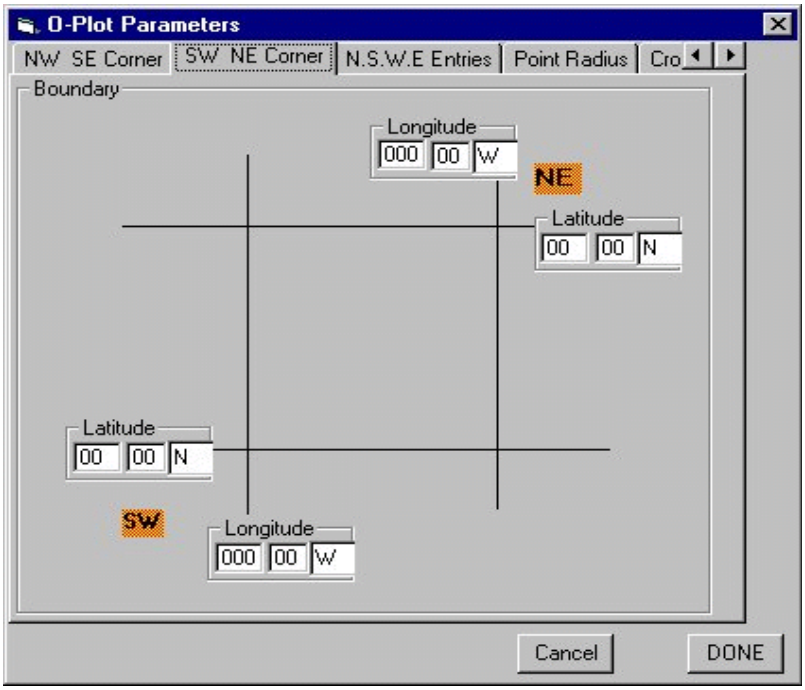


Figure 7-3 – Alert Query, O-Plot Parameters Screen

Position Boundaries Frame. Clicking on the "Enter Coords." box will bring up a second screen that is used to enter the position

boundaries. This new form is titled “O-Plot Parameters”. The form consists of five tab boxes, each of which represents a different method of entering coordinate information. The screen shown in Figure 7-3 is the "SW NE Corner". This screen has two tab buttons (left/right arrows) that are situated in the upper right corner of the form just below the title bar. These buttons may be used to scroll to a different tab (form) that is not visible. Clicking the Tab will bring up screen details.

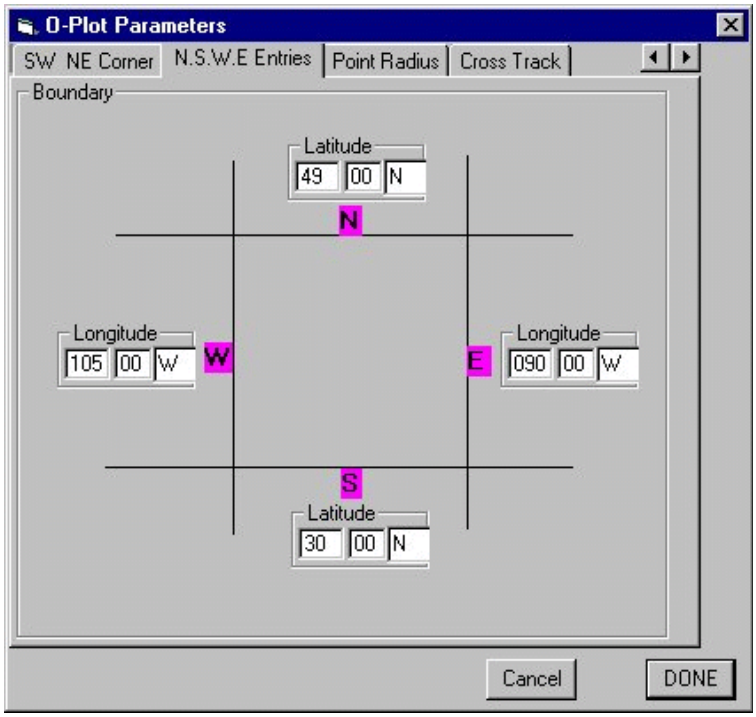


Figure 7-4 – O-Plot N.S.W.E screen

Figure 7-4 shows a form with North, South, West and East coordinates entered into the form. Clicking on “DONE” command button transfers these coordinates to the main Alert Site Query form. The geographical coordinates entered here represent an area of the United States from the Mississipi valley to the Rockies and from Mexico to Canada. Click “Search” on the main screen to continue this query.

Other O-Plot tabs include NW SE corner, Point and Radius, and Cross Track. Point and Radius calculates the distance between the central point and alert locations, returning only those locations that are within the user defined radius. Software to define a track and offset search (Cross Track) is

reserved for future development

Figure 7-5 shows the point and radius option. The default setting is at the equator and 0 longitude. A real latitude and longitude point must be entered. The default distance is 200 NM but can be changed by clicking on the “Distance” box and changing the entry.

Clicking "DONE" returns to the main screen and changes position boundary definition. The "Search" button must next be clicked to get results.

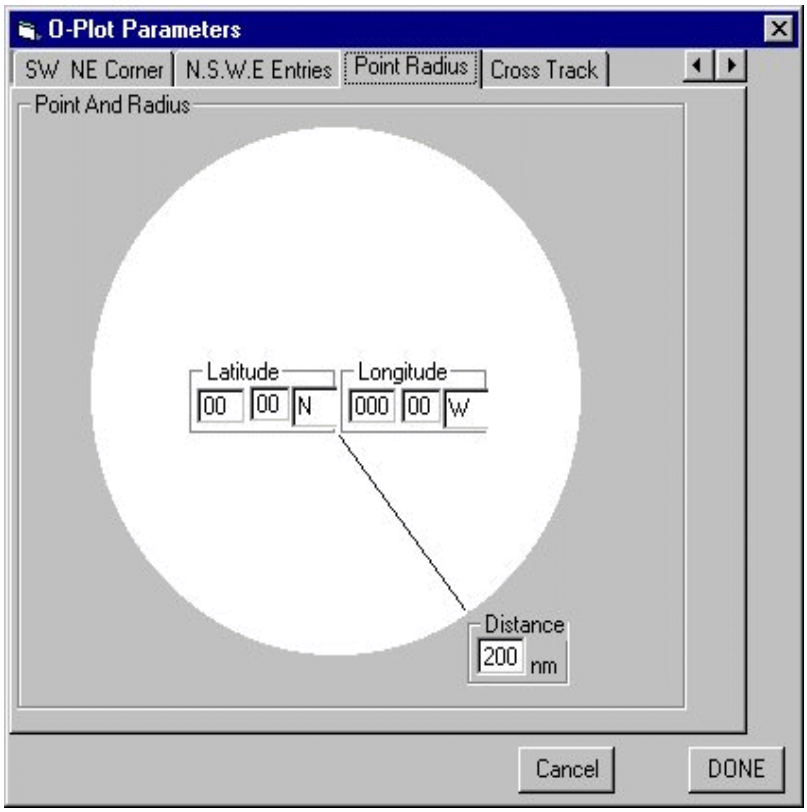
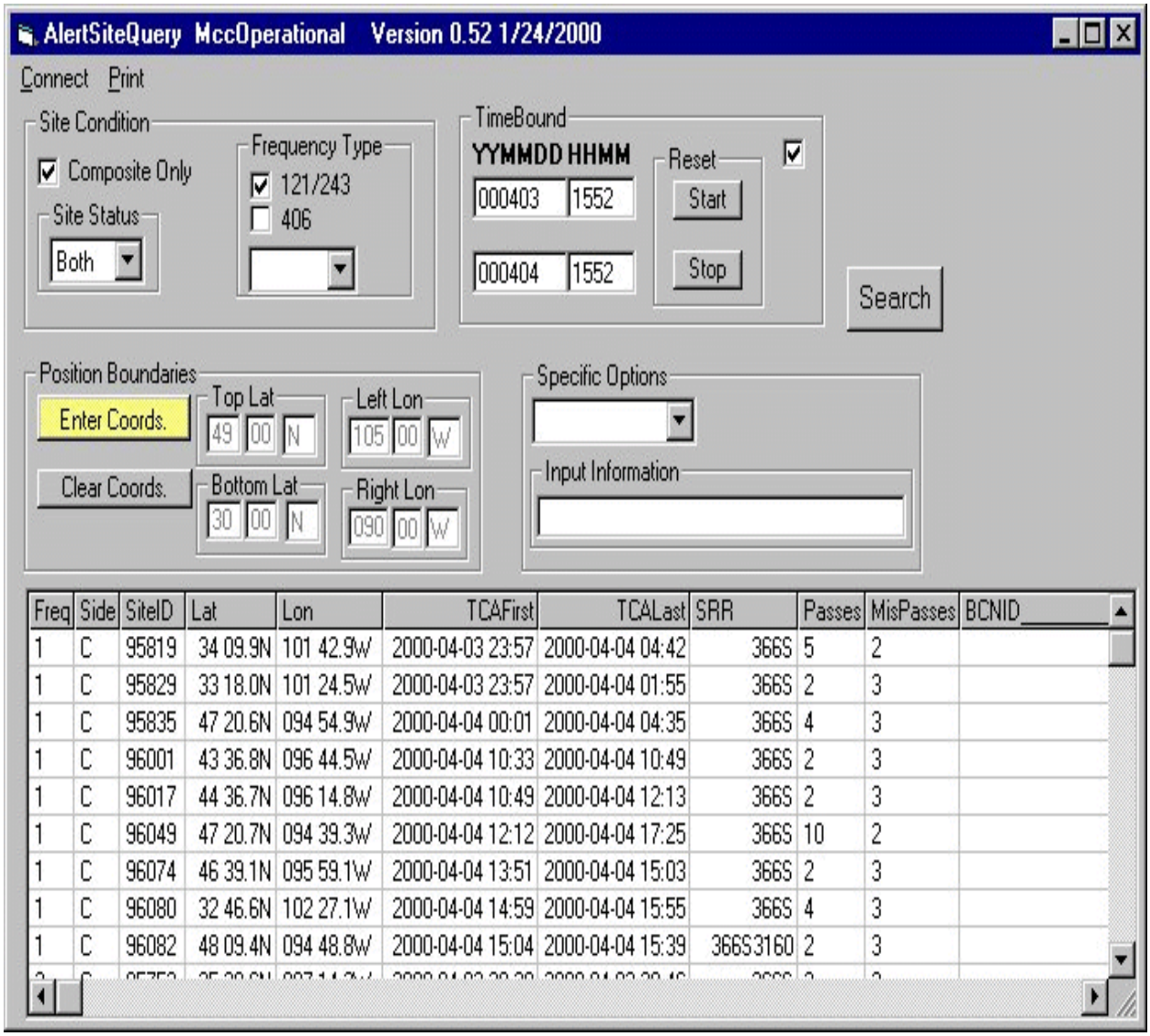


Figure 7-5 – Alert Query, Point and Radius

***Note**: If the Point and Radius option is used, the Position Boundaries frame on the main screen will be altered to display the point latitude/longitude on the first line and the radius on the second line (in lieu of Bottom Lat and Right Lon).*



Freq	Side	SiteID	Lat	Lon	TCAFirst	TCALast	SRR	Passes	MisPasses	BCNID
1	C	95819	34 09.9N	101 42.9W	2000-04-03 23:57	2000-04-04 04:42	366S	5	2	
1	C	95829	33 18.0N	101 24.5W	2000-04-03 23:57	2000-04-04 01:55	366S	2	3	
1	C	95835	47 20.6N	094 54.9W	2000-04-04 00:01	2000-04-04 04:35	366S	4	3	
1	C	96001	43 36.8N	096 44.5W	2000-04-04 10:33	2000-04-04 10:49	366S	2	3	
1	C	96017	44 36.7N	096 14.8W	2000-04-04 10:49	2000-04-04 12:13	366S	2	3	
1	C	96049	47 20.7N	094 39.3W	2000-04-04 12:12	2000-04-04 17:25	366S	10	2	
1	C	96074	46 39.1N	095 59.1W	2000-04-04 13:51	2000-04-04 15:03	366S	2	3	
1	C	96080	32 46.6N	102 27.1W	2000-04-04 14:59	2000-04-04 15:55	366S	4	3	
1	C	96082	48 09.4N	094 48.8W	2000-04-04 15:04	2000-04-04 15:39	366S3160	2	3	

Figure 7-6 – Alert Query, O-Plot Search results

Figure 7-6 shows the result of a query using O-Plot data from Figure 7-4. Note that the time period has been extended to 24 hours and that composite 121/243 Alert Site were selected (there is virtually no 406 activity in the interior USA because boaters are the main users of 406 beacons).

CLICK THE "CLEAR COORDS" COMMAND BUTTON WITHIN THE POSITION BOUNDARY FRAME WHEN YOUR QUERY IS FINISHED. OTHERWISE, ALL FUTURE QUERIES WILL BE RESTRICTED TO THESE BOUNDARIES

Site Status. Double clicking on a line that contains site data (Fig. 7-6, lower portion of the screen) will bring up a "Site Functions" window that consists of three tab boxes. (*Note: The Site ID is reported in the title bar. See Figure 7-7 below*)

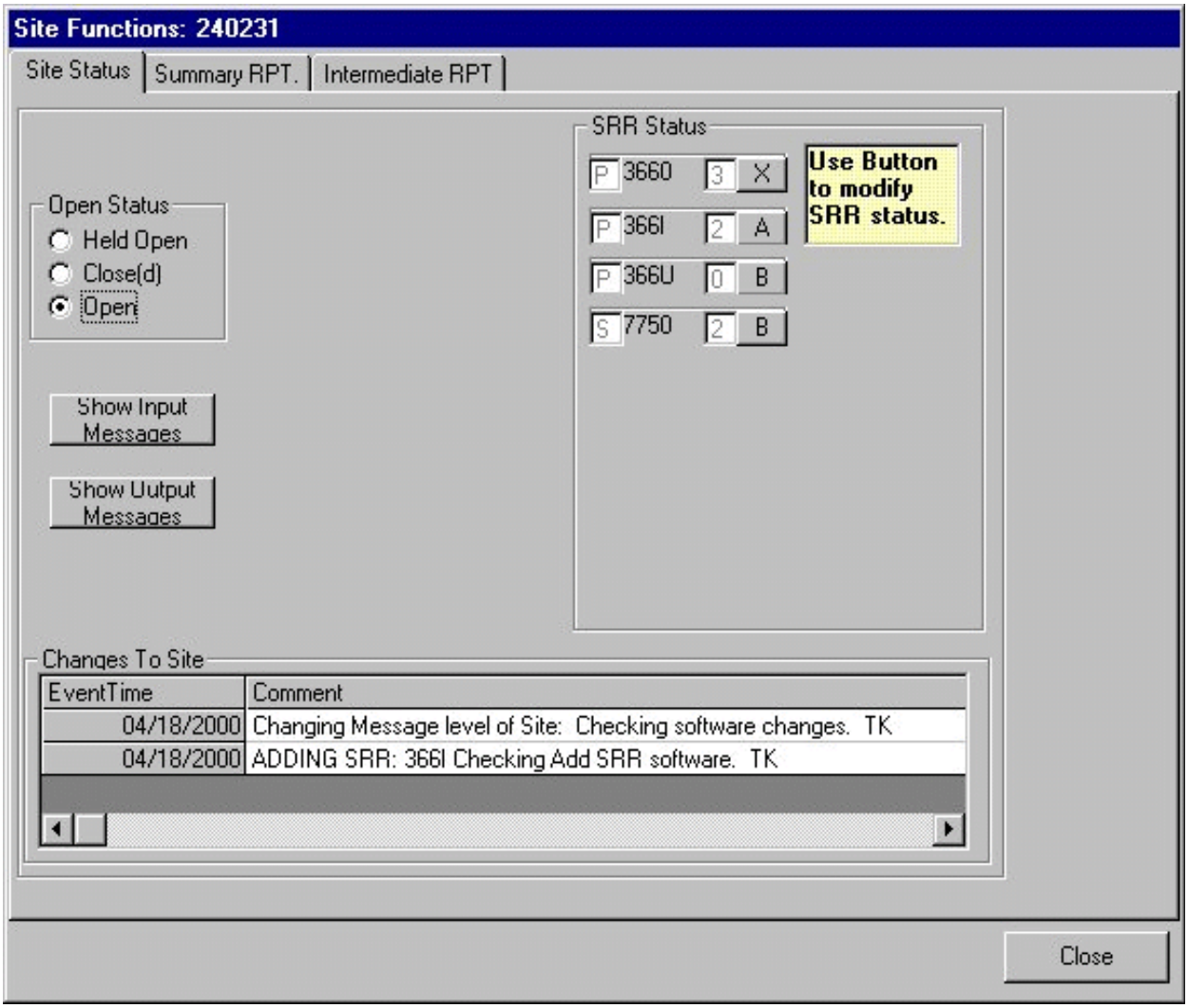


Figure 7-7 – Alert Site Status, Site Status actions

The Tab labelled "Site Status" allows Duty Controller to alter Alert Site status ("Close"or "Hold Open"), alter "SRR Status", or to view input/output messages related to the site. The three radio buttons in the "Open Status Frame" indicate the current status of the selected Alert Site. An "Open" site may be "Closed" or "Held Open".

The controller must manually close a site where the status was set to "Hold Open"

Message Command Buttons. No user action is required when a command button to “Show input messages” or “Show output messages” is clicked. The software will automatically load the search criteria into a Message Query search form. All message traffic related to the site will be located. Query output uses the same formats that are described in the Message Query section.

SRR Status Frame. When a change is made to SRR status, the Controller must enter a comment. If any changes were previously made to the site, the comments will appear in the text box labelled “Changes to Site”. (See bottom of the Site Status main screen, Fig. 7-7. In this example, a changes were made to 366U to stop sending messages, and an SRR was added (NOAA/USMCC) with a note to send all messages). The vertical row of text boxes on the left side of the Site Status frame consists of two components. The text box indicates whether a site is designated as “P” for Primary SRR, or “S” as Secondary SRR. The label to the right of each text box identifies the SRR. The second vertical row of text boxes indicates the message send level for the SRR that is listed along the same horizontal row. For Example, in Figure 7-7, the first row indicates that NOAA is a Primary SRR and has a message send level of “3". The command buttons on the right side of each row are used to modify the status for the SRR listed in that row. The SRR Status command buttons may contain the following labels:

- left blank: 406 Alert Site for unlocated alerts and where ambiguity is not resolved
- “A” indicates that it is the “A” location for the selected site
- “B” indicates that it is the “B” location for the selected site
- “C” indicates that the site is a composite site
- “X” indicates that it is an added SRR (addressee for site message traffic)

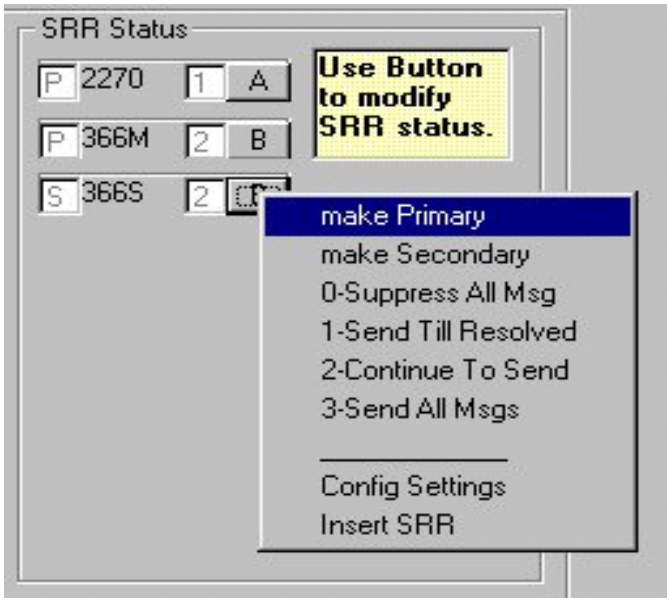


Figure 7-8 – Alert Site Status changes

To change an SRR status, click the command button on the line that lists the desired SRR. This brings up a box that contains several

options. (Fig. 7-8) For example, to change the message send level for Miami RCC (366M), click the upper button labelled “B” in Figure 7-8.

The new “Pop Up” box contains eight options. Moving the cursor over each line will automatically highlight the line. Click on the line to select the desired option. In this example (Fig. 7-8), focus is on the the line for AF RCC (366S) and clicking on the highlighted entry would change its status from Secondary to Primary SRR.

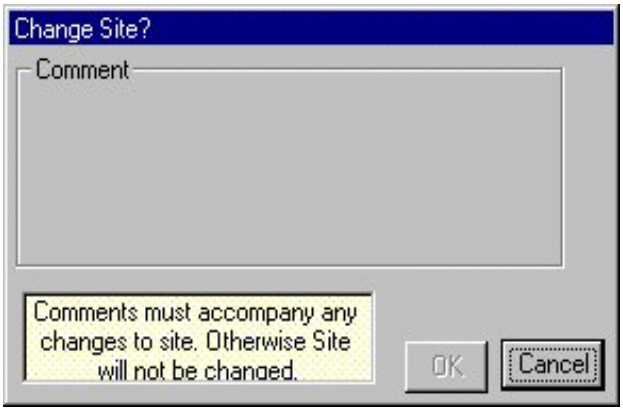


Figure 7-8a – Change Site comment box

Message transmission options are changed the same way -- highlight and click on the desired change. This will bring up a window titled “Change Site?” (Fig 7-8a). You must enter a comment in the text box in order to have the change take effect. The “OK” command button will become activated when comments are entered.

Send Message Options:

“0" –Suppress All Msg will stop all further alert messages from going to that destination.

“1" –Send Till Resolved will cause messages to be sent to the destination only until ambiguity has been resolved.

“2" –Continue to Send will ensure that messages are sent after ambiguity is resolved. Message traffic to MCCs stops automatically when ambiguity is resolved. Messages to USA SPOCs stop after a predetermined number of messages have been sent after ambiguity resolution (software parameter setting).

“3" --Send All Msgs is used to continue to send to an RCC after ambiguity is resolved (normally the RCC with the image location). This will ensure that all site updates are sent to the new destination.

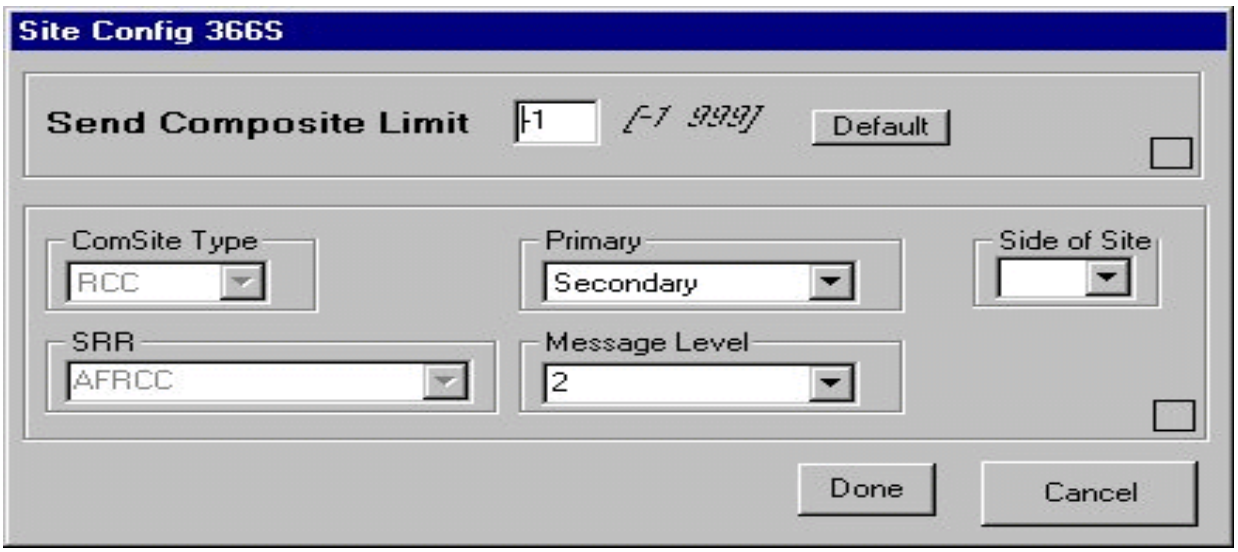


Figure 7-8b SRR Status Site Config window

Config Settings. Clicking on this selection will return the screen shown in Figure 7-8b. Note that the title bar indicates the SRR that was selected. The information on this screen corresponds to AF RCC data in Figure 7-8. The "Send Composite Limit" box is used to identify the number of messages to send to this SRR once ambiguity is resolved. The default is "-1" or software determined.Insert SRR. This selection brings up the screen shown in Figure 7-8c. This is the screen that was used to add NOAA SPOC in Figure 7-7. First, select the "ComSite Type", second the "SRR" then make changes as desired to the other combo boxes. Note that a "RED Square" appears inside any frames where changes were made (also applies to the Fig 7-8b). Select the "OK" command button when done.

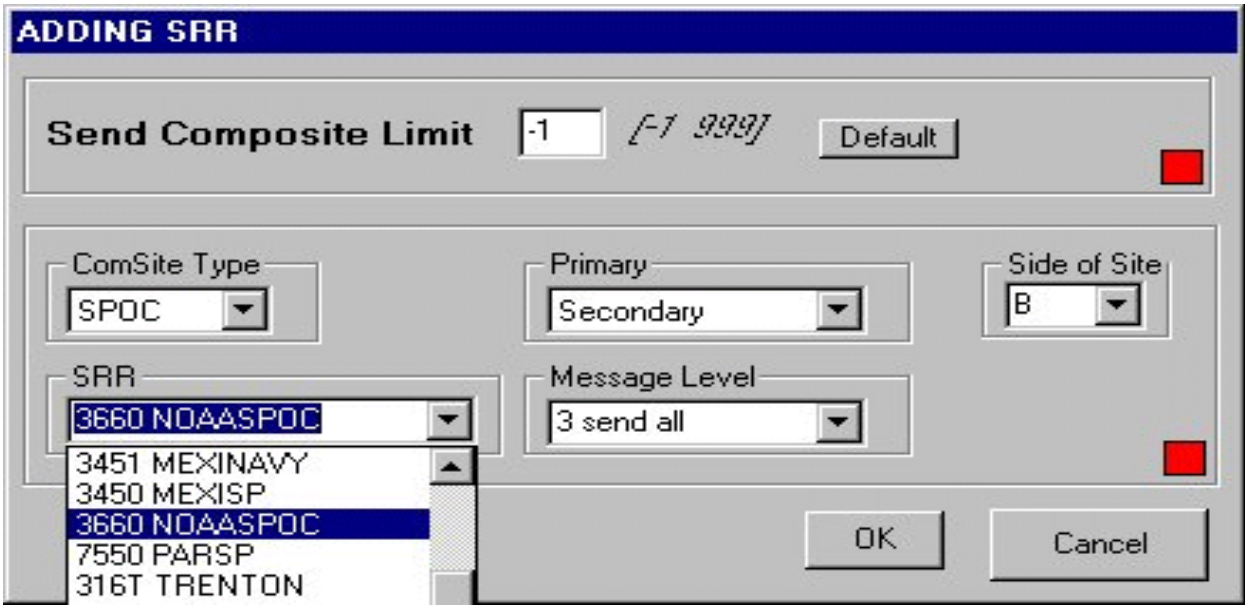


Figure 7-8c – SRR Status, Insert SRR screen

Notes: 1) The "B" side was selected here, but the main SRR Status screen shows an "X".
2) The Config Settings screen is used to view/alter Send Composite Limits.
3) The Add SRR screen does not show the Site SRR in the title bar. Be certain that you have selected the correct SRR before and after making changes.

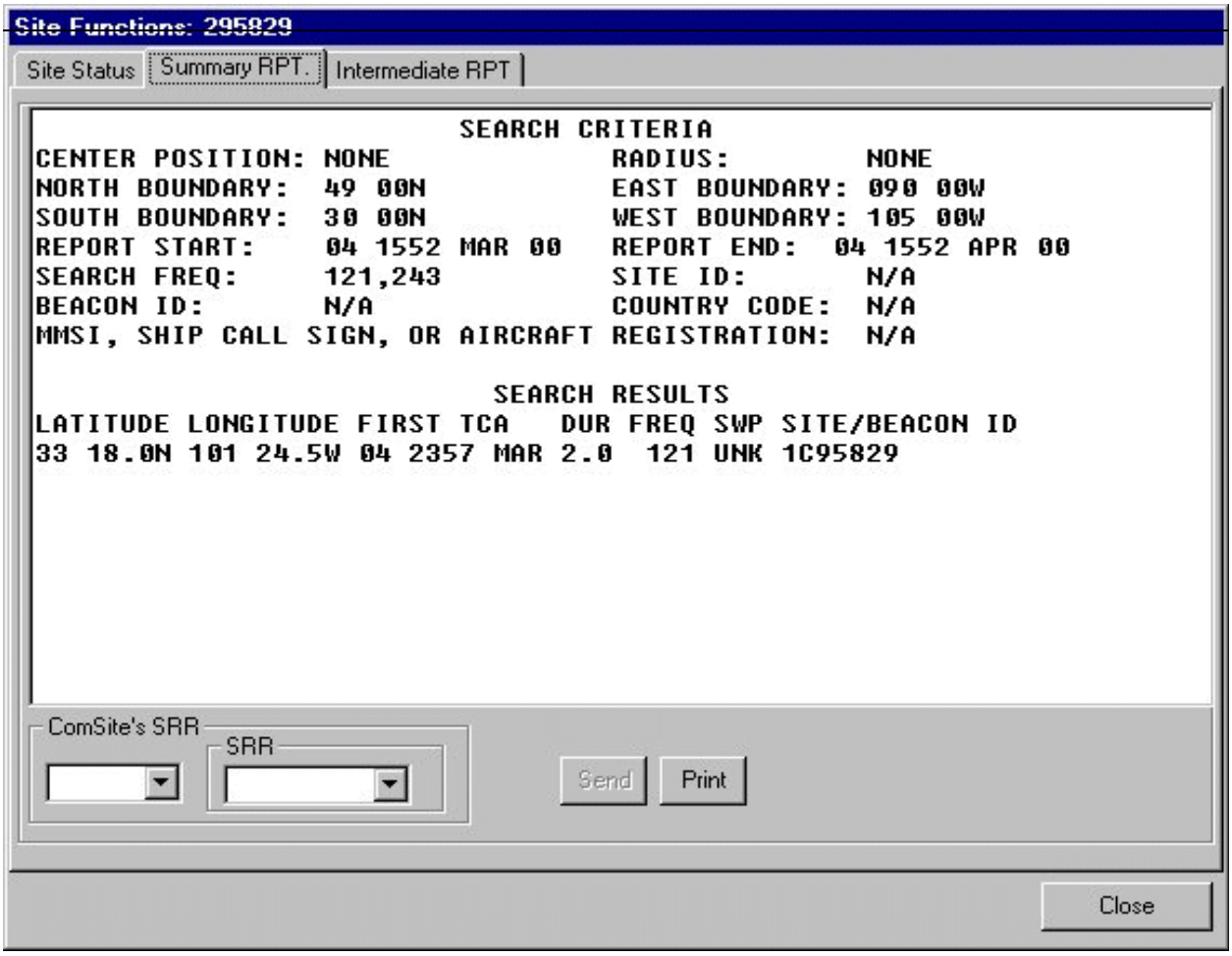


Figure 7-9 – Alert Query Summary Report with Location Boundaries set

Site Summary Report. Clicking on the "Summary RPT" tab brings up summary information for the selected site. It is used with O-plot queries, to send query results in a narrative message to another MCC/RCC/SPOC. Figure 7-9 shows a summary report that was derived following the query shown in Figure 7-6. To send this report to another address, the appropriate data must be entered in the "ComSite's SRR" frame. The combo box on the left side offers three choices of destination: MCC, RCC or SPOC. Once this selection is entered, a corresponding list of communication destinations is loaded into the "SRR" box. Select the desired SRR. The "Send" command button is now activated. Click it to transmit the information. Data may also be printed by clicking the "Print" command button.

Site Intermediate Report. This screen is the same as the Site Summary Report, except that a detailed listing of individual

pass summary results is included in the report. Note, at the top of this form, that no Position Boundaries are entered for this Alert Query. (See Figure 7-10)

> *Note: the location in an intermediate summary report is an average of all LUTs and MCCs that have reported results at the time the query was run. Therefore, the location may change if the query is re-run at a later time.*

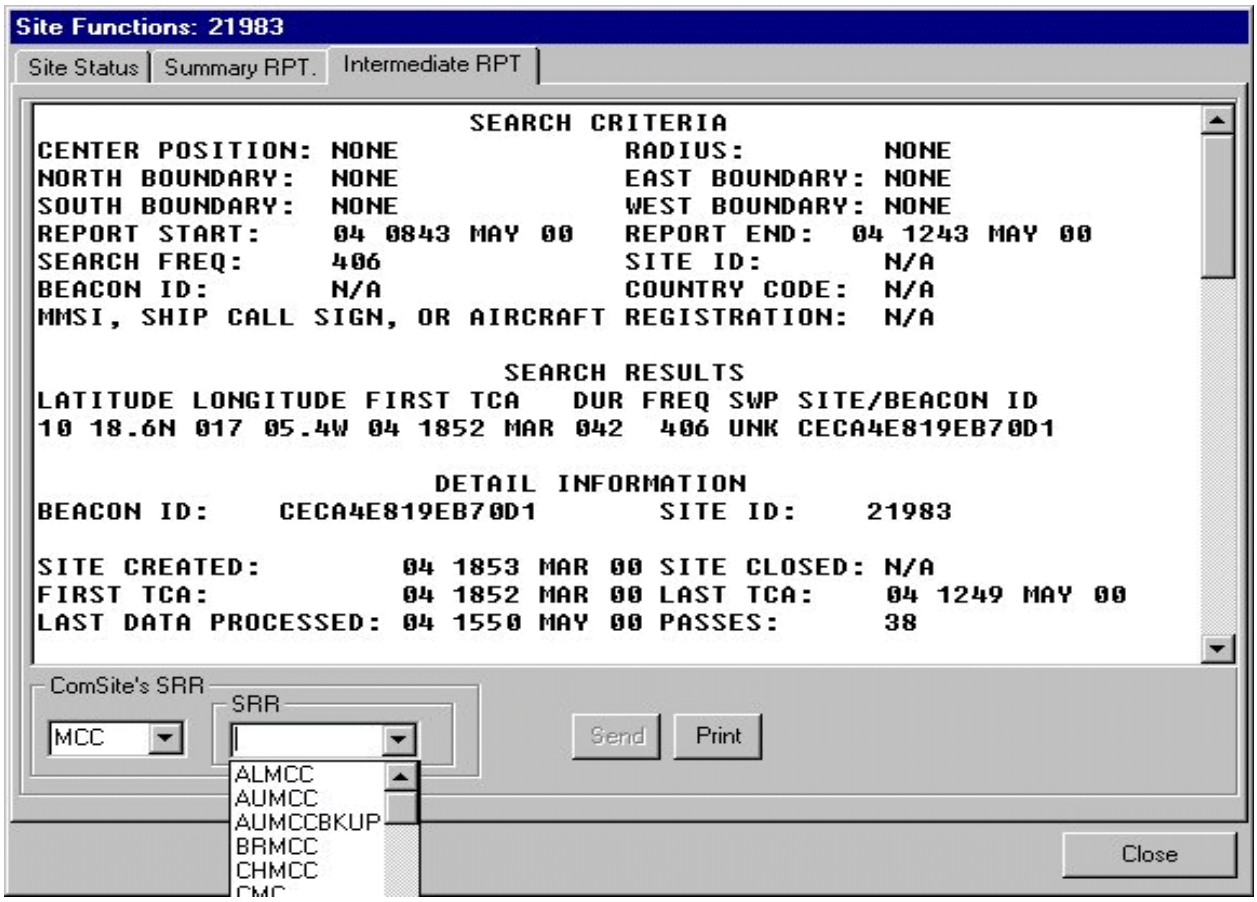


Figure 7-10 – Alert Site Query Intermediate Report

SPECIFIC OPTIONS FRAME

The “Specific Options” portion of the Alert Site Query form

is situated on the lower right side of the form, above the text box used for report outputs. It consists of one combo box and one text box for data entry. The user must first click on the combo box to make a selection from the drop down list box. An example of this drop down list is show in Figure 7-11.

Except for Site Id, the options presented in this frame apply only to 406 MHz beacons. At 121/243 MHz, the specific option frame can be a short cut to producing an intermediate report for an RCC when the Site ID is known. To do this, select "Site ID" from the drop down list, then enter the site number in the "Input Information" text box and click "Search". It is recommended that "Timebound" check box be turned off and that the Site Conditions are correctly set (Frequency and Site Status) when using the Site ID "Specific Option".

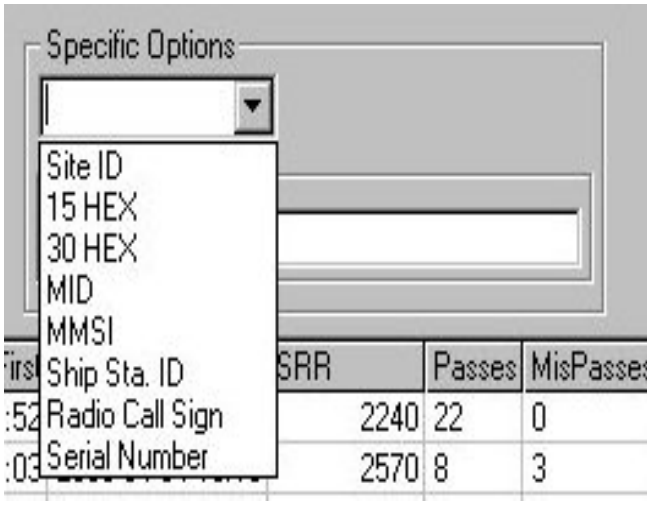


Figure 7-11 – Alert Query, Specific Options

Other Specific Options:
–15 HEX is the 15 hexadecimal beacon identification code.
–30 HEX is the longer hexadecimal beacon identification code that is used in MCC messages. It contains error detection codes.
--MID stands for Maritime Identification Digits and represents the nationality of the vessel
–MMSI is a MID code plus a selective identification code used by some nations
–Ship Sta. ID is another method of identifying a vessel, as is Radio Call Sign
–the majority of vessels use a serial number that is linked to databases at an MCC.

Figure 7-12 shows the result of a specific option query using the 15 HEX ID code.

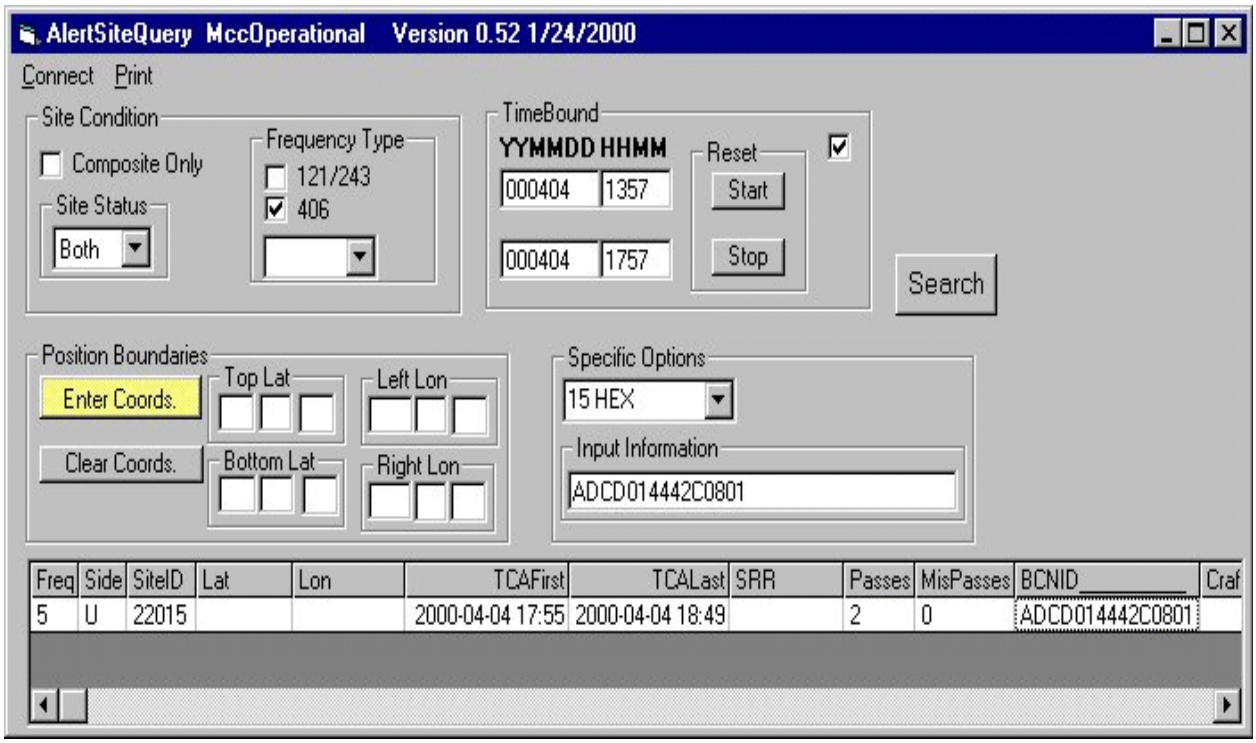


Figure 7-12 – Alert Site Query, 15 HEX ID option.

<u>Note</u>: separate, but similar query software is under development for 406 MHz interference data. The frequency code "4" is reserved for 406 interference. Interference software is not currently used by the Duty Controller

United States Mission Control Centre
Operating Instructions Manual

SECTION 8 – SCROLL

OVERVIEW

The USMCC is continually receiving, creating and transmitting messages. Incoming messages are processed and stored in various tables. The USMCC match/merge process reads data from these tables, undertakes additional processing, and stores the output in additional tables. As a result of these processes, output messages are created and sent to various destinations. While these processes are executing, messages are created and sent to the Duty Controller. These messages are called “Operator Messages”. The process that displays them is called “Scroll” because it causes the messages to scroll through the viewing window.

FUNCTIONS PROVIDED

Scroll provides two basic functions:

99. It gives the operator a continuous view of USMCC processing activity, and
100. It alerts the Duty Controller when unusual conditions are present that affect USMCC operations.

The Scroll interface is intended to run continuously during a Duty Controller shift. When the interface is started, a log in screen appears (Figure 8-1).

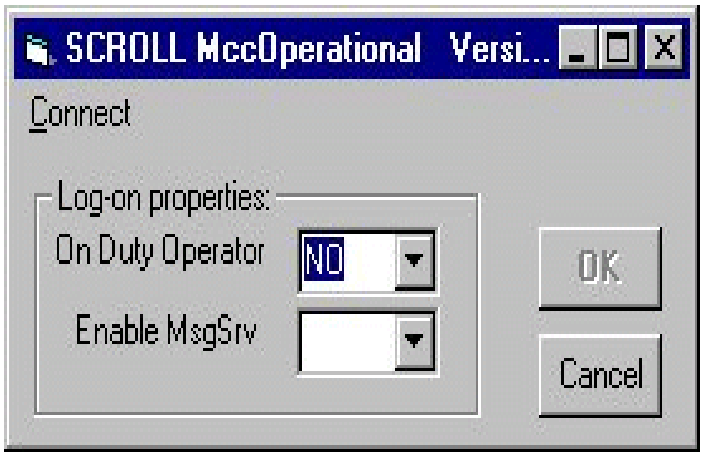


Figure 8-1 – Scroll Log On

Log On involves four steps:
1. Connect to the desired database
2. Duty Controllers select “YES” in the “On Duty Operator” box. Other users select “NO” (default value).
3. Select “YES” in the Enable MsgSrv box if you wish to have alarm boxes displayed on your terminal. (Duty Controllers always

see these messages. Other users have the option to view or suppress them.) You must cancel alarms.
4. Click the OK command button to start the Scroll program.

Scroll updates once (approximately) every 30 seconds.

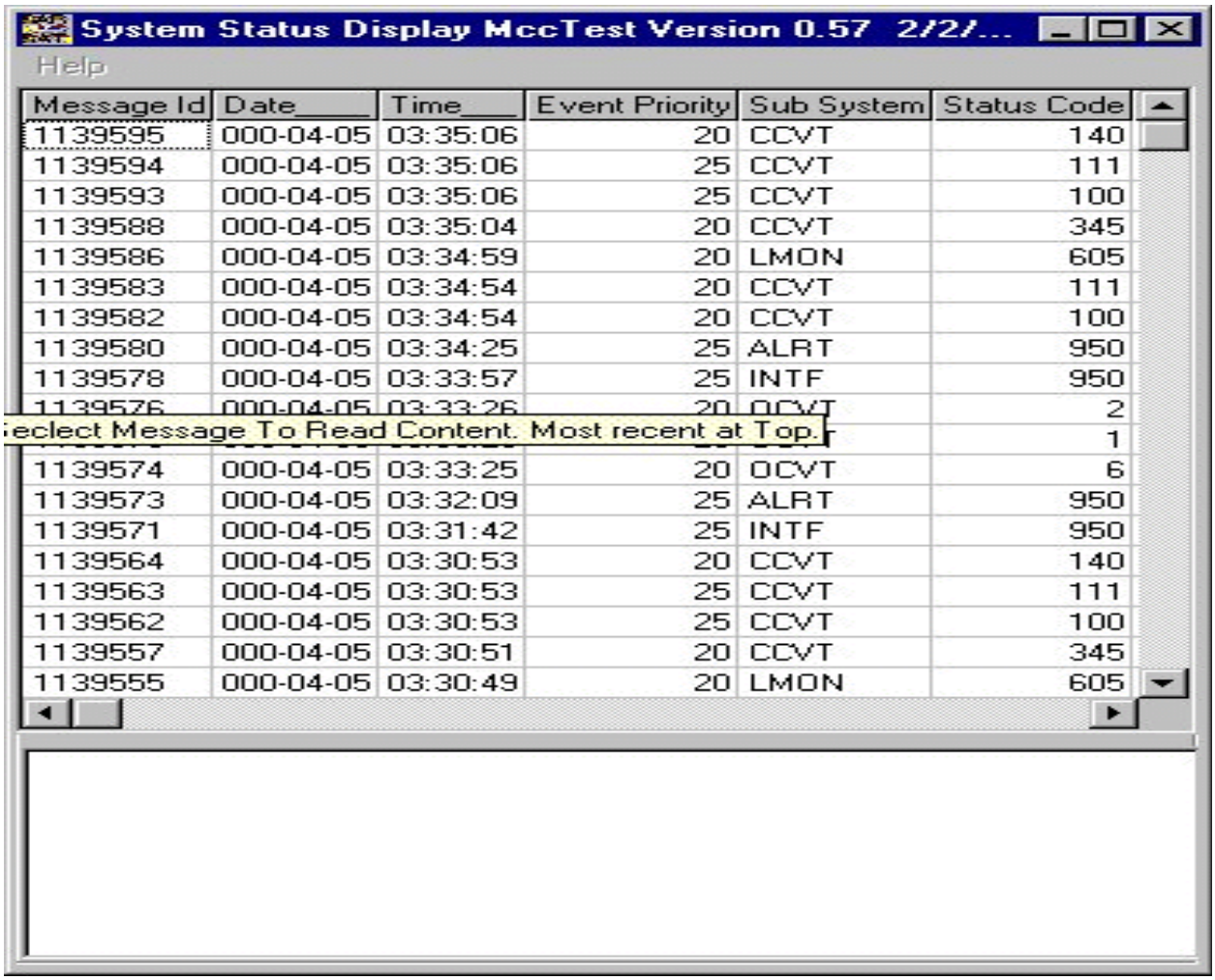


Figure 8-2 – Scroll, Initial Screen

When a new Controller or User starts the Scroll program, the software searches backwards approximately ten minutes and begins sending operator messages from that time forwards. The initial screen will appear like that shown in Figures 8-2 and Figure 8-3.

- "**Message ID**" is a systemgenerated sequence number that is assigned to each operator message that is passed to Scroll.

- The "**Date**" and "**Time**" columns indicate when the operator

message was created.

- “**Event priority**” is a number that indicates the importance of the message (severity of a problem).
- “**Sub System**” is the module that generated the operator message.
- “**Status Code**” is a unique message number that each program assigns to each different type of message.
- “**Message Content**” is the actual operator message.
- “**Program Section**” identifies modules within the Sub System.
- “**Program Priority**” is a number that indicates the importance of the message to the progammer.
- “**Associated Table**” indicates the database table that the program is using.
- “**Associated Item Id**” is the identification of this item in the “Associated Table”..

Figure 44 – Scroll, remaining operator message fields

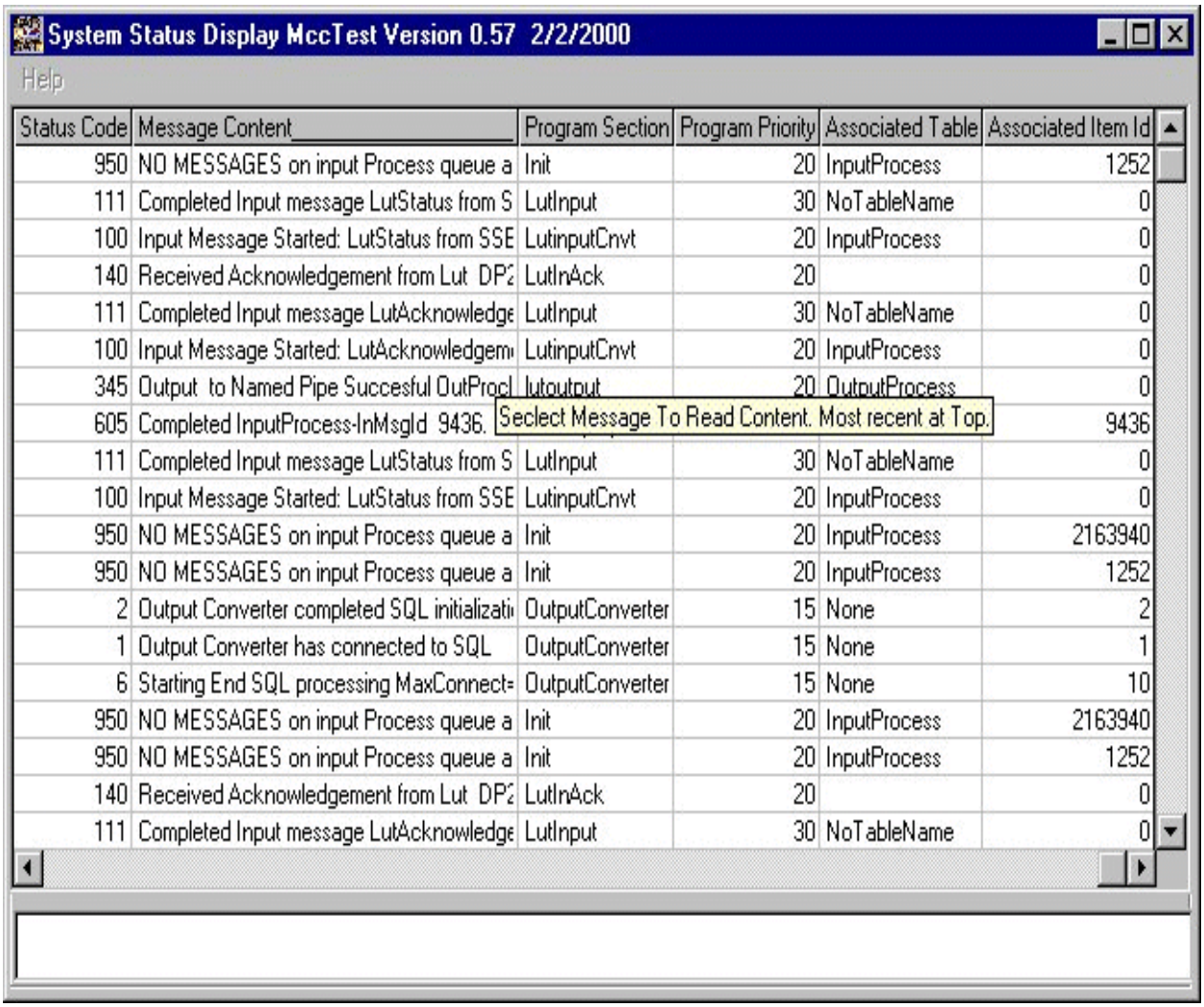


Figure 8-3 – Scroll, continuation of columns used for operator messages

The Scroll program occupies a significant area on the Duty Controller's workstation. It may be difficult to read on other user terminal that have a smaller viewing area and lower resolutions. In order to compensate, column widths are adjustable using click and drag techniques. The actual "Operator Message" can occupy up to 250 characters. To make it more readable, the user can read the full contents of the actual message by clicking on the desired entry. The full message will appear in the text box viewing window at the bottom of the Scroll screen. Figure 8-4 shows an example of a complete operator message.

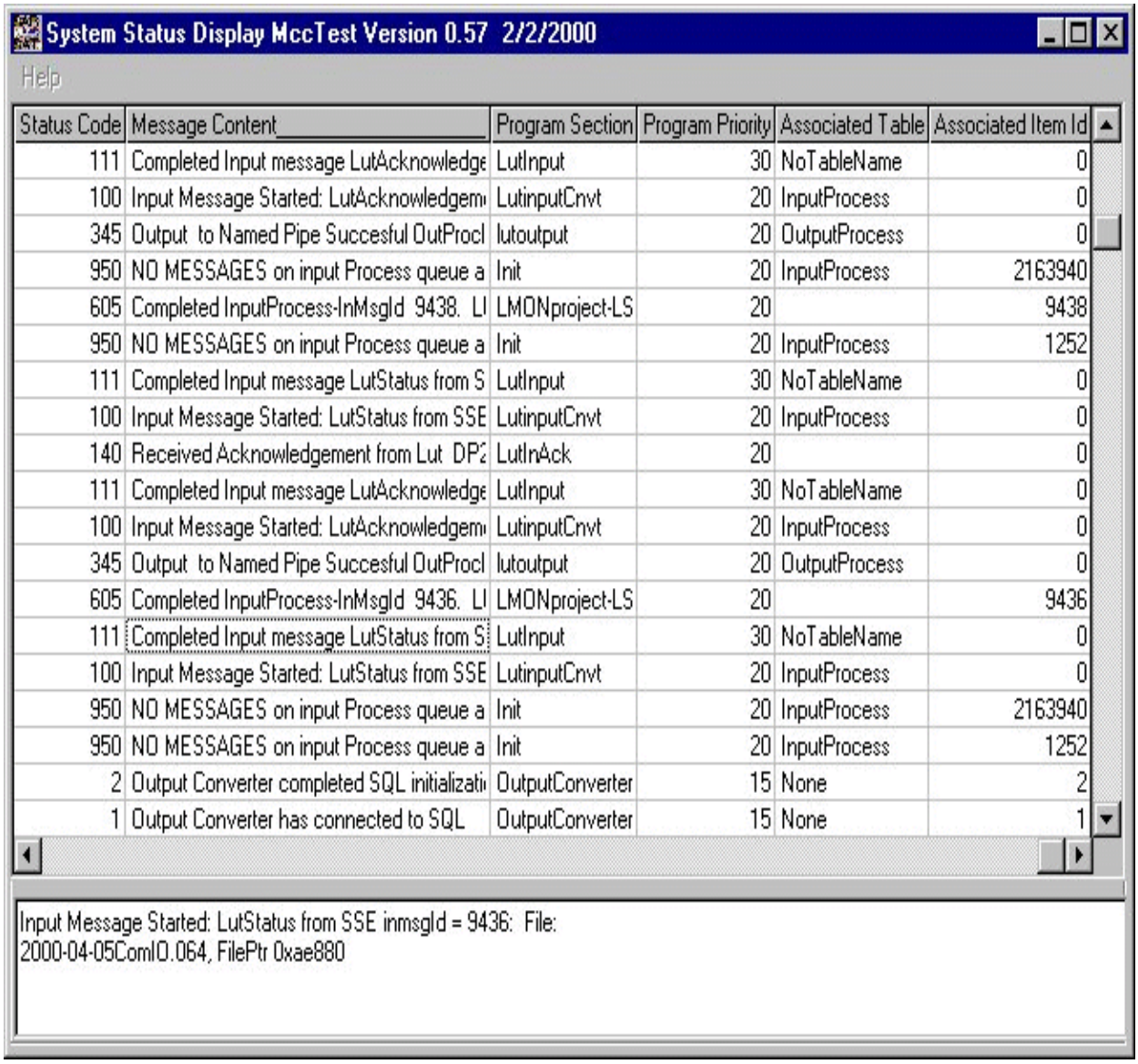


Figure 8-4 – Scroll, displaying of complete operator message

When the USMCC is running normally, many messages scroll through this window that are routine. The capability to view these messages is particularly useful when schedules and orbit vectors are sent to the LUTs. It also is useful for monitoring the shutdown and startup of other USMCC processes because one immediately receives a visual picture to indicate that processing has stopped, or is starting up correctly.

Monitoring and Alarms. Operator Messages that have an

operator (event) priority of 30 or greater are deemed to be alarms. The maximum value allotted to these messages is 49 and represents a severe software problem. Duty Controller SOPs provide specific direction for handling high priority operator messages. When alarms occur, the controller is presented with a "Pop Up Message Box" that stays on top of other screen displays until acknowledged. The background color of this box changes to reflect the severity of the alarm. This functionality is carried out by a module that is referred to as the message server. The program automatically logs the time and name of the Duty Controller who acknowledged each alarm

If the nature of the problem is such that a program cannot generate an operator message, Windows NT Messages boxes are used to write the problem directly to the screen on the Duty Controller's workstation.

An example of a Message Server message box if presented in Figure 8-5.

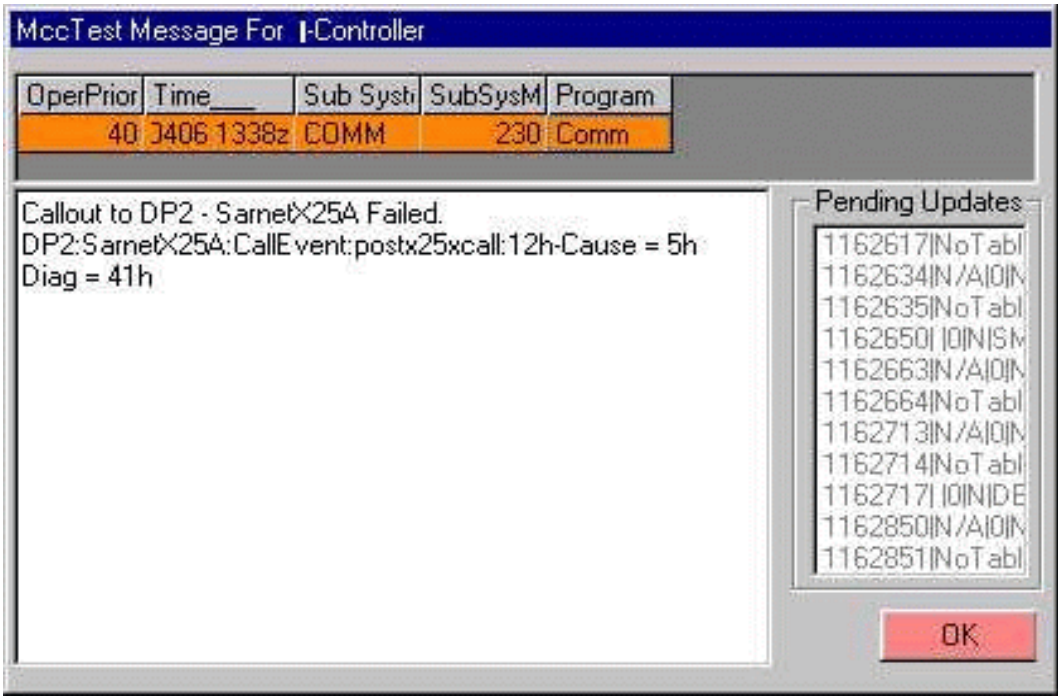


Figure 8-5 – Scroll, Alarm Box

In Figure 8-5, the Scroll entry appears in an Alarm Box tinted orange to indicate that it is a Level 2 alarm (See SOPs for more information on Alarm levels). The text of the alarm message is

displayed in the viewing area below the Alarm. The Controller must click the "OK" command button to acknowledge the alarm. This action will cause the time of acknowledgement and user identification to be logged by the software. Pending updates is a list of other alarms that need to be acknowledged. (This example was taken from the Test database which is not continuously monitored, hence the lengthly list of unacknowledged alarms.)

Figure 8-6 shows an example of a Windows NT alarm box.

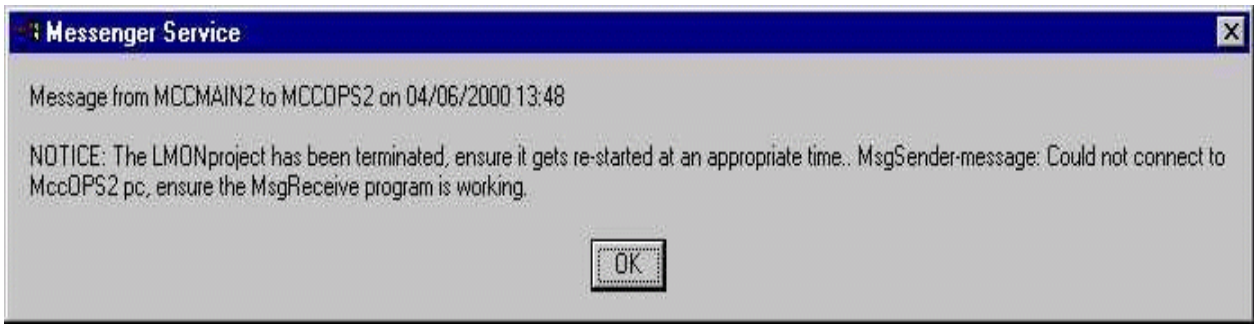


Figure 8-6 – Scroll, Windows NT Alarm