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AMPA PORTS VOICE DATA RESPONSE SYSTEM DESCRIPTION AND ACCESS STATISTICS:
May 1993 - May 1995

Silver Spring, Maryland
November 1995

noaa National Oceanic And Atmospheric Administration

U.S. DEPARTMENT OF COMMERCE
National Ocean Service
Office of Ocean and Earth Sciences
Marine Analysis and Interpretation Division
Coastal and Estuarine Oceanography Branch

Office of Ocean and Earth Science
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NOAA Technical Report NOS OES 009

TAMPA PORTS VOICE DATA RESPONSE SYSTEM DESCRIPTION AND ACCESS STATISTICS:
May 1993 - May 1995

Thomas D. Bethem

November 1995

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1. SYSTEM DESCRIPTION

1.1. INTRODUCTION

An oceanographic sensor system was developed by the National Ocean Service for Tampa Bay, FL, in response to a need for real time information for navigation. The system, called PORTS for Physical Oceanographic Real Time System, receives data from three types of instruments and five locations. Currents, wind and water levels are the three different types of incoming data. Port Manatee, Old Port Tampa, Port of Tampa, St. Petersburg, and Sunshine Skyway Bridge are the five locations. Currents are measured by Acoustic Doppler Current Profilers. Wind data are measured by anemometers mounted on the water level gauges as well as a single Coastal Climate meteorological sensor package located near the Sunshine Skyway Bridge. In addition to the suite of sensors, telemetry systems, a data acquisition system (DAS) and an information dissemination system (IDS) are also critical components of PORTS. The system was designed, developed, installed and evaluated over a 2-year period beginning in late 1989 (Fig. 1).

The sampling, collection, transmission and management of data is carefully orchestrated to provide reliable and consistent information. All systems are set to report at 6 minute intervals and have been timed to provide an average measurement centered on the hour and at succeeding 6 minute intervals. Each system is controlled and operated by its own internal clock. The real time concept dictates that each remote measurement site transmit data via UHF radio as soon after acquisition as possible. Intelligent packet modems control data transmission from each system and allow two-way communication with each system via dial-up phone line through the DAS. The DAS collects, processes and makes selected data available for dissemination.

PORTS has capitalized on the integration of microprocessor based instruments, packet radio technology, personal computers and voice response systems thus allowing operational users and decision makers convenient access to oceanographic information in real time. The DAS performs all acquisition, processing, quality control, error handling, archival, communications, and system management functions for the PORTS. The IDS performs all tasks associated with the delivery of PORTS products for the general user. All incoming and outgoing PORTS data and information pass through these two systems, which are located in the offices of the Greater Tampa Bay Marine Advisory Council (GTBMAC) on the campus of the University of South Florida (USF) in St. Petersburg, FL.

The real time IDS installed as part of Tampa Bay PORTS is the first of its kind to use the technology of Voice Data Response Systems (VDRS). The use of the VDRS was recommended by Captain Steve Day, Tampa Bay Pilots Association (TBPA). Representing the TBPA, Captain Day expressed a need for a simple, cost effective way to eliminate the need for scientific interpretation when receiving real time data. He recommended that the data be easily accessible, without the need for computers. He also recommended that the data be understood without graphs or tables. He suggested that the Coastal Estuarine Oceanography Branch (CEOB) investigate the voice response technology. Nearly 6 months of literature searches, vendor visitations and general market surveys

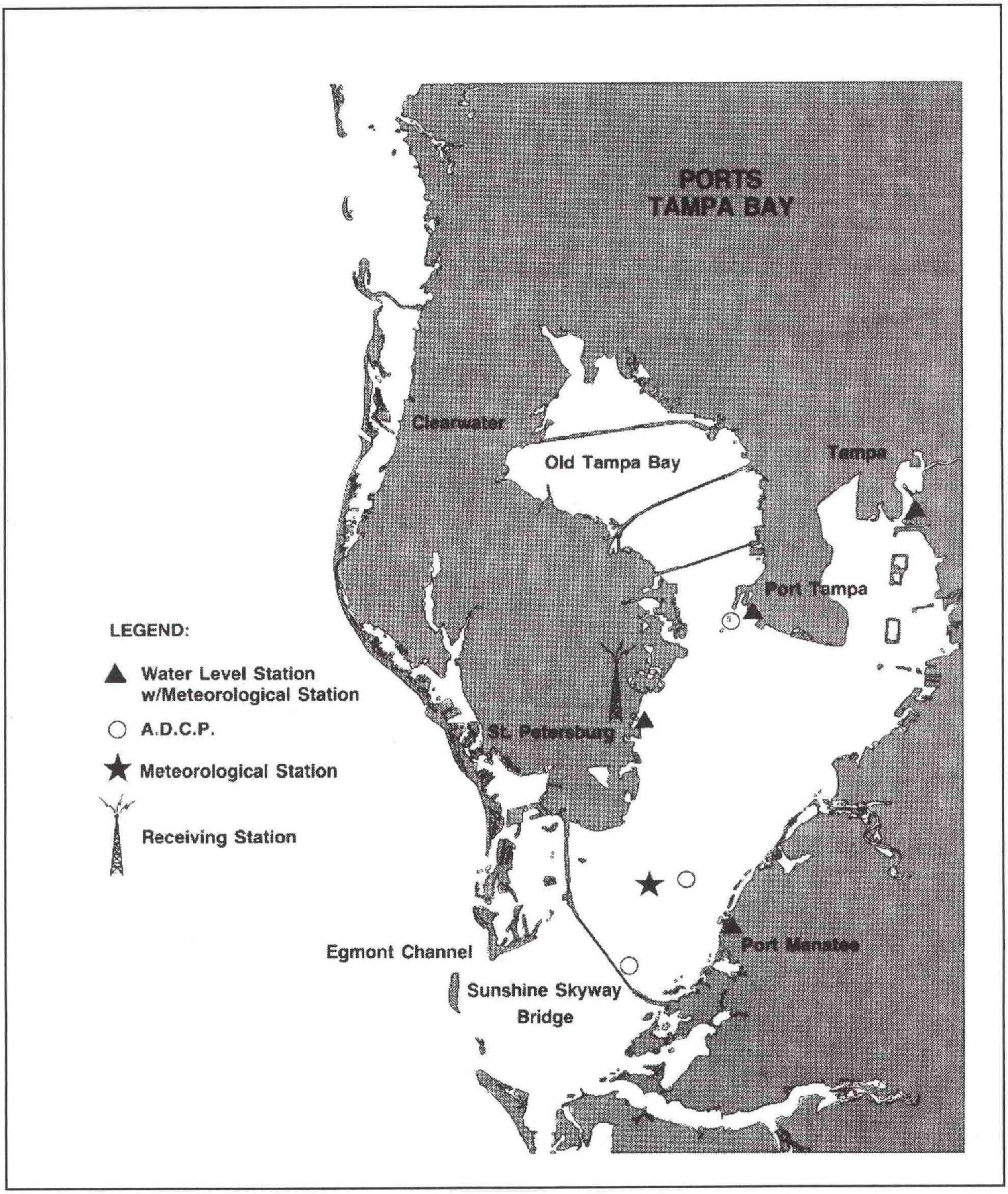

PORTS
TAMPA BAY
Clearwater
Old Tampa Bay
Tampa
Port Tampa
St. Petersburg
Port Manatee
Egmont Channel
Sunshine Skyway Bridge
LEGEND:
▲ Water Level Station w/Meteorological Station
○ A.D.C.P.
★ Meteorological Station
Receiving Station

Figure 1. Tampa Bay map showing the location of the PORTS measurement systems

resulted in the selection of the Syntellect Infobot Voice System. The Ambassador model was purchased. Training was received in Phoenix, AZ, and the application was coded using Syntellect's sophisticated fourth generation computer language. The TBPA's requirements were met, in addition, the programmer's need for ease of software development was satisfied.

1.2. SYSTEM CONTEXT: PORTS INFORMATION DISSEMINATION SYSTEM (IDS)

The information dissemination system consists of output functions and hardware of the DAS and the VDRS. The DAS and the IDS at USF are located within 5 feet of each other and use serial and coaxial cable to communicate.

Two primary modes of dissemination are employed by the IDS. The first is a screen text message generated by the DAS. This is a single screen, 22 line message that is sent to the DAS CRT screen in the GTBMAC PORTS offices at USF and is available by dialing the DAS from any personal computer (Fig. 2). The DAS CRT in the PORTS offices receives the text message on a continuous basis, always reflecting the latest information. The other mode of dissemination is a voice message generated by the VDRS that can provide PORTS information to any touch tone phone caller.

```
               Tampa Bay PORTS (Physical Oceanographic Real-Time System)
                     at  9:53 am EDT  August  3, 1995
                 National Oceanic and Atmospheric Administration
                            National Ocean Service
...............................................................................
               TIDES                :               CURRENTS
Port of Tampa       2.8 feet,Falling :  Sunshine Skyway       1.4 kts.(E), 234°T
Port Manatee        2.1 feet,Falling :  Port Manatee          0.6 kts.(E), 203°T
St. Petersburg      2.7 feet,Falling :  Old Port Tampa        1.1 kts.(E), 215°T
Old Port Tampa      3.0 feet,Falling :  (F)lood, (S)lack, (E)bb, towards °True
....................................:..........................................
                   METEOROLOGICAL                      :   BOTTOM WATER TEMP
Sunshine Skyway     21 knots from SSE, gusts to  24    :   Sunshine Skyway
                       Air temp.  83°F                 :   82°F
                       Pressure 1015 mb.               :   Old Port Tampa
Port of Tampa        6 knots from ESE, gusts to  16    :   81°F
Port Manatee         9 knots from ESE, gusts to  16    :
St. Petersburg      18 knots from SE , gusts to  22    :
Old Port Tampa       8 knots from E  , gusts to  13    :
...................................................:...........................
```

Figure 2. Tampa Bay PORTS text screen example as seen on the DAS

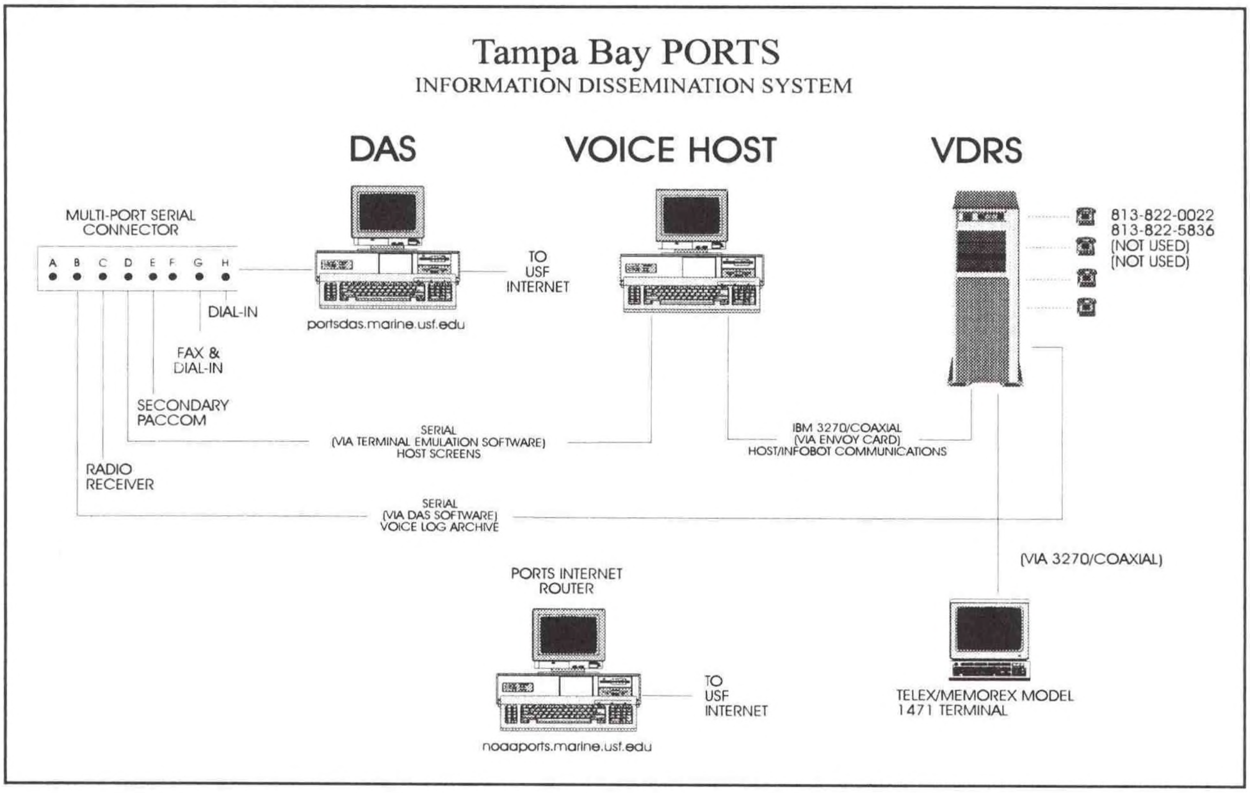
Both primary modes of dissemination provide the same quantity and quality of data but differ in the amount of information the user can receive at one time. The screen text message provides all of the information for all of the instruments at all locations on one screen. The voice system allows the user to choose what data to hear by providing a menu that the user selects from by pressing the appropriate touch tone keys on the phone. If the user wants to hear all the information, about three minutes expire while navigating through the entire menu. The voice system plays a very important role in providing a safe and convenient method for users that are not located in office environments or for those without access to a computer.

1.3. PORTS INFORMATION DISSEMINATION SYSTEM (IDS) COMPONENTS AND INTERFACES

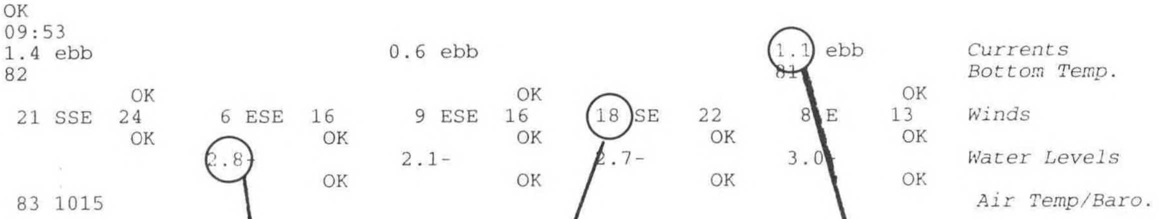
There are three major components to the IDS First, there is the DAS and its associated microcomputer and software. The DAS serves as the single source of processed data for the VDRS. Second, there is an IBM PC/486 microcomputer that is connected to the DAS microcomputer. This communication connection is through a serial cable and a terminal emulator software package, called Crosstalk, executing on the PC/486. This configuration makes the PC/486 operate as a "dumb" terminal. Its only purpose is to receive a specially formatted screen from the DAS computer. The PC/486 serves as a "host" to the voice processor and link between the DAS and the VDRS. The "host" PC receives a new screen each time the DAS receives new data. An interface card installed in the host PC/486, called the Envoy card, provides a physical and logical connection between the host PC/486 and the third and last component, the Infobot[1] voice processor. The connection from the Envoy card and the Infobot voice processor is through a coax cable establishing a network between the Infobot and the PC/486 host. Although PORTS does not use multiple voice systems or hosts, this network could be expanded to include many voice and hosts components (Fig. 3).

---

[1] Infobot is the name of the voice processor product line manufactured and sold by Syntellect Inc. with headquarters in Phoenix, Arizona. PORTS uses the Ambassador model which provides for up to 4 phone lines to receive calls (Table 1). The Infobot communicates with the host by using Syntellect's proprietary Envoy card installed in the host PC.

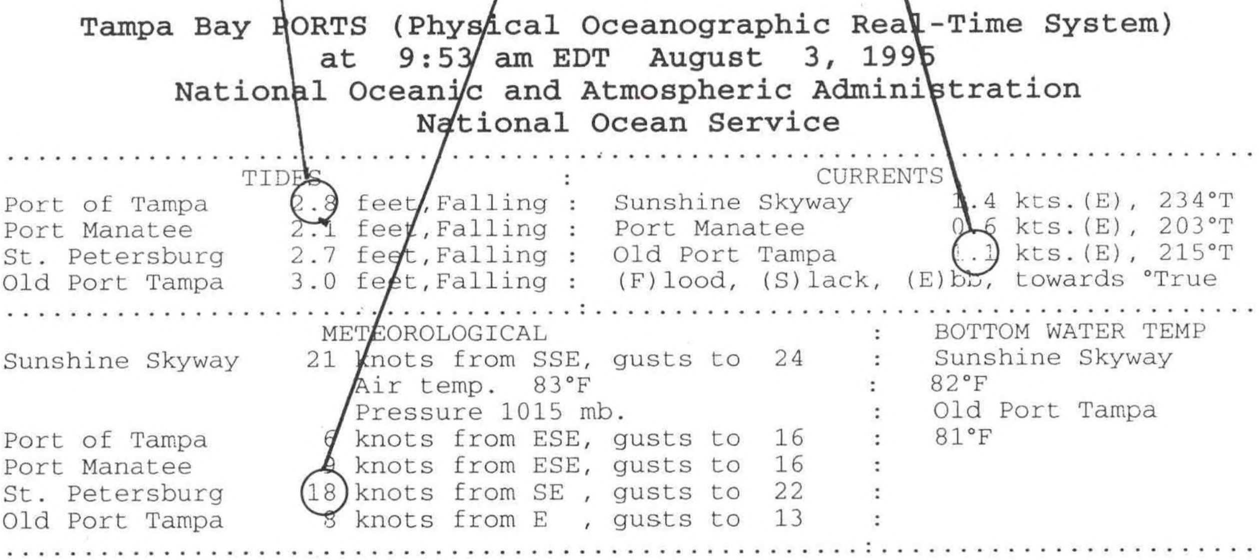

Tampa Bay PORTS
INFORMATION DISSEMINATION SYSTEM
DAS
VOICE HOST
VDRS
MULTI-PORT SERIAL CONNECTOR
A B C D E F G H
DIAL-IN
FAX & DIAL-IN
SECONDARY PACCOM
RADIO RECEIVER
TO USF INTERNET
portsdas.marine.usf.edu
813-822-0022
813-822-5836
(NOT USED)
(NOT USED)
SERIAL (VIA TERMINAL EMULATION SOFTWARE) HOST SCREENS
IBM 3270/COAXIAL (VIA ENVOY CARD) HOST/INFOBOT COMMUNICATIONS
SERIAL (VIA DAS SOFTWARE) VOICE LOG ARCHIVE
(VIA 3270/COAXIAL)
PORTS INTERNET ROUTER
TO USF INTERNET
noaaports.marine.usf.edu
TELEX/MEMOREX MODEL 1471 TERMINAL

Connected as described, the data flow is as follows. After processing the received data, the DAS "sends" the data through its RS-232 port to the receiving host. Acting like a dumb terminal, the host simply echoes the screen information that the DAS has sent. The screen sent by the DAS to the host screen can be seen in Figure 4(a). The DAS also displays this data on its CRT in a formatted manner (Fig. 4(b)). The information shown in Figure 4(a) is the same as that found in Figure 4(b) but formatted in a special form that the VDRS can interpret. The "OK" in the upper left corner indicates that all data has been received by the DAS and the VDRS should consider this screen fully updated. Other "OK" characters indicate that the individual sensors are functioning as expected. An absence of these "OK" characters will signal the VDRS to speak a temporary outage message to the caller. Lines drawn connecting Figure 4(a) values to Figure 4(b) values demonstrate the link between the two screens.



```
OK
09:53
1.4 ebb                               0.6 ebb                              1.1 ebb           Currents
82                                                                         81                Bottom Temp.
          OK                                     OK                                  OK
 21 SSE  24        6 ESE  16         9 ESE  16       18 SE     22        8 E     13          Winds
          OK                OK                   OK              OK                  OK
                 2.8-                2.1-             2.7-            3.0-                   Water Levels
                            OK                   OK              OK                  OK
 83 1015                                                                                      Air Temp/Baro.
```

Figure 4(a). Tampa Bay PORTS VDRS host screen.



```
     Tampa Bay PORTS (Physical Oceanographic Real-Time System)
                at  9:53 am EDT  August  3, 1995
          National Oceanic and Atmospheric Administration
                       National Ocean Service
.................................................................................
                   TIDES                :               CURRENTS
Port of Tampa       2.8 feet,Falling :  Sunshine Skyway        1.4 kts.(E), 234°T
Port Manatee        2.1 feet,Falling :  Port Manatee           0.6 kts.(E), 203°T
St. Petersburg      2.7 feet,Falling :  Old Port Tampa         1.1 kts.(E), 215°T
Old Port Tampa      3.0 feet,Falling :  (F)lood, (S)lack, (E)bb, towards °True
.................................................................................
                      METEOROLOGICAL                            :  BOTTOM WATER TEMP
Sunshine Skyway      21 knots from SSE, gusts to  24            :  Sunshine Skyway
                        Air temp.  83°F                         :  82°F
                        Pressure 1015 mb.                       :  Old Port Tampa
Port of Tampa         6 knots from ESE, gusts to  16            :  81°F
Port Manatee          9 knots from ESE, gusts to  16            :
St. Petersburg       18 knots from SE , gusts to  22            :
Old Port Tampa        8 knots from E  , gusts to  13            :
.................................................................................
```

Figure 4(b). Tampa Bay PORTS DAS screen.

The next step does not take place until the Infobot voice processor receives an incoming call. Were it not for this event, the data would continue to appear on the host microcomputer, being refreshed every six minutes (the sample period of the instruments). When a call is received, the application software installed on the voice processor takes over. The application software program was developed using a fourth generation programming language and is custom tailored to "read", recognize, interpret, and eventually "speak" what appears on the host computer screen. When a call is received and the appropriate touch tone number is entered by the caller, the voice processor makes a request for data from the host screen over a coax cable to the Envoy interface of the host and logically "grabs" the screen. Having been told by the voice processor software what fields to expect and where they will appear on the screen, the information is then available to be used in speech. Prerecorded fixed messages are combined with the dynamic host screen fields, and a continuous voice message is heard by the caller.

For example, the message to speak the floating point value of a current speed measured at Port Manatee would be created as follows. First the whole number portion of the current speed would be obtained from the captured screen. It would be assigned a screen field variable name called S CSD_MAN. The decimal or fractional portion of the speed would be assigned the screen field name S CSF_MAN (F for floating point). Given a speed of 1.2 knots, S CSD_MAN would be equal to 1 and S CSF_MAN would be equal to 2. The program would dictate that the prerecorded message "PORT MANATEE" be concatenated with the whole number portion, then concatenated with the prerecorded word "POINT", then concatenated with the fractional portion, and finally with the prerecorded word "KNOTS". The voice message heard by the caller would be "PORT MANATEE ONE POINT TWO KNOTS". In addition, the current state screen identifier for PORT MANATEE (S CST_MAN) would indicate a flood, ebb or slack and the associated speech for the state would also be added. The prerecorded words and/or phrases are represented as digitized rather than synthesized voice. The voice quality is like that of a recorded magnetic tape. To speak numbers and letters or months of the year, all numbers, months of the year and single letters must be prerecorded. These prerecorded values can be combined to form other numbers, as in speaking the number 150. The prerecorded number 100 is concatenated to the prerecorded number 50. This process of speaking screen fields and prerecorded sentences and phrases is repeated for all selections made by the caller.

To provide for system monitoring and evaluation, the voice application software can collect and report different types of caller statistics. These reports can reveal how many callers during any half-hour of the day have called in, the average length of the call for each half-hour of the day, as well as the total callers during that 24 hour period (Fig. 5). With some minor software changes to the application, other kinds of statistics can narrow the scope to look at different "pieces" of the voice menu to determine what parts are used the most or the least.

```
DAILY SUMMARY REPORT                    STARTING   07-31-95
Printed   00:00   08-01-95
                     CALLS     MODULE        CALLER        CALLS         AVERAGE
                     RECEIVED  DISCONNECT    DISCONNECT    TRANSFERRED   CALL
LENGTH
  00:00 - 00:30         0         0              0             0            0:00
  00:30 - 01:00         0         0              0             0            0:00
  01:00 - 01:30         1         0              1             0            0:52
  01:30 - 02:00         1         0              1             0            1:15
  02:00 - 02:30         0         0              0             0            0:00
  02:30 - 03:00         1         0              1             0            0:50
  03:00 - 03:30         0         0              0             0            0:00
  03:30 - 04:00         0         0              0             0            0:00
  04:00 - 04:30         0         0              0             0            0:00
  04:30 - 05:00         0         0              0             0            0:00
  05:00 - 05:30         0         0              0             0            0:00
  05:30 - 06:00         4         0              4             0            1:23
  06:00 - 06:30         3         0              3             0            2:02
  06:30 - 07:00         4         0              4             0            1:08
  07:00 - 07:30         7         0              7             0            0:59
  07:30 - 08:00        11         0             11             0            0:53
  08:00 - 08:30        13         0             13             0            1:07
  08:30 - 09:00        22         0             22             0            1:00
  09:00 - 09:30        15         0             15             0            0:59
  09:30 - 10:00        13         0             13             0            1:11
  10:00 - 10:30        19         0             19             0            1:07
  10:30 - 11:00        13         0             13             0            1:09
  11:00 - 11:30        18         0             18             0            0:58
  11:30 - 12:00        15         0             15             0            1:00
  12:00 - 12:30        15         1             14             0            1:30
  12:30 - 13:00        19         0             19             0            1:25
  13:00 - 13:30        15         0             15             0            1:15
  13:30 - 14:00        14         0             14             0            1:03
  14:00 - 14:30        15         0             15             0            1:11
  14:30 - 15:00        22         0             22             0            1:16
  15:00 - 15:30        21         0             21             0            1:15
  15:30 - 16:00        15         0             15             0            1:12
  16:00 - 16:30        18         0             18             0            1:06
  16:30 - 17:00        21         0             21             0            1:07
  17:00 - 17:30         8         0              8             0            1:14
  17:30 - 18:00        11         0             11             0            1:14
  18:00 - 18:30         2         0              2             0            1:11
  18:30 - 19:00         4         0              4             0            0:56
  19:00 - 19:30         2         0              2             0            1:28
  19:30 - 20:00         2         0              2             0            1:03
  20:00 - 20:30         4         0              4             0            0:55
  20:30 - 21:00         3         0              3             0            1:21
  21:00 - 21:30         1         0              1             0            0:58
  21:30 - 22:00         1         0              1             0            0:47
  22:00 - 22:30         1         0              1             0            3:54
  22:30 - 23:00         1         0              1             0            2:09
  23:00 - 23:30         1         0              1             0            1:02
  23:30 - 24:00         2         0              2             0            0:58

  TOTAL               378         1            377             0            1:10
```

Figure 5. Example of daily voice report - total calls per day

1.4. INFOBOT HARDWARE AND SOFTWARE DESCRIPTION

The Syntellect INFOBOT Ambassador Model is the entry level product in terms of physical size and capacity to accept incoming calls. It can be placed on the floor, a shelf or a desk, and it functions well in a normal office environment. Product specifications can be found in Table I.

TABLE I. VDRS Specifications

Height	19 inches.
Width	9 inches
Depth	19 inches
Weight	43 pounds

Power Source	115-volt AC, 60 Hz (single phase)
Environment	Humidity range = 10% to 80%
Temperature range	41 - 104 Degrees F.
Max. Power Consumption	300 Watts
Max. Heat Dissipation	1022 BTU/hour
Surge Protection	Up to 152 volts AC.
Telephone connections	4

The Ambassador contains five computer cards, one "Application Processor card" (AP Board) and four "Touch Tone Voice" (TTV Boards) boards (Fig. 6).

Application Card (1) -
The Application Card contains one floppy (high density 3 1/2") and one hard disk (40 MB Winchester) interface. It uses a Motorola 68000 microprocessor.

Touch Tone Voice Boards (4) -
These cards emulate the telephone, each board containing a single phone interface. Each board contains a 68008 microprocessor, two Am2091 bitslice microprocessors and 1/2 MB of memory. The bitslice microprocessor reads and writes information from the coax cable connecting the Ambassador to the data source (host). The 68008 microprocessor creates screen images of what appears on the host screen, controls the telephone hardware and monitors the work of the Am2091.

All boards are connected using an Intertask Communicator (ITC) over a VME bus. The operating system is called Virtual Real Time Execution (VRTX) and was developed by Read Systems, Inc.

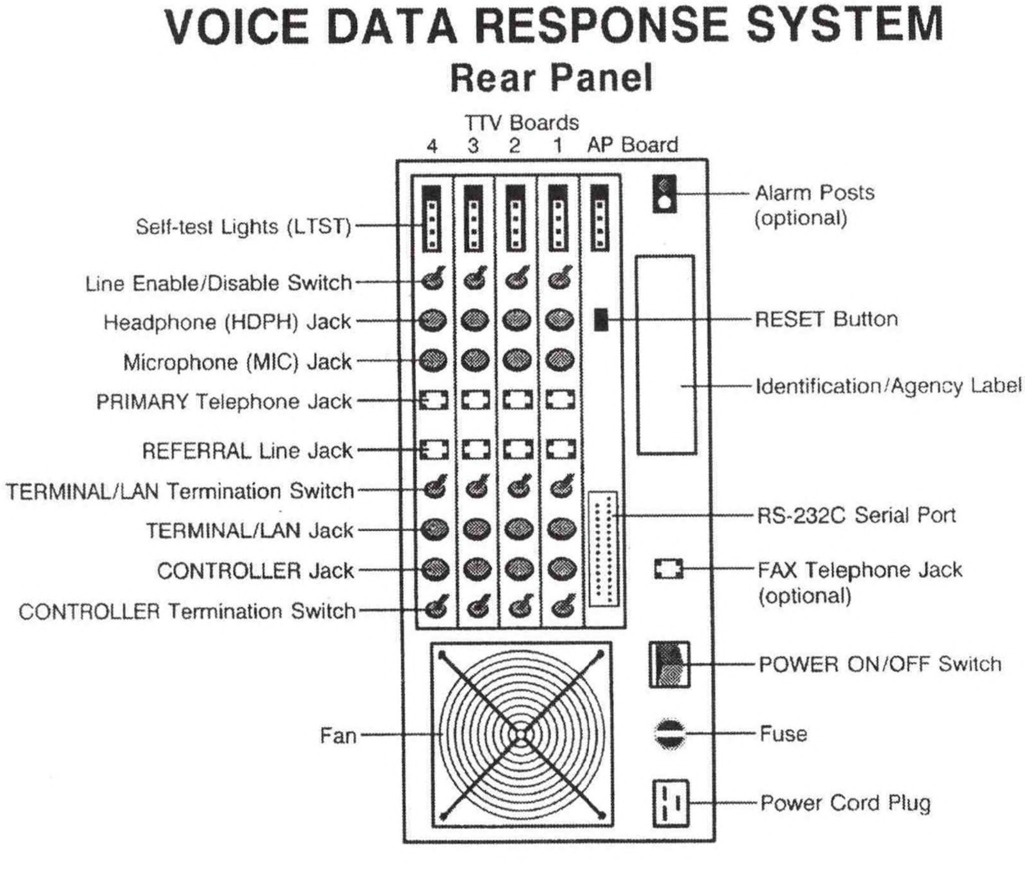

VOICE DATA RESPONSE SYSTEM
Rear Panel
TTV Boards
4
3
2
1
AP Board
Self-test Lights (LTST)
Line Enable/Disable Switch
Headphone (HDPH) Jack
Microphone (MIC) Jack
PRIMARY Telephone Jack
REFERRAL Line Jack
TERMINAL/LAN Termination Switch
TERMINAL/LAN Jack
CONTROLLER Jack
CONTROLLER Termination Switch
Fan
Alarm Posts (optional)
RESET Button
Identification/Agency Label
RS-232C Serial Port
FAX Telephone Jack (optional)
POWER ON/OFF Switch
Fuse
Power Cord Plug

Figure 6. Rear view of Syntellect's Ambassador VDRS

The VRTX was chosen primarily for its reliability and use in real time aerospace applications. An input/output and file manager (IOX/FMY), a "C" library, and some assembly code are also included. The Ambassador has a headphone and microphone jack for use in recording speech, and

an RS-232 port for a printer if desired. Extensive self testing is performed at start up. Indicator lights allow for visual monitoring of the test procedure. Self testing takes approximately 2-3 minutes. There are four lights per board that can represent a unique pattern for indicating the results of the self testing.

1.5. ACCESSING THE VDRS

The Tampa Bay PORTS VDRS is available 24 hours a day, seven days a week from any touch tone phone. Phone numbers for the system are (813) 822-5836 and (813) 822-0022. The caller will be greeted with an initial message identifying the system by name and welcoming the caller. This is followed by a "menu" of data possibilities to chose. The menu presents five possibilities.

1 - For Current data press 1
2 - For Water Level data press 2
3 - For Wind data press 3
4 - For Bottom Temperature data press 4
5 - For PORTS information press 9

An additional selection is not spoken but is available. By pressing 0, the caller can listen to an instrument status check. This is a quick way to determine if any instruments are not available before going through all of the menus.

1.6. SUMMARY OF VDRS MARKET ANALYSIS

CEOB conducted a year long search to find the technological and price performance match for a voice response system. This system would allow users to telephone a computer platform and through the use of the touch tone buttons on their telephone, receive information from a real-time data collecting system. The system would be located at the University of South Florida in St. Petersburg, Florida and would be an integral part of the Physical Oceanography Real Time System (PORTS) and the Tampa Bay Oceanography Project (TOP). The requirements for the voice response system were :

1. The system must be purchased as a stand alone system. That is, we were only interested in buying hardware and software to act as a peripheral to our already purchased PC. Most systems that interact with a microcomputer, insist on bundling the PC with the voice system.

2. The system must have a 4th Generation language for programming the voice system as to what to say, where to get the data, what to do if the system would encounter other than expected input. This language would eliminate the need for user programming in high level languages such as "C" or Pascal. Application implementation time needs to be minimal and with the possibility of a non-programmer to maintain the system.

3. The system must have a hardware and software maintenance program that could respond to emergencies quickly. The voice system will be connected to a real time oceanographic data dissemination system in St. Petersburg, Florida. On site personnel would monitor the system and if required, repairs and/or service would have to be done quickly.

The following companies were investigated for their satisfaction of our requirements. There appeared to be a myriad of companies making voice response systems. Syntellect, Inc., Microlog Corp., Perception Technology, AT&T Conversant Systems, Dialogic Corp., Atech Corp and Intervoice Corp. were the leaders in the market at the time and were considered.

Only Syntellect, Perception and Microlog were further considered after technical evaluation. Dialogic proved to be a manufacturer of circuit boards primarily and the limited software that was available would have required extended development using senior personnel. AT&T Conversant Systems were voice mail systems primarily and ran on main frames rather than microcomputers. Atech Corp. were large system integrators and required all software development to be done by Atech. Multiple vendors and the mandatory use of outside software development made this vendor unacceptable.

An evaluation of the vendors and their products revealed three possible sources. Syntellect Inc.; Microlog Corp.; and Perception Technology. The non-selected sources provided the basic capabilities but fell short in three main areas:

1. The 4th generation languages of Microlog and Perception are inferior to that of Syntellect.

2. The estimated Implementation time for a Microlog or Perception application would require the vendor to be contracted for application development. Syntellect would not.

3. Systems other than Syntellect must be purchased as bundled with the vendor providing the PC and in some cases restricting the upgrade of that PC by anyone other than the vendor.

2. ACCESS STATISTICS

2.1. INTRODUCTION

The VDRS was programmed to generate a voice report based on a computer generated log every night at midnight. This log can be seen in Fig. 5. The six column report represents the number of calls made to the VDRS during a 24 hour period beginning at midnight. The times in the first column are in 30 minute increments. Column two represents the number of calls received during a 30 minute interval. Column six represents the average length of a call during the 30 minute sample interval. Columns three, four and five can be disregarded. The report also tallies the number of calls during the entire 24 hour period as well as computes the average call length for the day.

This report serves as the single data source for computing the VDRS statistics. A separate report (not shown) gives additional information about the frequency of individual voice menu selections in percentages during the same 24 hour period. This kind of data provides some indication as to the interests of the caller. For each voice menu selection (currents, water levels, winds etc.), the report computes the percent of the time each selection is made by the caller. More users select the "wind data" from the voice menu than any other selection.

2.2. PROCEDURES FOR CALCULATING STATISTICS

Voice logs generated each day are concatenated and place in a monthly file named appropriately on the PORTS DAS. Monthly files from May 1993 to May 1995 were uploaded to a PC and stored for processing. A FORTRAN program was written to read all of the monthly files and then reformat the data into one that would be more easily processed. A second FORTRAN program read these reformatted files and generated monthly data sheets with statistics. These can be found in the appendix. Monthly data values from these sheets were subsequently entered into a spread sheet and a summary of the entire sample was generated (Table 2).

2.3. STATISTICAL SUMMARY

Table II represents the results of analyzing 1,104 sample days of operating the Tampa Bay VDRS. During the period May 1992 to May 1995, the VDRS received 167,485 calls. The Table is organized by year and month. The horizontal columns represent (1) number of days the VDRS was operating each month; (2) the total calls received each month; (3) the minimum number of calls for a day for each month; (4) the day the minimum number of calls occurred in the month; (5) the maximum number of calls for a day for each month; (6) the day the maximum number of calls occurred in the month; (7) the average number of calls received for each month; (8) the number of days in each month where the number of calls received exceeded 100 and (9) the percentage of time the total number of calls received in a month exceeded 100.

Some general statements can be made about the data. Figure 7 shows the monthly totals for calls received by the VDRS. November through April is the traditional "in season" time for the Gulf Coast beaches and resorts. This is evident in the higher totals during these periods in the chart in what turns out to be a cyclical increase in calls. Boaters, wind surfers, etc., use the VDRS frequently during this period. An average of 160 calls were received each day throughout the sample period. March 13, 1993, had the most calls in a 24 hour period with 711 callers dialing the VDRS.

Figures 8 through 11 show how the VDRS is used during wind events. Clearly, calls increase as the wind speed increases or in anticipation of a forecasted storm event. Figure 8 shows a classic

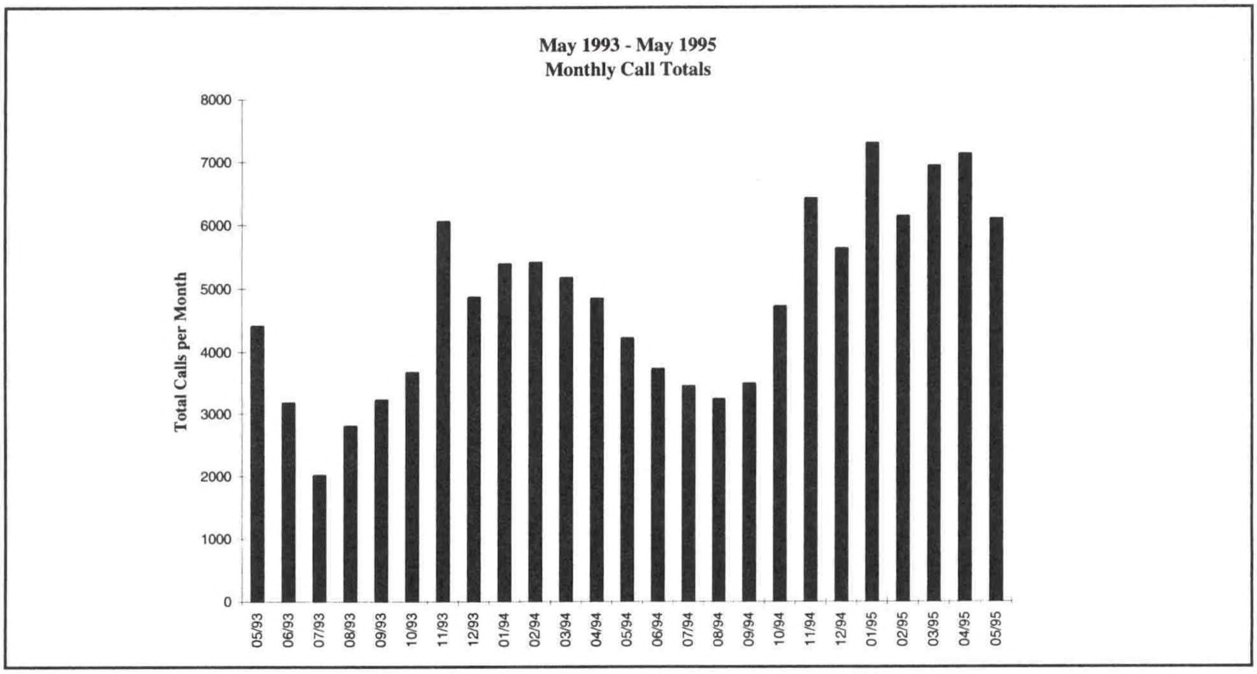


Figure 7. May 1993 - May 1995 monthly call totals

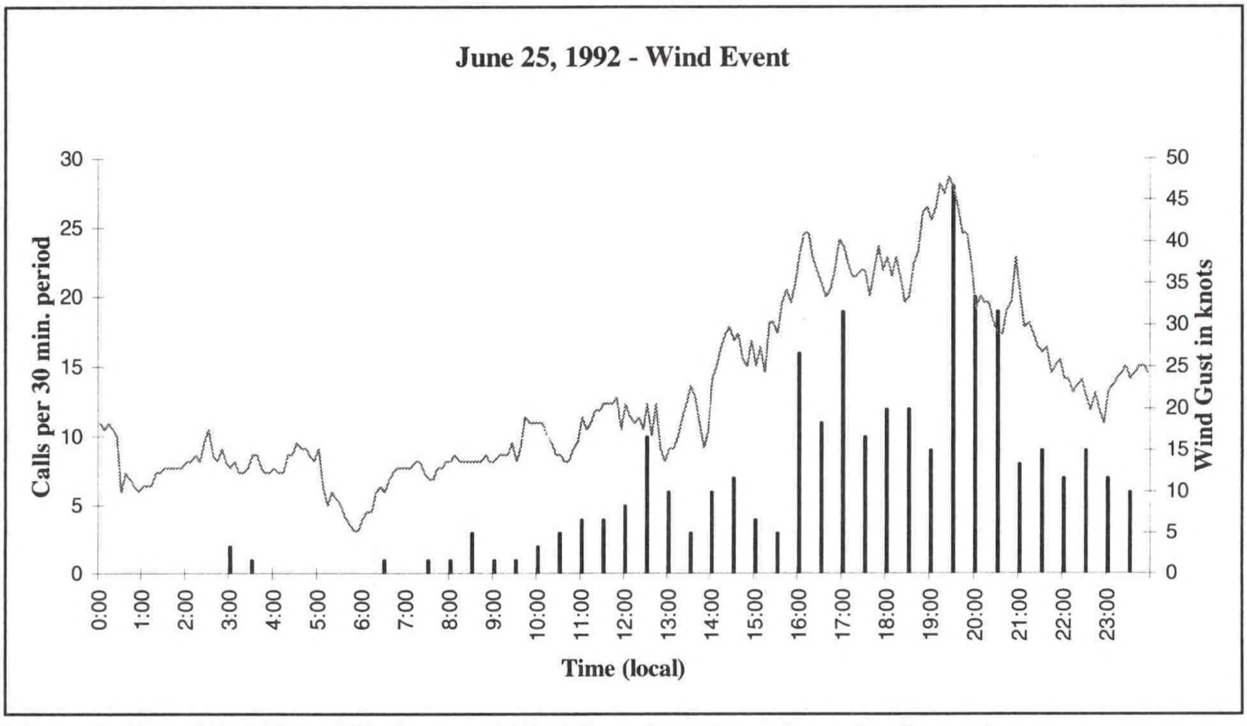


Figure 8. June 25, 1992 - Wind event: Wind Speeds and number of calls vs time

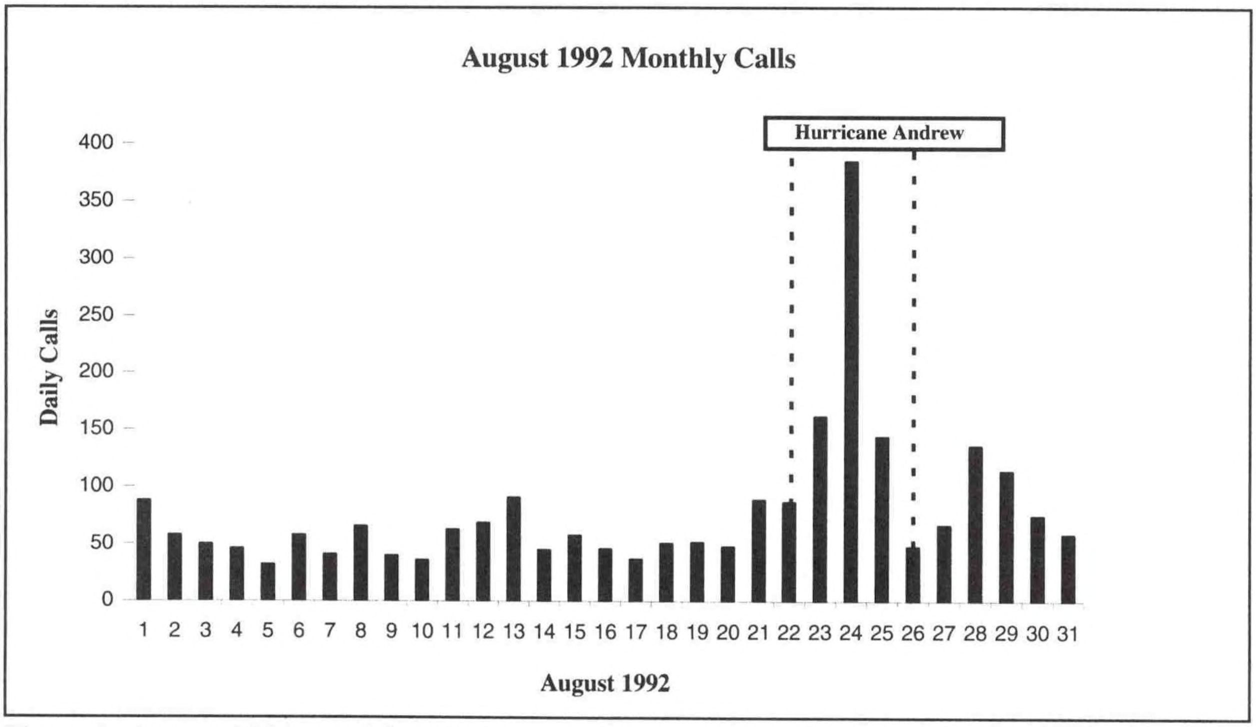


Figure 9. August 1992 monthly calls

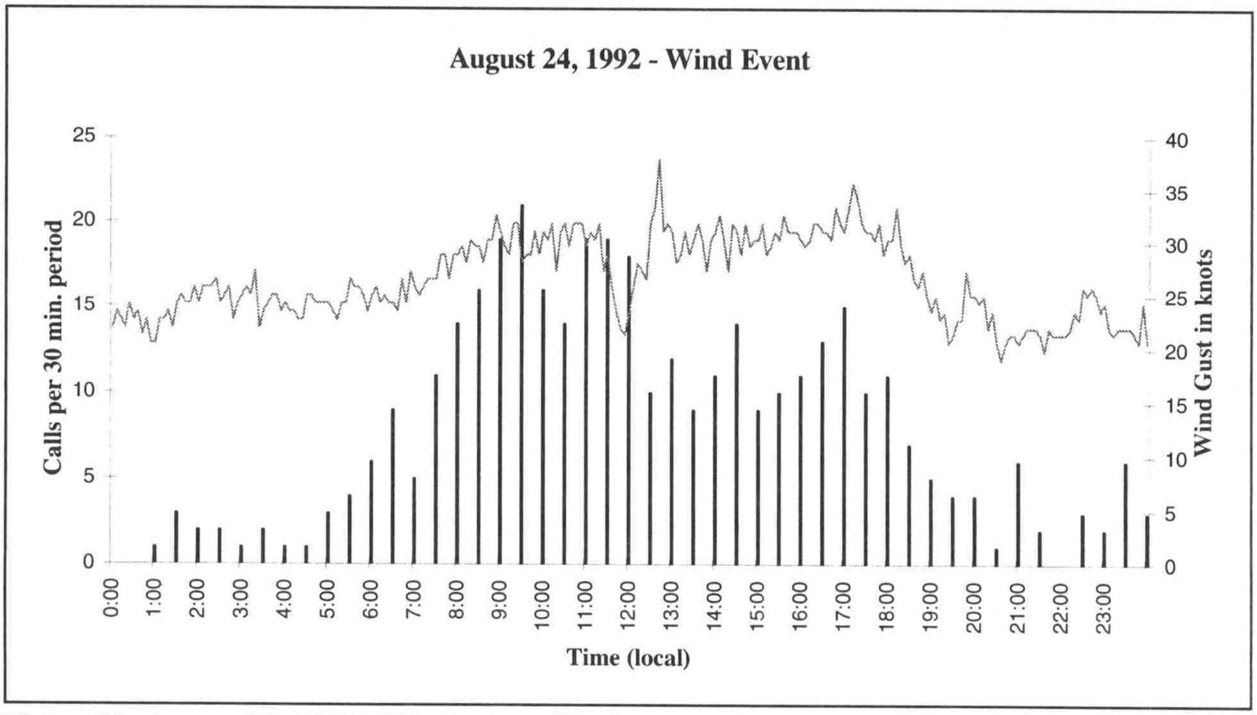


Figure 10. August 24, 1992 - Wind event: Wind speeds and number of calls vs time

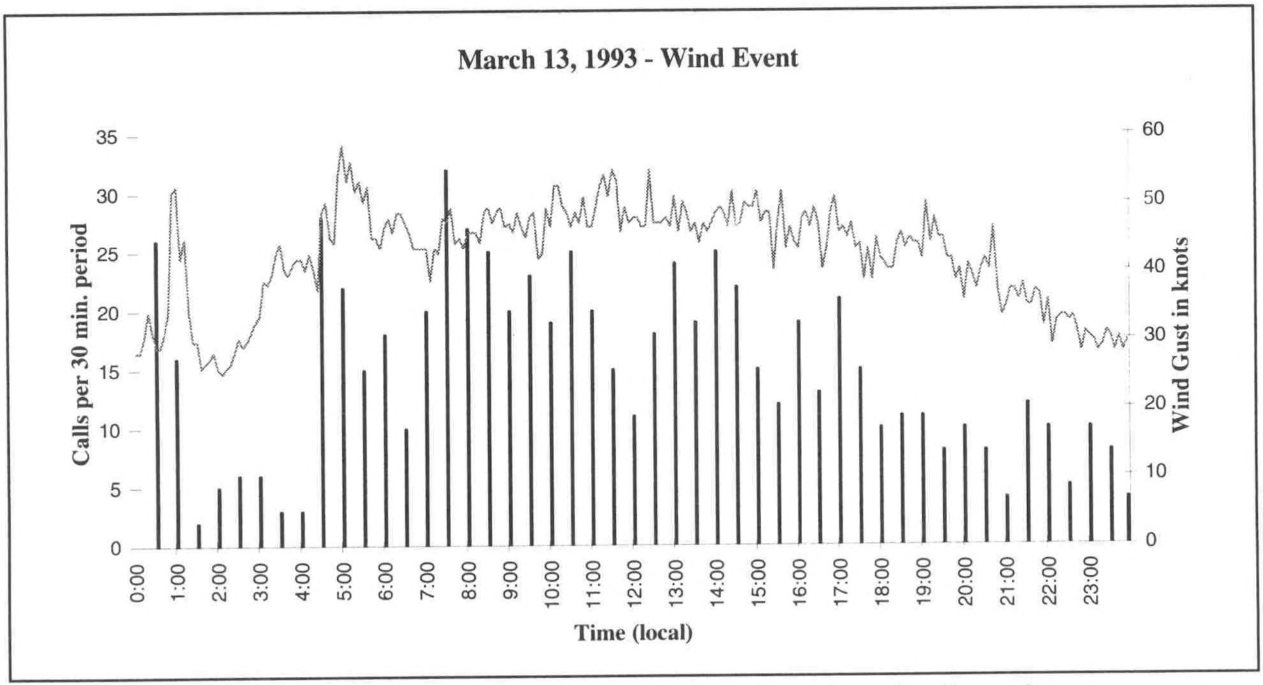


Figure 11. March 13, 1993 - Wind event: Wind speeds and number of calls vs time

Table II. May 1993 - May 1995
Table of Summary Statistics

1992									
Month	*Sample Days*	*Total Calls*	*Minimum*	*Occurred on Day:*	*Maximum*	*Occurred on Day:*	*Mean*	*# Days > 100 Calls*	*% of sample*
May	28	2795	3	21	242	7	99	10	36
June	30	3188	47	1	274	25	106	13	43
July	31	2098	33	29	130	4	67	3	10
August	31	2441	32	5	385	24	78	5	16
September	30	2670	46	23	221	30	89	10	33
October	26	3171	36	30	289	3	121	12	46
November	30	5879	46	23	417	10	195	27	90
December	31	3504	40	21	250	10	113	16	52
Year-End	*Total:*	*Total:*	*Smallest:*		*Largest:*	*Average:*		*Total:*	*Average:*
Statistics	**237**	**25746**	**3**		**417**		**109**	**96**	**41**

1993									
Month	*Sample Days*	*Total Calls*	*Minimum*	*Occurred on Day:*	*Maximum*	*Occurred on Day:*	*Mean*	*# Days > 100 Calls*	*% of sample*
January	28	4820	35	6	392	2	172	19	68
February	28	5677	44	10	337	7	202	21	75
March	31	6142	59	25	711	13	198	22	71
April	30	5416	65	13	404	9	180	21	70
May	31	4421	46	17	294	22	142	21	68
June	30	3183	37	23	291	18	106	12	40
July	29	2020	25	13	156	1	69	4	14
August	31	2812	48	5	176	22	90	11	35
September	30	3226	37	24	390	29	107	12	40
October	26	3680	53	8	434	30	141	13	50
November	30	6067	54	18	378	28	202	24	80
December	31	4876	58	19	351	11	157	19	61
Year-End	*Total:*	*Total:*	*Smallest:*		*Largest:*	*Average:*		*Total:*	*Average:*
Statistics	**355**	**52340**	**25**		**711**		**147**	**199**	**56**

1994									
Month	*Sample Days*	*Total Calls*	*Minimum*	*Occurred on Day:*	*Maximum*	*Occurred on Day:*	*Mean*	*# Days > 100 Calls*	*% of sample*
January	31	5399	28	24	467	3	174	20	65
February	28	5423	62	25	373	18	193	24	86
March	28	5180	1	31	507	2	185	23	82
April	30	4852	65	25	343	9	161	23	77
May	31	4225	49	13	410	20	136	17	55
June	30	3735	42	1	315	24	124	15	50
July	31	3447	42	25	329	3	111	11	35
August	31	3242	32	4	371	14	104	8	26
September	30	3489	30	1	338	30	116	11	37
October	30	4733	46	10	434	2	157	14	47
November	30	6423	74	10	512	13	214	25	83
December	31	5639	53	28	579	11	181	23	74
Year-End	*Total:*	*Total:*	*Smallest:*		*Largest:*	*Average:*		*Total:*	*Average:*
Statistics	**361**	**55787**	**1**		**579**		**155**	**214**	**60**

1995									
Month	*Sample Days*	*Total Calls*	*Minimum*	*Occurred on Day:*	*Maximum*	*Occurred on Day:*	*Mean*	*# Days > 100 Calls*	*% of sample*
January	31	7305	67	10	490	7	235	26	84
February	28	6140	86	14	484	4	219	27	96
March	31	6939	90	16	508	12	223	28	90
April	30	7129	82	19	477	11	237	29	97
May	31	6099	52	30	418	19	196	26	84
Year-End	*Total:*	*Total:*	*Smallest:*		*Largest:*	*Average:*		*Total:*	*Average:*
Statistics	**151**	**33612**	**52**		**508**		**222**	**136**	**90**

response to the wind event of June 25, 1992. Figure 9 focuses on Hurricane Andrew over the period August 22 through the 26, 1992. A 24 hour period is isolated in Figure 10 showing the passage of Andrew. Figure 13 shows the March 13th sample period where the highest daily number of calls occurred.

Real time systems are of course "event driven". Although tracking call totals helps to provide some indication of the volume of callers, it does not indicate under what circumstances the call was made. Was it made during a fast moving and sudden wind event? Was it used to track persons during a search and rescue? Was the caller a recreational boater, just interested in the water temperature? Did the call potentially save lives, provide a shipper with information to take on more cargo or was the call from a wind surfer interested in some recreation? Although all of these callers are important, the VDRS cannot discern between them. In the future, VDRS user surveys may be used to get a better idea of the user community. With some software modifications, this could be done as a menu selection through the existing VDRS. In addition, the market offers various methods exist to track incoming phone numbers that could provide even more detailed information on Tampa's VDRS.

3. REFERENCES

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4. ACKNOWLEDGMENTS

I would like to thank Sun Hahn, who wrote software to reformat the raw voice log files and to calculate the statistics. I would like to thank Michael Evans for his technical input and review and Matthew Lee and John Cassidy for data entry and graphics.

APPENDIX

DETAILED MONTHLY STATISTICAL ANALYSES

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: May   YEAR: 1992

```
SAMPLE DAYS                              :        28

TOTAL NUMBER OF CALLS RECEIVED           :      2795

MINIMUM NUMBER OF CALLS IN ONE DAY       :         3   on  May        21
MAXIMUM NUMBER OF CALLS IN ONE DAY       :       242   on  May         7
AVERAGE NUMBER OF CALLS IN THIS MONTH :           99

FREQUENCY INTERVALS          # OF DAYS THIS MONTH

0       to       100    =      18   ( 64.29% )
101     to       200    =       9   ( 32.14% )
201     to       300    =       1   (  3.57% )
301     to       400    =       0   (   .00% )
> 400                   =       0   (   .00% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =       182    (  6.51% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: June   YEAR: 1992

```
SAMPLE DAYS                              :        30

TOTAL NUMBER OF CALLS RECEIVED           :      3188

MINIMUM NUMBER OF CALLS IN ONE DAY       :        47   on  June        1
MAXIMUM NUMBER OF CALLS IN ONE DAY       :       274   on  June       25
AVERAGE NUMBER OF CALLS IN THIS MONTH :          106

FREQUENCY INTERVALS          # OF DAYS THIS MONTH

0       to       100    =      17   ( 56.67% )
101     to       200    =      11   ( 36.67% )
201     to       300    =       2   (  6.67% )
301     to       400    =       0   (   .00% )
> 400                   =       0   (   .00% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =       162    (  5.08% )
```

```
                                         Statistical Analysis
                              Tampa Bay PORTS: Voice Data Response System
                                 MONTHLY REPORT: Daily Frequencies of Call

                                 MONTH: July            YEAR: 1992


SAMPLE DAYS                                  :          31

TOTAL NUMBER OF CALLS RECEIVED               :        2098

MINIMUM NUMBER OF CALLS IN ONE DAY           :          33   on  July       29
MAXIMUM NUMBER OF CALLS IN ONE DAY           :         130   on  July        4
AVERAGE NUMBER OF CALLS IN THIS MONTH :                 67

FREQUENCY INTERVALS              # OF DAYS THIS MONTH

0        to        100     =        28    ( 90.32% )
101      to        200     =         3    (  9.68% )
201      to        300     =         0    (   .00% )
301      to        400     =         0    (   .00% )
> 400                      =         0    (   .00% )
NUMBER OF CALLS BETWEEN 00 AND 06   (local time)   =       162     (   7.72% )
```

```
                                         Statistical Analysis
                              Tampa Bay PORTS: Voice Data Response System
                                 MONTHLY REPORT: Daily Frequencies of Call

                                 MONTH: August          YEAR: 1992


SAMPLE DAYS                                  :          31

TOTAL NUMBER OF CALLS RECEIVED               :        2441

MINIMUM NUMBER OF CALLS IN ONE DAY           :          32   on  August      5
MAXIMUM NUMBER OF CALLS IN ONE DAY           :         385   on  August     24
AVERAGE NUMBER OF CALLS IN THIS MONTH :                 78

FREQUENCY INTERVALS              # OF DAYS THIS MONTH

0        to        100     =        26    ( 83.87% )
101      to        200     =         4    ( 12.90% )
201      to        300     =         0    (   .00% )
301      to        400     =         1    (  3.23% )
> 400                      =         0    (   .00% )
NUMBER OF CALLS BETWEEN 00 AND 06   (local time)   =       178     (   7.29% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: September YEAR: 1992

```
SAMPLE DAYS                               :           30

TOTAL NUMBER OF CALLS RECEIVED            :         2670

MINIMUM NUMBER OF CALLS IN ONE DAY        :           46    on   September 23
MAXIMUM NUMBER OF CALLS IN ONE DAY        :          221    on   September 30
AVERAGE NUMBER OF CALLS IN THIS MONTH :               89

FREQUENCY INTERVALS             # OF DAYS THIS MONTH

0       to      100     =       20    ( 66.67% )
101     to      200     =        9    ( 30.00% )
201     to      300     =        1    (  3.33% )
301     to      400     =        0    (   .00% )
> 400                   =        0    (   .00% )
NUMBER OF CALLS BETWEEN 00 AND 06   (local time)   =      170     (   6.37% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: October YEAR: 1992

```
SAMPLE DAYS                               :           26

TOTAL NUMBER OF CALLS RECEIVED            :         3171

MINIMUM NUMBER OF CALLS IN ONE DAY        :           36    on   October    30
MAXIMUM NUMBER OF CALLS IN ONE DAY        :          289    on   October     3
AVERAGE NUMBER OF CALLS IN THIS MONTH :              121

FREQUENCY INTERVALS             # OF DAYS THIS MONTH

0       to      100     =       14    ( 53.85% )
101     to      200     =        5    ( 19.23% )
201     to      300     =        7    ( 26.92% )
301     to      400     =        0    (   .00% )
> 400                   =        0    (   .00% )
NUMBER OF CALLS BETWEEN 00 AND 06   (local time)   =      225     (   7.10% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: November   YEAR: 1992

```
SAMPLE DAYS                              :        30

TOTAL NUMBER OF CALLS RECEIVED           :      5879

MINIMUM NUMBER OF CALLS IN ONE DAY       :        46   on  November  23
MAXIMUM NUMBER OF CALLS IN ONE DAY       :       417   on  November  10
AVERAGE NUMBER OF CALLS IN THIS MONTH :          195

FREQUENCY INTERVALS           # OF DAYS THIS MONTH

0       to      100     =       3   ( 10.00% )
101     to      200     =      14   ( 46.67% )
201     to      300     =      11   ( 36.67% )
301     to      400     =       1   (  3.33% )
> 400                   =       1   (  3.33% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =      251    (   4.27% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: December   YEAR: 1992

```
SAMPLE DAYS                              :        31

TOTAL NUMBER OF CALLS RECEIVED           :      3504

MINIMUM NUMBER OF CALLS IN ONE DAY       :        40   on  December  21
MAXIMUM NUMBER OF CALLS IN ONE DAY       :       250   on  December  10
AVERAGE NUMBER OF CALLS IN THIS MONTH :          113

FREQUENCY INTERVALS           # OF DAYS THIS MONTH

0       to      100     =      15   ( 48.39% )
101     to      200     =      12   ( 38.71% )
201     to      300     =       4   ( 12.90% )
301     to      400     =       0   (    .00% )
> 400                   =       0   (    .00% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =      196    (   5.59% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: January   YEAR: 1993

```
SAMPLE DAYS                                :         28

TOTAL NUMBER OF CALLS RECEIVED             :       4820

MINIMUM NUMBER OF CALLS IN ONE DAY         :         35   on  January    6
MAXIMUM NUMBER OF CALLS IN ONE DAY         :        392   on  January    2
AVERAGE NUMBER OF CALLS IN THIS MONTH :             172

FREQUENCY INTERVALS            # OF DAYS THIS MONTH

0        to        100     =        9    ( 32.14% )
101      to        200     =       10    ( 35.71% )
201      to        300     =        5    ( 17.86% )
301      to        400     =        4    ( 14.29% )
> 400                      =        0    (    .00% )
NUMBER OF CALLS BETWEEN 00 AND 06   (local time)   =       261    (  5.41% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: February   YEAR: 1993

```
SAMPLE DAYS                                :         28

TOTAL NUMBER OF CALLS RECEIVED             :       5677

MINIMUM NUMBER OF CALLS IN ONE DAY         :         44   on  February  10
MAXIMUM NUMBER OF CALLS IN ONE DAY         :        337   on  February   7
AVERAGE NUMBER OF CALLS IN THIS MONTH :             202

FREQUENCY INTERVALS            # OF DAYS THIS MONTH

0        to        100     =        7    ( 25.00% )
101      to        200     =        5    ( 17.86% )
201      to        300     =       12    ( 42.86% )
301      to        400     =        4    ( 14.29% )
> 400                      =        0    (    .00% )
NUMBER OF CALLS BETWEEN 00 AND 06   (local time)   =       258    (  4.54% )
```

```
                               Statistical Analysis
                      Tampa Bay PORTS: Voice Data Response System
                        MONTHLY REPORT: Daily Frequencies of Call

                         MONTH: March          YEAR: 1993


SAMPLE DAYS                                :          31

TOTAL NUMBER OF CALLS RECEIVED             :        6142

MINIMUM NUMBER OF CALLS IN ONE DAY         :          59   on  March      25
MAXIMUM NUMBER OF CALLS IN ONE DAY         :         711   on  March      13
AVERAGE NUMBER OF CALLS IN THIS MONTH      :         198

FREQUENCY INTERVALS          # OF DAYS THIS MONTH

0       to       100     =      9   ( 29.03% )
101     to       200     =     11   ( 35.48% )
201     to       300     =      6   ( 19.35% )
301     to       400     =      2   (  6.45% )
> 400                    =      3   (  9.68% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =      378    (   6.15% )
```

```
                               Statistical Analysis
                      Tampa Bay PORTS: Voice Data Response System
                        MONTHLY REPORT: Daily Frequencies of Call

                         MONTH: April          YEAR: 1993


SAMPLE DAYS                                :          30

TOTAL NUMBER OF CALLS RECEIVED             :        5416

MINIMUM NUMBER OF CALLS IN ONE DAY         :          65   on  April      13
MAXIMUM NUMBER OF CALLS IN ONE DAY         :         404   on  April       9
AVERAGE NUMBER OF CALLS IN THIS MONTH      :         180

FREQUENCY INTERVALS          # OF DAYS THIS MONTH

0       to       100     =      9   ( 30.00% )
101     to       200     =     10   ( 33.33% )
201     to       300     =      5   ( 16.67% )
301     to       400     =      5   ( 16.67% )
> 400                    =      1   (  3.33% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =      332    (   6.13% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: May YEAR: 1993

```
SAMPLE DAYS                              :        31

TOTAL NUMBER OF CALLS RECEIVED           :      4421

MINIMUM NUMBER OF CALLS IN ONE DAY       :        46   on   May         17
MAXIMUM NUMBER OF CALLS IN ONE DAY       :       294   on   May         22
AVERAGE NUMBER OF CALLS IN THIS MONTH :          142

FREQUENCY INTERVALS           # OF DAYS THIS MONTH

0      to       100     =       10   ( 32.26% )
101    to       200     =       17   ( 54.84% )
201    to       300     =        4   ( 12.90% )
301    to       400     =        0   (    .00% )
> 400                   =        0   (    .00% )
NUMBER OF CALLS BETWEEN 00 AND 06   (local time)   =       385    (  8.71% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: June YEAR: 1993

```
SAMPLE DAYS                              :        30

TOTAL NUMBER OF CALLS RECEIVED           :      3183

MINIMUM NUMBER OF CALLS IN ONE DAY       :        37   on   June        23
MAXIMUM NUMBER OF CALLS IN ONE DAY       :       291   on   June        18
AVERAGE NUMBER OF CALLS IN THIS MONTH :          106

FREQUENCY INTERVALS           # OF DAYS THIS MONTH

0      to       100     =       18   ( 60.00% )
101    to       200     =        9   ( 30.00% )
201    to       300     =        3   ( 10.00% )
301    to       400     =        0   (    .00% )
> 400                   =        0   (    .00% )
NUMBER OF CALLS BETWEEN 00 AND 06   (local time)   =       340    ( 10.68% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: July YEAR: 1993

```
SAMPLE DAYS                              :          29

TOTAL NUMBER OF CALLS RECEIVED           :        2020

MINIMUM NUMBER OF CALLS IN ONE DAY       :          25    on   July         13
MAXIMUM NUMBER OF CALLS IN ONE DAY       :         156    on   July          1
AVERAGE NUMBER OF CALLS IN THIS MONTH :             69

FREQUENCY INTERVALS              # OF DAYS THIS MONTH

0       to        100     =       25    ( 86.21% )
101     to        200     =        4    ( 13.79% )
201     to        300     =        0    (    .00% )
301     to        400     =        0    (    .00% )
> 400                     =        0    (    .00% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)   =        206    ( 10.20% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: August YEAR: 1993

```
SAMPLE DAYS                              :          31

TOTAL NUMBER OF CALLS RECEIVED           :        2812

MINIMUM NUMBER OF CALLS IN ONE DAY       :          48    on   August        5
MAXIMUM NUMBER OF CALLS IN ONE DAY       :         176    on   August       22
AVERAGE NUMBER OF CALLS IN THIS MONTH :             90

FREQUENCY INTERVALS              # OF DAYS THIS MONTH

0       to        100     =       20    ( 64.52% )
101     to        200     =       11    ( 35.48% )
201     to        300     =        0    (    .00% )
301     to        400     =        0    (    .00% )
> 400                     =        0    (    .00% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)   =        242    (  8.61% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: September YEAR: 1993

```
SAMPLE DAYS                              :        30

TOTAL NUMBER OF CALLS RECEIVED           :      3226

MINIMUM NUMBER OF CALLS IN ONE DAY       :        37    on   September 24
MAXIMUM NUMBER OF CALLS IN ONE DAY       :       390    on   September 29
AVERAGE NUMBER OF CALLS IN THIS MONTH :          107

FREQUENCY INTERVALS            # OF DAYS THIS MONTH

0       to       100     =       18    ( 60.00% )
101     to       200     =       10    ( 33.33% )
201     to       300     =        1    (  3.33% )
301     to       400     =        1    (  3.33% )
> 400                    =        0    (   .00% )
NUMBER OF CALLS BETWEEN 00 AND 06   (local time)   =       317    (  9.83% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: October YEAR: 1993

```
SAMPLE DAYS                              :        26

TOTAL NUMBER OF CALLS RECEIVED           :      3680

MINIMUM NUMBER OF CALLS IN ONE DAY       :        53    on   October     8
MAXIMUM NUMBER OF CALLS IN ONE DAY       :       434    on   October    30
AVERAGE NUMBER OF CALLS IN THIS MONTH :          141

FREQUENCY INTERVALS            # OF DAYS THIS MONTH

0       to       100     =       13    ( 50.00% )
101     to       200     =        9    ( 34.62% )
201     to       300     =        3    ( 11.54% )
301     to       400     =        0    (   .00% )
> 400                    =        1    (  3.85% )
NUMBER OF CALLS BETWEEN 00 AND 06   (local time)   =       351    (  9.54% )
```

```
                              Statistical Analysis
                 Tampa Bay PORTS: Voice Data Response System
                   MONTHLY REPORT: Daily Frequencies of Call

                    MONTH: November      YEAR: 1993


SAMPLE DAYS                                 :         30

TOTAL NUMBER OF CALLS RECEIVED              :       6067

MINIMUM NUMBER OF CALLS IN ONE DAY          :         54   on  November  18
MAXIMUM NUMBER OF CALLS IN ONE DAY          :        378   on  November  28
AVERAGE NUMBER OF CALLS IN THIS MONTH       :        202

FREQUENCY INTERVALS           # OF DAYS THIS MONTH

0       to      100     =      6   ( 20.00% )
101     to      200     =      9   ( 30.00% )
201     to      300     =      9   ( 30.00% )
301     to      400     =      6   ( 20.00% )
> 400                   =      0   (    .00% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =      360    (  5.93% )
```

```
                              Statistical Analysis
                 Tampa Bay PORTS: Voice Data Response System
                   MONTHLY REPORT: Daily Frequencies of Call

                    MONTH: December      YEAR: 1993


SAMPLE DAYS                                 :         31

TOTAL NUMBER OF CALLS RECEIVED              :       4876

MINIMUM NUMBER OF CALLS IN ONE DAY          :         58   on  December  19
MAXIMUM NUMBER OF CALLS IN ONE DAY          :        351   on  December  11
AVERAGE NUMBER OF CALLS IN THIS MONTH       :        157

FREQUENCY INTERVALS           # OF DAYS THIS MONTH

0       to      100     =     12   ( 38.71% )
101     to      200     =     10   ( 32.26% )
201     to      300     =      5   ( 16.13% )
301     to      400     =      4   ( 12.90% )
> 400                   =      0   (    .00% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =      374    (  7.67% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: January   YEAR: 1994

```
SAMPLE DAYS                              :         31

TOTAL NUMBER OF CALLS RECEIVED           :       5399

MINIMUM NUMBER OF CALLS IN ONE DAY       :         28   on  January    24
MAXIMUM NUMBER OF CALLS IN ONE DAY       :        467   on  January     3
AVERAGE NUMBER OF CALLS IN THIS MONTH :           174

FREQUENCY INTERVALS            # OF DAYS THIS MONTH

0       to       100     =        11    ( 35.48% )
101     to       200     =        10    ( 32.26% )
201     to       300     =         4    ( 12.90% )
301     to       400     =         5    ( 16.13% )
> 400                    =         1    (  3.23% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =        347    (   6.43% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: February   YEAR: 1994

```
SAMPLE DAYS                              :         28

TOTAL NUMBER OF CALLS RECEIVED           :       5423

MINIMUM NUMBER OF CALLS IN ONE DAY       :         62   on  February   25
MAXIMUM NUMBER OF CALLS IN ONE DAY       :        373   on  February   18
AVERAGE NUMBER OF CALLS IN THIS MONTH :           193

FREQUENCY INTERVALS            # OF DAYS THIS MONTH

0       to       100     =         4    ( 14.29% )
101     to       200     =        13    ( 46.43% )
201     to       300     =         7    ( 25.00% )
301     to       400     =         4    ( 14.29% )
> 400                    =         0    (    .00% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =        336    (   6.20% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: March   YEAR: 1994

```
SAMPLE DAYS                            :        28

TOTAL NUMBER OF CALLS RECEIVED         :      5180

MINIMUM NUMBER OF CALLS IN ONE DAY     :         1   on  March      31
MAXIMUM NUMBER OF CALLS IN ONE DAY     :       507   on  March       2
AVERAGE NUMBER OF CALLS IN THIS MONTH :       185

FREQUENCY INTERVALS            # OF DAYS THIS MONTH

0       to        100     =        5    ( 17.86% )
101     to        200     =       13    ( 46.43% )
201     to        300     =        6    ( 21.43% )
301     to        400     =        2    (  7.14% )
> 400                     =        2    (  7.14% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =      359    (  6.93% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: April   YEAR: 1994

```
SAMPLE DAYS                            :        30

TOTAL NUMBER OF CALLS RECEIVED         :      4852

MINIMUM NUMBER OF CALLS IN ONE DAY     :        65   on  April      25
MAXIMUM NUMBER OF CALLS IN ONE DAY     :       343   on  April       9
AVERAGE NUMBER OF CALLS IN THIS MONTH :       161

FREQUENCY INTERVALS            # OF DAYS THIS MONTH

0       to        100     =        7    ( 23.33% )
101     to        200     =       15    ( 50.00% )
201     to        300     =        7    ( 23.33% )
301     to        400     =        1    (  3.33% )
> 400                     =        0    (   .00% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =      318    (  6.55% )
```

```
                                       Statistical Analysis
                             Tampa Bay PORTS: Voice Data Response System
                                MONTHLY REPORT: Daily Frequencies of Call

                                MONTH: May           YEAR: 1994


SAMPLE DAYS                                :         31

TOTAL NUMBER OF CALLS RECEIVED             :       4225

MINIMUM NUMBER OF CALLS IN ONE DAY         :         49   on   May          13
MAXIMUM NUMBER OF CALLS IN ONE DAY         :        410   on   May          20
AVERAGE NUMBER OF CALLS IN THIS MONTH      :        136

FREQUENCY INTERVALS           # OF DAYS THIS MONTH

0       to       100     =      14   ( 45.16% )
101     to       200     =      15   ( 48.39% )
201     to       300     =       0   (    .00% )
301     to       400     =       1   (  3.23% )
> 400                    =       1   (  3.23% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)   =       211    (   4.99% )
```

```
                                       Statistical Analysis
                             Tampa Bay PORTS: Voice Data Response System
                                MONTHLY REPORT: Daily Frequencies of Call

                                MONTH: June          YEAR: 1994


SAMPLE DAYS                                :         30

TOTAL NUMBER OF CALLS RECEIVED             :       3735

MINIMUM NUMBER OF CALLS IN ONE DAY         :         42   on   June          1
MAXIMUM NUMBER OF CALLS IN ONE DAY         :        315   on   June         24
AVERAGE NUMBER OF CALLS IN THIS MONTH      :        124

FREQUENCY INTERVALS           # OF DAYS THIS MONTH

0       to       100     =      15   ( 50.00% )
101     to       200     =      11   ( 36.67% )
201     to       300     =       3   ( 10.00% )
301     to       400     =       1   (  3.33% )
> 400                    =       0   (    .00% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)   =       208    (   5.57% )
```

```
                         Statistical Analysis
              Tampa Bay PORTS: Voice Data Response System
                MONTHLY REPORT: Daily Frequencies of Call

                MONTH: July            YEAR: 1994


SAMPLE DAYS                                 :        31

TOTAL NUMBER OF CALLS RECEIVED              :      3447

MINIMUM NUMBER OF CALLS IN ONE DAY          :        42   on  July      25
MAXIMUM NUMBER OF CALLS IN ONE DAY          :       329   on  July       3
AVERAGE NUMBER OF CALLS IN THIS MONTH :             111

FREQUENCY INTERVALS              # OF DAYS THIS MONTH

0        to        100    =       20   ( 64.52% )
101      to        200    =        7   ( 22.58% )
201      to        300    =        3   (  9.68% )
301      to        400    =        1   (  3.23% )
> 400                     =        0   (   .00% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =      274    (  7.95% )


                         Statistical Analysis
              Tampa Bay PORTS: Voice Data Response System
                MONTHLY REPORT: Daily Frequencies of Call

                MONTH: August          YEAR: 1994


SAMPLE DAYS                                 :        31

TOTAL NUMBER OF CALLS RECEIVED              :      3242

MINIMUM NUMBER OF CALLS IN ONE DAY          :        32   on  August     4
MAXIMUM NUMBER OF CALLS IN ONE DAY          :       371   on  August    14
AVERAGE NUMBER OF CALLS IN THIS MONTH :             104

FREQUENCY INTERVALS              # OF DAYS THIS MONTH

0        to        100    =       23   ( 74.19% )
101      to        200    =        3   (  9.68% )
201      to        300    =        3   (  9.68% )
301      to        400    =        2   (  6.45% )
> 400                     =        0   (   .00% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =      187    (  5.77% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: September YEAR: 1994

```
SAMPLE DAYS                               :        30

TOTAL NUMBER OF CALLS RECEIVED            :      3489

MINIMUM NUMBER OF CALLS IN ONE DAY        :        30   on  September  1
MAXIMUM NUMBER OF CALLS IN ONE DAY        :       338   on  September 30
AVERAGE NUMBER OF CALLS IN THIS MONTH :           116

FREQUENCY INTERVALS           # OF DAYS THIS MONTH

0       to        100     =       19    ( 63.33% )
101     to        200     =        6    ( 20.00% )
201     to        300     =        3    ( 10.00% )
301     to        400     =        2    (  6.67% )
> 400                     =        0    (   .00% )
NUMBER OF CALLS BETWEEN 00 AND 06   (local time)   =       185     (  5.30% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: October YEAR: 1994

```
SAMPLE DAYS                               :        30

TOTAL NUMBER OF CALLS RECEIVED            :      4733

MINIMUM NUMBER OF CALLS IN ONE DAY        :        46   on  October   10
MAXIMUM NUMBER OF CALLS IN ONE DAY        :       434   on  October    2
AVERAGE NUMBER OF CALLS IN THIS MONTH :           157

FREQUENCY INTERVALS           # OF DAYS THIS MONTH

0       to        100     =       16    ( 53.33% )
101     to        200     =        4    ( 13.33% )
201     to        300     =        4    ( 13.33% )
301     to        400     =        5    ( 16.67% )
> 400                     =        1    (  3.33% )
NUMBER OF CALLS BETWEEN 00 AND 06   (local time)   =       279     (  5.89% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: November   YEAR: 1994

```
SAMPLE DAYS                                 :         30

TOTAL NUMBER OF CALLS RECEIVED              :       6423

MINIMUM NUMBER OF CALLS IN ONE DAY          :         74   on  November  10
MAXIMUM NUMBER OF CALLS IN ONE DAY          :        512   on  November  13
AVERAGE NUMBER OF CALLS IN THIS MONTH :              214

FREQUENCY INTERVALS            # OF DAYS THIS MONTH

0       to        100     =        5   ( 16.67% )
101     to        200     =       10   ( 33.33% )
201     to        300     =       10   ( 33.33% )
301     to        400     =        1   (  3.33% )
> 400                     =        4   ( 13.33% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)   =        346    (   5.39% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: December   YEAR: 1994

```
SAMPLE DAYS                                 :         31

TOTAL NUMBER OF CALLS RECEIVED              :       5639

MINIMUM NUMBER OF CALLS IN ONE DAY          :         53   on  December  28
MAXIMUM NUMBER OF CALLS IN ONE DAY          :        579   on  December  11
AVERAGE NUMBER OF CALLS IN THIS MONTH :              181

FREQUENCY INTERVALS            # OF DAYS THIS MONTH

0       to        100     =        8   ( 25.81% )
101     to        200     =       12   ( 38.71% )
201     to        300     =        7   ( 22.58% )
301     to        400     =        3   (  9.68% )
> 400                     =        1   (  3.23% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)   =        319    (   5.66% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: January YEAR: 1995

```
SAMPLE DAYS                              :          31

TOTAL NUMBER OF CALLS RECEIVED           :        7305

MINIMUM NUMBER OF CALLS IN ONE DAY       :          67   on  January   10
MAXIMUM NUMBER OF CALLS IN ONE DAY       :         490   on  January    7
AVERAGE NUMBER OF CALLS IN THIS MONTH :            235

FREQUENCY INTERVALS             # OF DAYS THIS MONTH

0       to      100     =       5   ( 16.13% )
101     to      200     =       9   ( 29.03% )
201     to      300     =       7   ( 22.58% )
301     to      400     =       5   ( 16.13% )
> 400                   =       5   ( 16.13% )
NUMBER OF CALLS BETWEEN 00 AND 06   (local time)   =       348    (  4.76% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: February YEAR: 1995

```
SAMPLE DAYS                              :          28

TOTAL NUMBER OF CALLS RECEIVED           :        6140

MINIMUM NUMBER OF CALLS IN ONE DAY       :          86   on  February  14
MAXIMUM NUMBER OF CALLS IN ONE DAY       :         484   on  February   4
AVERAGE NUMBER OF CALLS IN THIS MONTH :            219

FREQUENCY INTERVALS             # OF DAYS THIS MONTH

0       to      100     =       1   (  3.57% )
101     to      200     =      15   ( 53.57% )
201     to      300     =       7   ( 25.00% )
301     to      400     =       2   (  7.14% )
> 400                   =       3   ( 10.71% )
NUMBER OF CALLS BETWEEN 00 AND 06   (local time)   =       312    (  5.08% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: March YEAR: 1995

```
SAMPLE DAYS                                  :        31

TOTAL NUMBER OF CALLS RECEIVED               :      6939

MINIMUM NUMBER OF CALLS IN ONE DAY           :        90    on   March      16
MAXIMUM NUMBER OF CALLS IN ONE DAY           :       508    on   March      12
AVERAGE NUMBER OF CALLS IN THIS MONTH        :       223

FREQUENCY INTERVALS           # OF DAYS THIS MONTH

0       to       100    =      3   (  9.68% )
101     to       200    =     14   ( 45.16% )
201     to       300    =      5   ( 16.13% )
301     to       400    =      7   ( 22.58% )
> 400                   =      2   (  6.45% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =      349    (  5.03% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: April YEAR: 1995

```
SAMPLE DAYS                                  :        30

TOTAL NUMBER OF CALLS RECEIVED               :      7129

MINIMUM NUMBER OF CALLS IN ONE DAY           :        82    on   April      19
MAXIMUM NUMBER OF CALLS IN ONE DAY           :       477    on   April      11
AVERAGE NUMBER OF CALLS IN THIS MONTH        :       237

FREQUENCY INTERVALS           # OF DAYS THIS MONTH

0       to       100    =      1   (  3.33% )
101     to       200    =     12   ( 40.00% )
201     to       300    =     12   ( 40.00% )
301     to       400    =      2   (  6.67% )
> 400                   =      3   ( 10.00% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =      378    (  5.30% )
```

Statistical Analysis
Tampa Bay PORTS: Voice Data Response System
MONTHLY REPORT: Daily Frequencies of Call

MONTH: May **YEAR: 1995**

```
SAMPLE DAYS                              :          31

TOTAL NUMBER OF CALLS RECEIVED           :        6099

MINIMUM NUMBER OF CALLS IN ONE DAY       :          52   on   May          30
MAXIMUM NUMBER OF CALLS IN ONE DAY       :         418   on   May          19
AVERAGE NUMBER OF CALLS IN THIS MONTH :            196

FREQUENCY INTERVALS           # OF DAYS THIS MONTH

0      to      100     =        5   ( 16.13% )
101    to      200     =       15   ( 48.39% )
201    to      300     =        7   ( 22.58% )
301    to      400     =        3   (  9.68% )
> 400                  =        1   (  3.23% )
NUMBER OF CALLS BETWEEN 00 AND 06  (local time)  =       314    (  5.15% )
```